

Psychosocial risk exposure and mental health outcomes of European workers with low socioeconomic status

Literature Review

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List of Abbreviations

AFBS	Accommodation and Food & Beverage Services
CI	Confidence Interval (statistics)
COVID-19	Coronavirus disease 2019 (SARS-CoV-2)
DARES	Direction de l'Animation de la Recherche, des Études et des Statistiques (FR)
EC	European Commission
EESC	European Economic and Social Committee
EPSU	European Public Service Union
ESENER	European Survey of Enterprises on New and Emerging Risks
EU	European Union
EU-OSHA	European Agency for Safety and Health at Work
Eurofound	European Foundation for the Improvement of Living and Working Conditions
EWCS	European Working Conditions Survey
HCW	Home Healthcare Worker
Horeca	Hotels, Restaurants and Catering
HSA	Health & Safety Authority (IE)
HSES	High Socioeconomic Status
ICT	Information and Communication Technologies
ICT-ET	ICT-Enabled Technologies
ILO	International Labour Organisation
LSES	Low Socioeconomic Status
MSD	Musculoskeletal Disorder
OSH	Occupational Safety and Health
PSR	Psychosocial Risk
PTSD	Post-Traumatic Stress Disorder
SA	Sickness Absence
SES	Socioeconomic Status
SLR	Scoping Literature Review
SME	Small and Medium-sized Enterprise
UWSA	Unwanted Sexual Attention
WHO	World Health Organisation
WHP	Workplace Health Promotion

Executive summary

The specialised literature has been increasingly dealing with the implications of psychosocial risk (PSR) factors and corresponding mental health outcomes in employment. Previous research has often focused either on holistic working population or sectoral overviews of selected industries or occupations. However, there is a relative paucity of studies investigating specifically the most vulnerable social groups particularly exposed to PSRs, such as low-skilled or low-paid workers. Notwithstanding, preliminary evidence seems to indicate that this category may well be vulnerable to higher exposure. Therefore, to fill this knowledge gap, it is the main objective of this scoping review to provide an exploratory literature overview of the associations between PSR exposure and mental health outcomes of European workers with low socioeconomic status (hereafter referred to as LSES workers).

In the context of this study, **external trends** with the capacity to change the structure of work or even alter job quality and stability have also been taken into account. Specific effects associated with the **recent experience of the pandemic** and the technological developments induced by **digitalisation** are acknowledged as strong external trends with the capacity to affect working conditions and the occurrence of PSRs for LSES workers.

A further challenge of the study was also implicit in the operationalisation of the LSES category of workers for applied research, since it lacks a true consensual definition among scholars. Accordingly, this review required the development of **a broad operational definition of LSES workers** that includes: *a.* results directly associated with socioeconomic and sociodemographic status of workers; *b.* results associated with industry sectors and occupations potentially holding large shares of LSES workers; and *c.* results associated with quality of employment when these could help identify LSES workers. The results of the literature review are therefore presented through these categories.

The set of results is then accompanied by a selection of **10 good practices** detailing successful interventions in organisations that improved the management of PSRs in the workplace for potentially LSES employees, giving a broad coverage considering a balance among geographical and sectoral balance, organisation's size, typologies of stakeholders involved, typology of LSES targeted workers and typology of interventions.

Below a short summary on the results on PSRs occurrence and adverse mental health outcomes of European LSES workers is given, highlighting the main points:

1. The first category refers to results associated with socioeconomic, sociodemographic and occupational status. On the one side, the results focused on employees **acknowledged as LSES** through different indicators (e.g. income, education levels), classified under **manual occupations** or even under **low and unskilled occupations**. The analysis also included a focus on the two trends via discussion of **essential/frontline workers** and **gig economy workers**. On the other side, the sociodemographic nature of vulnerable groups of workers is assessed, establishing a **connection with their LSES dimension**.
 - Results are looked at considering gender differences for LSES as well as targeting **young and migrant workers**. A transversal reading of these results confirms the argument provided by the **interpretation of the effort–reward model** — whereby high job demands are not compensated by adequate job rewards — while placing even greater **emphasis for LSES workers on matters of job and income insecurity** as a further stressor among work factors that can be understood as a lack of reward. Certain vulnerable categories can also be exposed to additional specific factors that can worsen PSRs' effect on outcomes (e.g. gender segregation in labour market and additional household responsibility for women; workplace discrimination for migrants).
 - For what concerns outcomes, the main adverse mental health issue observed is a **decrease of mental health and wellbeing in general**. In addition **depression also represents a recurring outcome** across the various facets of the literature.
2. In the second category — results associated with work design and social interactions in the workplace for **industry sectors with large shares of LSES workers** — the focus is entirely provided on lower skilled and/or lower educated occupations in a broad selection of industry sectors.

For the sake of the analysis, results are divided across two conceptual categories: a. professional sectors whose typology of work execution has **a focus on users/clients/patients/customers**; and b. industry sectors with **a higher focus on manual occupations**.

- Transversal reading of the results across the various industry sectors reveals that LSES of the worker may not be the best focus for distinguishing common features in the PSRs/mental health outcomes debate. **Each sector displays a series of mechanisms and demands essential for the development of work tasks** (e.g. emotional demands required when interacting with third parties; physical workload associated with manual-oriented occupations). In addition, certain sectors and sub-professions display a greater concentration of workers' groups (e.g. female and migrant workers in domestic care, male ones for construction bricklayers). Notwithstanding, the two different focuses in the sectors allow for some degree of generalisation.
 - When looking at sectors with a **focus on users/patients/customers**, across the findings the most frequent PSRs studied for their association with mental health outcomes are the ones relative to **interactions with third parties**. Third party violence — mostly psychosocial as in the case of verbal aggression, but in some cases even physical in face-to-face services — is a strong recurring risk factor. Emotional dissonance and the obligation to 'deliver service with a smile' is another recurring risk in the studies. In addition, **lack of organisational support** was also observed across multiple sources and sectors in this classification as an important risk.
 - Transversal reading of findings with a **focus on manual occupations** reveals a more limited capacity for generalisation. However, it is broadly possible to notice a recurring presence **of high job demands in terms of work intensity** (including, for example, excessive workload and physical load). In this regard, a systematic review of the literature in construction even concluded that high job demands were more responsible than lack of job resources for the appearance of mental health issues (e.g. Sun et al., 2022). Notwithstanding, **low job rewards** with a particular emphasis in some sectors on the lack of promotion opportunities also appear as a recurring risk factor. No strong general outcome is observed through the results of all sectors. However, **stress, anxiety and depression** seemingly appear as the most cited outcomes overall across this second conceptual category.
3. Lastly, in the third category — **results associated with quality of employment** — the analysis focused on the one side on individuals holding a persistent or transitory state across low-quality employment or who experienced downward mobility in their career and on the other on employees in non-standard work arrangements (e.g. temporary and temporary agency workers, part-time workers in involuntary or marginal status, vulnerable independent and self-employed workers).
- As expected, the nature of the studies considered for this LSES dimension returns a transversal focus on **job insecurity, income insecurity and job precariousness** as the most frequent PSRs for workers in low quality of employment. It is however important to clarify that through literature evidence in this section — frequently associating LSES with workers holding these contractual conditions — the necessity **to consider matters of contractual stability and financial strain** for European workers is unveiled when discussing PSRs and mental health outcomes.
 - Overall, the analysis of mental effects reveals **much more frequent mentioning of depression for workers in low or precarious professional trajectories**. Less clear is the extent of mental health issues for non-standard work arrangements, but sufficient evidence is gathered for confirming **a worsening of health and wellbeing for workers under non-standard employment conditions**.

Finally, the results singled out the unexpectedly scattered **evidence on the exogenous drivers signalled for this research (COVID-19 and digitalisation)**.

- For the experience of the **COVID-19 pandemic**, this may be occurring since studies accounting for PSR factors connected to the virus spread and the lockdowns were at this stage mostly focused on higher SES health and care analyses (i.e. health professionals) or for teleworkable occupations. Another explanation may be that at the time of data collection other studies were still in the making and awaiting peer review approval. Studies on essential/frontline workers (and in one case, specifically dedicated to cleaners) were the strongest evidence gathered throughout the review that confirmed the worsening of working conditions and wellbeing.

- A second surprising finding of the research was **the strong lack of research exploring the impact of digitalisation on European workers'** PSRs exposure and mental health outcomes, particularly for LSES individuals.
- In terms of the results in this review, the most evident occupation embedded in a context of work **platformisation was the one associated with gig workers**. Two results from **the manufacturing sector** tackled digitalisation either explicitly (Wixted et al., 2018 with a sample of blue-collar workers in highly automated factories) or implicitly (Koukoulaki, 2014 including automation in the wider context of lean production). Mentions of digitalisation challenges are also present in the literature dedicated **to call centre workers** and for the future of the **agricultural sector**.

The study also allowed to extract some relevant evidence regarding mediating and protective factors with the potential to either **increase or moderate the extent of adverse health outcomes** on LSES workers.

- The findings reinforced the idea that **sociodemographic and socioeconomic indicators do play a role in how PSRs exposure effect the worker (they mediate the effect)**, as in the case of **gender** (e.g. the still remaining 'male breadwinner' cultural paradigm for LSES men, the gender segregation of labour market for LSES women). Frequent mention is also made to worker age, with particular emphasis on increased **vulnerability to PSRs exposure of young workers**. In turn, **migrant status** can condition additional vulnerability to job **insecurity and precariousness** alongside an increased exposure to **discrimination** when compared to local workers (Diaz-Bretones et al., 2020).
- Lastly, multiple argumentations associated either directly with LSES, low-skilled and manual occupations or those looking at job precarity and non-standard employment relationships have all confirmed that increased contractual instability (e.g. precarity, job insecurity) and financial strain (e.g. income insecurity) can also increase the gravity of other PSRs exposure and contribute to decreased wellbeing.
- Evidence for LSES workers seems to suggest that work-related factors contribute more than lifestyle factors to worse self-reported health (Dieker et al., 2019). In accordance with this, in the identified literature it is possible to find suggested **adjustments of work features** from job design, management and social relations that could act as protective factors against the development of adverse mental health. These include: **a. improving organisational support** (both among colleagues and supervisors), which is greatly seen as beneficial across most sectors oriented towards interaction with users/customers/patients; **b. reducing job demands**, since evidence from construction indicated for this type of manual occupation that high job demands tend to globally imply more adverse mental health implications compared to low job resources; **c. improving work-life balance** of workers, for instance by developing a series of targeted actions aimed at simplifying the management and balancing of household and work demands (e.g. flexible working patterns); **d. providing 'active jobs'**, holding **high job control when facing high demands** is considered as a protective factor against suicide risks for low/unskilled workers (Greiner and Arensman, 2022); **e. developing job engagement**, which was found as a strong protective factor against adverse outcomes, particularly for certain sectors (e.g. domestic care by Geisler et al., 2019; mining and manufacturing, via Mościcka-Teske et al., 2019 and Porru et al., 2014).

Based upon the study's overall findings the research team have pointed out a series of **lessons learned for PSRs' prevention, management and intervention**:

- Gathering an in-depth understanding of the **specificities of each industry sector**, type of work, activity and group of workers is a precondition to be aware of what needs to be tackled to reduce PSRs exposure.
- **Encouraging worker involvement**: On the one side, social partners' dialogue can stimulate worker representation and foster occupational safety and health (OSH) practices. On the other, emphasis is stressed on participatory practices that increase communication and encourage workers to outvoice concerns so as to improve organisational support, social relations at work and job engagement, making sure that LSES groups of workers are included.
- **Following a proper PSR prevention approach**, encompassing PSRs assessment and adequate follow-up measures as well as regular revision of the whole process and its impact,

is essential for ensuring good psychosocial working conditions in all establishments. This should include (among others) measures directed at the organisation of workload, the improvement of work–life balance, and a proactive approach against workplace bullying, harassment and discrimination, as well as providing specific training according to the nature of PSR exposure.

- **Engaging in mental health promotion:** Even if an employer does not perceive an immediate danger for the workers, there are still a series of preventive activities that can be undertaken to ensure the sustainability of a healthy psychosocial work environment, such as awareness-raising activities and training for employees.
- **Counselling services for employees** may also be considered when offering health benefits alongside more traditional health assessment routines.

The study also provides a series of **policy pointers** for institutional action. The recommendations suggest **ensuring proper focus on LSES workers** across all professional sectors, with particular **emphasis on industries not traditionally accustomed** to care of the psychosocial work environment (e.g. construction, agriculture). However, even well-explored sectors may hold **occupations that have been largely neglected by the research** (e.g. European ancillary professions in the health and care sector), and it is in any case necessary to consider **perspectives on vulnerable workers' groups** in specific sectors (e.g. migrant workers through discrimination and lack of ability to speak up for themselves, LSES women workers still holding greater weight in household management, etc.).

The study has also largely focused on **socioeconomic background and lack of resources** as a potential new way of looking at the impact of specific working conditions as OSH risks for future action. **Future research support and actions** specifically aimed at LSES workers are needed. **Stakeholders**, including interest groups for mental health promotion, social partners and industry representative organisations, would benefit from **integrating a special focus on LSES workers and PSRs** into their existing actions, such as **campaigns and initiatives**. These could also be **multi-stakeholder initiatives including a broad variety of representatives and covering different areas**. Supporting schemes, guidance and enforcement actions such as targeted labour inspection activities including special focus on LSES workers may be needed to ensure better OSH compliance. A specific focus on **SMEs is needed**, since these are also among the most present company sizes in sectors observed in the study that can potentially hold large shares of LSES workers. Appropriate mechanisms will be required to **give LSES workers a voice and direct participation** in decisions relative to OSH and PSRs management. At the same time, two further considerations may be necessary when considering the broader debate on LSES workers and their PSRs management. On a first level, the much present exposure to **MSD risk factors and heavy physical work** for this typology of employees makes it highly necessary to consider in more depth the interconnections between these and PSRs. Last, as shown by the example of frontline workers (who are often LSES), **future planning on critical events** and better preparedness in the face of emergencies (such as the COVID-19 pandemic) **will have to further take into account PSRs** and the worsening of working conditions and wellbeing for these categories of workers.

1 Setting the scene

1.1 Rationale and methodology

Research related to mental health has been progressively acquiring importance in occupational safety and health (OSH) matters and beyond. The broader policy context also increasingly recognises the importance of addressing mental health. In autumn 2022 during the *State of the Union Address*, European Commission (EC) President von der Leyen announced an initiative on mental health among the EC's priorities for the coming years (EC, 2022), followed by a new EC Communication on a comprehensive approach to mental health (EC, 2023). Furthermore, during the last decades working and employment conditions have been undergoing a constant transformation in which mental health stressors are on the rise. This is the result of different factors, including several exogenous drivers that have been impacting the labour market and society (e.g. digitalisation and new forms of work going along with it, the COVID-19 pandemic). Paradoxically, some of these drivers such as the COVID-19 pandemic crisis have also contributed to higher visibility of psychosocial risks (PSRs) in working lives. Data from the European Agency for Safety and Health at Work (EU-OSHA) Flash Eurobarometer survey shows that 51% of the respondents say that the COVID-19 pandemic has made it easier to talk about stress and mental health at work (EU-OSHA, 2022c).

The specialised literature has been increasingly dealing with the implications of PSRs and corresponding mental health outcomes in employment. Previous research has often focused either on the working population as a whole or overviews of selected industries or occupations. However, there is a relative paucity of studies investigating specifically the most vulnerable social groups particularly exposed to PSRs, such as low-skilled or low-paid workers. To fill this knowledge gap, it is the main objective of this research to provide an exploratory literature overview of the **associations between PSR exposure and mental health outcomes of European workers with a low socioeconomic status** (hereafter referred to as LSES workers) employed in a variety of sectors and with varied sociodemographic/socioeconomic backgrounds. The main research questions informing this research include:

1. *Among the broader psychosocial issues for mental health, what are the main psychosocial risk factors and adverse mental health outcomes concerning workers with low socioeconomic status?*
2. *(2A) Which sectors and workers' groups are mainly affected? (2B) And how did recent labour market evolutions affect the PSR factors at work for workers with LSES?*
3. *What kind of successful intervention strategies have so far been attempted, whether in terms of public regulations (e.g. sector or national regulations) or organisational practices (public and private)?*

Questions 1 and 2 are addressed by means of a scoping literature review (SLR) with systematic features. This research primarily summarises existing and up-to-date literature providing evidence on the subject in a variety of workplace contexts and backgrounds (whether sectoral, socioeconomic or sociodemographic, Chapter 2). Secondly, in order to address question 3, the study provides a collection and classification of a series of good practices for prevention and management of PSR exposure and mental health issues explicitly addressed to LSES workers (Chapter 3). The search for meaningful practices has been conducted via a holistic website and grey literature exploration allowing to identify notable examples of how governments, organisations or companies approach the topic to improve workplace environments for the prevention of PSRs and the promotion of mental health regarding the specific target group. The classification and analysis of results obtained from the SLR and the exploration of good practices are presented in Chapter 4, including research findings, limitations and future research directions (section 4.1) as well as informed policy pointers (4.2). These are meant to assist multilevel decision-makers in policy and practice when developing meaningful strategies for promoting safe and healthy workplaces.

Before presenting the core findings of the literature overview, this chapter sets the scene for the reader by providing the necessary background information (sections 1.2 and 0). Thus, after briefly illustrating the methodology of the SLR and the good practices collection below, we introduce a short definition and classification of PSRs and corresponding mental health outcomes associated with workers' exposure (section 1.2.1). Next, we explore the topic of recent labour market evolutions (e.g. technological

evolution in work, work disruptions caused by the COVID-19 pandemic) to understand the possible appearance of connected stressors in modern workplaces (section 1.2.2). Lastly, we inform the reader on the selected strategy for approaching the exposure to PSRs of LSES workers (section 0), a very broad (and often elusive) category of workers whose parameters can be adjusted according to individual studies (e.g. household income, low levels of educational attainment) and whose individuals belong to a large variety of industry sectors, occupations and population groups (e.g. 'young', 'men', 'women', 'migrant').

The selected methodology for this study was an SLR with systematic features. Four categories of sources were explored:

1. **Search engine publications:** Obtained from a systematic search through dedicated engines (PubMed, Scopus, Web of Science and Google Scholar) by means of an agreed set of keywords and strings to be employed for data collection (maximum of 800 publications captured through the four databases).
2. **Other publications:** This category initially allowed to introduce a selection of previously known scientific literature on the study subject and later allowed to perform a consistent snowballing process for developing further enquiries, for example on specific sectors and workers' backgrounds.
3. **Grey literature:** This category was reserved for storing all grey literature documents, including institutional literature (e.g. international, European and other level stakeholder organisations dealing with OSH issues and labour relations, and including items such as funded studies, sponsored research, working papers, policy briefs, strategies) and other levels of grey production (e.g. produced by EU-level networks, syndicates and other public/private organisations, and including position papers, statements, surveys). This was also useful for collecting and storing previous EU-OSHA publications akin to this study.
4. **Good practices data:** As no original fieldwork was included in study planning, this final category included all potential grey sources for good practices to be included for the study (i.e. websites, institutional documents, factsheets, etc.) as well a consultation with EU-OSHA including also its national focal points.¹

For the **literature review**, the process involved the initial consolidation of a Zotero library collection including all potential sources captured in the first three categories. These were then exported to an ad hoc Excel dataset including various control questions for analysis that would relate the sources to our research objectives (e.g. European focus, relevance to research questions, etc.) and fit some preliminary agreed criteria (e.g. publication type, time frame of the publication). Thus, researchers involved in this study conducted a first-level screening of compatible research through reference, abstract and criteria check (e.g. workers' sample mainly from European studies and LSES background).

Having filtered duplicates and non-relevant literature, the researchers proceeded into second-level analysis of the literature via full reading of the selected texts (first) and a process of text coding via NVivo software (second). The research team developed a set of codes akin to the main topics of the study, as they sought to identify key components of the research (e.g. LSES target, both in sociodemographic terms and sectors/occupations/employment; typology of study; PSRs at work; mental health outcomes). However, this process soon led the way for the parallel development of snowballing processes that helped in expanding the selection of relevant literature for the study. The resulting publications were also screened and analysed according to the above-mentioned methodology. Once the full analysis was completed, NVivo results were again extracted into a new Excel dataset with a summary of coded findings that was taken as the basis for the drafting of this report.

For the selection of **good practices**, the research team started from an originally agreed list of websites included in the final source category. This included multilevel institutional websites (e.g. EU institutions, institutional and project-dedicated OSH networks, national authorities) as well as other research institutes dedicated to occupational health issues. Individual cases were included in yet another Excel dataset, and possible repositories were manually explored in search of relevant information. As a guidance, the researchers kept the keywords from the systematic search as reference, and verified the

¹ See: <https://osha.europa.eu/en/about-eu-osha/national-focal-points>

LSES target groups and typology of PSR management or prevention activity. Pre-selected good practices were preliminarily converted into detailed factsheets including multiple descriptive details (e.g. title of initiative, organisations and countries involved, target groups/beneficiaries, description of activities, main outcomes of the practice). It is worth noting that this process also required a snowballing process and even a consultation of the identified literature in the review when searching for possible cases. The final selection consisted of a double approval process of 10 good practices showing a balance between typology of intervention and geographical distribution (north-south-west-east Europe). The cases have been elaborated for showcase in a dedicated chapter of the study (Chapter 3) and are also helpful for informing the policy pointers (see section 4.1.4). Lastly, an extended explanation of the entire research process can be consulted in the Annexes (I) section.

1.2 Conceptual framework

1.2.1 Work-related PSR factors and corresponding mental health outcomes

Employment is a key social determinant of health and can have wide-reaching consequences on employees' physical and mental health (Shields et al., 2021). Acknowledging this, work-related PSRs stand high on the European and international agenda. Original discussion arose out of the scientific debate and entered into the policy domain through international organisations such as the International Labour Organisation (ILO) and the World Health Organisation (WHO) (e.g. WHO and ILO, 2000). However, European institutions have also been progressively raising institutional attention on the matter of more extended and comprehensive OSH strategies including mental health. In 2022 EU-OSHA initiated its first campaign on psychosocial risks, in 2014-2015 a second campaign on the topic was launched. Early signs of a European framework can be observed in the EC's 'Green Paper and the European Social Partner Framework Agreement on work-related stress', alongside further initiatives promoting corporate social responsibility (Leka and Kortum, 2008). In more recent times, the EU has also begun to estimate the extent to which individual EU citizens suffer because of these issues and the economic costs of PSRs and their negative outcomes for the European economy (e.g. OECD and EU, 2018). At the same time, further acknowledgement of PSRs, stress and the issue of mental health has been achieved by cornerstone legal, political and strategic documents of the Union. These include the 'European Pillar of Social Rights' (EC, n.d.) and the mention of workers' mental health protection in the general 'EU Strategic Framework 2021-2027' (EC, 2021a) as well as the declaration of intentions from EC President von der Leyen quoted at the beginning of this document. Altogether, these policy calls attest to the need to develop relevant research aimed at the European context. Specifically, regarding precariousness and mental health the European Economic and Social Committee (EESC, 2023) has recently published an opinion based on a request from the Spanish EU Presidency. According to this document, the Spanish government considered it a priority to address the impact of precarious work on mental health during its presidency of the Council in 2023, because precariousness is incompatible with decent work, economic growth, good health, wellbeing and gender equality.

Thanks to the presence of a rich research production in the field, **the main work-related psychosocial hazards are nowadays well known**. Broadly speaking, they cover the following areas: work demands and organisation, control, support, relationships, role, change, and job and financial security. The academic debate has also clarified the baseline mechanisms that stimulate **an association between PSRs occurrence and adverse health outcomes**. Employees experience stress² when the demands of their job are excessive and greater than their capacity to cope with them. In addition to mental health problems, workers suffering from prolonged stress can go on to develop serious physical health problems such as cardiovascular disease or musculoskeletal problems. On the other hand, based on the levels of exposure, it has also been ascertained that a good psychosocial environment enhances

² See: <https://osha.europa.eu/en/themes/psychosocial-risks-and-stress>

good performance and personal development, as well as workers' mental and physical wellbeing (e.g. Aronsson et al., 2017; see end of section below).

Particularly in the context of this study, we take as a reference the standard definition of PSRs employed by EU-OSHA based upon the early works of the ILO and Cox and Griffiths (e.g. EU-OSHA, 2000; ILO, n.d., OSHwiki, 2022a). According to these, PSRs are specific interactions and events that emerge from cases of poor working conditions relative to either **work design, organisation and management** (e.g. excessive workloads, lack of involvement in decision-making, but also occupational uncertainty) or to the **social context at the workplace**. The latter relates to interpersonal relationships at work, including communication and support from colleagues and supervisors, and also with customers and clients. The social circumstances in the workplace can be the source of potential risks but can also provide a protective environment. Potential risks are the lack of social support from colleagues and supervisors, and exposure to conflicts and different types of adverse social behaviour (e.g. Eurofound and EU-OSHA, 2014). Adverse social behaviour comprises all forms of physical and verbal abuse and intimidation at work, either by employers or managers, co-workers and clients ('third-party violence').

It has been acknowledged that typologies and degrees of risks fundamentally vary through different levels of exposures across different occupations (e.g. Rigó et al., 2021). For example, customer-oriented or health and care workers may be more inclined to experience risks relative to the social context than manual labourers who are not expected to interact with third parties. At the same time, it has also been observed that certain drivers that are external to the labour market can bring changes in the structure of work with the capacity to stimulate PSR occurrence. These can include technological evolutions (e.g. digitalisation) or significative disruptions like economic recessions (e.g. 2010s Eurozone crisis) or the COVID-19 pandemic (see section 1.2.2).

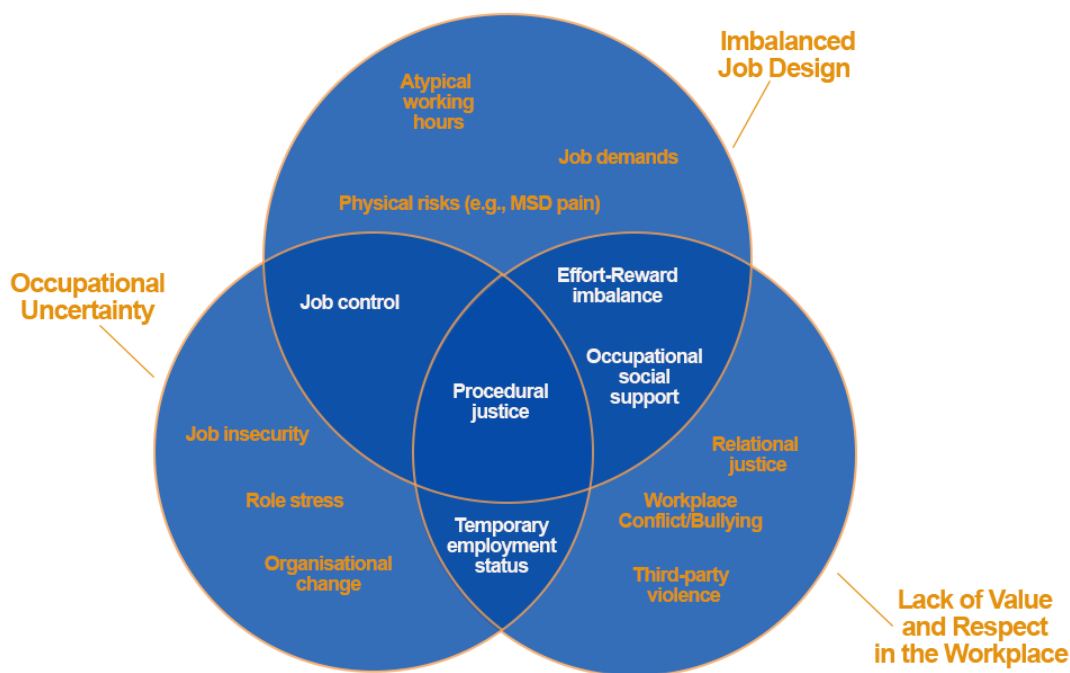
A useful model for the work of analysis performed in this study can be drawn from an adaptation of the work of classification performed by Harvey et al. (2017) (see Source: adapted from Harvey et al. (201 and section 0 for further reference). Borrowing the terminology from the authors, three fundamental categories of PSRs are classified according to the main conceptual source of stress. These include:

1. **Imbalanced job design:** These are PSR factors that stem from labour processes and work task-related features, as they depend on the way work is organised and managed. There exist a series of theoretical models helping to explain how these factors are associated with health outcomes. First, one of the most influential ones is Karasek's "demand-control model", later extended to the 'job strain model'. Its main assumption is that stressful conditions at work emerge from the combination of exposure to high psychological demands and a low degree of autonomy to deal with the job requirements. Low control results from lack of decision latitude on the pace of work or the opportunity to develop skills (Karasek, 1979). This model was further enriched by the inclusion of different aspects of working conditions that are classified into different job-related demands (physical, emotional) and resources that enable individuals to cope with these and mitigate potential negative health outcomes (e.g. Schaufeli and Taris, 2014; Bakker and Demerouti, 2017). The main assumption is that jobs with high demands (e.g. heavy workload) and low resources (e.g. managerial support, labour process autonomy) are associated with increased exposure to health risks and outcomes, such as stress or physical and emotional exhaustion. For instance, research has identified lower levels of control and autonomy on the job as one of the main determinants of job-related health outcomes. These typologies of factors are also considered as critical resources that enable individuals to cope with job demands, therefore mitigating potential adverse effects on their health status. It is worth observing that low-skilled and low-paid occupations (the main focus of this study) are often identified with highly standardised job processes and low decision latitude over the work organisation. A third example is the 'effort-reward imbalance model', which builds on the lack of reciprocity of the rewards provided by the employer in exchange for the effort required by the job, in terms of salaries, recognition, and career and promotion opportunities (Siegrist and Wege, 2020; Niedhammer et al., 2015).
2. **Lack of value and respect in the workplace:** This category includes risks originating from social interactions across workers/employers either vertically (e.g. manager-worker) or horizontally (e.g. worker-worker, worker-customer/user). They include imbalances in relationship of decision-making power or other typologies of unfair social interactions spanning (among others) across physical and psychological violence, bullying, harassment or discrimination (both in-work or from a third party). Examples of dedicated research have demonstrated positive associations between workplace bullying and symptoms of depression, anxiety and stress-related psychological complaints (Nolfe et

al., 2014; Verkuil et al., 2015). They have also deserved special attention from EU social dialogue, as it is the example for the services sector (e.g. EPSU, 2018 or the 'Framework agreement on harassment and violence at work', European Social Partners, 2007). These risks are strongly connected to both the preceding and next category since they relate to aspects like social support and reward, which also can also include financial or job security.

3. **Occupational uncertainty:** These are risks associated with the terms and conditions of employment, with an emphasis on the question of job insecurity and precariousness, that is, risk factors resulting from de-standardisation of the employment relationship. Occupational health research has usually approached PSR exposures on the basis of the nature of work tasks or the content of the job. However, over the last decades increasing emphasis has been placed on the deterioration of employment quality as a risk factor with negative implications for workers' mental health (e.g. De Moortel et al., 2014a; Niedhammer et al., 2021). Notwithstanding, many studies under this field often focus on one single dimension, such as the experience of employment instability over the life course or the association of non-standard contractual arrangements with low wages and unstable working conditions (e.g. temporary agency worker or marginal part-time from a sociological and socioeconomic perspective). A relevant example may be the Employment Precariousness Scale (EPRES) developed by Amable et al. (2006). See also Bhattacharya and Ray (2022).

Figure 1. Unifying model of workplace risk factors



Source: adapted from Harvey et al. (2017)

Based on the widely accepted definition of mental health by the WHO,³ there is **increasing evidence indicating an association between PSRs occurrence and adverse mental health outcomes** in systematic (meta-)reviews of the literature (Aronsson et al., 2017; Harvey et al., 2017; Milner et al., 2019; Murcia et al., 2013; Niedhammer et al., 2015, 2021; Van der Molen et al., 2020). Negative effects include (among others) stress, depression, anxiety, burnout or sleep disturbances. Lastly, enquiries on mental health outcomes may also be indirectly connected to other changes in health-related behaviours such

³ Whereby mental health is defined as 'a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community.' See as a reference: <https://www.who.int/data/gho/data/major-themes/health-and-well-being>

as smoking, alcohol and dietary habits, consumption of psychotropic substances conducive to mental health issues, or the absence of physical and social activity as proxy for depressive states. The literature also shows organisational outcomes interpreting the association between PSR exposure and workers' health and behaviour from the perspective of companies' performance as a result of absenteeism and presenteeism (e.g. Arjona-Fuentes et al., 2019; Zito et al., 2018). Studies usually relate to degrees of absenteeism or presenteeism at work due to/despite poor health, but can also extend into other considerations such as low employee retention and high turnover. Particularly when discussing sector-specific analyses, PSR exposure may overlap and combine with other specific forms of risks, such as ergonomic risks, and/or the impact of poor physical/environmental working conditions contributing to the development of adverse health outcomes (e.g. Arjona-Fuentes et al., 2019). Mental health effects may also be studied in combination with physical health outcomes such as the onset of musculoskeletal disorders (MSDs). PSRs can contribute to and exacerbate MSDs, and MSDs can be associated with psychosocial factors (EU-OSHA, 2021b).

Lastly, both research on adverse health outcomes and a separate strand of the literature have investigated **the effect of reduced PSR exposure and the positive outcomes** that can emerge from the presence of job resources (e.g. organisational and social support) and other moderators such as job rewards. For example, Aronsson et al. (2017) found moderately strong evidence that increased job control could reduce emotional exhaustion, while high levels of job support and workplace justice were also **protective factors** against this outcome. Starting therefore from the basic premise that for most individuals being employed and at work improves their mental health and wellbeing (c.f. Waddell and Burton, 2006). Research has also sought to identify specific determinants for 'meaningful' work in organisations, exploring linkages between individual, job-related, organisational and social/societal-level factors (e.g. Albrecht et al., 2021; Lysova et al., 2019). Similarly, others have classified spheres of influence for increased job performance, distinguishing among external environment, organisational features (including context of the company, leadership and management), and most importantly the work climate. Employee satisfaction, motivation, engagement and contribution at work also depend on these protective factors. Examples may include a workplace where: management and supervision are perceived to be open, flexible, and supportive; organisational roles are clearly defined, and expectations are reasonable and established jointly; at the same time, employees feel free to express their true feelings, express their opinions, and offer suggestions without fear of consequences (Furst, 2019). While the primary focus of the literature review included for this study remains concerned with adverse health outcomes, Harvey et al. (2017) also link the importance of understanding PSRs' role and outcomes as an essential component in the delivery of successful workplace interventions for promoting better mental health. These aspects are very useful when interpreting the classification and selection of good practices presented in Chapter 3 of this review.

While the above-mentioned results provide a bird's eye perspective on different literature strands of psychosocial (and other associated risks) research results, it is however important to underline that this section's overview comes from a general perspective across multiple industry sectors and workers' typologies. As a result, the originality of this study is found in the specific level of enquiry over the LSES category of workers' samples involved for this review. More details on the study population target and the methodology for its identification are presented in section 0.

1.2.2 Exogenous drivers and emerging stressors: the role of the pandemic and digitalisation in the modern psychosocial work environment

While the previous section offers a broad perspective on PSRs at work, it is important to consider that workplaces do not exist in a void but are rather embedded in the socioeconomic context in which they are located when performing any kind of business or public service activity. Thus, they can be affected by either the social protection mechanisms in place in a given territorial context (e.g. work regulations, trade union's rights, unemployment benefits) or prove vulnerable to external trends with the capacity to change the structure of work or even alter job quality and stability. These so-called exogenous 'megatrends' can include phenomena associated with globalisation, technology, demography and social

inequalities, climate change, or even changing policy and regulatory environments (ILO, 2020 quoted in Sorensen et al., 2021).

A previous relevant example was provided by Malard et al. (2013), who in their analysis of changes in PSR exposure of workers between 2005 and 2010 over 30 European countries were able to confirm hypotheses of changes in psychosocial work environments in times of economic crisis. Their research results seemed to confirm a deterioration in skills discretion and decision latitude as well as an increase in job insecurity in later years, with different degrees of worsening across occupations and a bigger impact on low-skilled employees. Notwithstanding, partial improvements in workplaces were detected concerning occurrences of job promotion, job effort (but among men only), reduction in bullying or sexual harassment (the latter among women only), reduction of long working hours (among men only) and better work–life balance. The authors offer speculations as to why this may have happened. On the deterioration side, they consider the results consistent with what may be expected in terms of work environments' adaptation in times of crisis. Meanwhile, advancements in certain occupations for workplace culture and societal attitudes may have conditioned partial improvements in job environments, but only for certain countries. Indeed, their results also showed significant national variations and were consistent with macroeconomic results indicating that some countries and population segments (i.e. low-skilled workers) were more negatively affected than others.

One decade later, workers have experienced even further disruptive circumstances showing important consequences on the future of OSH in workplaces. For the purposes of this study, the roles of the COVID-19 pandemic and the novel (accelerated) technological developments induced by digitalisation are acknowledged as strong external trends with the capacity to affect working conditions and the occurrence of PSRs. The rest of the section thus highlights the main reasons for this selection, alongside seeking to investigate potential implications of these exogenous drivers for PSRs occurrence in workers with LSES.

The extraordinary context of the **COVID-19 pandemic** was probably the most recent and evident driver of change. Indeed, many foresaw that the protective measures enforced to stop transmission and contagion would soon bring cascading effects into all aspects of human activity. The pandemic thus represented a unique extra-organisational stressor that aggravated typical workplace risk factors in terms of its scope, magnitude and impact on all employees (see Biggs et al., 2014 and Lovreglio et al., 2021, both cited in Sischka et al., 2022) and across all the existing industry sectors. The physical distancing measures have also conditioned an unprecedented classification of work based on their level of physical proximity to people (whether to colleagues, employers or customers/users). In broad terms, it was possible to classify three conceptual categories of affected jobs: a. 'teleworkable' occupations that could be carried out remotely; b. 'essential' work associated with crucial societal needs (e.g. agri-food production or primary goods' retail sales); and c. positions that require varying degrees of social interaction, some of which understood as 'non-essential' to society, for example hospitality and tourism (EC, 2021b).

The spread of the disease influenced a worsening of working conditions while often stimulating adverse outcomes on mental health for all workers. From a global perspective, all categories of workers experienced feelings of isolation, fear of infection, fear about loved ones and other factors related to possible virus exposition. In turn, these have been shown to lead to adverse mental health outcomes such as anxiety, stress, depression and insomnia (e.g. see the literature review by Sischka et al., 2022). For what concerns working conditions, stress often rose among workers based on the effect of the protective measures that were meant to safeguard them from contagion. The requirements of physical distancing often led employees towards new risks associated with work intensification (e.g. greater workload relative to either more manual load or increasing working hours/shift work) alongside issues of work isolation and lack of work communication (e.g. lack of face-to-face communication among employers and employees; abusive behaviours by frustrated customers). In this regard, the early review of COVID-19-related effects at the workplace by Giorgi et al. (2020) found global-scale evidence in the literature of adverse mental health outcomes for workers as a reaction to preventive measures. However, the above-mentioned categories also experienced different typologies of increased PSRs occurrence. For example, 'teleworkable' occupations may have had less concerns regarding direct virus exposure but had to deal with poor ergonomic conditions and other aggravating psychosocial circumstances (e.g. work–life unbalance and right to disconnect, blurring of work–private life spaces, social isolation and hardened workplace communication) (EU-OSHA, 2021c). Trying to zoom in on the main target group of

this study, such an employment category generally hosts a reduced share of LSES workers, but these negative occurrences may have been experienced by certain customer-oriented services such as call centre operators.

Heading into the second employment category, health and social care but also other ‘frontline’ or ‘essential’ groups were discussed as occupations at higher risk of infection with COVID-19 as well as being more likely to suffer stressful effects due to higher exposure to a range of risk factors (Sischa et al., 2022). On the former, it is important to consider that health and social care does not only foresee the presence of high-skilled professionals such as physicians and hospital nurses but also ancillary healthcare professions and long-term care facilitators including domestic workers more likely to be included as LSES (see section 2.2.3 for more information). On their own perception of the pandemic as a stressor, a recent enquiry by the OSH Pulse survey (EU-OSHA, 2022c) fittingly revealed that staff in this category reported a 44% increase in stress due to a combination of increased workload, initial poor availability of protective equipment and heightened emotional demands when dealing with deceased. For the latter, ‘frontline’ or ‘essential’ workers were defined as those employees with jobs seen as indispensable to maintain critical infrastructure and services that could not be realised via telework (examples include, among others, agri-food workers like slaughterhouse butchers and seasonal farmworkers, or even primary goods’ shop clerks and delivery workers). Due to the critical role of their active presence in the workplace, this category may have well experienced a full combination of PSRs connected to virus infection alongside greatly increased pressure characterising working conditions. A Eurofound study also confirmed the higher exposure of frontline workers to adverse social behaviour, especially in certain sectors like healthcare and public administration (Eurofound, forthcoming). In addition, other vulnerable groups (i.e. low-skilled workers, migrant workers, young workers, workers with disability among others potentially holding LSES) may have experienced an exacerbation of mental health issues on top of pre-existing disparities. This would also be due to a general overrepresentation in precarious and low paid jobs — many of which were classified as ‘essential workers’ during lockdowns — with no possibility to preventively work from home and with greater risks of direct exposition to COVID-19. The mentioned Eurofound study (forthcoming) also confirmed the higher exposure of lower-skilled occupations to adverse social behaviour. Lastly, for the third category of workers belonging to ‘non-essential’ sectors, worsened working conditions and heightened emotional demands were often accompanied by high job insecurity and perceptions of precariousness due to the prolonged economic uncertainty derived by restrictions put on businesses and services (Gunn et al., 2022; McNamara et al., 2021; EU-OSHA, 2022c). Findings associated with this literature review relative to the pandemic can be particularly observed in section 2.1 for ‘essential’ occupations and in the findings of certain industry sectors in section 2.2.

Meanwhile, **digitalisation** was already impacting workplaces before the COVID-19 pandemic, but physical distancing measures and remote working consequences of the COVID-19 crisis nonetheless accelerated its spread into the world of work (EU-OSHA, 2021c). **Scientific research** has so-far placed much focus on two main work arrangements that stand out for the intensity in the use of information and communication technologies (ICT), namely **telework and platform work** (see also as a reference EU-OSHA, 2018, 2022a, 2022b, 2022c). For example, research findings show that telework is often associated with a general trend towards the intensification of work through working time extension in the form of informal overtime at home (Chung, 2022). Meanwhile, for platform work research results show an increase in the amount of unpaid labour that workers are required to perform as part of their routine (Pulignano and Marà, 2021). Both modalities are also associated with the risk of physical and social isolation and reduced social support by co-workers and colleagues and to the blurring of boundaries between work and personal or family domains (EU-OSHA, 2018; Bérastégui, 2021). In addition, workers in both settings can be exposed to different forms of electronic monitoring and algorithmic management practices with an impact on the pace of work and in the quality of relationships within the organisation, as it can contribute to a lack of trust towards employer and more pronounced power imbalances (Ball, 2021; Wood, 2021; Mental Health Europe, 2022; c.f. EU-OSHA, 2022c). Finally, in platform work the performance of short-term assignments for different clients often entails limited opportunities for career advancement. Given the uncertainty about future employment prospects, platform workers experience job insecurity and usually over engage in labour tasks to preserve their employability, eventually resulting in stress and emotional exhaustion (Bérastégui, 2021).

On its account, EU-OSHA ran a foresight exercise (EU-OSHA, 2018) and is running a campaign on Safe and Healthy Work in the Digital Age (EU-OSHA, 2023b) seeking to provide a renewed focus on OSH and digitalisation in the workplace of the imminent future. It is also worth noting that policy attention has shifted from mass spread of ICT to a much broader spectrum of so-called ICT-enabled technologies (ICT-ETs). These include advancements such as the Internet of things, artificial intelligence (AI), big data, cloud computing, collaborative robotics, advanced realities, additive manufacturing and the use of online platforms (EU-OSHA, 2018). Recent evidence from the OSH Pulse survey (EU-OSHA, 2022c) confirms that we may only be at an early stage of the technological transition process. Indeed, it is shown that digital devices and technologies most frequently used in the workplace are still laptops, tablets, smartphones or other portable devices (73% across the EU), followed by desktop computers (60%) and broadband technologies to access the Internet (55%). Less frequently used in the workplace are wearable devices (11%), machines or robots incorporating AI (5%), and robots interacting with the worker (3%). Although it is confirmed that the spread and prevalence of ICT-ETs are currently varied across Europe and across different sectors and socioeconomic groups, ICT is more and more becoming integrated to all sectors rather than being confined to certain industries. Just like ICT usage skyrocketed during the first two decades of the 21st century, it is expected that the new technologies will bring further changes to the nature and organisation of work, as well as leading to new forms of work and employment status (EU-OSHA, 2018).

Altogether, ICT-ETs can present the advantage of better and informed decision-making for workplaces to the benefit of non-highly skilled workers, and yet if not regulated these technologies can also lead to reduced worker autonomy and loss of control, increased production pressure and the relative stress that can ensue. Consequences can be even more tangible in the case of high automation of tasks, hence allowing technical/digital devices or systems to execute (whether partially or fully) assignments previously entrusted to humans. While there is potential at the psychosocial level for reducing high-risk or repetitive tasks and for providing new work learning and creativity, on the reverse side an uncontrolled over-reliance could lead to cognitive overload or to possible loss of specific skills/work positions for low-skilled employees.

Despite the crucial need for data on these issues, the scattered evidence detected through the development of this review (e.g. in section 2.1 or 2.2.5) seems to confirm the premature level of research associating ICT-ET PSRs exposure and mental health outcomes, particularly in the European context and including consideration of workers' socioeconomic backgrounds. Yet, the search through literature databases also returned an example at the international level for possible research methodologies. In their original study, Cheng et al. (2021) performed an analysis of the association between occupation-level probability of job automation and workers' adverse health outcomes (burnout and work-related injury/disease). Their definition is based on 'automation probability' of occupations as the degree of worker's control in a task relative to: *a.* perception and manipulation, *b.* creativity and *c.* social intelligence. By deriving automation probabilities for 38 occupational groups (also accounting for socioeconomic differences), the results returned that workers in an environment with a high probability of automation were more likely to be exposed to low job control and higher job insecurity. Their most relevant health outcome was work-related injury/disease prevalence. Meanwhile, workers in jobs with a low automation probability showed a higher level of exposure to job demands (both psychological and physical) and a greater risk of mental burnout as adverse health outcomes. In addition, automation probability significantly predicted workers' health after adjustment for demographic characteristics and psychosocial work conditions. It is however necessary to consider that the authors do not provide direct explanations on the differences between health outcomes in workplaces with either high or low automation, and that the article does not evaluate specific moderating/protective properties of automation in the psychosocial work environment.

1.3 The framework for the analysis of LSES workers in this study

Socioeconomic status (SES) is used to refer to social, economic and work status of individuals (usually in terms of their education, income, employment). **Low socioeconomic status (LSES)** thus relates to individuals with low educational achievement and/or low household income and often holding reduced access to financial, educational, social and health resources compared to people with higher SES.⁴

However, beyond the glossary definition an operationalisation of this category for applied research lacks a true consensual definition among scholars as its measurement occurs through different variables (Kamalulil and Panatik, 2021). For example, multiple studies consider objective (and measurable) indicators of income inadequacy (i.e. individual and household income levels below poverty threshold) as the main indicator for LSES acknowledgement. Other studies cover dimensions such as educational attainment levels, occupational status or housing type. However, yet another strand of the literature considers subjective measures such as perceived income insecurity or financial uncertainty (also termed as 'perceived financial strain') to capture the worries people have about their economic vulnerability in addition to recorded low-income levels (e.g. Klug et al., 2020; Diikstra and Horstman, 2015). Crucially, some of these studies stress that objective and subjective measures are to some extent independent from each other, hence complicating the process of identification of the target population for this analysis.

Most likely as a direct consequence of lacking consensus on measurements, early results of this research outlined **a scarcity of evidence exclusively dedicated to this heterogenous category** for the European context. Thus, it was clear that this exploratory literature review required the development of **a broad operational definition of LSES workers** that includes: *a.* results associated with socioeconomic and sociodemographic status of workers; *b.* results associated with industry sectors and occupations potentially holding large shares of LSES; and *c.* results associated with quality of employment when these could help in identifying LSES workers. This brought the final selection to include:

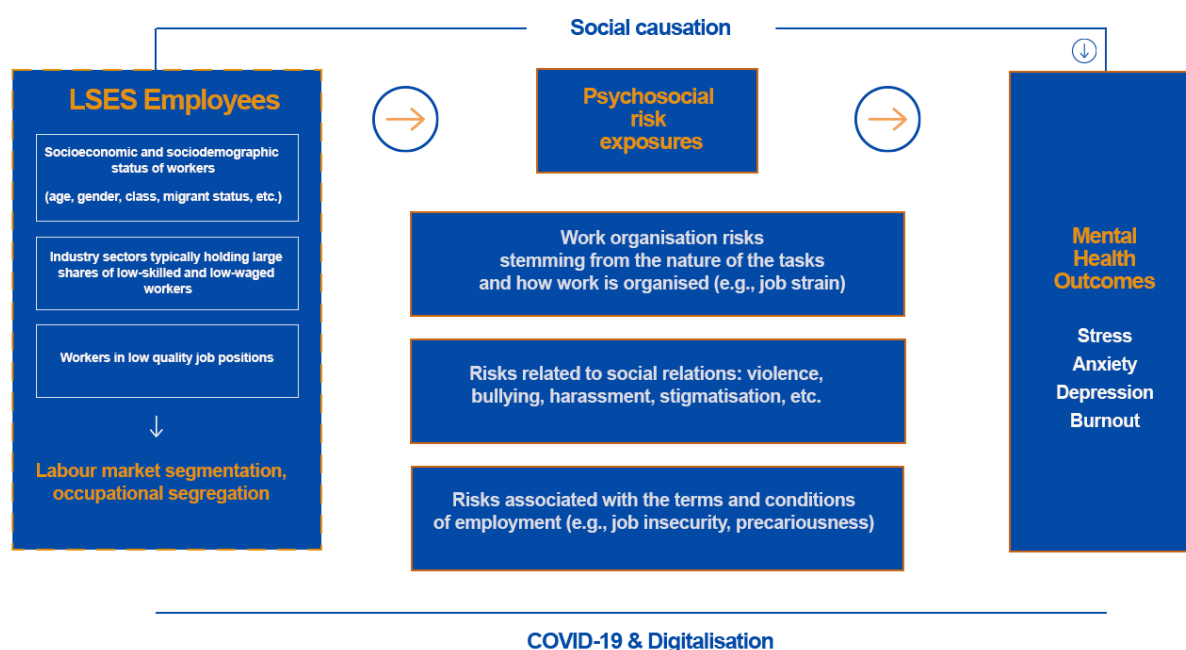
1. Studies where LSES employees are directly acknowledged through socioeconomic and sociodemographic variables. Among this, of particular relevance were cross-sectional analyses in occupational health inequalities (i.e. between typology of work or among different socioeconomic and sociodemographic backgrounds of workers).
2. Studies explicitly considering as a target a vulnerable group of workers recognised in the literature as particularly exposed to PSRs. These included, for example, the gender dimension, age of worker or migrant status, and had to consider (at least partially) the perspective of low-income/low-skilled workers.
3. A vast selection of studies associated with multiple industry sectors that are potentially populated by large shares of LSES workers. In this literature review, this includes hospitality, services (with a focus on retail and call centres), professional and domestic cleaning, home care, ancillary healthcare, construction, manufacturing and production plus agriculture. The selection was made based on original research objectives and through consultation of further sources for the identification of relevant sectors (e.g. Eurostat and Eurofound Survey of Earnings Structure, 2018). Attention was also raised on the matter of European diversity, and the salary rates of certain professions across different European countries and different sectors (e.g. studies from the hospitality sector were scanned for information on LSES workers such as food servers and were excluded when highly skilled staff such as managers were the subject of the analysis).
4. A selection of studies considering economic and labour vulnerability of workers from the point of view of job quality. This also included partial evidence from non-standard relations of employment (e.g. PSRs exposure of non-voluntary part-time workers).
5. In addition, special emphasis was put on the search and inclusion of studies that would cover the main subject of this study in relation to the two exogenous drivers of labour market change described

⁴ See: <https://dictionary.apa.org/socioeconomic-status> and <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/socioeconomic-status>

in section 1.2.2 (COVID-19 pandemic and digitalisation). For example, the selection included the category of 'essential workers' and 'essential jobs' during the pandemic, exposed in section 2.1.

The above-mentioned sources were thus classified under the three broad categories described. A fundamental criterion for the filtering of the sources has been the presence of evidence (in qualitative terms) showing associations between PSRs exposure and the emergence of mental health outcomes in the worker population under analysis (see section 1.1). Meanwhile, PSRs have been acknowledged through the lenses of the theoretical model by Harvey et al. (2017) as presented in section 1.2.1. Special emphasis was given to sources responding to previous criteria and also dealing with the exogenous drivers stimulating further stressors (see section 1.2.2). The theoretical framework employed by the research thus makes use of all the elements detailed so far. An illustrative schematisation of the research process is shown in Figure 2.

Figure 2. Graphical visualisation of the analytical framework employed in this study



Source: the authors

2 Mental health outcomes from exposure to PSRs of European LSES workers

Following the broad operational definitions of LSES workers described in section 0, the results of the literature review are presented by means of three different categories, including several facets of the association between PSRs exposure and mental health outcomes in the target population of the study.

These are:

1. Results associated with the **socioeconomic, sociodemographic and occupational status of workers**, helping to unveil the main connections between different dimensions of vulnerable workers' groups exposed to PSRs and the relative mental health outcomes that may ensue (section 2.1).
2. Results associated with **work design and social interactions in the workplace for industry sectors with large shares of LSES workers** (section 2.2). On the one side, these may stem from the nature of the tasks and how work is organised (balance between different job demands, available resources and associated risk factors - job strain, emotional dissonance, etc.). Due to the specific demands of each sector, results are classified in several sub-sections associated with the nature of the job or sector. Additionally, this section also highlights risk factors associated with social interactions in the workplace (e.g. third-party violence, bullying/harassment and sexual harassment).
3. Results associated with **low quality of employment**, with an emphasis on the question of job insecurity and employment precariousness, that is, risk factor occurrence and mental health outcomes resulting from de-standardisation of the employment relationship (section 2.3).

Throughout the review, the reader will also encounter in certain sections studies dedicated to the impact of the exogenous trends specifically selected for this study (see section 1.2.2). The study thus includes literature focused on a deterioration of psychosocial work environment due to the recent experience of the pandemic as well as assembled evidence on LSES workers and digitalisation. Contrary to expectations, specific literature dealing with these trends and connected to the main topic of the study (quantifiable evidence of PSRs exposure and mental health outcomes in LSES workers) is still an emerging field. While it is expected that further quantitative data on the extended pandemic period may be released in the future, we also identify a clear research gap in enquiries directed at technological evolutions in the workplace relative to LSES workers (see section 4.1.3).

2.1 Results associated with socioeconomic, sociodemographic and occupational status of workers

The bulk of the research on occupational health inequalities (i.e. between typology of work or among different socioeconomic and sociodemographic backgrounds of workers) has identified a set of PSRs exposures associated with the development of mental issues. This piece of the analytical framework has proved useful for analysing occupational health inequalities across social classes (e.g. De Moortel et al., 2014a), between genders (e.g. Campos-Serna et al., 2013; Milner et al., 2021; De Moortel et al., 2014b), and other LSES population subgroups, such as young workers (Shields, 2021), migrant workers and ethnic minorities (e.g. Nieuwenhuijsen et al., 2015; Diaz-Bretones et al., 2020; Gosselin et al., 2021). The analysis of gender differences in the exposure to different types of risks is a core issue in the research literature. Some studies have found a larger impact of PSRs and employment precariousness on mental health among men than among women (e.g. Ferrante et al., 2019), while other studies suggest an opposite picture. Finally, there is emerging evidence on 'essential occupations' during the COVID-19 crisis that fit with our analytical framework as described in section 1.2.2 (e.g. Dütsch, 2022; Esteve-Matalí et al., 2022; Utzet et al., 2022). In addition, recent research suggests that lower-educated respondents are not as comfortable speaking to their manager about mental health issues than respondents with a higher level of education. While 53% of respondents who completed their education by age 15 agree with this statement, this figure goes up to 59% for respondents who stayed in education longer (EU-OSHA, 2022c).

One of the very few identified systematic literature reviews directly dealing with LSES workers (at global scale but including multiple European countries) addressed the matter of **socioeconomic inequalities in self-reported health including work factors and lifestyle behaviours** in the analysis. Thus, Dieker et al. (2019) depart from two main hypotheses for explaining inequalities impacting across different socioeconomic groups: *a.* that people with LSES have a less healthy lifestyle and live and work in more disadvantaged conditions than people with a high socioeconomic status (HSES); and *b.* that the effects of unhealthy lifestyle and poor living and working conditions on health are larger for those with a low SES. In all studies included in this systematic review, workers with the lowest SES had a statistically significantly higher risk of poor general self-rated health than workers with the highest SES for at least one measure of the variables associated with SES (e.g. education, income, occupational class). The review identifies 14 cross-sectional studies reporting that PSR factors (e.g. job insecurity, decision latitude, social support at work) partially contribute to socioeconomic inequalities in self-rated health among workers. For example, one of the studies found that less job resources (less autonomy and less reward) contributed to worse self-reported health and that workers with LSES had less autonomy and less rewards and consequently worse self-reported health. Dieker et al. (2019) additionally comment on having found indications that the lack of some PSR factors (e.g. low job resources) contribute to socioeconomic health inequalities rather than the job demands associated with the typology of work. In terms of general findings, Dieker et al. (2019) report that there is strong evidence that work and lifestyle factors partly explain inequalities in self-rated health among workers of different SES, where LSES workers evidently show poorer self-reported health than higher SES employees. Furthermore, the results indicate that the **contribution of work factors** (i.e. all three dimensions, including work design, social relations and job insecurity) **in explaining these health inequalities might be larger than the contribution of lifestyle factors.**

Drawing on a large cohort study of young employees in Sweden, Björkenstam et al. (2021) find that **manual workers** were at higher risk of prescription of antidepressants and/or psychiatric care with a diagnosis of mental disorder when compared with non-manual workers. Additionally, among both manual and non-manual workers, the most elevated risk was observed in those employed in health and social services (with a high share of female employment) and lowest for construction workers. Svane-Petersen et al. (2020) acknowledged that **lower levels of job control (skill discretion and decision authority) were associated with higher risks of clinically diagnosed depressive disorders**, and that the association was higher for men than for women. Although they do not find a clear relation to SES in their analyses, it is worth considering that LSES (low-skilled and low-paid) occupations are usually characterised by low job decision latitude or low autonomy in the job.

Focusing on direct association between PSRs exposure and suicidal behaviour, Greiner and Arensman (2022) stress emphasis on meta-analytical evidence indicating that low-skilled occupations in certain workplace settings (including health and care, construction, manufacturing and agriculture) **are more prone to suicide risks than others**. Conversely, the presence of **‘active jobs’** (moderated by high control facing high demands) **has been signalled as a protective factor against suicide.**

De Moortel et al. (2014b) found that **unskilled workers report worse mental wellbeing** compared to higher-class positions. However, the explanation of the association between social class and mental health involves different mediating factors for men than for women. In line with other research findings, **low-quality employment relations mediate this relationship only for men**. An explanation for this could be found in differences in the persistence of traditional social roles and in the resulting different meaning of employment relations for men and women (‘male breadwinner’ model). The gender segregation is also confirmed by a recent Eurofound publication (2022b).

On the matter of **gender differentiation in PSR exposure and mental health**, research evidence from longitudinal studies shows considerable differences in the impact of working and employment conditions on the health of men and women (Milner et al., 2021). **Several studies suggest that men’s health is more vulnerable to the effects of precarious employment than women’s**. However, **the effect of long working hours on mental health is higher among women than among men** (see also Franklin et al., 2022). Campos-Serna et al. (2013) explore gender differences in the exposure to working and employment conditions on the basis of a systematic review of studies conducted mainly in Europe. Their results show how these differences are shaped by gender segregation in the labour market. Regarding psychosocial conditions, **men are more exposed to high physically demanding jobs, longer hours of work and low support at work**, while working **women are more exposed to emotional demands**

and low control (for a list of examples of hazards and risks found in female-dominated occupations, see also EU-OSHA, 2014). The unequal gender distribution of work-related psychosocial hazards between women and men is mainly related to the horizontal segregation of the labour market, which concentrates women in occupations and economic activities (services) with higher exposure to work-related psychosocial hazards. The exposure to emotional demands has been found to contribute to the gender gap in mental health between and within occupational classes (Schütte et al., 2015; Kjellson, 2021). Indeed, different studies show an increase in the prevalence of mental health issues in the workforce that is partly attributed to the growth of high-strain jobs in the health and social services sector (Almroth et al., 2022; Aronsson et al., 2017; Björkenstam et al., 2021; Nyberg et al., 2021). While there are many low-status women workers in certain settings (e.g. residential homes), social and healthcare sectors employ a large share of women with high and medium qualification levels. This can explain the observed differences in the association of psychosocial working conditions and mental health outcomes among men and women and why there is a stronger association between lower job control (job strain) and poor mental health outcomes among men than among women (Svane-Petersen et al., 2020).

Following Almroth et al. (2022), this might be due to the fact that the incidence of poor mental health (depression) is more evenly distributed across different levels of education and different occupations among women compared to men. Their analysis on the basis of a large longitudinal sample of the Swedish working population showed that women in the medium-low control category were almost exclusively lower-level healthcare workers, while men in the equivalent group had a large range of different occupations. Women employed in these types of jobs are at a higher risk of depression due to their exposure to emotional demands. In addition, women are disproportionately exposed to additional risk factors for depression that are unrelated to the characteristics of the working environment (family or care responsibilities).

Arias-de la Torre et al.'s (2019) study based on a representative sample of the Spanish population analysed the influence of both employment status and family and household characteristics on mental health problems and whether this relationship varies across genders and occupational social classes (manual and non-manual). Their findings show that the **prevalence of poor mental health was overall higher among women, and among those that belong to manual occupational groups in both genders**. When considering the effect of family roles, men who assume the main 'breadwinner role' are more likely to have poor mental health due to financial strain and worries to cover household expenses, especially among those performing manual jobs. Among women, poor mental health is more prevalent among those carrying out household work themselves and belonging to the manual occupational class as a result of the overload that household chores pose when added to paid work. These findings highlight the need for gender-sensitive approaches to the analysis of the implications of precarious employment on mental health (Valero et al., 2021). **Gender inequalities in the labour market and related health outcomes are interrelated with socioeconomic status:** women from low socioeconomic groups have higher rates of temporary employment, involuntary part-time work and low wages, as well as more unstable employment trajectories. However, few studies consider the implications of the unequal distribution of household tasks in the analysis of men and women's participation patterns in the labour market. Also, few studies consider the influence of other sources of discrimination from an intersectional approach, such as occupational class and migration status, which often makes it difficult to fully appraise the relationship between the SES, employment precariousness and mental health.

Meanwhile, in their systematic literature review on **young and precarious workers'** employment conditions and mental health risks, Shields et al. (2021) dedicate a section of their analysis to possible **COVID-19 long-term repercussions** on employment conditions and mental health of the young labour force. They acknowledge that typical industries in which a majority of young people are employed (e.g. tourism and hospitality) have been disproportionately affected by reduction in job quality and increase in job insecurity. They also remark that already existing trends such as the progressive reduction of fixed-term occupations in the modern labour market economy and the constantly delayed transitioning from education to the labour force will be further exacerbated by the new cycle of recession. As a result, they foresee increased risks for poor psychosocial working environments, increased job strain, effort–reward imbalance, lack of organisational justice, low social support and job insecurity for young workers, also based on previous studies applied to the general population. On the subject of social relations at work of young workers, Shields et al. (2021) also find evidence that in comparison to their elder counterparts, young labour forces are more vulnerable to workplace bullying and conflict with

supervisors and colleagues. This is also accompanied by higher risks of sexual harassment and episodes of social injustice as well as inequity in treatment when compared to older workers.

On the subject of **migrant workers**, it is important to underline that while not all migrants are of LSES (and a combination of highly skilled and low economic may also occur), their frequent presence among lower-skilled or precarious positions (e.g. informal economy) makes them more likely to be included as yet another vulnerable group analysed by this study. To begin with, Nieuwenhuijsen et al. (2015) employ a large-scale, multi-ethnic cohort study on health and healthcare utilisation among different ethnic groups living in the Netherlands (Amsterdam). Their analysis is directed at testing whether mental health inequalities between ethnic groups are mediated by exposure to unfavourable working conditions. Lack of recovery opportunities (i.e. job design features such as time off from job, breaks and interruptions) are assessed jointly with perceived work stress against two adverse mental health outcomes (generic quality of mental health and depressive symptoms). After controlling for age and gender, and with very few exceptions to the results, an overall majority of ethnic minorities showed a higher risk of mental health problems when compared to the Dutch population. Their results show the **lack of recovery opportunities** to be preponderant in the manifestation of adverse outcomes and suggest specific interventions directed at work design improvement for this stressor. Meanwhile, in a similar study conducted in France using nationally representative data from the French Working Conditions Survey, Gosselin et al. (2021) examine the prevalence of PSR factors at work among first- and second-generation immigrants in France across a variety of higher and lower SES occupations. Their findings showed that both first- and second-generation immigrants are more exposed to higher levels of job strain and low support even after controlling for occupation and employment conditions (thus also including lower occupation status). Findings also show a **higher prevalence of anxiety disorders are associated with job strain** only among second-generation immigrants from Africa. The study, however, falls short on being able to provide explanatory mechanisms as to why being an immigrant increased the probability to PSRs exposure. The authors provide justification for this by explaining that the data lacked information on the specific work tasks executed in the occupations as well as missing data on discrimination episodes at work.

Contrary to previous results, the work of analysis performed by Diaz-Bretones et al. (2020) on migrant workers based on data from the Spanish Survey of Working Conditions (*Encuesta Nacional de Condiciones de Trabajo*) brings interesting features to the debate on PSR exposure and mental wellbeing of foreign workers. While they find **evidence in linking increased rates of PSR exposure between certain occupational groups and psychosocial working conditions** (e.g. job insecurity, workload, social support and autonomy), their results ultimately confirm that migrant workers reported better wellbeing in comparison with the native population. The authors bring to the table different factors that may help explain this evidence, such as the 'endurance' effect of permanent resident migrants in Spain with consolidated job positions or even the '**healthy migrant**' hypothesis according to which migrant workers are often younger (and probably healthier and more optimistic) than the native population. Notwithstanding, building upon previous evidence in the literature they are also cautious about individual perceptions of health and mental wellbeing as subjective experiences shaped by culture, behaviour, norms and values. In addition, they express some worry at experiences of underreporting, lack of awareness and help-seeking, or even the desire to appear healthy to remain economically valuable to an employer. Lastly, the literature review (Diaz-Bretones et al., 2020) also finds clear evidence that **migrant workers face bigger discrimination and bullying when compared to local workers**. This leads to increased job dissatisfaction and frustration, making the vulnerable group prone to suffering work-related stress. Other stressors that contribute to this state may include the lack of social and family support due to country relocation, as well as the lack of support from co-workers and supervisors, often attributed to cultural and language barriers.

The paper by Dütsch (2022) on the prevalent working conditions in critical occupations based on data from the 2019 German BAuA Working Time Survey helps in establishing the **essential workers** as yet another vulnerable group for PSRs exposure. Essential workers are more likely to be employed in unskilled and semi-skilled activities, they are paid less than non-essential employees (-2.08% estimate) and work more physically proximate to others than non-essential workers. Among the 10 lowest paid critical occupations are cleaning services and retail occupations. Concerning working time patterns, employees in essential jobs are **more likely to work longer hours** and they are also more likely to work **more often during atypical working hours** (night shift work and weekends). Disadvantageous

work characteristics are also apparent when considering working time autonomy: employees in critical jobs have **less working time autonomy** because they work more regularly on call or standby than non-essential employees. In addition, essential workers are expected to be reachable for work purposes beyond regular working hours more often than non-essential employees. The study also reveals critical aspects of essential workers' working conditions and working environments such as greater physical strain, exposure to adverse climate and noise conditions, and low job decision latitude, without further analysis on the potential implications of long and atypical working hours. The study of Esteve-Matalí et al. (2022) is one of the few selected references that have addressed mental health inequalities across different occupational groups in the last years and in the context of the **COVID-19 pandemic**. Their findings show a sharp deterioration of mental health indicators among the Spanish salaried population in 2021 compared with previous crisis periods, and especially after the 2008 crisis. The authors observe **a reduction of mental health inequalities in 2021 between manual and non-manual workers** that is explained by the worsening of the typically advantaged groups (those in non-manual occupations and permanent contracts). Unlike in previous economic crises, the employment of many less-qualified manual workers has been protected from unemployment through the implementation of short-time work schemes (*ERTE* in Spanish), while the situation of essential workers (in health and non-health occupations) in precarious settings might have worsened already challenged states of mental health. This paper is in line with other studies on the experience of precarious employment in the context of the pandemic (e.g. Wu, 2022) that point to a decreasing importance of objective (contractual) employment stability compared to subjective perceptions of insecurity. This can be interpreted as a result of general uncertainties about the economic situation that reached other worker categories in stable positions in the labour market (those with open-ended contracts).

Utzet et al. (2022) examine employment and working conditions, exposure to PSRs, as well as health status and the consumption of tranquilisers and opioid analgesics between **essential and non-essential workers in the midst of the COVID-19 pandemic** in Spain (April to May 2020). Frontline workers are mostly employed in manual occupations, specifically in catering and personal and protection services, and as salespersons and unskilled workers. In terms of gender, more than two-thirds of frontline female workers were in the healthcare, social care and cleaning sectors, while nearly the same proportion of men in frontline occupations were employed in the construction, industry, transport or healthcare sector. Results show no big differences in the contractual situation of the two groups but a **higher prevalence of low wages among frontline workers** (the share of workers whose salary does not cover basic needs was 32% compared to 24% among non-essential workers). Nevertheless, significant gender differences exist, with frontline women experiencing more temporary contracts and worse wages than men in frontline and women in non-frontline occupations. In terms of PSR exposure, overall, **frontline workers reported lower levels of job insecurity and work–family conflict** than non-frontline workers. **Female frontline workers, however, were more exposed to higher emotional demands and work-related strain** than frontline men. This difference is reflecting the high proportion of women working in social and personal services, in contrast with frontline men. The emotional demands to which frontline women were exposed could explain the worsening of general and mental health in this group compared to frontline men. In addition, this worsening of frontline women's mental health could have also been related to fears of becoming infected and becoming a source of infection to their families. Finally, this could also explain why women in frontline occupations consume more tranquilisers and opioid analgesics than non-frontline women.

Lastly, although the gig economy sector only constitutes a minor part of the European working population, the highly digitalised work environment, the presence of potentially vulnerable groups among its workers (e.g. young, migrants, low-skilled), the possibility of a growing sector and the variety of stressors observed give very good reasons for research aimed at this category. As shown in the introduction, EU-OSHA already contributed to the debate via comprehensive OSH research on **digital platform work** (section 1.2.2). In its broader overview of regulation, policies, practices and research on the topic, EU-OSHA already reported the main challenges and risks of this specialised sub-sector, including: a. professional isolation; b. long and irregular working hours; c. algorithmic management; d. digital monitoring/surveillance; and e. the presence of limited OSH regulations (EU-OSHA, 2022a). In one of the first systematic literature reviews on PSRs exposure in this professional field, Bérastégui (2021) builds a reference framework by identifying the three main stressor dimensions of gig work developed through digital platforms (a. social and physical isolation; b. work transience and boundaryless working time; and c. algorithmic management and digital surveillance) and detailing

evidence of the main associated PSR factors (e.g. workload, perception of job insecurity) leading to adverse mental health outcomes (the most common of which across the category include stress, anxiety and exhaustion/burnout). However, the author is aware of important research limitations, including the wide sectoral variety in work platforms (e.g. crowdworking and digital services beyond traditional drivers and food delivery), the already mentioned lack of strong quantitative research demonstrating the magnitude of these issues (which was mostly gathered through qualitative analysis) and an overrepresentation of United States studies in comparison to European evidence. Meanwhile, Apouey et al.'s (2020) results provide a more focused perspective to the general findings identified above. Their work is centred on analysis of a survey on the experience of a sample of workers including drivers and food delivery riders in France. The survey data was collected during the COVID-19 crisis between March and April 2020. The authors did **not find higher levels of self-reported stress and anxiety compared with other precarious workers** in their comparative sample. Actually, riders consistently reported lower levels of stress and anxiety relative to other workers despite the fact that they were particularly affected by an increased workload during the pandemic. These findings suggest the influence of selection of healthier workers in the food delivery sector but also the effect of other job characteristics that compensate for the stress due to income insecurity or intense urban traffic. In particular, respondents indicated autonomy and physical activity as positive features of their job with a role in their mental and general wellbeing.

2.2 Results associated with work design and social interactions in the workplace for industry sectors with large shares of LSES workers

This section highlights research results accounting for a non-exhaustive sample of LSES jobs and sectors. The multi-sector nature of the industry review does not make it feasible to provide a detailed description of the psychosocial work environment of each sector and its association with mental health outcomes. This is mostly due to different research approaches and the specific job demands associated with uneven requirements of sectors (e.g. emotional demands for health and care, production pressure in manufacturing and construction). Notwithstanding, the literature review provides a broad overview of experiences in hospitality and tourism, customer-dedicated services (e.g. call centre and retail), cleaning, health and care (focusing on home care workers and ancillary professionals), manufacturing or other production activities (e.g. mining) and construction plus agriculture. At the same time, whenever available, further evidence is displayed on particularly vulnerable groups inside sectors and to argumentation on the changing labour market trends identified for this study. It is also worth mentioning that many of these studies remark on the need to consider not only job design and management in the sectors but also PSRs associated with social interrelations demanded by these occupations to fully understand the implications of job strain.

2.2.1 Hospitality and tourism

The hospitality and tourism sector covers a wide range of commercial sub-sectors associated with hotels and other means of accommodation (e.g. hostels, bed and breakfast, etc.) as well as a variety of food providers in various industrial and commercial premises (e.g. restaurants, cafés, bars, contract catering, fast food). It is also known with the acronym of Horeca (hotels, restaurants and catering) as well as AFBS (accommodation and food & beverage services). Based upon previous findings, the macro-sector potentially holds high shares of LSES workers, since it is closely related to the tourism sector which is the largest sector of third-country national migrant workers. The sector further employs a high share of young people providing many of them with their first employment (EC, 2016). It is characterised by various modalities of atypical employment (temporary/seasonal and part-time work), no written employment contracts, non-standard, irregular long/short working time (split shifts) and scarce employer-paid training (EU-OSHA, 2023a). In addition, a large part of the jobs offered by this sector are filled by unskilled and low-skilled labour (EU-OSHA, 2023a). The findings from this review raise **general awareness of the PSR-filled work environment inherent to these occupations**. Hotel staff or food/catering servers – workers acknowledged as LSES in this macro-sector – are exposed to high job

demands regarding the **intensity of work** in terms of both task requirements (workload) and **emotional demands in dealing with customers**, as also evidenced in recent research (Ariza-Montes et al., 2018; Arjona-Fuentes et al., 2019; Hunger and Seibt, 2022; Ayachit and Chitta, 2022; Xiong et al., 2023).

Ariza-Montes et al. (2018) assess the employment, working and psychosocial conditions of staff in the **European hospitality sector** against other occupations. In fact, this research focuses on four types of jobs with well-differentiated effects on the psychological wellbeing of employees: active jobs, low-strain jobs, high-strain jobs and passive jobs — the last category typically involving service staff with low qualifications (such as custodians, porters, cleaners and helpers). Findings confirm that the highest level of precariousness is usually attributed to occupations of the hospitality industry. With regard to employment conditions, undeclared work, job insecurity and inadequate levels of compensation are most frequent among servers. When it comes to psychosocial and organisational risk factors, servers are more likely to work longer hours — despite the polarised nature of this industry in terms of working time patterns. Servers are also more likely to work irregular hours (e.g. multiple shifts, unsocial hours and during nights). Significant differences are stated between servers and other jobs, as servers have a higher exposure to verbal abuse, humiliating behaviour of clients and unwanted sexual attention. The authors' analysis of Eurofound's 6th European Working Conditions Survey (EWCS) revealed poorer psychological wellbeing of servers when compared to other service workers. Researchers attributed this to insufficient protective measures offered by the industry, the feelings of guiltiness due to inadequate time to spend with their families (work–family conflict), and the verbal abuse of unrespectful customers these workers are expected to endure.

Arjona-Fuentes et al. (2019) explore the individual, organisational and physical/mental health factors that promote **presenteeism in the hospitality industry**. Presenteeism is defined as workers deciding to stay present in their workplace even if they are physically or mentally unfit to do so. The presenteeism rate in the European hospitality sector currently stands at 38.3% according to the above-mentioned 2015 EWCS (which provides the data for the mentioned research), which is similar to the rate recorded in other studies conducted with a comparative multi-sector approach (around 40.0%, Aronsson et al., 2000 quoted in Arjona-Fuentes et al., 2019). However, the rate of 60-70% is reported in northern Europe (Bergstrom et al., 2009a; Robertson et al., 2012 quoted in Arjona-Fuentes et al., 2019). **Job insecurity has been frequently cited as a factor that explains the presenteeism** of employees in the European hospitality sector, since it is dominated by workers with low job qualifications and young people. Another reason is an endemic seasonality associated with working in tourist destinations. Another explanatory factor is surprisingly the commitment of professionals to deal with angry clients, being highly exposed to health and safety risks (e.g. alcohol abuse, stress, sexual harassment). The possible explanation found is the conflict between their working and family life, often resulting in family abandonment and in turn creating the need to be recognised at least in the professional environment. Moreover, company size matters: most hospitality companies are small businesses, showing difficulty in replacing employees and thus requiring an extra moral commitment from workers. Finally, the answers are sought on how workers with health issues relate to presenteeism, linking them to a. financial difficulties, or to b. a team-play effort and solidarity (staying longer hours not to overload colleagues with additional work). Also, presenteeism is demonstrated in cases of chronic physical diseases, and two of them (back pain and fatigue, resulting from long periods of standing) are even identified as determinants of presenteeism. The explanation provided by interviewed staff from the sector is that pain and fatigue are considered as 'natural' in their kind of job, hence normalising the situation/culture of presenteeism. The study sheds light on presenteeism as a serious outcome of PSRs in the hospitality sector, disclosing both negative consequences for workers' health and at the organisational level.

Hunger and Seibt (2022) in their cross-sectional study (**hotel-catering-food industry**) of **shift workers'** health risks state that psychosocial work stress is rarely included in companies' occupational health and safety approaches, although psychosocial work-related stress has been broadly discussed at academic level as a risk factor for impaired health. They prove that shift and night work have a negative impact on health. Using the job effort–reward model, they examine which relationships exist for shift workers between clusters of psychosocial work stress and overcommitment, and cardiovascular or psychological health indicators. As a result, they recommend the creation of an **inability to recover (IR) measurement tool** as an independent diagnostic value for the assessment of psychosocial work stress and suggest it as a new component of occupational health screening concepts specifically for shift

workers. To cope with the high work stress caused by shift and night work, a balance between work and recovery and sufficient regeneration phases are the essential prerequisite for high work performance.

On their account, Ayachit and Chitta (2022) review **burnout studies** from the existing hospitality literature with a specific focus **on the food service industry**. Interestingly, the systematic review reveals a paucity of studies with such a focus in Europe despite the large contribution of the food service sector to the economy of many European countries. In general, in the studies conducted so far the focus on hotel employees (especially in luxury categories and frontline roles) largely prevails, which suggests that further dedicated analysis of burnout determinants and outcomes in the restaurants segment is an important future research subject. In the 100 reviewed studies, antecedents and outcomes of burnout syndrome are explored, with the Maslach Burnout Inventory being the most widely used tool. While the findings overall confirm well-established results both in terms of PSRs (e.g. emotional labour, excessive workload and customer incivility) and adverse outcomes, they shed light on **some remarkable gaps** such as the need to factor in the analysis **the transformation of the sector brought by the COVID-19** pandemic that deeply altered consumption patterns and consequently the way restaurants operate (e.g. spatial layout, ambient conditions, etc.). In the authors' view, future studies should look more in depth at (new and old) burnout determinants in this sector through the lens of the revolutionary change it is undergoing, including the increasing pervasiveness of **digital technologies** in the provision of contactless services, doorstep delivery, novel and flexible restaurant design, and continuous innovation to increase efficiency and consumers' satisfaction.

Xiong et al. (2023) examine the effects of **emotional labour** on the mental health of **hotel interns** in their first experience on the job. The study therefore also accounts for a majority of **young workers** in the sample. Emotional labour in this profession ('deliver service with a smile') is understood as the exhausting effort of suppressing one's emotions when interacting with other people at work. The authors analyse its effects as an occupational chronic stressor stimulating the development of mental health issues. A longitudinal set of data spanning across four waves of enquiry and eight months of observation identifies **a dynamic, growing rhythm of anxiety and depression when emotional labour becomes a chronic stressor**. This is also one of the few longitudinal studies in this review, and the authors are well aware of the benefits of the methodology allowing them to reveal clearer and more direct causal directions.

Ram (2018) reviews the current knowledge about **workplace violence, bullying and sexual harassment in the tourism and hospitality industry**. The literature indicates that the high prevalence of these aggressive behaviours is due to a mix of structural reasons, insufficient managerial skills and/or common beliefs (i.e. the belief that staff should obey guests' wishes, summarised with the motto 'the customer is always right' and taking abusive manners of customers as acceptable and tolerated 'as a part of the job'). In addition, the author warns about reference in the review of how abusive and violent behaviour in the sector is often conceived as normative and that vulnerable groups in the sector include not only gender but also nationality and ethnicity. The author's findings in terms of outcomes are varied and refer to different levels (individual, work organisation and industry). **For individual workers**, bullying at the workplace was related to stress, lower performance, higher absenteeism and turnover intentions. Third-party violence was associated with turnover intentions, emotional exhaustion and decrease in life satisfaction. Findings on sexual harassment were less clear in terms of mental health outcomes, but still implied a variety of negative thoughts and feelings indicating lack of wellbeing (e.g. embarrassment and anger, disgust, adversity to work, lack of self-security) as well as negative impacts on job rewards (perceived and connected lack of promotion). From the point of view of the **organisational impacts** of these PSRs' exposure, the individual consequences for employees can lead to greater absenteeism, increased staff turnover, reduced productivity, poor industrial and public relations, and greater numbers of complaints and conflicts. More in particular, bullying was associated with a negative organisational climate and with a negative impact on company creativity. Sexual harassment was instead connected with significative loss of productivity and high staff turnover rate. Ram (2018) even gathers evidence of indirect negative impacts for the **industry sector**, since it provides a sexualised and risky image for hotels as a working environment, also deterring new workers from coming to work in accommodation establishments.

Meanwhile, some authors highlight that **organisational support** (quality relationships with colleagues and supervisors) **has an even more important role than job control** in the moderation of job demands for the sector. For example, Ariza-Montes et al. (2018) found no evidence on the moderating role of job

decision latitude on job demands of service staff compared to managerial staff in the hospitality sector. The buffering effect of decision latitude among managers in the hospitality industry may be motivated by greater skill discretion and deciding authority that these employees usually have compared with lower-qualified occupations (i.e. servers, cleaners and food preparation assistants). On the contrary, social support played a key role for all occupational groups considered. The study found that the **support of co-workers and supervisors effectively moderates the negative effects of job demands on employees' psychological wellbeing**. Co-worker support exerts a buffering effect on cleaners and food preparation assistants' psychological demands. Supervisors' support successfully moderates the psychological demands faced by hospitality service workers. The results clearly show the mitigating effect of workplace setting-related social support (from supervisors and co-workers) on the PSRs' consequences.

Chela-Alvarez et al. (2021) explore stressors of **hotel housekeepers** in the Balearic Islands and their **effects on work–life balance from a gender perspective**. Mental health outcomes (depression and anxiety) and other adverse health outcomes (e.g. MSDs, cardiovascular diseases) are in this analysis the consequence of excessive job demands referring to physical and psychological level (e.g. time pressure, physical burden, lack of resources, lack of support from supervisor, lack of flexibility and little control derived from role conflict). In the hospitality sector, the authors acknowledge that most of the jobs are for unskilled workers and held mostly by migrant and young women under temporary contracts and with low wages. The typical LSES sociodemographic profile of the workers coupled with the poor working conditions make these workers vulnerable to many social relations stressors, such as violence, discriminatory attitudes, and conflicting demands from clients and supervisors. In addition, certain vulnerable groups are more likely to be in a generally disadvantageous situation, and therefore experience more stressors as well as limited access to resources to cope with them. Chela-Alvarez et al. (2021) particularly focus on gender and social conditioning, since horizontal and vertical segregation expose women to different hazards; for instance, **feminised jobs often include more repetitive tasks**. **Multiple roles at work and at home** increase the stress of female employees who experience their job as invisible and unrecognised. Regarding practical implications for policymakers and human resources (HR) departments in hotels, the authors provide recommendations for hotel organisation to improve the job demands–resource balance, such as reducing workload and increasing resources (e.g. planning for unexpected events in the daily working schedule, allowing working in pairs or helping among workers, improving the design and adapting the furniture and hotel facilities to cleaning tasks, as well as increasing staff members). The study concludes that regarding **work–life balance, planning days off well in advance and proper management of work schedules are seen as simple yet effective improvements** to job conditions of workers in the hospitality sector. Chela-Alvarez et al. (2023) return to the domestic burden of hotel housekeepers to investigate factors that explain work–family conflict in a non-skilled, 100% feminised occupational group in the same Spanish setting. The proportion of workers in this sector reporting difficulties to bring an equilibrium between work-related and family-related responsibilities (56.7%) is shown to be higher than that of Spanish working women in other sectors (51.9%) according to the data from the European Quality of Life Survey 2016, that the authors took as reference. According to the authors, **contextual risk factors** for the increasing work–life conflict include living with one or two cohabitants (especially with dependants in need of care), low social support, having difficulties making ends meet, being the main responsible person for domestic tasks, presenting higher levels of stress at work and being younger. Other work-related variables described by informants as 'making work–life balance more difficult' included having a temporary contract, higher number of working hours, inflexibility of work schedule, time pressure and high job demands. Nevertheless, **positive outcomes of a good work–life balance at work have also been reported**. These included: increases in job performance, satisfaction and organisational commitment, and decreases in job burnout and absenteeism. Other protective factors from not experiencing a work–family conflict are job and wage satisfaction. Finally, the authors highlight some further strategies to improve working conditions of women in the sector: hospitality companies should implement measures to reduce daily stress, such as diminishing the number of rooms to be cleaned per day or the variety of tasks to be carried out by personnel — as well as considering improving wages. Moreover, public authorities should launch campaigns to foster co-responsibility of partners for caring and performing household tasks, providing services and resources to support caring for children and dependent family members (e.g. affordable childcare services, summer camps, day care centres for the elderly and home assistance).

2.2.2 Customer-dedicated services

The focus of this section is based on the **provision of services that are offered to the general population or to other businesses**. This macro-sector is usually understood as the provision of time and knowledge during which products (including advice, access, attention, discussion, experience) and other services are provided to customers. It is however worth underlining the highly diverse nature of sub-sectors and industries included under this classification. According to the typology of study, the category can span across sectors such as retail and wholesale, but also healthcare, public administration, transport and financial services (OSHWiki, 2017). Due to this flexibility, employees are therefore exposed to a variety of different working conditions and different psychosocial hazards. However, previous EU-level enquiries have encountered some similarities across PSRs associated with interactions with customers, hence making social relations' risks and associated stress responses a common denominator for the entire sector (OSHWiki, 2017). In relation to this study, the literature review has focused on a relatively high number of sources specifically addressing the psychosocial work environment of potentially LSES workers committed to customer services. These may include different modalities either on **voice-to-voice** or **face-to-face modality** (Emanuel et al., 2020). It thus includes the specific sub-activities of call centres and retail stores. Frequently cited are references to women as a particularly exposed vulnerable group to PSRs in these types of working environments. It is also worth mentioning that several studies directly focused on emotional demands and social relations risk factors concerning the interactions with customers, confirming what was previously discussed above. Lastly, digitalisation relative to work flexibilisation has been considered in some studies as conducive to a further stressful psychosocial work environment in call centres.

Duarte et al. (2020) theorise that between 70% and 80% of the European workforce consists of service workers at risk of emotional demands resulting from the interpersonal nature underpinning this line of work. **Emotional demands** erode workers' emotional health because the increased effort associated with the appraisal of demands and coping with them results in strain which over time can lead to employees feeling fatigued and worn out. The authors focus on emotional demands related to different relational sources (customers but also colleagues, supervisors and employees) and their diverse influence on service workers' exhaustion and engagement. According to them, this is also the first study to have differentiated between sources of emotional demands, offering a new avenue of research for future studies looking at emotional demands at work. The results show that emotional demands from both sources (clients and colleagues) are associated with higher emotional exhaustion and impact employees' wellbeing. However, when emotional demands are seen as part of the job role (e.g. dealing with stressful situations with clients) their **negative impact is significantly reduced in the presence of a cooperative social support at work**. On the other hand, emotional demands at organisational level (e.g. dealing with stressful situations with a manager or co-workers) seem to act as roadblocks to individual growth and development and therefore can lead to further exhausted and disengaged workers.

Indregard et al. (2017) focus on different categories of the service sector characterised by social interactions with customers (client-driven work environment) where the management of emotions appears as a job requirement. The main PSR under analysis is defined as **emotional dissonance**, understood as the discrepancy between expressed and felt emotions as the principal strain phenomenon in this sector. This study aims at: *a.* determining the relationship between emotional dissonance and medically certified sickness absence among employees working with clients; and *b.* comparing the effect of emotional dissonance on medically certified sickness absence impacting other psychological and social work factors (i.e. quantitative demands, decision demands, role clarity, role conflict, control over work intensity and decision control). The research has been conducted on a broad sample of 7,758 employees recruited from 96 Norwegian organisations (all working with clients). The cross-sectional sample includes a variety of workers in various occupational groups (e.g. legislators, technicians, clerks and armed forces but also over 2,000 contributions from shop/market sales, craft and related workers, other elementary occupations). General results show that the **emotional dissonance and role conflict significantly predicted the presence of medically certified sickness absence**. The finding of a direct relationship between emotional dissonance and sickness absence is consistent with the theoretical association between emotion regulation and absenteeism. Moreover, **control over work intensity and decision control worked as protective factors** and were related to a reduced sickness absence. Only role conflict was a risk factor influencing the duration of sickness

absence negatively when all factors were analysed simultaneously. The general conclusion is that emotional dissonance is a common risk factor for the presence of medically certified sickness absence in client-driven work environments. Unfortunately, the study does not explicitly focus on cross-sectional comparison across occupational groups. Nonetheless, Indregard et al. (2017) consider it reasonable to assume that the associations may be stronger for some occupations than for others.

Emanuel et al. (2020) shift the attention to the relationship among job demands typical for service work, **emotional dissonance and relative affective discomfort vis-à-vis work–family conflict** in two different jobs: **call centre agents**, characterised by a voice-to-voice relation with customers, and **supermarket cashiers**, characterised by a face-to-face relation. Just like in the hospitality sector, emotional labour is a fundamental component of service work (providing ‘service with a smile’). On a first level, the results of the study confirmed that emotional dissonance and customer verbal aggression are positively associated with affective discomfort at work, hence relating to apparent signs of stress. Second, emotional dissonance and customer verbal aggression were positively associated with work–family conflict, but the experience varied on whether confrontation between workers and customers occurred face-to-face or voice-to-voice: emotional dissonance only related to work–family conflict for call agents, while customer verbal aggression related to work–family conflict for cashiers. Third, **clear evidence was established between reporting affective discomfort at work and personal life conflict**, showing that emotions from the workplace would transfer to the home and family domain.

Zito et al. (2018) verify the role of emotional dissonance and of two specific job resources (job autonomy and supervisors’ support) in the perception of job satisfaction and turnover intentions among employees of an **Italian call centre**. Their own review of the literature highlights that a call centre job displays several features of a stressful work environment: role stress, performance monitoring and lack of control on the activity, insufficient coaching, training and supervisors’ support as well as emotional exhaustion at work, leading to emotional dissonance and resulting in job dissatisfaction. The direct results of the analyses show the **role of job resources in fostering job satisfaction and in decreasing turnover intentions**. Emotional dissonance reveals a negative relation with job satisfaction and a positive relation with turnover. Moreover, job satisfaction is negatively related to turnover and mediates the relationship between job resources and turnover. This study contributes to extending knowledge about the variables influencing turnover intentions, a crucial problem among call centres. Moreover, the study identifies theoretical considerations and practical implications to promote wellbeing among call centre employees. To foster job satisfaction and reduce turnover intentions, in fact, it is important to make resources available, but also to offer specific training programmes to make employees and supervisors aware of the consequences of emotional dissonance. Another aspect comes with the need to improve the supervisor support for employees to overcome negative emotional situations and to build a positive organisational context. These measures can effectively influence organisational identification and the psychological attachment to the organisation.

Enhancing the sense of belonging and the organisational identification can result in higher motivation, job satisfaction, organisational citizenship behaviours and reduced turnover intentions. Molino et al. (2016) address **emotional dissonance of call centre workers in an Italian telecommunications company** through a cross-sectional study with 531 workers, of whom 352 worked in customer assistance and 179 in the information service. The aim was to explore how two different job demands (workload and customer verbal aggression) and three job resources (supervisor support, colleague support and job autonomy), typical of the call centre context, are related to affective discomfort as a wellbeing dimension and whether these relationships are mediated by emotional dissonance. Call centre activities can be divided across inbound and outbound activities requiring different modality of tasks involving workers. Inbound refers to receiving calls from customers while outbound refers to making calls to sell services/products. The paper only focuses on inbound call centre activities. Previous literature evidence is available on the stress levels associated with receiving calls from customers and providing customer assistance. Complaints, inquiries and verbal aggression are frequent, accounting for greater emotional labour. Molino et al. (2016) direct enquiries on two specific sub-kinds of inbound activities, namely customer assistance services (receiving calls to solve specific technical problems) and information services (providing phone numbers that customers require). Analyses showed that customer assistance agents experience greater customer verbal aggression and emotional dissonance than information service agents. In terms of job demands considered and exposure to PSRs, customer verbal aggression showed a direct positive relationship with both emotional dissonance and affective

discomfort. As for workload, the results confirmed that excessive amount and pressure of work could also generate negative feelings and be strongly associated with amplification of affective discomfort via emotional dissonance. Hence, the amount of and pressure at work could generate negative feelings and additionally negative feelings coming from the workload or the customer aggression were more difficult to manage because of the workload. Regarding job resources, supervisor support and job autonomy, they all have a direct negative relationship with affective discomfort for both types of inbound activities. This demonstrates that a supportive climate and having autonomy in the job contributes to employee wellbeing, likely because of greater discretion in choosing how to manage calls with customers and how to deal with difficult situations, preventing negative reactions from the customers and bad feelings for the worker. Suggestions for organisations and practitioners emerged to identify practical implications useful both to support employees in coping with emotional labour and to promote wellbeing in inbound call centres. Interestingly, neither colleague nor supervisor support at work seemed to help in dealing with emotional dissonance, most likely due to the individual task execution nature of multiple activities on the job. For what concerns policy pointers, Molino et al. (2016) signal the need to improve training programmes to enhance employees' emotion regulation skills, and to introduce HR practices aimed at clarifying emotional requirements of the job.

Roque (2016) analysed **the PSRs encountered in Portuguese call centres in a qualitative study**. Although no statistical correlation is directly provided in the paper, qualitative fieldwork showed that workers in this sub-sector (labelled as 'Infoproletariat' or 'Cibertariat' by Huws, 2003 quoted in Roque, 2016) mostly comprise vulnerable worker groups such as women and temporary and precarious workers. The paper does not statistically correlate PSRs exposure to mental health outcomes, but rather provides qualitative analysis aiming to highlight evidence of risk factors (e.g. bullying, time and workload pressure) and the possibility of developing negative psychosocial outcomes. According to Roque, the ultimate negative outcome is that of entering what he defines as the 'precarious mind': an alienation state in which workers live in a constant state of emotional fear regarding work. According to his definition, it is a mind blockage akin to a depressive state in which career ambitions disappear and workers lose their occupational identities. It is also worth mentioning that the author states that introduction of new ICT technological innovation for work execution in this line of work can promote precarisation of labour relations and loss of social and labour rights, hence increasing job insecurity risks. Nevertheless, Roque (2016) also highlights the protective role of social relations for mitigating these risks. In 2014, *the Call Centre Workers' Trade Union* was created, facing tremendous challenges to recognise the lack of health and safety conditions in this line of work. One of their main goals was the signing of a petition meant to: a. define customer relationship assistant as a profession of high strain; b. establish it as a profession in which 75% of the work can be done online (and which would be in need of more relevant national OSH legislation); and c. fight against harassment of workers and against increased work insecurity.

Bridging the findings of this section, Neto et al. (2018) explore work-life conflict, job demands and various kinds of support as determinants of workers' mental health and wellbeing in a cross-sectional study with two samples: one sample comprising **clothes store sales employees** and the other comprising **call centre operators**, both in Portugal. Several comparative findings can be extracted from the cross-sectional observation of the two professions, looking at the consequence of PSRs for adverse mental wellbeing. For job characteristics, the factors were similar between workers in the two professions. **High job demands and work-family life conflict** were both confirmed by the analysis as reducing mental wellbeing, although the latter had a bigger effect than the former. **Job control and supervisory and co-worker support had significant protective effects** on mental wellbeing and, in both companies, supervisory support had a stronger effect. For socioeconomic variables, in terms of gender, men in retail tended to have lower levels of mental wellbeing than women. However, the opposite was observed in call centres. Interestingly, the proportion of cases of poor mental wellbeing also increased based on age for both professions. Higher education (compared to basic schooling) conditioned reduced mental wellbeing for retail but not for the call centre, except for those with a university degree level. It is still important to underline that almost none of the socioeconomic variables' results were deemed as statistically significant. Ultimately, the study could confirm that work-life conflict was strongly associated with a decrease in employees' mental wellbeing, much more than other factors (e.g. job demands) for both professions. This held true regardless of age, gender or level of schooling of employees.

Kaliniene et al. (2021) studied **the presence of burnout among a retail cohort of young feminine workers (254) in Lithuania**, specifically the sales staff of a clothing retail company who work in direct contact with customers. The statistical analysis showed high prevalence of burnout across three burnout scales, namely personal, work-related and client-related burnout which was 53.5%, 66.5% and 55.5% respectively in the sample. More specifically, the study showed that high job demands, low job control, low manager's support, low co-workers' support and poor relationships were all significantly associated with all three burnout subscales. However, it was **high job demands** (e.g. time pressure, intensity of work, workload) **that was most significantly associated with all burnout scales**. Meanwhile, more elevated rates of managers' support displayed significant associations with a lower probability of burnout at all levels, whether considering a high or an average level of support. Co-workers' support followed close, showing a possibility to reduce work-related burnout by about 30% and conversely showing that average and poor relationships at work with colleagues indicated a greater probability to incur personal and work-related burnout. However, unlike other studies in this review, associations with other variables such as age or work experience did not show any mediating effects, maintaining a general focus on the importance of high job demands for negative outcome and of **workplace support (supervisor and colleagues) as most relevant protective factor**.

To conclude this section, Shiri et al. (2021) explored the association of working hour characteristics with **short sickness absence** (between one and three days) among **retail (grocery stores and supermarkets) workers in Finland**. The sickness absence outcome is included in this review since there is existing evidence in other occupational studies that its increased occurrence can be an early warning for mental disorders (e.g. Sumanen et al., 2017; Harkko et al., 2021). Previous cohort studies collected in their framework already found an association between shift work and sickness absence. The results of this study suggest that the percentage and number of short (fewer than 11 hours) shift intervals strongly predict short sickness absence among retail workers with a dose–response relationship. Weekly working hours of more than 40 hours and night shifts also predict short sickness absence among retail workers. The study shows that among factors related to shift work in the retail sector, a short shift interval is the strongest risk factor for short sickness absence. Moreover, long weekly working hours increased the risk of short sickness absence among part-time workers and working mainly night shifts increased the risk among full-time workers. **The findings state the strong dose–response relationship between a short interval across shifts (quick return) and short sickness absence**. A dose–response relationship was found among both part- and full-time workers, both men and women, and among both younger and older workers. However, it was particularly strong for women, part-time workers and those younger than 30 years. Regarding the solutions foreseen, improving intervals between shifts and shortening long weekly working hours could reduce the risk of short sickness absence among retail workers.

2.2.3 Health and care: home care, long-term carers and ancillary occupations

The EU human **health and healthcare sector** is a key sector in terms of its contribution to the health and wellbeing of Europe's citizens. However, while a significant share of workers is employed in hospitals, it is important to underline that **these services can also take place in other facilities**, such as **primary care institutions, nursing homes and at patients' private homes**. According to previous research, it is a female-dominated sector and characterised with large inequalities in the employment and working conditions of different occupational profiles (non-medical and medical occupations) and also within care professionals (e.g. nurses and physicians), with home care workers being among the lowest-paid jobs in all EU Member States with a high share of informal work. The healthcare and social care sector stands out for the **high exposure to PSRs compared to other sectors**. According to the European Survey of Enterprises on New and Emerging Risks (ESENER) 2019, this is partly due to the emotional demands of care work but it is mostly explained by how work is organised (EU-OSHA, 2022b). Prevalent PSRs in the sector include high work intensity due to understaffing of health and care facilities, harassment and violence in the workplace, and higher risks of burnout. Of relevant interest to this section of the review are the so-called home care workers who generally provide domestic long-term care services to users discharged from the hospital, the elderly, users with disabilities, chronic diseases, drug addiction issues, mental health challenges, and terminally ill patients. The literature shows high evidence

of research on this category both for job design and social relations' risks. Emphasis is also stressed on women and migrant workers developing this profession in the European context, although evidence is still partial and could benefit from increased focus on mental health outcomes (e.g. Vianello, 2019; Bover et al., 2015). Scarce results were instead detected for ancillary healthcare (i.e. non-clinical) occupations in medical settings. These clearly denote a broad research gap in the scientific debate surrounding PSRs exposure and mental health outcomes of hospital/medical care staff other than traditional ones such as physicians or nurses (Sèrole et al., 2021).

As a first outlook on home care workers' results, Assander et al. (2022) developed a cross-sectional study on **home care staff specialised in elder care in Sweden** through a limited sample of employees (225) from five home care agencies in a large national county. The main findings highlight that workers in the sector are indeed exposed to high levels of job strain, and that this is mainly attributed to a combination of individual and organisational factors. For what concerns job design aspects, home care workers reported an excessive workload — including broad expectations from users in terms of multiple tasks execution and incompatible requests with the profession (e.g. cleaning) — leading to increasing feelings of stress and turnover considerations alongside depressive symptoms and sleeping problems. In addition to this, they also report parallel findings from the Swedish National Board of Health and Welfare concluding that home care staff is on sick leave twice as often when compared to other professions in the sector. Incidentally, Nyberg et al. (2021, 2022) also studied **the Swedish health and social care industry** trying to understand why its employees have an increased risk of sickness absence compared to workers from other industries. Unfortunately, the reasons for the increased risk in sickness absence are not fully understood by the research due to inconclusive associations. However, poorer working conditions have been suggested to be a plausible contributing factor, particularly in the field of poorer psychosocial working conditions. These results are set against the context of organisational and regulatory changes in the home care service system in the country, which in recent years have even led to an increase in job demands in combination with a structural reduction of organisational support in this line of work. As contextual factors, Nyberg et al. (2021) highlight that in the paradigm of today's elder care, home services are prioritised by users over living in nursing homes. In addition, older adults are nowadays frailer and suffering multiple health conditions, thus adding up to the need for more advanced care support. For what concerns social relations' risks, they recognised that an organisational culture and climate contributing to negative perceptions of support and recognition can stimulate high job strain just as much as high job demands. Home care workers in their sample remarked that agency-led independent work and limited contact with colleagues can further contribute to strained psychosocial work environments. Furthermore, a perceived lack of continuous and sufficient communication within the work setting — coupled with a felt lack of interest from management in staff health and wellbeing — further contributed to feelings of stress conducive to depressive symptoms and sleep issues. Based upon all of this, the authors suggest two key elements in possible strategies to decrease job strain in the sector. Firstly, they encourage the development of group sessions among staff with a focus on self-reflection and communication to give workers a chance to meet with managers. Second, they include the possibility of introducing **reablement programmes in home care services** allowing to generate a better connection between worker and service user. Empowering the service users to collaborate and take responsibility for some daily activities themselves could in principle generate a new supportive work environment decreasing job strain in home care environments.

Grasmo et al. (2021) rely on a very small sample (N=8) of **Norwegian home care workers** to perform **in-depth semi-structured interviews** of their working conditions related to occupational health. Although unable to offer statistically significant correlation, direct testimonials can contribute to highlight contextual risk factors during the job alongside signs of adverse health outcomes. The authors mainly identify three categories of occupational health risks. Firstly, they confirm social relations can be a source of risks deriving from relationships with both colleagues and users. Beyond more traditional acknowledgement of verbal violence, sexual harassment and stigmatisation as a source of stressful working conditions, they also add to the framework possible grief attached to sickness or loss of service users when an emotional connection had been established with the patient. A second source of stress was identified in the concept of home care as 'an unpredictable workplace'. Having to work at an assisted user's house often means having to deal with other people's homes and unwillingness to change possible environmental hazards of all kinds (e.g. from adapting workspaces to suffering passive smoke). The interviews confirm a variety of outcomes that follow confrontation between user and carer that can lead to stress as a clear mental health outcome as well as MSDs. Lastly, the interviewed workers

highlighted the organisational conditions of their work as the final source of occupational risks. High job demands were often expressed through time pressures and staffing replacement challenges alongside constant shift work. A variety of adverse health outcomes was observed, including mental and emotional strain, exhaustion and burnout, and negative feelings for having too little time to meet users' psychological and social needs. Shift work was also explicitly mentioned by interviewees as associated with disturbed sleep patterns, reduced sleep quality, and higher needs of rest and recovery time.

When considering the specificities of quantitative job demands required by health and care service workers, special attention should also be paid to the specific implications of emotional demands as a moderating factor. Geisler et al. (2019) perform a targeted analysis on **workers from Swedish social services of local municipalities**, including a series of health/long-term care workers and maintenance assistants at home if users are unable to do so autonomously. The results of their research show that emotional engagement (e.g. dedication to patients) can moderate the negative influence of quantitative demands due to work engagement and dedication feelings, but only if the latter are not too high. Social relations' risks for the sector have also been the subject of specific systematic literature reviews. Phoo and Reid (2022) specifically focus on the **violence towards home care workers**, which is considered as underreported while adversely affecting the physical and mental health of both workers and care recipients. Results showed that violence was common from care users with cognitive disorders, substance abuse disorder and limited mobility; towards workers who feared that violence might happen; in very close as well as very distant carer–client relationships; and when care plans were not inclusive of clients' needs. This contribution highlights a gap in evidence on determinants of violence towards care workers working in individual home settings and suggests potential areas to be addressed to reduce such violence. Regarding the organisational factors, these include care plans, the type of work organisation and support provided by the employer, whether workers had undertaken violence management training and other measures taken by their employers to address violence. The associations between the practicality of the care plan and violence were examined in a survey among home care aides who helped with daily living, showing that there was a higher risk when the care plan was not clear, when it did not allocate adequate time, required working at non-predictable hours, or when the aides were asked by clients to do tasks that were not part of their role. According to the authors, measures recommended to be taken by organisations should include accountable violence management procedures, including compulsory workplace health and safety monitoring and training employees on how to maintain professional relationship boundaries with clients. For the care workers who must endure the consequences of the gaps between the care plans offered by the agencies and the care demanded by clients, agencies should continually monitor that the clients' expectation of care match the reality provided by the care workers.

On their account, Clari et al. (2020) perform a meta-analysis exploring the **prevalence of sexual violence** (including sexual harassment and abuse) perpetrated by clients against what they define as **home healthcare workers** (HCWs), including professional and paraprofessional (informal) staff in high-income countries. The literature shows that workplace violence is highly dependent upon the work sector and job characteristics, and that HCWs are more likely to experience workplace violence and injuries than other industry workers. However, only few researchers have examined workplace violence against health care workers in *non-hospital settings*⁵. In terms of research limitations, the authors clarify that no meta-regression could be performed due to lack of data in reporting personal and working characteristics related to workplace sexual violence. Notwithstanding, Clari et al. (2020) were still able to state that the prevalence of sexual abuse was lower than that of sexual harassment, which affected one out of 10 HCWs. In addition, real prevalence of sexual violence may be considerably higher than observed in this meta-analysis because home care is a setting that lacks witnesses and often goes along with underreporting of violence and abuse. The authors thus compile a literature-based series of reasons for understanding lack of reporting, including: fear of being punished or ridiculed; lack of trust in investigators, police and other health workers; shame and embarrassment; lack of actual consequences for the offenders; and lack of other witnesses due to the domestic workplace setting. In addition to all

⁵ The results reveal the prevalence of sexual violence (both harassment and abuse) among paraprofessional (informal) HCWs. This was calculated through overall pooled prevalence meta-analysis via I² index and by performing the Cochran Q test, revealing a prevalence of 6% (95% confidence interval (CI): 0.01–0.13) with an I² = 98%.

these, it should also be added that lack of procedures, information and support from the employer's side do also play an important role in underreporting. While the authors do not directly associate the PSRs with mental outcomes, they build a framework of reference for possible adverse mental health outcomes associated with experiences of workplace and sexual violence. These would mainly include depression, shame, anxiety and anguish, anger, post-traumatic stress disorder (PTSD) and suicidal ideations. As a reaction to these hazards, Clari et al. (2020) suggest the implementation of **early warning systems via training of HCWs in recognising potential at-risk situations** and by responding effectively to limit the possibilities of assaults.

Friborg et al. (2017) contribute to the debate by investigating *cross-sectional* association between **sexual harassment by clients or customers and depressive symptoms** in 1,041 Danish organisations in **elder care work, social work and akin customer service work**. They also verify if this association was different compared to sexual harassment conducted by a colleague, supervisor or subordinate. Results show that the exposure to workplace sexual harassment from clients, users or customers was indeed significantly associated with a higher level of depressive symptoms (2.05; 95% CI: 0.98–3.12) compared to no exposure. In addition, **employees harassed by colleagues, supervisors or subordinates had a higher mean level of depressive symptoms** (2.45; 95% CI: 0.57–4.34) than employees harassed by clients or customers. A possible explanation given by the authors was that employees harassed by a colleague, supervisor or subordinate may fear job loss, retribution and that the harasser will not receive any penalty. This notion is in line with previous research identified, showing that only between 5% and 30% of targets of sexual harassment in general file formal complaints, and that employees harassed by a supervisor are less likely to report the conduct compared to those harassed by a client/patient. In contrast, it is often recognised that sexual harassment can occur in face-to-face services, and it may still be perceived as a part of the job to manage such situations.

The current review also produced a series of findings specifically addressed at **migrant and women home carers** as a vulnerable group in this broad sector. The DARES report (2021) examined the exposure to PSRs among home care workers using data from the 2017 SUMER (*Surveillance médicale des expositions aux risques professionnels*) survey. In terms of workers' group status, home care workers are identified as mostly women, and they are more frequently of foreign origin. Although work intensity is moderate compared with the rest of the salaried population, their working time patterns are highly fragmented due to the extension of part-time work and atypical and unpredictable schedules (76% of home workers are on part-time work, 51% report not working the same hours every day and 15% do not know their work schedules a week in advance). This also results in long hours of work, leading to increased risk of exhaustion and work–family conflict. Home care workers are at higher risk of professional isolation, a risk that tends to increase the burden of the emotional demands that are inherent to care work. In addition, home care workers report higher levels of job insecurity. All of this is shown to contribute to poorer physical and mental health wellbeing.

More case-focused studies are present, yet they report only piece-gathered evidence of exposure to PSRs and stressful working conditions. Vianello (2019) carries out an analysis of **most hazardous factors of home care work in Italy** through targeted focus groups and a non-representative survey of 867 home care assistants **with migrant background** (over 90% of whom foreign-born). The author does not specifically correlate PSRs exposure to mental health outcomes, but rather develops her own index of 'worker malaise' being defined on physical and psychological risks to which home carers could have been exposed (including e.g. longer working days, isolation, separation from family and overlapping social roles). Her malaise index was developed by counting affirmative answers to her questionnaire of assessment according to a simple scale of occurrence frequency (i.e. Absent, Low, Intermediate, High). Her analysis helps in unveiling three important research results: a. that there is a strong correlation between high job demands (both physical and emotional) and workers' malaise; b. that the live-in formula (workers living at their client's premises) is not clearly linked with higher levels of psychophysical malaise compared to workers living outside their client's premises – whereas feelings of isolation correlate in a greatly increased way for those living in the client's place; and c. that violence in the workplace is clearly one of the main risks to which workers in the sector are exposed.

Hopfgartner et al. (2022) relate the experience of precariousness and even job exploitation experienced by **Romanian workers in live-in care jobs in Austria**. Based on a small sample (N=13), they perform in-depth interviews highlighting that while Western welfare states attract migrant workers due to high demand in social care, poor psychosocial and physical working conditions can generate a grave

situation of labour exploitation. An interesting feature of the sample is the indication of a clear gender bias for live-in care work. While female caregivers are seen as a 'natural' choice for work including emotional demands, male caregivers tend to be chosen for tasks requiring strength and control. In addition, the research highlights relatable PSRs akin exposure in terms of financial and job insecurity (e.g. low-waged, insecure self-employment), excessive job demands (e.g. high workload and extensive shifts, extra demands beyond care), inadequate training, and low status and recognition. Other interesting social relations' risks are encountered in the role conflict generated: *a.* between clients and caregivers holding a family members/friends-like relationship rather than employer–employee one; and *b.* in the presence of social deprivation when migrant workers are isolated and bound to the job while experiencing disconnection from their loved ones and their social networks at home. Implicitly, all of these factors contributed to a negative psychosocial work environment prone to adverse mental health outcomes. Bover et al. (2015) specifically focus their analysis on Latin-American migrant workers working in home care in Spain. Once again, the association is not clearly linked to mental health outcomes but rather to quality of life. Notwithstanding, high job demands (e.g. live-in formula, high workload), job insecurity, young age and irregular migrant status all account for poorer wellbeing. Seeking to assist policymakers and employers, Gebhard and Herz (2022) focus on the analysis of targeted interventions contributing to making home care a healthy workplace. Although the authors consider it a societal concern of great importance, research on specific interventions for improving working conditions is scarce when it comes to psychosocial perspectives. In their literature selection, only four studies partially dealt with mental health of care workers beyond other physical outcomes (e.g. pain, MSDs, health behaviours) and overall identified that the root cause of their work stress lies in organisational and structural levels of job design in the sector. However, no specific intervention with proven results were identified, especially no organisational interventions. The only hints given in two studies focused on the individual measures such as mindfulness trainings and breathing exercises. The paper closes argumentation by requesting a broader development of intervention control studies in the sector.

Another sectoral review concludes the visualisation of results through accounting for **ancillary occupations** in medical settings, often known with a variety of different names (e.g. forgotten healthcare occupations, professionals with non-healthcare roles, non-healthcare workers) and yet proving challenging to identify in this typology of research due to a much broader focus of the literature on traditional healthcare professions (e.g. physicians, nurses). This sub-category instead refers to workers in a hospital or other health and care settings, performing support tasks for the management/care of facilities and patients (e.g. cleaners, cooks, midwives, ward assistants, caregivers, childcare assistants, janitors, stretcher-bearers, low administrative assistants). However, despite in-depth research this review could only provide a single contribution fitting all necessary parameters (i.e. recent publication, ancillary staff focus, European workers-dedicated). Thus, Sèrole et al. (2021) developed a **cross-sectional study of multiple workers' occupations at the University Hospital of Clermont-Ferrand, France**. The study is well aware of the conceptual separation between primary healthcare professionals and the so-called forgotten healthcare occupations described above, and thus accounts for PSRs exposure and burnout across the various categories. As one of their primary results, it is shown that certain ancillary categories are exposed to increased risk of burnout, first among all, the category of hospital cleaners (71% of the total sample) due to work overinvestment and an increase in emotional exhaustion, depersonalisation and the desire for personal accomplishment. The authors expose a series of hypotheses that could explain these results, among which are included the high job demands and low resources associated with time pressure, economic constraints, heavy workloads and even partial emotional demands derived from indirect contact with patients. Other possible contextual explanations could derive from associated physical efforts, age, gender and even low position in the occupational hierarchy. It is however worth observing that the European literature is in dire need of further research on ancillary healthcare (see section 4.1.3). An interesting example from a third country detected in the literature review and hereby reported due to results' relevance is the study conducted by Ahmadi et al. (2022) seeking to investigate the association between physical and psychological workloads and occupational fatigue among Iranian hospital service personnel. The protagonists of the study were ancillary healthcare staff whose main duties resided in complementary tasks to the work of physicians and nurses, but that are equally essential to efficient management of the health facility (e.g. dealing with hospital waste, transporting of patients, cleaning tasks including changing bed linens, mopping floors and equipment sterilisation). Based on contributions from 198 workers (86% response rate), the authors

detected that both physical and psychological workload intensities ran high in workers (72.2% for the former and 47% for the latter). In addition, Ahmadi et al. (2022) sought to determine the precise nature of fatigue as an outcome, distinguishing between 'physical fatigue', 'psychological fatigue', 'fatigue due to shift work' and 'general fatigue'. Most importantly, their analysis unveiled that age, gender, marital status, daily working hours and most importantly psychological workload were all factors contributing to the development of the various types of fatigue.

2.2.4 Cleaning

Professional cleaning is considered to be **one of the most common occupations in the EU**, as cleaning is a common task carried out in virtually all industry groups and workplaces. However, it is a sector that is often not considered as a separate occupational group in EU-level statistics or surveys, hence making it more difficult to obtain precise estimation about SES (EU-OSHA, 2010). Nonetheless, previous estimations have considered it as **a sector ripe with potentially LSES vulnerable groups**, including a high preponderance of female, migrant and ageing workers (EU-OSHA, 2010). Research results on cleaners from this review have also demonstrated the presence of an **industry sector with a potentially dangerous psychosocial work environment**. However, the availability of sources found with the literature review was reduced in comparison to other industry sectors. There is also a strong preponderance of studies including cleaners associated with companies, whereas domestic cleaning work has only been identified in one publication and under qualitative research on social stigmatisation as a source of poor wellbeing (Bosmans et al., 2016). Lastly, one study was identified relative to the fundamental role of cleaners during the pandemic, but the timing of the study only made it possible to consider additional psychosocial burden of cleaners as essential workers during the most acute phase of the pandemic (i.e. first large lockdown period, see Dias et al., 2022). Overall, the hereby exposed selection confirms previous research findings (e.g. EU-OSHA, 2010) considering that the high job demands and the lack of resources for the sector are conditional to possible increases in rates of adverse physical and mental health issues.

Gamperiene et al. (2006) examined the association between psychosocial and organisational work conditions and mental health among **women employed in the cleaning profession in Norway**. This occupation is nationally characterised by a high percentage of female employees and migrant workers, and comes with a high rate of morbidity as well as a high level of disability pensioning. According to the article the cleaning profession has also proved to show a rigid structure of leadership and work organisation that results into a relatively high turnover and the absence of a permanent workplace. Self-report questionnaires were mailed to 661 cleaning staff personnel from cleaning organisations in seven cities across Norway. A factor analysis of the questions specific to the psychosocial work environment identified the following four underlying dimensions: poor satisfaction with leadership, poor satisfaction with co-workers, time pressure/control, and lack of information/knowledge. Two of these, **poor satisfaction with leadership and poor satisfaction with co-workers, were significantly related to mental health**. Having contact with colleagues less than once a day and not being ethnically Norwegian further increased the risk for mental health problems. The results thus indicate that mental health is associated with the quality of leadership and collaboration with co-workers, as well as with ethnicity. High-quality collaboration between the cleaning staff and their leaders appears to be more important than the number of meetings. Meanwhile, López-Goñi et al. (2022) fill the knowledge gap by examining the **health status of female cleaning workers in Spain**, showing a high risk of suffering impaired health. A multi-centred cross-sectional study was carried out in the cleaning service sector of a Spanish company with the final sample being composed of 455 female cleaning workers. PSR factors were assessed jointly with sociodemographic variables and perceived health status when looking for evidence of physical and mental health outcomes. The results show that the main psychosocial challenge for these women is **the lack of acknowledgement of the tasks performed by superiors**. This finding highlights the need to sensitise managers and employers about the need to acknowledge the work performed by workers. Less preponderant associations were also found on **support relationships with the rest of the employees**.

Charles et al. (2009) focus on **the broad group of building cleaners (i.e. housekeepers, janitors or caretakers)** by performing a systematic review of epidemiologic studies in the work environment of cleaners **employed in hospitals, hotels, restaurants and private homes** as a category of workers

who experience diverse occupational hazards resulting in health problems. Cleaners are among the lowest paid workers, and many are employed on a part-time or informal basis. There are a variety of psychosocial stressors cleaners are exposed to: the sense of social isolation, concern for one's physical safety (especially among women), working alone and outside of regular working hours, the ramifications of the low status of this job that prevents them from having any influence over several aspects of their work, monotonous work, low social and legal protection, and little or no job security. The PSR identified in this study is primarily the **stigma and social prejudice** attached to the job. Mental health outcomes (i.e. depression, anxiety) were associated with all above-described psychosocial stressors across different studies while also accounting for the consequence of societal stigma. MSDs are also signalled among adverse health outcomes associated with PSRs exposure; as previously mentioned there are plenty of interactions between PSRs and MSDs. Both risks do not act in isolation but their effect is often combined (EU-OSHA, 2021b).

Bosmans et al. (2016) explore the coping strategies that moderate the relation between **the stigma of dirty work (social stressor) and domestic cleaning workers' sense of self (mental wellbeing)** based on the analyses of 43 interviews with **domestic workers in Belgium**. Their results show that 'dirty workers' feel like being seen as unskilled, are often treated with disrespect, are exposed to oppression and deprivation, and experience racism. A series of in-depth interviews were performed to explore their coping strategies to deal with the stigmatisation that stems from physically and socially tainted work characteristics (i.e. selective social comparisons, avoidance, acceptance or distancing from role, confronting stigmatising behaviours, reframing). By using a social stress approach in which stigma is considered a stressor, the results reveal a range of maladaptive and adaptive coping strategies that contribute to a negative or a more positive sense of self. Four main categories of coping strategies are discussed: confronting/countering perceptions and behaviours, occupational ideologies, social weighting, and defensive tactics. The first two categories are adaptive coping strategies; the last two can be adaptive or maladaptive and leading to internalising the stigma attached to one's job. It is also revealed that workers used adaptive and maladaptive coping strategies simultaneously, leading to mixed implications for their sense of self. Finally, **this study finds that positive, supportive employment relations with clients and employers are an important social coping resource for domestic workers** since they often work in isolation and hardly see colleagues. These supportive employment relations can contribute to a more positive sense of self for domestic workers and improve their mental wellbeing and work performance.

Lastly, Dias et al. (2022) focus on self-reported perceptions of **female cleaning service workers in Portugal during the pandemic** to identify factors at work that increase worries and anxiety. Besides acknowledging the sector as broadly populated by female LSES workers, they identify both the **worsening of work conditions (e.g. work overload, feelings of job insecurity) and the perception of health risks (e.g. 'fear of contagion' effect for their families first and for themselves second) as most contributing to increased mental health issues** for this category of workers during the first acute period of the pandemic.

2.2.5 Manufacturing and production

The manufacturing sector can be broadly defined as an agglomeration of industries engaged in chemical, mechanical or physical transformation of materials, substances or components into consumer or industrial goods. In itself the term is most commonly applied to industrial production in which raw production materials are transformed into finished goods on a larger scale and then used in the supply chain (OSHwiki, 2022a). For the sake of grouping findings more oriented towards akin typologies of manual labour occupations, **this section deals with manufacturing and other productive activities that are not traditionally associated with the sector (e.g. mining)**. This is also because while much early evidence in this sector was dedicated across the literature to blue-collar workers in the United States automobile manufacturing, according to a publication identified in this review there was **a diminished trend towards analyses of the psychosocial work environment for the manufacturing sector in Europe**. ESENER survey data provide a series of results of manufacturing activities and PSR management, showing relatively low engagement on PSRs compared to other sectors, with 31,6% of companies having an action plan against stress at work and PSRs at work (EU-OSHA, 2022d). In addition, there is currently a lack of recent and systematic EU findings for the industry. As a result of all

the above, scattered evidence on the main subject of this study was only available across a variety of manufacturing and other production activities in Europe (e.g. Cohidon et al. (2009) on slaughtering houses and food production, and Mościcka-Teske et al. (2019) on miners). Notwithstanding, it may also be the case that evidence on digitalisation and automatisisation research (e.g. Wixted et al., 2018) will soon require a renewed emphasis on the psychosocial work environment of production spaces, as in the case of new robotised and network-connected factories dominated by the Internet of things.

Gathering evidence from food production factories, Cohidon et al. (2009) have performed a comprehensive survey of perceived health status for **blue-collar employees of the meat industry in the French Brittany region**. Their main aim is to unveil the high prevalence of poor health reported by the workers in the sector, both at physical and mental health level. The analysis of results from the PSR-based Karasek questionnaire helps them unveil the presence of high quantitative and qualitative demands at work, the lack of adequate resources and to a lesser extent missing job rewards such as promotion opportunities at the workplace. High psychological demands are present in terms of the slaughtering, cutting and deboning activities of large animals and poultry as well as certain organisational factors generating further pressure (e.g. difficult work environment in noisy, cold, humid and bacteria-prone space under tight schedules and rigid worker–supervisor hierarchies). The study also deals with factors relative to vulnerable groups, such as young age (identified as an increased risk variable factor) and gender differentiation, where increased poor health perceptions are accounted for women with particular emphasis on unsociable working hours disrupting sleep rhythms.

Contrary to preliminary expectations, Mościcka-Teske et al. (2019) perform a cross-sectional study of **Polish miners** vis-à-vis other national workers from the metal, energy, chemical and construction industries in the country and find that miners in the sample are in general more healthy, less stressed, more positive emotionally and normatively committed to work, more satisfied with work, and more stable in their employment (as opposite to turnover intention) than other workers in Polish heavy industries. As reminded by the authors, this is not to say that the mining sector is free from work hazards or other PSRs factors. For example, high physical demands and risks of accidents (80-90% of which are caused in coal mines by human factors) are indeed important stressors for the profession. Their enquiry brought them to consider levels of occupational stress and risk of injury as the main adverse health outcomes. Notwithstanding, they ultimately identify for miners higher levels of job satisfaction, normative work commitment and a lower level of turnover intentions. Although the article does not specifically address specific reasons associated with this finding, it may be worth wondering whether cultural/normative reasons associated with community professions (e.g. miner communities with long histories and higher shares of miner workers) infer meaningful job engagement perceptions.

Regarding vulnerable workers' groups, Porru et al. (2014) developed a small **cross-sectional sample analysis of migrant workers in LSES occupations in Italy** (e.g. industry, services, hospitality) formally seeking help at the Unit of Occupational Health of the *Spedali Civili of Brescia* (local hospital of the city). Their analysis is directly based on diagnosis of adverse mental outcomes generated at the workplace through exposure to PSRs. Although not specifically reporting all correlation data between PSRs and mental health outcomes, comparative analysis allows them to observe that migrant workers from some ethnic groups (i.e. Albania, Morocco, Pakistan) prevalently employed in the metal or manufacturing industry and with a medium-high level of education (and yet holding LSES positions) were further at risk of developing psychiatric disorders (e.g. anxiety, depression, sleep issues). Their further discussion of the results also brings interesting considerations for migrant workers' access to healthcare in the country. Migrant workers in the sample have been found to require greater healthcare due to a high level of unmet health needs, which could in turn increase vulnerability and susceptibility to occupational hazards. Access to occupational healthcare for this group is also considered an issue for migrant workers. Indeed, during the same observation period of the sample, the total number of occupational evaluations for mental and/or behavioural disorders was 13 times higher for native workers. Lastly, the results of the non-systematic literature review developed in support of the paper have identified a very strong lack of national literature on the subject, despite political and public recommendations to give more space to migrant workers' health in the occupational context.

Lastly, for what concerns the advent of **highly digitalised production environments**, beyond the studies performed by EU-OSHA on the subject (i.e. EU-OSHA, 2018, 2022b, 2023c; see section 1.2.2 for more details), Wixted et al. (2018) confirm that very few modern studies have looked at how recent technological advances (e.g. Internet of things, Industry 4.0 and advanced automation) coupled with

work intensification have led to increased levels of cognitive workload, potentially shaping the psychosocial work environment. Evidence of increased stress response due to high automation in manufacturing can be encountered in their cross-sectional study including a modest sample of low-skilled workers in Ireland. Although the main goal of their research is to demonstrate that distress and worry ultimately mediate the relationship between PSRs exposure (i.e. cognitive demands, skills discretion, job control and feelings of social isolation), stress and MSDs, at psychosocial level they clearly show a link between PSRs and feeling stressed. Interesting perspectives are also offered by the extensive literature review with systematic features of Koukoulaki (2014) on the impact of lean production methods in manufacturing on manual occupation workers. The author's main target is the design of a comprehensive interaction model illustrating the relations between lean practices and risk factors (both for mental health and MSDs). According to the findings, at least **some features of lean production seem to correlate with stress of workers**, namely a reduction in job resources (e.g. reduced time in the cycle of production, reduced staffing), an increase in surveillance ('mistake proofing'), excessive standardisation of tasks (in the presence low job control), and a decrease in team working (i.e. lack of job support among co-workers and supervisors).

2.2.6 Construction

For what concerns the construction sector, a useful definition is offered by the ILO (2021), defining this industry as the joint activities that include 'construction, renovation, maintenance, and demolition of building (residential and non-residential), as well as work conducted in civil engineering projects such as roads and utility systems'. It has been extensively signalled **as an industry with strong implications for its workers in terms of workplace risks and potential physical and mental health adverse outcomes** (OSHWiki, 2022b). Consequently, in recent times construction workers have become the subject of a richer corpus of evidence incorporating vulnerable workers' groups in their analyses, as well as considering socioeconomic variables in the research (e.g. systematic reviews from Chan et al., 2020 and Frimpong et al., 2022).

Chan et al. (2020) have elaborated **one of the broadest mappings of risk factors (32 stressors) for the industry**, the overall majority of which are associated with the psychosocial work environment. Eight grouping families are identified in the framework, also including SES perspective (i.e. work support, job control, workplace injustice, job demand, welfare and socioeconomic variables; coping mechanisms, work-life balance). Corresponding mental health outcomes identified by studies in the review included depression, anxiety, PTSD and suicide. **Overall, factors related to job demand and job controls were considered the foremost PSRs contributing to mental illness of construction workers** (i.e. long working hours exceeding 60 hours per week, work overload, low opportunity in decision-making, conflictive occupational/organisational climate) and conducive to depression and suicidal ideation. Note that beyond the risk/adverse outcome association, the **study also acknowledges 10 broad protective factors** that can reduce the development of mental issues. These include marital status, increased job control, increased job support, reduced job demand, reduced workplace discrimination, family-friendly job opportunities, workplace justice, better welfare or positive socioeconomic measures, and, finally, positive (adaptive) coping strategies (that is, stress management techniques and positive thinking rather than negative coping through alcohol or other substances abuse).

Meanwhile, the work provided by Sun et al. (2022) tries to establish **a more statistically sound ranking in the association between specific psychosocial hazards and mental health outcomes for workers in the industry**. The meta-analysis incorporates 48 studies on a global scale, but this also includes European workers as well as a majority of potentially vulnerable groups (e.g. general workforce, unskilled, elder workers). In their work, 14 psychosocial hazards are identified and exploited in the analysis for the identification of mental health outcomes, hereby classified in order of gravity as 'context-free' psychological strain (e.g. depression and anxiety not dependent on work-related circumstances), job-related psychological strain (work-specific stress) and job burnout (high level of job-related distress). Overall results confirm a pooled correlation coefficient between PSRs and mental health problems at 0.28 (95% CI: 0.24 to 0.33). Results suggest that psychosocial hazards were somewhat more associated with job-related psychological strain ($r = 0.31$, 95% CI: 0.22 to 0.39, $k = 9$) and job burnout ($r = 0.31$, 95% CI: 0.23 to 0.40, $k = 23$), followed by context-free psychological strain ($r = 0.27$, 95% CI: 0.21 to 0.33, $k = 22$). Among factor-related estimations, **role conflict had the strongest significant**

correlation with mental health issues, followed by role ambiguity, job insecurity and interpersonal conflict in the workplace. An interesting side result of the meta-analysis is that high job demands tend to globally imply more adverse mental health implications compared to low job resources (e.g. low job support, reward or recognition; low control, lack of career opportunities). The authors thus suggest that in terms of workplace intervention to prevent PSRs, **a primary focus should be placed on avoiding overburdening employees with excessive job demands.**

On their account, Frimpong et al. (2022) chose to focus their systematic literature review on **young construction workers as a particularly vulnerable group in the sector.** Thirty PSRs are categorised under three macro-categories of domains: a. personal ones (including features such as physical health conditions in life and pre-existing psychological conditions and past history of attempted suicide that may also contribute to derived risks at work, age, lifestyle, professional and health knowledge); b. *socioeconomic* (social and economic circumstances); and c. organisational/industrial (including the nature and context of work alongside the industry sociocultural norms). The originality of the research lays in the desire to explore interdependencies of traditional work-related PSRs with other factors influencing young workers' identity and behaviour, hence elaborating a conceptual model where all stressors are interconnected with psychological distress and ultimately with poor mental health. Interestingly, the model devotes much attention to worker's age as a critical determinant of the 'strain effects of occupational stress'. Being older and more experienced can act as a moderating factor shielding the negative influence of socioeconomic and organisational PSRs. Conversely, young workers may feel the need to constantly 'prove themselves' against uncertain circumstances while also lacking in decision authority due to inexperience. Among adverse outcomes specifically connected to age, the authors identify higher exposure to bullying and as outcomes of PSRs strong dangers of PTSD, substance abuse and even suicide.

Boschman et al. (2013) provide **a European country-focused perspective (the Netherlands)** by comparing cross-sectional PSR exposure and mental health outcomes of two distinct professions inside the construction industry. These are the occupation of **bricklayer** as an example of a manual occupation and the **construction supervisor** as an example of a managerial occupation. The psychosocial work environment of bricklayers and supervisors differs in several aspects: bricklayers experience worse job control, learning opportunities and future perspectives. Among the construction supervisors it is found that mental demands are higher compared to the general working population. Among both occupations, high job demands (high work speed and quantity) are associated with symptoms of depression. Low participation in decision making and low social support from the direct supervisor are additional PSR factors for symptoms of depression among supervisors. Finally, King and La Montagne (2021) elaborate **preliminary expectations on COVID-19 effects** relative to a previously identified association **between PSR exposure and suicide in the construction sector.** A priori, the sector is already considered as highly populated with vulnerable groups (i.e. young age, males embedded in masculinity norms, workers with LSES, migrants). In addition, workers are considered as being exposed to multiple stressors belonging to several dimensions (e.g. work conditions, bad quality of employment, strong hierarchical structures based on conservative sociocultural norms). Based on previously acknowledged evidence on the association between economic recession and suicide in the sector, they expect that the new economic crisis may bring an unfortunate confluence of psychosocial factors leading to heightened risk of suicide both during and after the pandemic.

2.2.7 Agriculture

Agriculture is generally defined as a crucial industry that provides food and other essential resources to people around the world. The sector involves a wide range of occupations, including crop farmers, livestock farming, other agricultural workers and farm labourers, among others. It is also generally considered as a high OSH risk sector, but beside the accident risk and exposure to a broad variety of physical and chemical risks, there is **growing evidence that those involved in farming are also at higher risk of developing mental health problems.** Broadly speaking, these can relate to the stressful physical environment and working conditions (equalling high job demands), the social relations of farmers (particularly within farmer families) and even to job quality in terms of financial insecurity (Fraser et al., 2005). Among the various mental health outcomes, suicide risks have been reported as highly preponderant for this worker's category (e.g. Klingelschmidt et al., 2018). Closing in on potentially LSES

targets of the analysis, special attention has been devoted to the subject of **migrant agricultural workers**, constituting nowadays the core workforce of the agricultural sector (e.g. Ramos et al., 2020; Urrego-Parra et al., 2022). While no definitive statistical evidence has been encountered in this review regarding the study focus on the exogenous drivers of labour change included in this study, preliminary arguments account for important consequences of digitalisation and even climate change for workers in the sector.

While it is commonly acknowledged that the sector is ripe with vulnerable workers, Ramos et al. (2020) feel that a common understanding of 'vulnerable populations' in the European agricultural context is still missing. They thus generate **a classification of five categories of agricultural workers**, each one with a set of specific (and at times aggravating) conditions worsening the possibility of adverse health outcomes, including mental issues. The first category includes **foreign-born farmworkers**, representing third-country migrants from outside the EU seeking agricultural occupations and yet suffering greatly from extreme lack of legal protection, high occupational hazards, missing access to healthcare and even exploitation. The second refers to **migrant and seasonal farmworkers**, understood as those who perform temporary agricultural work by regularly moving inside the EU space. These workers are usually attracted by larger EU Member States such as Germany, Spain, France, Italy and Romania. While holding legal acknowledgement of their working status, these may also suffer from risk associated with the contingency of their work contracts (i.e. job insecurity) alongside further experiences of poor working conditions and even exploitation. The third category is associated with **beginning farmers**, where all agricultural workers with less than five years of experience (regardless of age, although this category often coincides with young labourers) are prone to job-risks associated with limited experience, unfamiliarity with tasks, unawareness of safety risks and economic insecurity. The fourth is connected to **farm families**, where OSH practices are generally scarce and where the farm working environment and its psychosocial climate can generate a variety of work-life conflicts. Fifth and final, **farmworkers with physical or intellectual disabilities, jointly with farmers holding pre-existing mental health issues**, are a final category at risk due to pre-existing conditions aggravating exposure to adverse health outcomes. Following another (somewhat rare) example of the **literature review exclusively targeted at European migrant workers**, Urrego-Parra et al. (2022) carry out a scoping of scientific publications to understand health outcomes of this workers' category in the sector. The results are quite harsh, insofar as they depict the migrant agricultural workforce as a neglected population experiencing high workplace vulnerability and precariousness, physical and mental health issues, and poor working conditions. Alongside a plethora of physical health issues (e.g. from MSDs to diseases and negative coping behaviours), PSRs exposures in terms of job design and social relations most often align with evidence of anxiety, stress and depression. Other factors that support these findings include conflicts with the local population, intolerance, language barriers, discrimination, exposure to racist attitudes, disrespect and isolation as well as job insecurity and barriers in accessing healthcare services.

To provide further evidence along these lines, the PSRs assessment by Montoya-García et al. (2013) on **agricultural workers in Almería-type greenhouses of Spain** constitutes an interesting comparative sample in PSRs exposure perception between native and migrant workers. Overall, the results seemed to indicate that while PSRs exposure was more acute for native workers, the 'healthy migrant' paradigm prevailed more for migrant workers further accustomed to difficult working conditions and scarce national health services in their own country. Meanwhile, social relations' risks (enclosed in 'bullying' relationships at work) appeared as a much higher risk factor for non-European migrants (i.e. African and Latin-American, 48% in the sample) in conjunction with sensations of low self-esteem, the lack of supportive family groups, a feeling of cultural shock regarding new ways of life and experiences of economic insecurity. However, it is worth underlining that for eastern European workers (many of whom with an intermediate-high level of education), lack of recognition and low autonomy in their jobs also constituted a relevant risk factor in 30.6% and 23.8% of the sample respectively. As a conclusion the authors of the study deem necessary to reinforce PSRs management through new prevention programmes or networks. A short literature review of good practices brings them to consider as viable solutions salary bonuses, adjustment of shifts for increased work-life balance, tasks variation, extra breaks, further training, social and participatory work activities, and offering specific psychosocial interventions for cultural adaptation of foreign workers.

Regarding the exogenous drivers relative to the pandemic or digitalisation, no specific studies in the literature review provided sufficient quantifiable evidence of PSRs exposure and mental health outcomes connected to exogenous drivers for LSES workers in agriculture. Notwithstanding, some preliminary arguments can be extracted from foretelling research. A recent work by EU-OSHA (2020) has examined the future of agriculture and OSH practices by looking at evidence from Europe and beyond. What appears clear is that much like in other productive sectors (see section 2.2.5), **digitalisation technologies may soon become a relevant addition to agricultural workers operating in the so-called smart farms**. Sensorisation of crops and greenhouses and the introduction of robots and cobots in cooperation with manual work could expose manual workers to new risks of monotony, stress and increased mental effort when having to deal with advanced technologies. Lastly, **the same research has also identified the new variable of climate change in agricultural work as a context-based PSR of the future**. Adapting production to changing temperatures and rainfall patterns as well as coping with increased risks of heat waves, droughts, natural disasters, or even flora- and fauna-related diseases are all important factors with the possibility to aggravate mental health conditions (EU-OSHA, 2020).

2.3 Results associated with quality of employment, with a focus on job insecurity and precariousness

Occupational health research has usually approached PSR exposures on the basis of the nature of work tasks, the organisation at work or the role of social relations at the workplace. However, over the last decades increasing emphasis has been placed on **the deterioration of employment quality as a risk factor with negative implications for workers' mental health** (Allan et al., 2021; De Moortel et al., 2014b; Niedhammer et al., 2021). Traditionally, research associated with the concept of precarious work has been entrusted to the definitions and works of the Eurofound agency (Eurofound, 2018). While their work usually tends to be more focused on sociological aspects and workers' rights, examples of their previous research also show an overlap between employment insecurity and OSH discussions on working conditions, work organisation and health outcomes (Eurofound, 2012). Generally Eurofound research shows that good job quality supports wellbeing and is the basis for a sustainable and high-quality working life (Eurofound, 2022b). The same report also gives worrying figures on the high number of people in precarious situations with 26% reporting to have difficulty making ends meet and 17% unable to predict their earnings in the coming three months.

It should be considered that **employment precariousness** is a multidimensional concept for jobs or employment trajectories defined by employment insecurity, income inadequacy, and lack of rights and protection (Kreshpaj et al., 2020; Utzet et al., 2021) and it is not only limited to employment insecurity. Rather, a strand of the literature usually makes a distinction between employment instability and job insecurity. The former refers to objective unstable employment trajectories alternating employment and unemployment periods, and the latter to subjective perceptions or fears of losing the job and/or having to find a new one. However, in other scientific papers both terms are at times used indistinctly and this can generate an overlap between sociological and psychological perspectives. Employment instability is also proxied by atypical contractual arrangements. Temporary workers and part-time employees are more likely to become unemployed and usually face a 'wage penalty' (meaning a difference in payment for the same job) compared to workers in same or similar jobs with permanent contracts (Westhoff, 2022). In addition, as stated below, there is some evidence that workers under these contractual arrangements are exposed to worse psychosocial working conditions (Hakanen, 2019; Nielsen et al., 2021).

For the sake of this study, it is thus useful to explore both general findings associated with low quality of employment (determining increased precarity and feelings of job insecurity in workers with corresponding mental health outcomes) as well as PSRs exposure evidence found in samples of workers subject to non-standard work arrangements. Note that many of the studies in the latter category focus on a single dimension, such as the experience of employment instability over the life course, or the association of non-standard contractual arrangements with low wages and unstable working conditions (e.g. temporary agency worker or marginal part-time).

2.3.1 Mental health issues associated with low quality of employment

Longitudinal research shows that cumulative and prolonged exposures to low-quality employment trajectories characterised by employment insecurity and employment precariousness are associated with poorer mental health outcomes, such as the risk of depression, anxiety and emotional exhaustion (for specific literature reviews on the subject, check Pulford et al., 2022; Rönnblad et al., 2019; De Witte et al., 2016; Llosa et al., 2018). Evidence from studies conducted in different EU Member States show that precarious trajectories characterised by employment instability or job insecurity, particularly for vulnerable groups such as LSES and women, are associated with poorer mental health and the emergence of different mental health issues.

Jonsson et al. (2021) found that individuals in different **low-quality employment trajectories** that accounted for a quarter of the cohort sample (identified by persistence or transitions across low-quality employment states or downward mobility) **showed a higher incidence of diagnosed mental disorders, substance abuse and suicide attempts compared with high-quality employment trajectories** (i.e. high incomes and stable employment). Interestingly, the only exception is identified among those working as solo self-employed over the whole period (only women in this situation showed a higher risk of substance abuse). These results are broadly attributed to the accumulative effect of financial strain, job and income insecurity, and other psychosocial exposures, but no detailed causal mechanisms are provided by the study. A similar study by Balogh et al. (2022) in Belgium shows a gradient of mental disorders along employment trajectory types while highlighting gender-specific results. Individuals more exposed to long-term unemployment and those in more unstable employment trajectories (i.e. more time in subsidised and non-standard employment, with unemployment spells and lower relative income) **exhibited increased rates of subsequent mental health-related disability** compared to those in more standard trajectories. From a gender perspective, the study finds that women transitioning into self-employment during the period covered in the study showed more risk of subsequent mental health disability than their male counterparts. This finding suggests that **women moving from unstable careers to self-employment are more vulnerable than men** (see also Ferrín, 2021).

Wahrendorf et al. (2019) analyse the implications of **unstable and precarious employment trajectories** on different health outcomes, including affective, physical and cognitive functions. The study builds on detailed retrospective information at early career stages (25-45 years) of a sample of the French working population. The analysis considers different career characteristics such as the number of temporary jobs and unemployment spells, longest-held occupational position over the period and the lack of promotion. With regard to specific mental health issues, **lack of promotion and temporary employment were associated with higher prevalence of depressive symptoms**. Similar research conducted over a sample of European countries confirms these findings (Wahrendorf et al., 2021). Participants that experienced repeated periods of unemployment and worked in elementary occupations for most of their time between the ages of 25 and 50 had a poorer health functioning in the later stages of their life. Associations were observed for all measures of physical, cognitive and affective functioning, with stronger associations in the case of men for depressive symptoms. Crucially, results show that the association between career characteristics and health was not moderated by differences in labour market policies across countries, neither in the case of unemployment protection nor in the investment into active labour market policies.

Pyöriä et al. (2021) analyse **whether employment precariousness** is associated with a higher risk of receiving a **disability pension due to depression and whether this differs between genders**. Employment insecurity is assessed against objective and subjective indicators: the fear of job loss or the prospects of finding a new job, the experience of previous unemployment, or being employed on fixed-term contracts and in low-paid jobs. Results show that poor employability prospects and previous unemployment increased the risk of disability pension due to depression among men, but no corresponding association is found among women. Results also show that the accumulation of precariousness characteristics increases the risks of entering into depression disability schemes, again only among men. Similar results are reported by Ferrante et al. (2019) for Italy, who found an increased risk of poor mental health in association with precarious employment among male workers mediated by the effect of financial strain and job insecurity, while this was not observed among working women. The

detrimental effects of unemployment and job insecurity might be greater for men than for women, as it might challenge the men's identity around the supposed to be 'breadwinner' status.

Draksler et al. (2018) are instead presented with the opportunity to analyse **the physical and psychosocial effects of organisational restructuring** on 1,046 workers at a textile manufacturing industry in Slovenia. Their cross-sectional study classifies the workers among 'survivors' who remained at the job, re-employed who lost their job and found a new one, and lastly workers who stayed unemployed after being laid off. Their results are also contrasted with a national-level survey. For what concerns mental health issues, group comparison identified significantly poorer mental health and depression in the unemployed groups (due to their lowered socioeconomic position), although the re-employed would then rank second in adverse outcome with feelings of depression. Lastly, although the survivor groups were overall less affected than the other two groups, these were still less healthy than the national-level control group, also showing higher reports of depressive symptoms. Based on further evidence from the literature, the authors speculate that negative outcomes are also possible for those who maintain the job, especially when considering the prolonged experience of job insecurity and feelings of guilt for surviving dismissal when compared to the other workers' groups.

Reuter et al. (2020) study **unwanted sexual attention (UWSA) and sexual harassment** as prevalent experiences **for women in precarious working life** and often accompanied by poor health. Despite increasing numbers especially of young people working in insecure and irregular employment settings, there is little empirical evidence if such precarious arrangements are associated with UWSA or sexual harassment. For both men and women, precarious employment was significantly associated with elevated prevalence of UWSA and sexual harassment, especially when reporting schedule unpredictability, multiple job holding and low information on OSH. The results suggest that precariously employed individuals may be more prone to experience sexual harassment and UWSA at the workplace compared with workers in non-precarious settings, as they are disadvantaged in terms of job security, statutory rights and protection against poverty. Prevention measures and future research should consider that workers in precarious employment relations may be a group at special risk of becoming a victim of UWSA and sexual harassment. Finally, the experience of UWSA and sexual harassment at work may be pathways through which precarious employment affects health.

Lastly, the literature review employed to build the framework for analysis in previously identified findings of Diaz-Bretones et al. (2020) also finds clear evidence that as a vulnerable group **migrant workers** are highly exposed to poor employment and working conditions, especially in times of economic recession. **Job insecurity** becomes a dominating risk factor associated with poor employee health, including mainly mild-to-moderate depressive and anxiety disorders.

2.3.2 Evidence from non-standard work arrangements

In addition to the above, there is evidence of the association of non-standard work arrangements with poorer mental health outcomes and psychosocial working conditions. Partial evidence is gathered from studies associated with temporary agency work, part-time workers and independent self-employed.

▪ Temporary workers

From the perspective of LSES, **the share of low-wage and low-skilled employees among temporary workers is much higher than the average**. An ILO report funded by the EU Social Fund (ILO, 2016) dedicates a specific section on the subject by asking whether temporary agency work constitutes a steppingstone to a better job or an eternal trap for the worker. Findings listed in the report seem to indicate that this modality of job seems to bring the unemployed into this specific type of work, but not necessarily into permanent regular jobs, hence locking them in a perpetual LSES. In addition, evidence in the literature suggests that this effect is mediated either by capacity of labour absorption in countries but most importantly due to socioeconomic and sociodemographic variables akin to the vulnerable groups identified in this study (e.g. age, level of education, industry sector). Other results from cross-sectional studies specifically considering the influence of atypical contractual arrangements are not conclusive and suggest that the relationship between contractual instability and the potential negative health outcomes is not straightforward but mediated by feelings or perceptions of job insecurity

(Wagenaar et al., 2012; Thomson and Hünefeld, 2021). However, it is still important to consider that **not all forms of atypical employment can be associated with negative health outcomes**. Temporary workers were found to have the worst records on general health, musculoskeletal complaints and emotional exhaustion compared to other groups in stable and on-call contractual arrangements in a sample of the Dutch working population (Wagenaar et al., 2012). Temporary agency work was also related to wellbeing impairments and psychosomatic complaints in a large sample of German employees, and this association is mediated by increased perceptions of job and income insecurity as compared with workers in standard employment (Thomson and Hünefeld, 2021). Hakanen et al.'s (2019) analysis based on the 2015 EWCS shows that temporary agency workers reported higher job insecurity and are also exposed to higher physical job demands and lower resources than workers under permanent and temporary contracts. However, although job control levels are the lowest among temporary agency workers compared to the other groups, this still has a protective effect against the risk of exhaustion. Likewise, good social relations at work and support from colleagues and supervisors are found to be more important for job engagement of temporary agency workers than job control. These findings suggest that the importance of different resources and demands may vary across employment contract groups depending on the outcome.

▪ Part-time work

Working hours mismatch has been addressed in research as a stressor with negative implications for mental health. **Involuntary part-time workers** are those working part-time because they could not find a full-time job. Involuntary part-time work is associated with in-work poverty risks and other risk factors such as increased work intensity, lower control over work schedules (Franklin et al., 2022) and worse psychosocial working conditions (Nielsen et al., 2021).

De Moortel et al. (2018) assess **the influence of either overemployment or underemployment on workers' mental health in a sample of German employees** over a two-year observation period. These categories are built considering the differences between desired and actual working hours. Results show that overemployment is related to negative impact on mental health (both for men and women), compared with workers whose actual and preferred hours match. In contrast, underemployment was not related to a worsening of mental health. Significantly, the authors notice that the negative impact of underemployment disappeared after controlling for household income. This finding highlights the protective effect of household composition in providing financial stability for underemployed workers. Results also reveal gender differences in the expected effect of job rewards as moderators of the impact of working time mismatches on workers' mental health. In the case of women, the positive impact of job rewards on mental health disappeared when they work more hours than wanted, indicating difficulties in combining household and paid work responsibilities. In contrast, among men, the negative effects of overemployment disappear when considering the effect of job rewards, which may indicate a higher importance for men attached to job rewards compared to matched working hours.

A study by Nielsen et al. (2021) aimed to analyse the psychosocial work environment of **marginal part-time workers (those working 8-15 hours per week) in Denmark**. Compared with full-time workers, marginal part-time workers surveyed by the study are younger, more often women and LSES (low educational attainment and income levels). Findings show that marginal part-time workers report less quantitative job demands, lower levels of influence at work and lower levels of support from colleagues, less job satisfaction and higher job insecurity compared with full-time workers. The study shows that marginal part-time workers are more likely to report poorer health than full-time workers. The results also show higher risks of stress, sleep disorders and pain for marginal part-time workers even if not statistically significant. In summary, findings suggest an accumulation of unfavourable work environment characteristics and bad health among marginal part-time workers. Several characteristics of work environment also intervene in the association between marginal part-time work and health and may contribute to confounding or mediating the association (i.e. estimates for depressive symptoms and stress increase after adjusting for quantitative demands).

- **Independent self-employed**

Here, it should be noted that the extension of this work arrangement over the last decade has been attributed to the digitalisation of work organisation practices (platform work) and/or also to the consequences of the 2008 Great Recession, which pushed many workers, and mostly women, into self-employment by necessity (Ferrín, 2021). Although this form of employment may be only tangentially related with LSES employment, some research findings point to **the worsening of mental health of solo self-employed women in connection with increased income insecurity** (Balogh et al., 2022; Jonsson et al., 2021). In this regard, Gevaert et al.'s (2021) study dealing with mental health implications of different employment quality types for both waged and self-employed confirms that those employment arrangements that diverge from the standard employment relationship show the most negative health associations. Among these, the poorest health situation was identified among the insecure self-employed type, which is characterised by low income and income insecurities due to dependence on only one client and among those who are self-employed out of economic necessity. The health scores of these self-employed were far worse than those of all other employment quality types, including those of the low-quality waged employed.

3 A selection of good practices on PSRs prevention, management and intervention for LSES workers

3.1 Typologies and effectiveness of existing practices for value creation in the workplace

The examples of good practices highlighted in this chapter address the very essence of the problems that emerge in unhealthy working environments, presenting a range of prevention and intervention programmes put in place to target organisational aspects that hinder healthy and safe working in a variety of sectors potentially populated by high shares of LSES workers. Not only do they identify the organisational shortages, they also engage in overall PSR management in line with the proactive (preventive) agendas they develop to mitigate the risks (ILO, 2022). Together with workers, the companies' management boards explore how to address unhealthy dynamics and practices within their organisations and they co-design feasible solutions to eradicate work stressors such as inappropriate task design, conditions facilitating abusive co-workers' behaviours and poor leadership.

The kinds of practices that deserve to be recognised as 'good examples' are those that use *comprehensive multilevel interventions* to create tailored solutions. They do not aim to solely resolve the current problems in the workplaces but also to ensure development of **positive working environments**.⁶ Within the WHO framework, interventions to prevent and manage PSRs at work are threefold: primary, secondary and tertiary level. Primary-level interventions address the source of the PSRs, acting primarily at organisational level, being concerned with workplace organisation and work environment, and dealing with aspects of work design, organisation and management. Workplace health promotion can be included here as a second step after ensuring proper organisational measures. Secondary-level interventions address the consequences of PSRs on individuals and groups at specific risk, ameliorating the situation and limiting the risk through awareness raising, training and education (e.g. how to effectively manage stress, relationships, conflicts, time at work, etc.). In turn, tertiary-level interventions are meant to support individuals already experiencing (mental) health problems, to help them in dealing with the consequences of exposure to stress and managing their symptoms.

The good practices selected in this study are primary-level interventions or combined interventions (primary, secondary and tertiary). Priority has been given to those with demonstrated **long-term commitment with the improvement process** of the company's management board. Good company practices start with **an adequate analysis of PSRs**, tailoring the assessment and the search for solutions to the specific needs of the organisation; secondly, they perform a **nuanced planning of actions** to be taken to improve the state of the art; and finally, they **execute the action plans and follow up** with checking their effectiveness. Moreover, good practices show that the company's management board engages employees' representatives in the co-design of solutions assuring that proposed solutions really meet workers' needs. The process of worker involvement *per se* has significant positive outcomes for both employers and employees and creates value for companies and all people that directly and indirectly relate to it. The co-design process creates opportunities for including workers' voices and participation which are critical drivers of wellbeing (Fox et al., 2022) and, in turn, greater job satisfaction brings benefits for the company also in terms of better cost-effectiveness. When the action plan is implemented, the organisations continuously seek for improvements and good practices show their systematic commitment and progress. Usually, a new assessment takes place in the post-intervention period when lessons learnt are extracted from the experience gained. This way, the organisations not only acknowledge the need for change in their working practices but also learn which aspects of the job tasks, processes and decision-making procedures need to be redesigned. The capacity to extract actionable recommendations for the reorganisation, based on employees' inputs, assures quality long-term results.

⁶ See: https://oshwiki.eu/wiki/Positive_Occupational_Health_Psychology

Sauter and Murphy (2004) suggest that employees may also need **training to adapt to new working practices, job tasks and procedures**, which requires **commitment and support**⁷ from the organisation, such as the interventions themselves. Also, companies' management boards need to be trained, and the overall purpose of this selection of good practices is to encourage the appropriate capacity development. Summing up, 'good practices' have been selected as those activities of PSR identification and management that showed awareness of the need for a profound change in their organisation and accountability for long-term implementation of the organisational change by means of participative decision-making. The aim was to improve the wellbeing and working environment of LSES workers while shedding light on industry sectors with a large presence of vulnerable employees akin to this classification.

3.2 Selection of good practices included in this study

This study presents a catalogue composed of **10 examples** (nine from European countries and one from Australia) of successful interventions in companies that improved the management of PSRs in the workplace. The sample aims to show promising approaches in recognising, assessing and preventing PSRs, including policies, strategies and workplace practices. Some of them cover not only the prevention but also the rehabilitation and return-to-work of potential LSES employees. Regarding the content displayed, on the one hand, the selection gives a broad coverage considering geographical, sectoral, organisation's size, stakeholders involved and LSES targeted group (alongside focus on some vulnerable group, e.g. older workers, women, young people, migrant workers). Data and information on the good practices has been retrieved from external sources representing a variety of stakeholders (e.g. trade unions, the European Network of Workplace Health Promotion⁸, the Irish Health and Safety Authority⁹ and sometimes also information provided directly by the companies. A list of detailed sources for each of the good practices can be found at the end of the document, following main study document references (list II. Good practices references).

1. Mental health and wellbeing of workers at L&R Company (Czech Republic)

Sector: Manufacturing	Organisation: Lohmann & Rauscher (L&R) Company (manufacturer of surgical materials & sets)	Target group: Ca. 730 employees (from manufacturing to office duties)
	Website: https://www.lohmannrauscher.com/en	Focus: women and older workers
	Stakeholders involved: N/A	

Company management and PSR awareness: Lohmann & Rauscher (L&R) is a leading international supplier of high-quality medical devices and hygiene products — ranging from conventional bandages to modern treatment and nursing systems. Created in 1998 from the merger of the two companies Lohmann (founded in 1851) and Rauscher (founded in 1899), L&R now employs more than 5,000 people. Mental health and wellbeing of workers is a primary focus of the company policy. The company was formerly founded on the family basis and retained some principles of family care, put in place through the involvement of the management. This case is specifically relevant to the present study and its LSES focus as a major part of the workforce in L&R is based on the unqualified local population, mostly women. The approach also includes training and empowerment of the workforce to enable the acquisition of required work competences that greatly enhanced their sense of purpose, wellbeing and mental health.

⁷ See: https://oshwiki.eu/wiki/Commitment_and_leadership_as_key_occupational_health_and_safety_principles

⁸ <https://www.enwhp.org/>

⁹ <https://www.hsa.ie/eng/>

Actions taken: The company has set up an 'action group' that is composed of managers, a physician and a psychologist. Meetings of the group are held at six-week intervals, in which effects of the preventive and corrective measures taken are discussed and evaluated.

Work organisation was revised to allow greater decision latitude for the workforce. In some departments, employees were allowed to decide the composition of their working group, which improved their wellbeing and the groups' overall working performance. Although the company relies on shift work, mothers, single parents and workers with limiting health conditions are allowed to work only on day shifts or, in some cases, from home. A big emphasis is put on workers' training and thus enabling them to fulfil a variety of tasks in the company. Workers are trained to execute different operations, enabling rotation to avoid work monotony. Managers exert great effort to find new possibilities for manufacturing and for reskilling/upskilling their workers according to their abilities, using clear, understandable and simplified instructions. For better understanding of the concepts of stress and stress management, a parallel programme called 'Education for mental health promotion' was designed and implemented. Awareness is raised among employees about the need for continual change and learning to master new procedures and operations. Employees now recognise this trend as positive — it brings new tasks that they can learn to cope with together with receiving the employer's support. This can in turn help them assert themselves in the job market.

Moreover, a system for early detection of mental problems (signs of breakdown, burnout, overwork, also a possible relation to chronic somatic diseases) was included in the regular medical care of employees. The problems that emerge are solved case by case according to their nature, either by organisational and other measures implemented by the company or by free counselling for workers with a specialist in mental health. Several changes in work organisation are implemented to meet employees' needs on a case-by-case basis. All measures concerning workers' mental and physical health are bundled in the corporate health management system and interlinked in a lifelong approach. In fact, the company has also often been featured as an example of a virtuous case dealing with the specific health challenges faced by an increasingly aged workforce.

From the perspective of contractual arrangements, the company policy is to offer permanent employment to all employees. In addition, the company also protects the worker beyond the workplace, helping employees to solve material (e.g. lending cars) and financial problems, or difficult situations, such as the seizure of property of employees in debt. The company supports a culture of loyal work for the L&R by fidelity bonuses and regularly raises employees' wages also considering inflation level.

Last, since 2017 in most of the production facilities employees who desire to commit part of their time to promoting team spirit may become 'ambassadors' as part of the 'WE are L&R' initiatives and be in charge of running on-site campaigns, solidarity events, recreational activities, and so on to favour a positive work environment and social bonds.

Main outcomes: All in all, this contributes to generating a positive work environment whereas workers' concerns about their financial situation or contractual precariousness are minimised and so are the levels of stress and anxiety they might be conducive of. By applying a comprehensive PSR prevention programme complemented with a training and education programme, employees feel empowered, which greatly enhances their wellbeing and mental health. By a combination of clever business policy, health promotion and education of employees and their personal integration in organisation and manufacturing processes the management creates an atmosphere of collectively achieved goals. As the company self-reported in a sustainability report, this turns into an above-average time employees stay employed in the company and high ratings given by employees when surveyed on issues such as meaningful work, cooperation, work environment and job security.

2. Workplace Health Promotion programme by Radenci Spa (Slovenia)

Sector:	Organisation: Zdravilišče Radenci, Družba za Turizem d. o. o.	Target group: Ca. 223
Tourism & Hospitality	(Radenci Spa, accommodation, food and tourism services)	workers in the Radenci hotel facility (room service, kitchen and spa services)
	Website: https://www.sava-hotels-resorts.com/en/zdravilisce-radenci	
	Stakeholders involved: N/A	

Company management and PSR awareness: Sava Turizem d.d. and its umbrella brand Sava Hotels & Resorts is the largest Slovenian tourism company that operates seven touristic destinations across the country. As Sava d.d. is the Sava Group's controlling company, it is the lead partner responsible for running the strategic activities through its Safety Competency Centre. This provides proactive and preventive advice to the company's management boards, ensuring compliance with OSH regulations, environmental and fire protection, and so on. Beyond traditional safety management, a wide array of proactive actions to mitigate the potential harms deriving from PSRs are put in place, also including activities as part of the company's broader *corporate social responsibility* strategy.

Actions taken: A detailed risk assessment was carried out evaluating the impact of PSRs on employees' health and wellbeing, followed by a comprehensive action plan to prevent and reduce the PSRs identified. Specific aspects considered in the risk assessment were psychosocial support at work, organisational culture, clear management of expectations, politeness and respect, psychological fitness for work, growth and development, recognitions and rewards, cooperation and influence, workload, inclusion, balance, and psychological protection and safety. The measures include organisational changes considering the work design, improvement of communication workflow, and the development and implementation of training on several aspects. A choice of concrete actions is listed below:

- Carrying out regular employee satisfaction surveys and implementing follow-up actions where necessary
- Enabling and encouraging employees to take part in the decision-making processes
- Flexible work arrangements
- Providing employees with all the information they need to perform their work effectively
- Measures to prevent excessive workload
- An honest and impartial management style
- Assessing managers' communication and interpersonal skills and providing related training
- Improving work-life balance
- Acknowledging employees' good work
- Providing a respectful and encouraging work environment for all employees

As part of the 'Improve Our Health and Well-Being' project aimed at reducing absenteeism, the company carried out workshops and interviews with employees who had taken lengthy sick leaves, or repeated brief sick leaves or returned to work after long-term sick leaves. The workshops aimed to help individuals deal with illnesses as part of their lives, adapting the workplace to the individual capacities and providing them with skills to successfully cope with health issues. Separate workshops were held for managers to learn how to identify signs of employees' mental distress and to take appropriate action when problems arise. The company regularly monitors (monthly) the health and safety indicators, using the findings to shape corrective measures.

Main outcomes: A structured risk assessment with employee involvement and clear follow-up with measures, broad approach considering organisational, management and individual aspects, and individual support measures covering a broad range of issues (health, work-life balance, work adaptation). Measures taken in terms of work reorganisation to match the needs of different social groups. Sensibility for work-life balance as a main prerequisite for wellbeing shown by creating a

Family-Friendly Company Certificate to monitor the incorporation of necessary measures and fostering the company's responsibility for its employees and the community. The Institute of Occupational, Traffic and Sports Medicine¹⁰ also presented the company's approach as an example of good practices.

3. Work Positive project at Acquired Brain Injury Ireland (ABI Ireland)

Sector: Health and Care	Organisation: Acquired Brain Injury (ABI) Ireland (community-based neuro-rehabilitation services) Website: https://www.abiireland.ie/ Stakeholders involved: Ireland's Health & Safety Authority (HSA) (OSH national agency); State Claims Agency (state body); CISM Network Ireland (stakeholder); Wellhub (stakeholder)	Target group: Ca. 325 staff members out of whom 301 employed as rehabilitation and support staff (last recount in 2020 annual report). Original practice included 56 workers. Focus: Long-term care staff
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Company management and PSR awareness: Acquired Brain Injury (ABI) Ireland is funded by the Health Service Executive and is a dedicated provider of community-based neuro-rehabilitation services for people with acquired brain injury and their families. The organisation works in communities across Ireland to support and empower people to rebuild their lives after a brain injury. ABI Ireland also campaigns, educates and advocates for the rights and needs of people with acquired brain injury. With the arrival of COVID-19 the organisation became one of the first providers of 'tele-rehab' services in Ireland. ABI joined as a case study in the Work Positive project when it was first launched in 2008 by Ireland's Health & Safety Authority (HSA), taking advantage of the opportunity to identify potential psychosocial hazards and develop detailed risk assessments for stress in the organisation. ABI was briefed by the HSA and got the management buy-in for the execution of the project. In the following years, the organisation has reaffirmed its commitment to the adoption of proactive PSR management strategies as reported in its annual reports (publicly available until 2020 on the company website).

Actions taken: The core target group of the study conducted in the frame of the HSA project was rehabilitation assistant staff. Rehabilitation assistants work together with clinical staff – skilled health and social care professionals – to support brain injury survivors throughout their rehabilitation journey. While clinicians include psychologists, occupational therapists and social workers with specialised qualifications in brain injury and rehabilitation, rehabilitation assistants have lower qualifications and status and operate as frontline staff encountering specific psychosocial hazards such as lone working, dealing with challenging patient behaviour and families, and doing shift work.

The HSA delivered information to the management team on how to organise the survey. Fifty-six staff were targeted and 45 questionnaires were completed (80% return rate). In the follow-up, three focus group sessions were run in two different geographical areas and were facilitated by an external consultant, to discuss the issue of 'role' as this was highlighted as 'clear need for improvement' in the survey. Workers' comments were captured with a view to collating feedback and determining any action that could be taken to address concerns raised. For all staff, the main area that required corrective actions was the social life and relationships at work. Relationship building needed to be developed for strained relationships, as the area of 'Control' and 'Role' needed further interventions. The most recent documentation available highlights the fact that, despite their lower qualification,

¹⁰ See:

https://www.kclj.si/index.php?dir=/divisions_departments/independent_units/institute_of_occupational_traffic_and_sports_medicine

rehabilitation assistants are undergoing ongoing training to ensure they can respond to the needs of those they support and cope with the psychosocial demands of their job.

Furthermore, the participation in the HSA project has placed the seeds for an internal in-depth reflection and the start of a series of permanent actions to address PSRs in the workplace. Indeed, in subsequent years, the organisation reported that the performance of an employee feedback survey has become a standard practice. The survey carried out in 2019 as part of the broader ABI Employee Communication and Engagement set of actions covered several areas: Organisational Culture, Communication, Leadership, Teamwork, Manager Support, Work Environment, Employee Development, Compensation and Recognition, and Work Engagement. This last survey achieved a strong response rate (80.8%) and the scores were very positive for the organisation overall. Scores remained consistently strong for Teamwork, Work Environment, Employee Development and Manager Support: 94% of employees reported that their manager treats them with respect, compared to 84% in the previous 2018 edition.

Along with this, a continuous learning and development programme has been put in place with the twofold aim to ensure the best care is provided to service users and increased job satisfaction and morale, as well as enhancing job motivation and reducing turnover. Annual Employee Information Days are also arranged. Although they had to be paused in 2020 due to the COVID-19 outbreak, employees continued to receive weekly information directly from the CEO and a specific survey was also carried out in relation to the COVID-19 management response, to determine what further supports or concerns employees had during the health emergency crisis.

Main outcomes: ABI Ireland found the participation in the Work Positive project a worthwhile exercise as it got staff thinking and talking about stress at work from a proactive risk management point of view rather than a reactive point of view. Frontline staff appreciated having their voices heard and their concerns listened to. They became aware that not all of their concerns could be tackled in one go but would be addressed as part of a broader risk assessment process.

The Work Positive project also provided benefits to management in that they have been provided with a clear picture of the PSRs their staff is facing. This allowed management to address the issues that have arisen using a systematic risk management approach. The focus groups have provided additional valuable information by allowing frontline staff to flesh out their concerns and provide recommendations for solutions. Overall, the formative experience of the Work Positive project stimulated a real change of perspective and strategic direction of OSH practices in the eyes of company management and workers.

4. Single queue system and psychosocial support in Carrefour (France)

Sector: Retail and Sales	Organisation: Carrefour France Website: https://www.carrefour.com/en Stakeholders involved: National Federation of Support to Victims and Mediation (INAVEM, today <i>France Victimes</i>)	Target group: Ca. 110,000 employees Focus: cashiers and shopworkers (in-store personnel)
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Company management and PSR awareness: Carrefour is a well-known and global food retailer, operating a chain of hypermarkets, groceries and convenience stores. The company has increasing awareness of the importance of human capital, showing high-level accountability for innovation to improve working conditions. In the last decade, Carrefour France adopted several national and international programmes, designing and implementing vital action plans on health, safety and quality of work life.

Actions taken: Single queue system: Retail staff were exposed to abuse from customers who become impatient waiting in a long queue before accessing cashiers. Violence and verbal abuse towards staff were a serious occupational health issue as well as a safety problem. Carrefour decided to optimise client waiting time and cashier staff exposure by creating a single queue

system. The goal was to diminish pressure on the cashier by minimising the queue at each cash desk. The single queue allowed easy closure of cash desks when cashiers were taking a break and allowed customers to be guided to the first available cash desk when it is their turn. As a result of this action, the cashiers are less exposed to any kind of aggressive behaviour from clients as there is no pressure in front of the cash desk and the clients' needs are also better addressed through efficient organisation of work. The single queue concept has been accompanied by a close supervision concept including employee feedback. It was considered a great success, with 82% of employees stating that their work had improved thanks to that measure. Among them, 22% considered that the single queue allowed a better relationship with clients, and 77% believed that conditions of work improved because of better distribution of clients among the cash desks.

Psychosocial support call centre: Workers in the retail sector, particularly cashiers, are often exposed to violence and aggressive behaviour from customers. In some cases this extends to even more traumatic events, such as robberies. Apart from having the appropriate safety measures in place, victim support in any case of third-party violence is crucial to minimise the impact on their health and wellbeing and to make staff feel secure. Carrefour opened a call centre in 2012 through a partnership with the INAVEM Institute (now *France Victimes*) to provide support to staff and their families. Access to a psychologist was also provided for victims of traumatic events in both their work and private life. Workers who are victims of violence or who need psychological help can contact the hotline, which is 100% confidential and reachable 24/7. Workers have the possibility to discuss their problems with qualified psychologists by phone, Internet chat or email. All contacts are anonymous and confidential. After two years, an analysis of the nature of requests related to individual/private life issues showed a focus on financial problems, housing issues and so on, while the most pressing work-related concerns expressed by workers revolve around the relations with management and the recognition at work. As a result, advice on a broader range of social issues has been provided to workers since 2015 to address their everyday needs. If the employee agrees, the social worker opens a file for the employee and can help in various ways such as with relationships with the public administration, finding support for financial problems or providing support when there are life changes (divorce, separation, professional transfer, etc.) or a need for information on social services. The call centre has been a success and all 110,000 people working for Carrefour have access to it. The hotline also allows the company to gain (anonymous) feedback on the wellbeing of its workforce. In addition, a broader international company policy has been adopted at group level, 'Act for Change' in 2020. The policy confirms that all Carrefour country groups have implemented an action plan in 2020 assuring proper risk prevention including occupational stress prevention and improving staff's work-life balance. The policy further emphasises the importance of including franchisees and temporary employees in their approach.

Main outcomes: Today the support provided via the psychosocial support call centre is inserted in a broader company policy at global level called the Act for Change programme. According to a post-pandemic report issued by the international group in 2022, nowadays psychological support systems are in place in eight countries. At group level, third-party violence prevention, employee feedback and implementation of measures following the evaluation of the requests and concerns expressed via an internal anonymous support hotline, and training in stress management as well as provision of individual psychological support are key assets of the programme.

5. Trade union-assisted PSR evaluation in a cleaning company (Spain)

Sector: Professional Cleaning	Organisation: Anonymous cleaning company Website: N/A Stakeholders involved: Working Commissions (<i>Comisiones Obreras</i>) CCOO, trade union of Spain	Target group: Ca. 90 cleaner workers
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Company management and PSR awareness: The business involved is a professional cleaning company whose main contract was relative to cleaning activities in a private university in Madrid, Spain. The company had a large service contract for extensive maintenance of two campuses, several buildings, two student accommodation residences, two sporting facilities, several university clinics and a variety of staff offices. The case started because of a precise request of the OSH delegates from the company to the CCOO trade union. According to the nature of the request, up until the evaluation workers had experienced both work conflict (particularly in the presence of multiple issues between one cleaning manager and the workers) and a lack of organisational interest through the company's main strategy to constantly derogate any attempts for collective bargaining.

Actions taken: The trade union had to insist on and request multiple meetings with the business in order to persuade them to take corrective actions. The final compromise consisted of the conduction of a PSR assessment through the employment of a method named 'FPSICO' developed by the National Institute of Security, Hygiene and Well-being at Work of Spain.

FPSICO is a psychosocial evaluation tool that can be applied to any company no matter the size, industry sector or activity. The tool can additionally be adapted to the specific needs of a given business (e.g. selection of questions for evaluation according to business and task typology). It implies the use of collective data rather than individual responses, and it is advised to extract results based on different variables for the analysis (e.g. work occupation, gender of workers). Ultimately, it provides a series of quantitative results capable of estimating psychosocial working conditions. The results can be used to inform organisational changes in work design and management.

The evaluation took place as expected via distribution of the questionnaires, but the trade union had to deal with scarce participation in the survey due to invalidation of several responses (according to the sources, this was due to a lack of proper training on how to correctly respond to the items in the questionnaire). Notwithstanding, the preliminary report on the results of the evaluation already highlighted several psychosocial dimensions in need of urgent corrective measures for all staff, including work autonomy, workload, worker supervision and participation, and organisational interest in worker wellbeing and remuneration. Due to the difficult work environment, the trade union decided not to delay the process further and to take concrete action based upon available data.

Main outcomes: The first and most decisive action was the development of detailed information protocols on the job tasks that were meant to clarify and reinforce work autonomy and workload for the employees. Priority in the development process of the protocols was initially given to night shift workers in the company. Each job position was given specific details about required tasks during the shift, ranking those that would be high priority and to be performed daily while distinguishing them from other tasks that could be either optional or to be performed on a more extended basis. The intended effect of this new set of instructions has been to resize workload, improve workflow, clarify break time, and providing workers with sufficient knowledge and freedom to decide certain aspects of task planning and distribution, for example the cleaning methods to be followed and how to properly distribute furniture and office equipment during cleaning duty.

A second corrective action was the requirement for high-level and intermediate managers in the company to attend specialised training on social skills and team management. The intended effect has been to stimulate a reduction in previously experienced work conflict between workers and supervisors. In addition, CCOO also promised a posterior follow-up of the situation to verify whether managers had successfully learned and implemented the new skills so as to stimulate and improve the social climate and increase support in the work environment.

6. How to deal with threatening situations in stores: a web-based tutorial (Finland)

Sector: Retail and Sales	Organisation: Three largest retail and wholesale companies in Finland (anonymous) Website: N/A Stakeholders involved: Finnish Commerce Federation of Employers, Finnish trade union PAM	Target group: Ca. 11,000 workers by 2016 Focus: Cashiers and in-store personnel
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Company management and PSR awareness: This practice was promoted after the increase in incidents involving violence or threats of violence (robberies) in stores, resulting from a legislative change that allowed the opening of stores at night in the country. Employers were aware of the need to prevent difficult situations and to train their employees in this matter. The idea to implement capacity building activities is a common initiative of the Finnish Commerce Federation of Employers, the trade union PAM, and the safety officers of the three largest companies in the retail and wholesale domain in Finland, completely aware of the risks encountered by workers. They wanted to train the staff in how to recognise threatening situations, prevent their escalation and react should they find themselves in a violent confrontation.

Actions taken: A tutorial was designed to provide general instructions on the kind of conduct that will help prevent a threatening situation. The tutorial includes information on how to identify potentially difficult or threatening customers/situations, and how to act when facing suspicious behaviour alerting the manager, the security system for lone workers and so on. It shows examples of some specific situations that could happen in a store: drunken customers, shoplifting, robbery and armed robbery, providing instructions on how to treat difficult customers in the respective situations.

The tutorial was developed with a first part dedicated to preventive measures, giving advice to report any suspicious behaviour even before anything serious happens, and minimise the amount of money in the cash desk. The second part provides details on how to catch a shoplifter safely and what to do after a threatening incident: close the store, call the police, report the incident to a manager, a co-worker or a security guard. This step needs interaction with the management department and relies on measures taken in the company to help their workers in danger. It also recommends giving employees the possibility of seeking psychological help from occupational health services to treat appropriately the mental trauma suffered. For workers, the tutorial gives examples showing how people can be trained to recognise difficult situations, to minimise the threat, to react appropriately after an event and to take care of victims. For employers, especially smaller businesses (employers with limited resources), the programme includes the possibility of free-of-charge training for their workers in preventing, identifying and reacting to the threat of violence.

Main outcomes: The tutorial is a free-access learning material/tool, available on the Internet since 2011 for all employees and employers interested in it. It is a brief, effective, easy-to-use tool aiming to promote an open discussion in the workplace on how to address safety at work, mainly in the retail and sales sector. According to self-reported data from the Federation of Employers, the tutorial is very popular. Users are mostly companies but also students in vocational education, which has a very positive impact on spreading awareness about the need for a safe and healthy workplace for employees. Thanks to this tool, awareness has grown of the violence in stores and the issue is being taken more seriously by society through the spreading of these messages.

7. Trade union-assisted PSR management in a car sale & repair business (Spain)

Sector:	Organisation: Anonymous car business company	Target group: Ca. 100
Car Sales & Repair	Website: N/A	workers (from mechanics to office duties)
	Stakeholders involved: Working Commissions (<i>Comisiones Obreras</i>) CCOO, trade union of Spain	

Company management and PSR awareness: This anonymous company from Spain is active in sales and repair of cars. The OSH delegates from the company (having close connections with the Spanish trade union CCOO) asked the company to realise an evaluation of the psychosocial situation of workers as part of a series of activities for increased occupational health. The company accepted, and the working group was established consisting of the employer's representatives (Committee for Health and Safety) and workers' representatives advised by trade union technicians.

Technicians of the CCOO (Spanish trade union, Occupational Health Secretariat of Madrid) were requested to present the ISTAS 21 method, an adaptation for the Spanish context of the Copenhagen psychosocial questionnaire, which assessed 20 different occupational psychosocial dimensions of PSR exposure. The methodology was rigorously followed, expecting to detect harassment practices as in some departments conflictive situations had been reported.

Actions taken: Recommendations for corrective measures were generated and debated within the Health and Safety Committee, and finally approved by both parties. There was a high degree of consensus between employer's and workers' representatives and most of the measures foreseen were organisational, complemented with training and awareness-raising activities. The reorganisation of work affected human and material resources in all departments of the company:

- Change in time planning of tasks in all departments dealing with customers. Concrete hours were defined and implemented for the reception and delivery of vehicles, with positive effect on both workers and clients. This allowed workers to focus on a particular activity without having to continually switch from task to task.
- Also, a new design and distribution of working areas was completed in the shop floor, with a rearranged waiting room for customers; reorganisation of the workspace was carried out to eliminate accumulation of vehicles, workers and customers in certain areas, and thus avoiding interruptions and conflicts. A new car park for vehicles was set up, separating spaces for cars, customers' reception and workers from other company departments.
- Workspace in administrative departments was reshaped with the objective of improving the coordination between them.
- A new easier and more intuitive management system was implemented using a new software. Training sessions were scheduled for workers to learn how to use the new tools.
- To enrich the work content and reduce the degree of monotony where possible, the work has been reorganised so that workers are involved in the whole cycle of work and so that in this way they can undertake a broader array of varied tasks.

Main outcomes: The intervention started thanks to the initiative of the employees' representatives with assigned OSH function in the company who shared with the company leadership the need to carry out the evaluation of PSRs and requested the trade union technicians to come to the company to present the ISTAS 21 evaluation method. The company management agreed upon going ahead with the proposed process and showed commitment to undertake the evaluation. Based on its results, the specific PSRs were identified and analysed and reasons for existing conflicts uncovered. This allowed the company managers and employees to jointly design solutions and define appropriate measures with a large consensus, ranging from workspace reorganisation to task reorganisation, complemented with training and awareness-raising activities, which were successfully implemented, improving work coordination and overall working climate in the company.

8. Workplace health promotion programme by DEAKON Degen GmbH (Austria)

Sector: Manufacturing	Organisation: DEAKON Degen GmbH (cable manufacturing company)	Target group: Ca. 19 employees (from manufacturing to office duties) in 2018
	Website: http://www.deakon.at/	
	Stakeholders involved: N/A	

Company management and PSR awareness: DEAKON Degen GmbH is a manufacturing SME founded in 1988 that produces cables and wires for electric and telephone equipment as well as compound-filled flexible leads. It has been featured in several compilations of best practices at both national level (by the Austrian Business Council for Sustainable Development) and internationally. According to the available information reported in the sources, the general manager of the company showed exceptional personal engagement and appreciation of the almost entirely female workforce and their needs as well as the ambition to build a prosperous enterprise. The company mission statement was summarised as 'Working in healthy conditions in a women- and family-friendly environment'. DEAKON is committed to the promotion of health at the workplace and the building of a family-friendly, age-friendly, women-friendly and phase-of-life-sensible working environment based on equal opportunities. The aims of the company's health policy are to establish safe and healthy working conditions for all employees considering all aspects of health (physical, mental and social). The enterprise has set up a nuanced structure for workplace health promotion (WHP) despite its small size.

Actions taken: DEAKON's approach comprises a holistic understanding of health and involves employees in the design and development of their health promotion programme. For this, in 2018 the company declared to allocate sufficient resources to the health programme in terms of time and budget (annually, €9,000). Examples of the measures taken:

- **Working hours:** Free choice between full- and part-time work; pooling of working hours for part-time employment (three to five days a week); flexible working hours – core attendance time, holiday and compensatory time. Production team plans human resources: mothers have priority in holiday planning. If required, employees can take their children to their workplace, or may leave the work to take care of children in the case of a sudden need.
- **Communication:** Employees are encouraged to speak openly to the management in confidence about psychological problems: issues are treated with highest confidentiality and individual support is provided including external help, if required. The regular breaks at work are taken together (managers and workers) in order to facilitate good communication between all staff and management.
- **Workplace design:** Purchasing of ergonomically optimal equipment is ensured, adequate lighting, friendly atmosphere.
- **Work organisation:** Job rotation; support of employees in new tasks by the team leaders and co-workers, realistic goal setting, avoidance of pressure and stress as well as open communication about issues in this regard.
- **Working climate:** Priority is given to a respectful and friendly attitude between all staff, a good mood and sense of humour are appreciated, disrespectful behaviour is not tolerated. Priority is given to good solution of conflicts, for example there are contact persons named for targeted questions/aspects.
- **Management behaviour:** Respect and regard for every employee, positive feedback to employees is part of the management priorities, publishing of customer/supplier feedback on a notice board shows appreciation and gives opportunities for discussing improvements, open-mindedness for employee proposals is supported and a constant desire to improve working conditions is part of the company culture.
- **Improving skills and knowledge, capacity building activities:** Constant training is provided, both at the workplace and externally in line with assigned duties, for all employees during working hours.

Main outcomes: High accountability of both the management team and workers in this SME for building and maintaining a safe and healthy workplace is accomplished through a constant improvement of the working conditions, especially a healthy atmosphere and good communication at work. The appropriate measures and activities are co-designed after a joint analysis of the needs and requirements retrieved through staff appraisals and surveys that take place on a biannual basis, while the joint planning of activities is performed annually. The company shows through self-reporting in anonymous surveys a 100% workers' satisfaction rate, very low sickness figures and zero accidents, and it is a role model for other SMEs and even for larger companies.

9. Workplace health promotion for female workers in low-paid jobs during menopause and midlife (the Netherlands)

Sector:
Health
and Care

Organisation: Amsterdam University Medical Centre
(university hospital)

Website: <https://www.amsterdamumc.org/en.htm>

Stakeholders involved: Amsterdam Public Health
Research Institute (UMC, University of Amsterdam),
Healthy Women

Target group: Ca. 70 healthcare
ancillary positions (e.g. patient
food service assistants, service
desk employees and cleaners)

Focus: female, migrant and
midlife workers

Company management and PSR awareness: This good practice refers to an academic initiative to fill the knowledge and awareness gap on the WHP interventions that can empower female workers in low-paid jobs during menopause and midlife transition. The intervention was applied in the work environment of the Amsterdam University Medical Centre, a leading university hospital that combines complex high-quality patient care, innovative scientific research and education of the next-generation healthcare professionals. This targeted practice raises awareness on the specific characteristics and needs of the mentioned group of workers (ageing, female, LSES, including a sample with migrant background and in ancillary healthcare positions) and the positive effect of tailored interventions designed to alleviate: a. their double biomedical and midlife transition lived with increasing stress (sleep disturbances, hot flashes, anxiety, irritability, joint pain, depression, mood swings) and new care/social responsibilities, on top of b. their LSES-specific unfavourable working conditions (inflexible working hours, low degree of autonomy, high levels of stress, physically demanding work, etc.). Knowledge and understanding are built on the impact that WHP interventions, implemented within organisations that integrally support female workers in low-paid jobs, can have on the improvement of their work satisfaction and performance. The research also highlights the lack of existing research literature on the matter and hence the need to address this topic.

Actions taken: Addressing the specific needs of this target group, a private Dutch company called 'Healthy Women' has developed a WHP intervention – the work-life programme (WLP) – aimed at supporting female workers during menopause and midlife. The WLP applies an integral approach to explore the individual needs of participants, health education on menopause and lifestyle, an individual health check and follow-up consultation, coaching to improve work-life balance, and physical training including, for example, walking training. All of these elements were implemented in the current setting. It starts with a general information session for the targeted work force. The WLP had previously been implemented in multiple Dutch organisations employing many female workers in low-paid jobs; however, scientific evaluation of the implementation, including the impact of the intervention, had not taken place until now. This study provides a demonstration of the meaning, feasibility and usefulness of tailor-made interventions.

Findings suggest that LSES female workers experience a positive impact from the WLP, an intervention that empowers them to make choices that benefit their health and wellbeing both at work and in their private lives. Importantly, the study results lead to key recommendations to be

considered for a successful maintenance of the practice at organisational level. It is acknowledged that raising awareness of midlife and menopause as an occupational health challenge should be done systematically and across diverse professional levels, including line managers, HR advisors, occupational health physicians and employees. The engagement of line managers is fundamental to smoothly integrate the delivery of a work-related intervention during working hours.

Main outcomes: The described intervention is an example of good practice stemming from an academia-led research initiative into LSES ageing female workers (many of them with a migrant background) that has successfully turned into a routine organisational practice. In fact, based upon the experience gained via the research project, the organisation has permanently included this topic in its HR policy and appointed a menopause consultant. For some of the participants the approach also led to positive changes in the workplace, such as more openness about challenges at work and about the workload. A concrete example mentions a worker who got her workload reduced after engaging in a conversation with her supervisor triggered by the project support.

The study results show a change in menopausal symptoms for the women involved and does show positive results in other outcome variables such as quality of life and work ability, however not significant. As a possible reason for not showing significant results, the authors mention the missing of targeting more organisational changes in parallel to the individual programme.

Finally, the study provides recommendations for future research to focus on intervention aspects at the organisational level and examine if interventions can reduce sickness absence and provide further positive outcomes. Research can be designed in a way to create evidence for future policy and decision-making within public and private entities.

10. Capacity building partnership for suicide prevention through MATES (Australia)

Sector: Construction (activities also scaled to mining, energy sector)	Organisation: MATES (non-profit entity) Website: https://mates.org.au/ Involved stakeholders: 50+ Stakeholders among employee entitlement funds, employer associations, employee unions and construction businesses	Target group: Ca. 280,792 workers in the sector involved in the training (up to 2023) Focus: On-site blue-collar workers
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Company management and PSR awareness: The MATES in Construction (MATES) programme has been active in Queensland (Australia) since 2007 as a joint initiative of employers' and employees' associations. It was started as a response to an alarming report from the Australian Institute for Suicide Research and Prevention that demonstrated significantly higher suicide rates among Queensland building industry workers (Heller et al., 2007). The programme was developed to mitigate suicide risks for workers in the industry, as an early intervention programme based on community development. The programme operates under a partnership that acknowledges the shared responsibility between employers, workers and government. It obtains funding from a diverse pool of sources that include state redundancy funds, direct industry funding and government grants. Despite not being a European case, it is included here due to the high success and spread of the initiative across further sectors and the specific focus on blue-collar workers.

Actions taken: MATES was established as an independent industry-established charity for the purpose of reducing suicide among construction workers. The MATES on-site programme includes the following activities: *a.* General Awareness Training (GAT), a one-hour programme designed to engage workers in suicide prevention provided to all workers on site (the presentations refer to multiple issues leading to suicide risk, including life behaviours but also work-related risk factors); *b.* Connector, a four-hour programme training workers to connect workmates to support, provided to volunteers on site; *c.* ASIST workers, a 16-hour programme training workers on site to intervene when a co-worker is at risk of suicide; and *d.* site accreditation: worksites that meet the minimum training requirements have the possibility to receive site accreditation.

In addition, the basic building blocks of the programme include: 1) promotion of information material on sites for engagement (e.g. on World Suicide Prevention Day); 2) field officers to support the volunteer network; 3) on-site volunteers who inform management on site about mental health and suicide risk; 4) case management; 5) a 24/7 support line; and 6) national policy advocacy such as the Australian Building and Construction Industry Blueprint for Better Mental Health and Suicide Prevention that is a framework for better mental health endorsed by all major construction unions and employer associations in Australia. It uses a *peer support model* raising awareness among workers about suicide as a preventable risk, teaching them how to provide psychological support to each other in critical situations. The intervention aims to build strength and resilience of workers, removing the stigma around mental health and promoting general capacity development in suicide prevention.

Main outcomes: The programme is a multi-stakeholder cross-sectoral national intervention involving industry, the public sector, NGOs and academia (researchers engaged to inform industry around best mental health practices to prevent the risk of suicide at the workplace). Self-reported numbers on the organisation website indicate high value of the activity, with 26,442 people trained through the Connector path, 3,320 through the ASIST training and over 13,703 cases of potential suicide risk managed since 2008 (year of establishment). The initiative has also undergone academic evaluation via reporting with good results and a proved reduction in suicide rates in the Queensland state (see Doran et al., 2019). The strong success of the initiative has inspired the development of parallel initiatives applying the same methodology in the mining sector (since 2012) with over 22,895 people trained and in the energy sector (since 2016) with over 11,729 trained.

4 Discussion and recommendations

4.1 Discussion of results, gaps and future research directions

The main aim of this study was an exploratory collection of evidence regarding PSRs exposure and associated mental health outcomes of European workers with LSES. Early on during the research it became clear that the scarcity of literature focused on this broad category of workers would present a challenge in the data collection and analysis. Therefore, evidence on PSRs exposure and mental health outcomes in European LSES workers was gathered through the exploration of three dimensions of workers' identification with traits akin to LSES workers. These were relative to **a. socioeconomic and sociodemographic variables** (including occupational ones) that were conducive to the identification of low-skilled/low-paid and low-trajectory manual occupations; **b. an exploration of industry sectors** acknowledged by European-level statistics as potentially employing a large share of LSES workers; **c. a multidimensional approach to job insecurity and job precariousness** as an important proxy for LSES workers, particularly so when in low professional trajectories and non-standard contractual work arrangements (Chapter 2). This evidence was further supported by a collection of good practices potentially targeted towards LSES workers, helping to unveil a series of real-life experiences on PSRs management, prevention and intervention (Chapter 3).

A word of caution may be necessary before proceeding into the summary and discussion of the main findings of this document, as this is relative to the importance of the research limitations encountered by the project. As is often the case for this kind of review, all the sources acknowledged in this study employ a large variety of operational definitions, research objectives, variables and methodologies of execution. These, for example, can span across cross-sectoral or longitudinal samples and employ a variety of scales constructed on self-assessed questionnaires (e.g. Copenhagen Psychosocial Questionnaire), develop small-sample qualitative interviews or use registered medical data (e.g. sickness leave, prescribed psychotropic medicines, etc.). It is also important to acknowledge that when statistical data are employed, the overall majority of the studies analysed only provides cross-sectional rather than longitudinal data, hence further complicating the delivery of strong causality and correlation between specific PSRs exposure and associated mental health outcomes. Due to all the above, this research is not meant to perform a systematic meta-analysis of data but rather a scoping review giving an overview of the topic based on available research. This **best-evidence synthesis** methodology was performed to provide **a bird's eye perspective of the main items in the results**. These include context-based factors, main PSRs exposure, main adverse outcomes and other evidence, including mediating and protective factors.

Extensive text analysis and frequency of mentioning of these factors across the literature can thus provide a broad perspective on the main elements of the research necessary to reply to the original research questions that are listed in section 1.1 and tackled below. In this section, the study provides a comparative discussion on the main findings associated with identified PSRs and mental health outcomes (section 4.1.1), followed by reflections on evidence of effect mediators and protective factors against adverse health (section 4.1.2). All of this leads the way to suggest multiple research gaps and future research directions that could be taken departing from this exploratory study (section 4.1.3) as well as other lessons learned from experiences of PSRs prevention, management and intervention (section 4.1.4). As a final feature of the research, the study takes stock of the overall results in order to elaborate a series of policy pointers directed both for regulatory purposes and for stimulating further institutional research and action (section 4.2).

4.1.1 PSRs and adverse mental health outcomes of European LSES workers

Throughout this sub-section, the study discusses the research findings that allow to answer the following guiding questions: 1. *Among the broader psychosocial issues for mental health, what are the main psychosocial risk factors and adverse mental health outcomes concerning workers with low socioeconomic status?* 2A. *Which sectors and workers' groups are mainly affected by these changes?* The discussion is divided alongside the three already mentioned dimensions of the analysis, while also including a discussion on findings relative to the two exogenous drivers of labour market evolution

(digitalisation and COVID-19). Illustrative tables for the findings are included in the Annex (II) section of the study.

▪ Socioeconomic, sociodemographic and occupational status

The first set of results specifically dealt with socioeconomic variables and occupational status of workers. Whether **directly acknowledged as LSES through different indicators** (e.g. income, education levels), classified under **manual occupations** or even under **low and unskilled occupations**, the main argument for PSRs exposure in this strand of the literature often compared these workers with HSES and associated with a variety of contexts akin to a lack of job resources (e.g. less job rewards, lower job control). Possible adverse health outcomes markedly indicated a risk of poorer mental health, with some specific hints towards depressive disorder. The literature also hinted at higher suicide risks for low and unskilled occupations, although this was conditioned by employment sector differences with a specific study showing higher rates for low-skilled workers in construction, health and care, manufacture and agriculture (Greiner and Arensman, 2022). For acknowledged LSES, the literature shows a tendency that **work factors were more impacting towards self-reported bad health than lifestyle factors and that the lack of job resources is more important than the weight of high job demands** (Dieker et al., 2019). Similarly, low family/household status contributed to a greater impact on mental health for both men and women in manual occupations (Arisa-de la Torre et al., 2019). Two further occupational statuses were selected as proxies for analysis of LSES workers thanks to their interconnections with the exogenous drivers of labour market evolution selected for this research. Firstly, **essential/frontline workers** were highlighted as a category of jobs (often more akin to manual occupations) that were essential to the well-functioning of society during the acute stage of the COVID-19 pandemic. They represent a solid proxy for LSES workers, since they are more likely to be employed in unskilled and semi-skilled activities (manual), they are paid less than non-essential employees (-2.08% estimate) and they work more physically proximate to third parties (link to virus exposure). The identified literature for this group established increased PSRs exposure to **longer work hours and extreme shifts, excessive workload and a low degree of job control**. Contrasting evidence was found on exposure to job insecurity, since it highly depended on the ‘essential’ category of the industry sector in which they worked. **For women workers in this category, there was also certain evidence of higher emotional demands, job strain and medical substance use** (e.g. tranquilisers and opioid analgesics, Utzet et al., 2022). **Gig workers** were also selected due to the high presence of potentially LSES vulnerable groups among their ranks (e.g. young, migrant) and to their highly digitalised work environment (through digital platform work). A further spotlight was provided by their increased role in society during the COVID-19 pandemic, particularly for delivery workers. The literature mostly provided evidence of excessive workload, low social support inside and outside work, poor work–life balance, job insecurity (intrinsic to the gig nature of work), risk exposure to low organisational support and even work injustice due to algorithmic surveillance associated with platform work. Main outcomes associated with these risks included stress, anxiety and exhaustion/burnout. Notwithstanding, one source provided contrasting evidence and cross-sectionally confirmed lower rates of stress and anxiety due to the positive role of job autonomy (supposedly high job decision latitude, even if other research results show that algorithms of digital platforms often don’t enable high decision latitude, EU-OSHA, 2022a) and even physical activity in task execution in times of lockdown (Apouey et al., 2020, see also section below on exogenous drivers).

The second set of results was instead oriented at uncovering **LSES vulnerable groups through different sociodemographic variables**. Multiple sources dealt with gender segregation in the labour market as conditional to different PSRs exposure. In terms of commonalities between **men and women**, the literature identifies the negative effects of long working hours (with a bigger effect on women, e.g. Milner et al., 2021; Franklin et al., 2022) and low job control. It also confirms other differences in PSRs exposure. **For men in LSES jobs**, the very traditional but still higher probability to assume the ‘main breadwinner role’ in the family leads to **increased job and income insecurity pressure**. Meanwhile, for **LSES women** gender segregation in the labour market is a reality that marks greater exposure to **emotional demands and work–life balance issues** (e.g. household and children care). The identified literature agrees on focus over general poor mental health and depression as main adverse health outcomes connected to these factors, with slight hints that depression may be higher among LSES women. **Young workers** were instead accounted for through a systematic literature review on young

and precarious employees (Shields et al., 2021). The main PSRs identified for this vulnerable group include increased job strain (i.e. excessive workload), effort–reward imbalance, lack of organisational justice, low organisational support and job insecurity (particularly in the case of industry sectors strongly affected by the COVID-19 pandemic). Also in this case, general poor mental health and depression are evidenced as the main adverse outcomes. Lastly, the literature in this section of the review acknowledges **migrant status** as yet another LSES vulnerable group. Although not all migrants are LSES workers, existing evidence confirms that this category holds a frequent presence among lower-skilled and precarious positions. High physical demands, low job demands, low job control, low organisational support and job insecurity are recurring PSRs for this group; additionally one author also stressed the lack of recovery opportunities (e.g. time off from work, in-work breaks) as a serious issue for migrant workers (Nieuwenhuijsen et al., 2015). The literature identifies general poor mental health and more specifically hints at stress, depression and anxiety as adverse health outcomes. Additionally, it is worth signalling that in a previous literature review Diaz-Bretones et al. (2020) found concrete evidence of a wider exposure to workplace discrimination for migrants (i.e. racist discrimination and bullying) compared to local workers.

A transversal reading of these results seems to confirm the argument provided by the interpretation of the effort–reward model — whereby high job demands if not compensated by adequate job rewards lead to high job strain — while placing even greater emphasis for LSES workers on matters of job and income insecurity as a further stressor among work factors. Certain vulnerable categories can also be exposed to additional specific factors that can worsen PSRs effect on outcomes (e.g. gender segregation in the labour market and additional household responsibilities mainly for women; workplace discrimination for migrants). For what concerns outcomes, the main adverse mental health issue observed is a generical degradation of mental health and wellbeing. However, depression also represents a recurring outcome across the various facets of the literature.

▪ Industry sectors potentially holding large shares of LSES workers

The exploratory data collection process of this research has returned a large variety of findings relative to multiple industry sectors, including hospitality and tourism, customer-dedicated services (e.g. call centre and retail), cleaning, health and care (focusing on home care workers and ancillary professionals), manufacturing or other production activities (e.g. mining) and construction as well as agriculture. In terms of affinity of argumentation, the discussion of these results is divided into two parts based upon the nature of the tasks executed during work concretely whether focused on servicing third parties or on performing manual tasks. In addition, a greater number of available sources in this section compared to the former one allows for identifying how frequently the mentioning of a given PSR exposure and of mental health outcomes is identified in the employed literature.

The first set of results deals with professional sectors whose work tasks are defined by a **high exposure to third parties (users/clients/patients/customers)**.

In **hospitality and tourism**, LSES workers are frequently acknowledged as a typical worker profile in the sector (Chela-Alvarez et al., 2021). The identified literature dealt with professions such as food servers, hotel housekeepers/cleaners and food preparation assistants. Food servers are considered as a sub-occupation particularly at risk, due to greater exposure to social relations' risks relative to interaction with customers. However, women workers are also indicated as a particularly vulnerable group. In terms of identified PSRs exposure, third-party violence (psychological, including verbal abuse and physical aggression) was considered as the prevailing risk factor through frequency in publications, followed by the implications of shift work and unsocial working hours for workers in this sector. Other frequent mentions included long working hours, sexual harassment, job insecurity and work–family conflict. On this last one, Chela-Alvarez et al. (2023) stress that additional work–family conflict contextual factors for LSES women include living with cohabitants (and dependants in need of care), low social support in life, income instability, being the main caretaker at home and being younger. Less frequent but also considered factors include emotional demands (i.e. the emotional dissonance obligation to 'deliver service with a smile', see Xiong et al., 2023), time pressure, work overload and lack of organisational support. Mental health outcomes showed a slight preponderance towards stress, burnout, anxiety and depression, while organisational outcomes proxying for possible mental health issues included presenteeism and to a lesser degree absenteeism and job turnover intentions.

For **customer-dedicated services**, the focus of the results is divided across **general observation on the job category** (derived from mixed-study samples of workers) and on individual observations on **call centre and retail workers**. From a general perspective, it is estimated that between 70% and 80% of the European workforce consists of service workers at risk of emotional demands resulting from the interpersonal nature of work (Duarte et al., 2020). To confirm this, emotional dissonance in relation to customers is confirmed as the most frequently appearing PSR across the identified literature. Lack of organisational support (both from colleagues and supervisors) and work–family conflict follow as less frequent but also tangible risks. Other mentions in the literature include third-party psychosocial violence and role conflict. However, in one case a publication returned contrasting evidence claiming that stressful situations with a manager or co-workers may be riskier than the emotional demands arising from customer attendance (Duarte et al., 2020). No prevailing outcome emerged from the analysis, but anxiety, exhaustion, affective discomfort and stress were all listed as individual outcomes, alongside absenteeism as an organisational outcome. Call centre workers (voice-to-voice service) were the next common category in the identified literature. Vulnerable workers examined by identified literature for this profession include women and precarious/temporary workers. Slightly more frequent PSRs associated with their work included emotional dissonance, low job control, excessive workload and psychosocial third-party violence. Low job resources and lack of organisational support (colleagues/supervisors) were also identified as important risk factors for this group, although to a lesser degree. Mental health outcomes for this category were less evident, since a generical degradation in poor mental health is deciphered through appearance of affective discomfort and often at the organisational level via turnover intentions. Lastly, the findings account for retail workers, a face-to-face modality of customer-oriented services, for which sources of the review mainly dealt with grocery, supermarkets and clothes sale business activities. No repeated mention was found across PSRs and outcomes. Still, in terms of risk factors the studies listed time pressure, excessive workload, lack of organisational support (colleague/supervisor), shift work, long working hours and lack of recovery opportunity. As for outcomes, dedicated findings identified burnout as the direct mental health effect and short sickness absence as a possible organisational outcome.

In the **health and care** sector, narrowing the research scope to the LSES target group resulted in a selection of relevant studies focusing on three categories, namely **home care workers in general**, specific **vulnerable subgroups within the home care workers' group (migrant and women)**, and **ancillary healthcare workers**. From an overview of studies dedicated to all home care workers, a modern trend emerges on the greater demand of this profession rather than having the patient in a nursing home. Structural reduction of organisational support has also been observed as a recurring trend in this sub-sector, at least for certain countries (e.g. Nyberg et al., 2021). Generally a domestic work setting (i.e. one in which there can be no witnesses) goes along with an increased risk of workplace violence (Clari et al., 2020). Third-party violence (both physical and psychological) is very frequently mentioned as a possible risk in the encountered literature, and it is followed to a lesser extent by the lack of organisational support. Other PSR factors with slightly more frequency of occurrence include excessive workload, shift work and professional isolation. Individual mentions were also made of role conflict (e.g. extra requests to also perform cleaning tasks), emotional demands from user, time pressure and even workplace harassment by colleagues. Mental health outcomes displayed a greater frequency for stress and depression occurrence, followed by sleeping issues and anxiety. Meanwhile, at organisational level some hints suggested organisational absenteeism and turnover intentions as outcomes. Only in the case of sexual violence, one source in the literature warned of PTSD and higher suicide risk.

Another recurring trend in the literature refers to the high presence of women workers, more frequently of foreign origin who are attracted by the high demand of these services in western European countries. As a result, some studies specifically addressed this vulnerable workers' category. Excessive workload and job insecurity seem to be the most occurring PSRs and are then followed by professional isolation due to domestic setting (and being far away from home) and shift work. Less frequent (but also present) is the mention in the studies of long working hours, work–family conflict, high emotional demands, role conflict (e.g. cleaning tasks), and user-related violence (both physical and psychological). Evidence of outcomes is however less clear; the results mostly correlate with poor general health (both physical and mental) and in one case with hints of exhaustion/burnout. In addition, it is worth mentioning that in one study contrasting evidence was found on the lack of negative outcomes due to professional isolation and live-in formula of women migrant care workers in domestic settings (Vianello, 2019). The only

European study detected by the literature review dealing with ancillary healthcare (i.e. non-medical staff performing support tasks for management/care of facilities and patients, such as assistants, cooks, stretcher-bearers) reveals that they are truly the 'forgotten workers' in the broader sector. Thus, Sèrole et al. (2021) highlighted time pressure, excessive workload, high emotional demands (from patients) and lack of job resources (especially income) as PSR factors most conducive to a burnout outcome. In this sample of ancillary workers (acknowledged as LSES), hospital cleaners were the leading category experiencing an adverse health effect.

The second set of results was instead oriented towards **industry sectors with a higher focus on manual occupations**.

The **professional cleaning** sector (with emphasis on company-based but also domestic experiences) is acknowledged by the literature as a potentially risk-prone psychosocial environment. It suffers from a rigid structure of work organisation (e.g. shifts, workload) and traditionally shows a high turnover. It is also a sector carrying a stigma of social prejudice since a career in cleaning is acknowledged in several sources as '**dirty work**'. It usually holds a preponderance of female, migrant and ageing workers among its shares of employees. The selected literature referred to a variety of risks, including low organisational support or directly the lack of support (in the form of interpersonal conflict with both colleagues and management), a lack of job rewards, professional isolation and job insecurity. Outcomes found in the screened studies are a general decrease of mental wellbeing and increase of anxiety. Other hints were also made towards depressive disorder and MSDs, these last ones in their role as a possible factor interacting with PSRs.

In **manufacturing and production**, the scattered evidence gave place to a series of findings mostly based on individual publications contemplating different occupations. Evidence was encountered for **slaughterers in meat industry production** (Cohidon et al., 2009), **miners** (Mościcka-Teske et al., 2019), **migrant blue-collar workers in manufacturing and the metal industry** (Porru et al., 2014), and **low-skilled blue-collar workers in highly automated factories** (Wixted et al., 2018). Trying to build bridges across the various occupations, all of these dealt with a variety of PSRs associated with high job demands (e.g. time pressure, excessive workload, long working hours, high physical demands) as well as a lack of job resources (e.g. lack of job rewards, low job discretion and job control). However, each occupation also dealt with task-specific risks. For example, butchers were exposed to high emotional demands in constant animal slaughter activity. Miners had higher perceived risks of physical injury and accidents due to mining activity. Migrants had to deal with workplace discrimination in industrial manufacturing settings, and lastly the automated context made workers more vulnerable to high cognitive demands and professional isolation (worker-machine). The findings on outcomes were also not unanimous: the research on meat workers only established poorer health (both physical and mental) as the adverse health outcome. Migrant workers presented higher rates of anxiety, depression and sleep issues. In principle, miners and low-skilled workers in automated settings share stress and physical injury as outcomes (i.e. stress and higher risk of injury/MSDs). However, contrasting evidence is offered by the research on miners, since this cross-sectional study highlights that miners had still less evidence of adverse mental health outcomes when compared to other industrial manual occupations in Poland (Mościcka-Teske et al., 2019).

The last two sectors (**agriculture and construction**) particularly zoomed in on low-skilled workers (e.g. builders, bricklayers) for construction and on migrant farmworkers for agriculture. Both sectors were acknowledged for their difficult physical and psychosocial work environments. In both cases, the psychological risks of these professions have only been more recently remarked on in the literature (i.e. past two decades). Trends of the workplace affecting LSES construction workers included the presence of rigid hierarchies at work and conservative sociocultural norms in the workplace. A higher presence of systematic reviews of the specialised literature allowed to observe a series of slightly more frequent PSRs occurrence for these workers, including time pressure, excessive workload, low job control, role conflict and job insecurity. Individual mentioning is also made across studies of long working hours and interpersonal conflict at work as well as low job rewards and opportunities. Mental health outcomes for this job category appeared more severe on average than in other sectors. Most frequent mention was attributed to depression, stress and anxiety but also to PTSD and even suicide risks, the last of which is further considered as a serious issue in the sector according to the findings on good practices (see 10. Australia, in section 3.2). To a lesser degree, burnout and substance abuse (e.g. drugs, alcohol) were also included as possible outcomes.

Lastly, for migrant farmworkers the literature spoke of a need to distinguish between foreign-born farmworkers (from outside the EU) and seasonal migrants (EU citizens enacting temporary displacement in farming seasons, Ramos et al., 2020). However, only one study made explicit reference to this distinction, and only found a substantial difference in PSRs exposure for low job rewards and autonomy. This would affect more seasonal workers, allegedly due to probability of having a higher educational status. Meanwhile, other PSRs with slightly more frequent mention were high physical demands, professional isolation, workplace discrimination and job insecurity. Individual mentioning was also made of lack of organisational support and lack of social support in life outside of work, most likely due to living away from home. No ranking of outcomes was observable, as from the literature individual mentions are made of generical poor mental health, anxiety, stress, depression and sleep issues as a behavioural proxy.

Transversal reading of the results across the various industry sectors reveals that LSES of the worker may not be the best focus for distinguishing common features in the PSRs/mental health outcomes debate. Indeed, **each sector displays a series of mechanisms and demands essential for the development of work tasks** (e.g. emotional demands required when interacting with third parties; physical workload associated with manual-oriented occupations). In addition, **certain sectors and sub-professions display a greater concentration of certain workers' groups** (e.g. female workers in domestic care, male ones for construction bricklayers). Notwithstanding, the separation and discussion of two different focuses in the sectors allows for some degree of generalisation. When looking at sectors with a focus on service provision to users/clients/patients/customers, across the findings the most frequent PSRs studied for their association with mental health outcomes are the ones relative to interactions with third parties. Third-party violence, mostly psychological as in the case of verbal aggression but in some cases even physical in face-to-face services, is a strong recurring item in the list. Emotional dissonance and the obligation to 'deliver service with a smile' is another recurring PSR in the studies. In addition, lack of organisational support was also observed across multiple sources and sectors in this classification as an important risk conditioning the outcomes. Indeed, the mediating effect of positive relationships with managers and colleagues is also part of the discussion on mediators and protective factors in section 4.1.2. On the other hand, transversal reading of findings with a focus on manual occupations reveals a more limited generalisability. However, it is broadly possible to notice a recurring presence of high job demands in terms of work intensity (thus including, for example, excessive workload and excessive physical load). In this regard, a systematic review of the literature in construction even concluded that high job demands were more responsible than lack of job resources for the appearance of mental health issues (Sun et al., 2022; Chan et al., 2020). Notwithstanding, low job rewards (with a particular emphasis in some sectors on the lack of promotion opportunities) also appear as a recurring PSR factor across these sectors. No strong outcome presence is observed through observation of results in all sectors. However, stress, anxiety and depression seemingly appear as the most cited outcomes overall across all sectors.

▪ LSES workers with poor quality of employment

The third and final dimension acting as a proxy for identifying LSES workers and their possible PSRs exposure related to mental health outcomes refers to low quality of employment. The findings are shown across two main perspectives: *a.* research results on publications considering as the main subject of the study **workers in low professional trajectories or precarious employment**; and *b.* research results associated with **non-standard work arrangements**.

The first set of the results thus focused on those individuals holding a persistent or transitory state across low-quality employment or who experienced downward mobility in their career. This implicitly assumes that these workers were either more akin to belong to low-skilled and low-paid occupations or to hold LSES. Indeed, the identified literature in the review returned a higher frequency of mentioning relative to job insecurity and job precariousness as the main psychosocial factors leading to mental health outcomes. Notwithstanding, across the sources the matter of income insecurity, lack of job rewards (e.g. promotions), UWSA, sexual harassment and even difficult experiences of organisational restructuring were individually encountered throughout the studies. For what concerns the main adverse health outcomes, the literature marked a strong frequency of mentioning for depression (also including the proxy finding of certified people with a disability pension attributed to this disorder), followed by generical

evidence of degradation of mental health (and in one study of both physical and mental health) and to a lesser extent anxiety. Further individual mentions are present for exhaustion, risk of substance abuse (e.g. drugs, alcohol) and suicide risks. To these findings, it may also be added that more frequently migrant workers are prone to these kinds of low-employment trajectories that make them even more vulnerable to job insecurity and job precariousness (Diaz-Bretones et al., 2020).

Evidence associated with non-standard work arrangements was fragmented across a series of different work agreements. Temporary workers (with a focus on temporary agency workers) were acknowledged by part of the identified literature, since evidence does exist that this category holds a high share of low-waged and low-skilled employees. As expected, job insecurity was the most ranked psychosocial factor accounting for the risk of mental health outcomes. To a lesser extent, the literature also included considerations on the effect of income insecurity and the generical presence of high job demands and low job resources. Here, the results for mental health outcomes give a slight preponderance to exhaustion, although one mention of degradation of worker health (both physical and mental) and proxy evidence for MSDs is also considered. Part-time work is analysed under two different perspectives for even greater accuracy in considering LSES workers. On the one side, the literature identified involuntary part-time workers — understood as those working part-time but who could not find a full-time job. For them, the literature identified high work intensity, work shifts and the matter of availability, long working hours, lack of job rewards and work–family conflict as significant PSRs, although without showing any frequent mentioning for any of them across studies. However, in terms of outcomes this literature could only return generical evidence of mental health degradation and of generical workers' health degradation (both physical and mental). On the other side, a focus was given on marginal part-time workers, understood as those only working between 8-15 hours per week. This was also considered as a strong proxy for LSES workers. Here, the literature provided a list mainly based on high job insecurity and low job resources (i.e. low job satisfaction, organisational support, decision latitude), but in this case it is interesting to know that low job demands (due to scarce working time) was also considered as a PSR. However, no frequent outcome emerged from the literature, as evidence returned higher risks for stress and depression, sleep problems as behavioural proxy for mental issues and lastly a generical outcome of 'pain' experienced by the workers with a hint towards MSDs. Finally, this section also held consideration towards vulnerable independent and self-employed workers acknowledged as LSES workers. The sources only recognise here the PSRs of income insecurity (double mention across studies), job insecurity and job precariousness. However, all sources can only agree on stating that the main adverse outcome for this category is a degradation of workers' health (both physical and mental).

As expected, the nature of the studies considered for **this LSES dimension returns a transversal focus on job insecurity, income insecurity and job precariousness as the most frequent PSRs** for workers in low-quality employment. It is however important to clarify that due to literature evidence in this section frequently associating LSES with workers holding these contractual conditions, it is also necessary to consider matters of contractual stability and financial strain for European workers. Overall, the analysis of mental health outcomes detects a much more frequent mentioning of depression for workers in low or precarious professional trajectories. Less clear is the extent of mental health issues for non-standard work arrangements, but sufficient evidence is gathered for confirming a worsening of health and wellbeing for workers under these non-standard employment conditions.

▪ Evidence on exogenous drivers

In this section, we discuss evidence relative to the effect of the exogenous drivers on work management and design. Their analysis is conditional to replying to the second part of research question 2 for this research (2B. *And how did recent labour market evolutions affect the PSR factors at work for workers with LSES?*). Unexpectedly, the findings of the literature review were not as abundant as expected during the research design stage. For the experience of the **COVID-19 pandemic**, this may be the case since studies accounting for PSR factors connected to the virus spread and the lockdowns were at this stage mostly focused on HSES health and care analyses (i.e. health professionals) or teleworkable occupations. Another explanation may be that at the time of data collection (October to December 2022) other studies were still in the making and awaiting peer review approval. Studies on essential/frontline workers (and in one case, specifically dedicated to cleaners) were the strongest evidence gathered throughout the review. Some publications only discussed at theoretical level the impact of COVID-19 on

worsening working conditions in different sectors (e.g. Shields, 2021; Bérastégui, 2021). The studies on essential workers did not explicitly consider PSR factors associated with the virus, but rather framed the pandemic as a variable aggravating already existing risks associated with work management and design (i.e. Dutch, 2022; Esteve-Magalí et al., 2021; Utzet et al., 2022). Only the study by Dias et al. (2022) on professional industry cleaners included perception of virus exposure (i.e. fear of contagion) as an additional risk conditioning worse mental wellbeing. For the construction sector, King and La Montagne (2021) only provide a commentary article where they link their previous research effects of the Eurozone crisis and suicide risks for workers to the possible effects of the massive economic crisis triggered by the pandemic. Interestingly, on the subject of gig workers (food delivery riders), Apouey et al. (2021) suggest that physical activity and work autonomy (i.e. greater freedom to carry on with the tasks and to freely move during lockdowns) were protective factors against stress and anxiety during the first great spread of the virus.

Meanwhile, a second surprising finding of the research was the strong lack of contributions exploring **the impact of digitalisation on European workers' PSRs exposure and mental health outcomes**, particularly for individuals with LSES. Statements in the literature expressed that European research tends to lack contributions in this regard, particularly for the manufacturing sector (Koukoulaki, 2014). In terms of the results in this review, the most evident occupation embedded in a context of work platformisation was the one associated with gig workers (e.g. EU-OSHA, 2022a; Apouey et al., 2021). For example, in his classification of PSRs, Bérastégui (2021) develops a specific category for *algorithmic management and surveillance*, associating it with excessive workload and low organisational support (e.g. lack of trust, conflict) leading to more frequent evidence of stress, exhaustion, burnout and anxiety. The literature on vulnerable self-employed also refers to this category of workers. Two results from the manufacturing sector tackled digitalisation either explicitly (Wixted et al., 2018, with a sample of blue-collar workers in highly automated factories) or implicitly (Koukoulaki, 2014, including automation in the wider context of lean production). Wixted et al. (2018) was the only study capable of explicitly hinting at the development of stress as a tangible outcome and to a proxy effect relative to MSDs (see also previous section, results on manufacturing). Mentions of digitalisation challenges are also present in the literature dedicated to call centre workers (i.e. Roque, 2016), where it is seen as a driver of worsening working conditions. At the same time, it is also mentioned as a compelling challenge for the future of the agricultural sector (i.e. EU-OSHA, 2020). Further discussion on research gaps associated with the exogenous drivers can be consulted in section 4.1.3.

4.1.2 Evidence of mediating and protective factors on adverse outcomes

This section of the findings extracts relevant evidence regarding mediating and protective factors with the potential to regulate the extent of adverse health outcomes on LSES workers. Across the three dimensions of analyses, some studies contributed to additional factors conditioning PSRs exposure and to the search for solutions in design and management of work. This section distinguishes between two main categories and attempts to provide a comparative perspective on the findings.

Firstly, solid evidence across the literature suggests that **sociodemographic and socioeconomic indicators matter for mediating PSR exposure effects**.

1. **Gender:** For LSES men the 'male breadwinner' cultural paradigm seems to condition a worsening of mental health outcomes based on job insecurity and precariousness (e.g. Pyöriä et al., 2021). For LSES women, gender segregation in the labour market is instead a reality that can condition greater exposure to emotional demands and work–life conflict issues. Additional factors that were observed for this group are work–family conflicts, living with cohabitants (and dependants in need of care), low social support in life, income instability, being the main caretaker at home and being younger (Chela-Alvarez et al., 2023). Evidence from some industry sectors also outlined greater risk for violence and sexual harassment, as in the case of the hospitality industry or home care workers. Additional evidence on gender in possible LSES occupations is also available throughout some industry sectors (e.g. Cohidon et al., 2009 for male workers) and even in certain forms of self-employment, conditioning greater risk of mental health issues for women (e.g. Jonsson, 2021; Ferrín, 2021).

2. **Age:** Frequent mention is also made of worker age, with particular emphasis on increased vulnerability to PSRs exposure of young workers. The results of the systematic review from Shields et al. (2021) reveal that age mediates exposure to workplace bullying, role conflict, sexual harassment and work injustice, with more impactful effects for young workers. It is also considered a critical mediating factor by the dedicated systematic review findings of Frimpong et al. (2022) in construction. Both age and gender condition risk exposure in the meat production industry (Cohidon et al., 2009). Worker age is also listed in conjunction with ethnicity for increased risk of mental health issues development in older professional cleaners (Gamperiene et al., 2006), while young age and irregular resident status increased PSRs exposure for domestic health care workers (Bover et al., 2015).
3. **Migrant status:** Further evidence on migrant status of workers displayed additional vulnerability to job insecurity and precariousness, alongside wider exposure to workplace discrimination when compared to local workers (Diaz-Bretones et al., 2020). Some articles also tackled the 'healthy migrant' paradigm when trying to interpret research that did not provide evidence of PSRs exposure and associated mental health outcomes (e.g. Montoya-García et al., 2013). According to this, migrants would be younger, healthier and 'more optimistic' by displaying a higher rate of job satisfaction towards their current job. However, this research also aligns with calls for a critical read into such a hypothesis by signalling danger of underreporting due to different cultural approaches to mental health or fear of employer judgement (Diaz-Bretones et al., 2020).
4. **Job insecurity:** Multiple research results associated either directly with LSES, low-skilled and manual occupations (section 2.1) or those looking at job precarity and non-standard employment relationships (section 2.3) have all confirmed that increased contractual instability (e.g. precarity, job insecurity) and financial strain (e.g. income insecurity) are contributing factors that can also increase the gravity of other generical PSRs exposure, alongside favouring the appearance of adverse mental health outcomes (e.g. Wagenaar et al., 2012; Thomson and Hünefeld, 2021).

Secondly, evidence for LSES workers seems to suggest that work-related factors contribute more than lifestyle factors to worse self-reported health (Dieker et al., 2019). In accordance with this, in the identified literature it is possible to find suggested **adjustments of work features** from job design, management and social relations that could act as protective factors against the development of adverse mental health. These include:

1. **Organisational support (colleagues/supervisors):** An increase in this job resource is greatly seen as beneficial across most sectors oriented towards interaction with users/clients/customers/patients. In hospitality and tourism, it is seen as having an even more important role than job control in moderating adverse effects of excessive demands (Ariza-Montes et al., 2018). When coupled with increased job autonomy, it can contribute to employee wellbeing in call centres according to Molino et al. (2016), while for Duarte et al. (2020) dealing with stressful situations with a manager or co-workers is seen as riskier than the emotional demands requested by working with customers. Phoo and Reid (2022) also see organisational support as a safety net reducing risks associated with workplace third-party violence for home care workers. Lastly, even in the case of a manual occupation (professional cleaners), Bosmans et al. (2016) believe that a combination of organisational support and good customer relationships can moderate exposure to other PSRs.
2. **Reducing job demands:** An interesting finding of the literature derives from an identical statement in two systematic reviews associated with the construction sector as a manual occupation. Contrary to the importance of organisational support exposed above, both Chan et al. (2020) and Sun et al. (2022) agree that high job demands tend to globally imply more adverse mental health implications compared to low job resources (e.g. low job support, reward or recognition, low control, lack of career opportunities) and that ultimately high job demands are more conditional to the appearance of mental health outcomes.
3. **Improving work–life balance:** Some sources also refer to the role of an improved work–life balance as a protective factor against PSRs exposure. For example, Chela-Alvarez et al. (2023) consider for women hotelkeepers in the hospitality industry a series of targeted actions aiming at simplifying household and family management (see section 4.1.4 for more details).
4. **'Active jobs':** Holding high job control when facing high demands was considered as a protective factor against suicide risks for low/unskilled workers (Greiner and Arensman, 2022). However, in

the case of temporary agency workers, contrasting evidence was given on how lower levels of job control can moderate worker exhaustion (Hakanen et al., 2019).

5. **Job engagement:** For domestic healthcare, emotional investment from long-term care of users/patients can moderate job demands' risks, but only if these last ones are not too excessive (Geisler et al., 2019). Job satisfaction was also a strong moderator for miners in Poland and blue-collar migrants in metal and other manufacturing industries in Italy (Mościcka-Teske et al., 2019; Porru et al., 2014).

4.1.3 Research gaps and future research directions

Despite the abundance of research results across the three dimensions of analysis, this study was able to identify a series of important research gaps that should inspire future research directions in the field of PSRs exposure and associated adverse mental health outcomes. More specifically:

1. The great majority of the encountered studies indicates that this field of knowledge is **dominated by cross-sectional research, and that more enquiries employing longitudinal samples are required** to establish solid relations of causality between precise PSR exposure, derived mental health outcomes and the mediating effect of protective factors. However, it is still acknowledged that recurring waves of data collection over the same sample of workers can be difficult and require large research resources. This can also be more complex in the case of LSES workers in industry sectors with high levels of temporary/precarious/seasonal jobs or high turnover rates.
2. In contrast, while the COVID-19 pandemic caused immense suffering, it also triggered the **revalorisation of essential jobs in critical industry sectors** that are required for the well-functioning of society, several of which include large shares of low-skilled and low-salaried workers (e.g. food production and retail). This aspect could stimulate further acknowledgement in society and open new research avenues on the health and wellbeing of such workers in contemporary society.
3. However, the results of this research **contradicted initial expectations for a higher number of studies exploring the effect of the pandemic** on European workers' PSRs exposure. Across the three dimensions, very few studies directly explored the subject by means of a cohort of workers (e.g. Dias et al., 2022). Yet, some clearly called for research gaps in sectors that could have sorely required more contributions considering this exogenous driver. For example, Ayachit et al. (2022) call out the research gap considering COVID-19 and the consequential digitalisation measures implemented for ensuring physical distancing in the food service industry (e.g. impact of delivery platforms services).
4. Incidentally, **an unexpected yet broad research gap found in this report was the one associated with digitalisation of LSES occupations**, particularly relative to essential aspects of technological evolution in work design and management. Across all three dimensions, very few publications actually dealt with the psychosocial consequences of introducing new ICT-ETs at the workplace, and even fewer actually employed a sample of workers to test hypotheses beyond theoretical assumptions. Considering the early transition technological stage envisioned by EU-OSHA (2018, see also section 1.2.2), this can be considered as credible. And yet, further EU-level research will be strongly needed to address fundamental evolutions soon to condition most workplaces (see also below).
5. The exploratory journey across industry sectors potentially including large shares of LSES workers returned a satisfactory rate of results for most professions. And yet one typology of profession and one sector surprisingly revealed extensive research gaps. Firstly, contrary to pandemic-derived expectation, **European ancillary healthcare professions were truly 'the forgotten healthcare occupations'** among hundreds of discarded results examining PSRs exposure and mental health outcomes of health professionals. Given their fundamental role as essential jobs in times of health emergency crisis, further studies are strongly needed for assessing post-pandemic consequences of this category. Secondly, another big miss of the literature was encountered in **the European manufacturing sector**. Previous research statements already confirmed a diminished trend towards examining blue-collar workers in Europe (Koukoulaki, 2014), but there is an urgent need to address these professions in light of the progressive expansion of ICT-ETs in manufacturing and productive establishments.

6. Finally, while it might be too early for a literature review of a substantial body of publications on the subject, it is also worth reminding that **recovery from the COVID-19 pandemic has been abruptly reversed by the onset of the war in Ukraine in 2022**. Recent enquiries unveil that the energy and inflation crisis that derived from this continue to bring uncertainty in both living and working conditions, with concrete risks for mental health issues (particularly for depression, Eurofound, 2022a). Meanwhile, news of **imminent spread of immersive/virtual (e.g. metaverse) and augmented reality technologies** (e.g. glasses and visors) go hand in hand with new software development of **AI deep neural language technologies** such as ChatGPT. **Future research may also require elaborating a more complete framework** on the greater consequences of extended crisis and technological evolutions spanning across the 2020s, particularly for industry sectors traditionally populated by non-highly skilled personnel.

4.1.4 Lessons learned for PSRs prevention, management and intervention

This section approaches the subject of the last research question in the study (3. *What kind of successful intervention strategies have so far been attempted, whether in terms of public regulations (e.g. sector or national regulations) or organisational practices (public and private)?*) It extracts suggestions and evidence on good practices encountered in the literature review and in the selection made in section 3.2 of this study (both research studies and grey literature). These findings are mainly directed at companies/establishments, with a keen eye on advising employers from both large corporations and smaller businesses (including SMEs) on how to improve the psychosocial work environment for workers with LSES. Beside the legal obligation to protect workers from any harm to their safety and health, which in some Member States also includes the specific mention of PSRs and mental health, there are additional reasons for employers to protect their workers. A dangerous psychosocial work environment is not only detrimental to individual workers' health but also to business prosperity. This study as well as other specialised enquiries have identified negative proxies of mental health outcomes affecting the business (e.g. presenteeism/absenteeism of workers affecting productivity, high staff turnover, and bad reputation for both the business and the relevant sector leading to lack of human resources, as discussed for example in the hospitality sector by Ram, 2018). Conversely, high levels of positive job engagement in workers increase feelings of work meaningfulness, stimulating creativity and productivity in a company.

In the following examples, suggestions and recommendations concerning useful practical interventions for companies with LSES are summarised:

1. **Learning about the specific PSR aspects related to a certain type of work, sector, activity or worker:** The first step for employers may be a familiarisation with the specific sectoral job demands associated with the development of businesses and services in their company. In this respect it is also important to make sure to cover all kinds of workers in a company. The results of this study and of other sectoral enquiries show that the typology of work performed, and the level of demands required, can greatly condition frequency of adverse mental health outcomes for workers and may vary a lot across sectors and activities. In this respect it is also important to take a very broad approach from the beginning and to make sure that certain groups of workers are not overlooked or are even approached with a special focus (e.g. like young workers, migrant workers, women in specific sectors, temporary agent workers, etc.).
2. **The important role of worker involvement:** As indicated by the literature, social partners' dialogue can stimulate worker representation and foster OSH practices (e.g. Roque, 2016). In certain cases, they can also promote dialogue in companies that are less likely to take part in preventive actions (e.g. SMEs and traditional sectors). The two good practices from Spain (0. and 0.) show the positive outcomes of external intervention in the company. While it is also important to consider the vulnerability of LSES workers and limited possibilities for attending to these processes due to lower knowledge on, capacity and support for raising OSH concerns when belonging to specific sociodemographic groups or non-standard employment relationships (EU-OSHA, 2021a; see also section 4.2), multiple sources in the review also pointed to the usefulness of participatory practices for workers in order to increase communication and outvoice concerns. For example, Nyberg et al. (2021) consider that group sessions for workers in the domestic healthcare sector help in fighting professional isolation, generate cohesion and communicate risks before these develop negative outcomes for workers and the company. At the same time, they even suggest the introduction of a

reablement programme in which a carer does not just provide a service but also collaborates with the patient in order to collaborate in small task development, developing trust and co-responsibility. A fitting case is also displayed in good practice 3. Ireland, where rehabilitation assistants could discuss concerns on social relations at work during focus group sessions. According to evidence, participatory practices at work (e.g. workers' meetings, feedback exchange, joint or consulted decisions, more interactive itineraries with customers or patients) account for greater levels of job engagement and increased feelings of work meaningfulness for workers, hence increasing both individual and company benefits. Employers should strive as much as possible to introduce active participation of workers (e.g. including broader opportunities for autonomy and decision-making) in the work management process of the business.

3. **Plenty of general recommendations exist on how to approach PSRs evaluation and management in companies** (see for example, EU-OSHA, 2018¹¹). These specifically give indications on how to approach a PSR assessment properly from scratch and how to follow up with concrete measures. Generally linking PSR prevention to the overall OSH approach is highly recommended. For the specific target group of LSES there is no difference in terms of the general approach. However, certain risks can be of higher importance:

- **The organisation of workload** seems to be the origin of certain risks in some sectors, especially since LSES workers often have less decision latitude and as such lower possibilities to influence their workload and cope with it. For example, Chela-Alvarez et al. (2021, 2023) argue for women in the hospitality sector that companies should implement measures to reduce daily stress, that is, diminishing the number of rooms to be cleaned per day or the variety of tasks to be carried out by personnel. This policy suggestion was already translated in a practical example for hotel housekeepers in the Balearic Islands of Spain, where regional legislation will enforce regulation of workload for this category (e.g. limitation of total numbers of rooms to be cleaned) and the implementation of assistive equipment (mechanically or electronically powered lifting beds, Telecinco.es, 2023). Employers should ensure that work is organised to ensure congruence between workload and the number of work hours, thus avoiding the spread of a culture of working long hours and high work intensity that is detrimental to workers' mental health. Several good practices in this report also show how companies sought to adjust working load and time in the company to improve workers' wellbeing (e.g. good practices 1. Czech Republic, 2. Slovenia and 0. Spain).
- **Improving work–life balance:** Work–life balance has been brought up in many studies as a dominant risk factor for the respective target group, especially for women and digital platform workers. Further examples for companies include a variety of measures such as adapting flexible daily working hours, giving the choice of different working hour schemes or foreseeing flexible arrangements for emergency family issues. As concrete examples, good practices 1. Czech Republic and 8. Austria in this study display company interest and consideration for workers in assisting with financial strain or with adjusting working times in line with work–family needs.
- **Workplace bullying, harassment and discrimination:** Specific LSES workers are more prone to be exposed to these kinds of risks, for example migrant workers. Certain psychosocial interventions for cultural adaptation of foreign workers as well as adapted information on working rights and recovery opportunities (e.g. breaks at work, off-time from work) may be required (e.g. Nieuwenhuijsen et al., 2015; Montoya-García et al., 2013). Likewise, it is important to generally ensure that training and information for migrant workers considers the target language to ensure proper work induction and facilitate learning on the job.
- **Providing specific training according to the nature of PSR exposure:** While it should be noted that the hierarchy of prevention always foresees as of primary concern the implementation of organisational and technical measures to prevent PSRs, multiple sources in this review suggested to provide specific training to develop coping strategies against potential PSR exposure, for example against emotional dissonance in call centres. Going beyond typical organisational solutions (e.g. not working alone) and technical measures (e.g. protective solutions such as a safety button, broad counters, clear separation between employee and client areas), the good practices collected in this study include examples of targeted training, such as

¹¹ See: https://osha.europa.eu/sites/default/files/EC_GUIDE_STRESS_MSD_WEB.pdf

6. Finland with a web-based tutorial against customer violence. Likewise, this argument also refers to the example from 10. Australia with the highly successful suicide prevention activities for workers in construction (and other manufacturing and productive sectors).
4. **Engaging in mental health promotion:** Even if an employer does not perceive an immediate danger for the company, there are still a series of preventive activities that can be taken to ensure the sustainability of a healthy psychosocial work environment. These can be of particular relevance for industry sectors and occupations traditionally unaccustomed to mental health care. Companies should fight to reduce stigma about mental health at the workplace, and eliminate any feelings of guilt, sense of failure or unworthiness that may be held by employees. Providing sources of general mental health literacy, general awareness activities and contact-based education strategies are all solid options in this regard. Discriminatory behaviour against mental health conditions or other adverse health behaviours (e.g. alcohol or substance abuse) should not be tolerated, as colleagues and supervisors should receive adequate training for dealing with troubled co-workers.
5. **Do not forget about non-traditional protagonists of the measures:** Special support should be addressed to SMEs, a typology of businesses often overrepresented in 'conservative' industry sectors that may not be conscious about the relevance of safe psychosocial work environments and that potentially hold larger shares of LSES workers. As stated in recent research on SMEs (EESC, 2022), the European economy largely relies on the over 23 million active small and medium companies across the EU-27 (99.8% of all non-financial nor business services companies in Europe by 2020). Likewise, SMEs also constitute the backbone of many sectors assessed in this study. For example, in the European construction sector, 95% of all firms are either microenterprises or SMEs. For agriculture, available data from 2016 accounted for the presence in the EU of 10.3 million agricultural holdings, the majority being family-run small-farming businesses of fewer than 5 hectares (EESC, 2022). In contrast to that, Beck and Lenhard's (2019) results based on a survey of 6,500 SMEs in Germany point to large challenges in the implementation of PSR assessments, thus defining the greater need of attention for this typology of businesses. Good practice 8. from Austria represents an excellent example of positive measures enabled in a SME company environment.
6. **Consulting services:** Lastly, if the company is to offer any kind of health benefits, it should also consider including mental health benefits (e.g. counselling services) alongside more traditional health assessment routines (Coe et al., 2021). See also good practice 4. France on the company-affiliated psychosocial contact centre in France.

4.2 Policy pointers for future action

Based on the results of this study, policy pointers for institutional action at European, national and sectoral levels are summarised below.

- LSES workers are often more exposed to PSRs than other groups: **There is a need to specifically include LSES workers across all industry sectors in OSH strategies and actions, including improvements to their working environment and actions on PSRs.**
- **Actions** and resources should be tailored **to the specific circumstances and risks** faced by different **occupations and specific jobs within sectors**. For example, different actions will be needed for farmers and seasonal farmworkers. Actions include research, awareness raising, programmes, tools and interventions.
- Specific attention needs to be given to **raising awareness of PSRs among those sectors and occupations not traditionally linked to PSRs**, such as construction and agriculture and others. Further research is needed in these sectors to determine the best way to reach them and the kind of support and resources they need.
- Ensure that in those sectors where PSRs are well recognised, **all occupations are covered, including LSES workers**. For example, in the health and social care sector ensure that ancillary workers are included as well as nursing and medical staff.
- Take account of the specific PSR factors, circumstances and **needs of vulnerable workers' groups** within specific sectors and occupations. This includes lack of resources and specific vulnerabilities because of their sociodemographic background.

- For migrant workers, issues include being in a position that makes it difficult for them to speak up, low trade union representation, greater likelihood of suffering discrimination at work, and language and cultural barriers. Language barriers can mean that they are less aware and informed.
- For women workers, issues include being in low-pay jobs that are often overlooked as well as the need to recognise work–life conflicts when addressing PSRs. Campaigns aimed at fostering co-responsibility of partners for caring and performing household tasks could for example contribute to a change of paradigm for gender issues. Providing services and resources to support caring for children and dependent family members (e.g. affordable childcare services, summer camps, day care centres for elderly and home assistance, see Chela-Alvarez et al., 2023) but also regulations (e.g. appropriate parental leave, allowing days off for taking care of a sick family member) could also contribute to better work–life balance of women workers.
- LSES male workers can be more vulnerable to certain types of risks, for example job insecurity, if they are the major bread winner, or resistant to admitting stress.
- Issues for young workers may include issues related to temporary employment, greater exposure to bullying and harassment, and lack of training. In addition, the COVID-19 pandemic especially affected sectors that have a high share of young workers, like the hospitality sector. This additional job insecurity aspect put further strain on them.
- **Future research support and actions** are needed aimed at LSES workers. They should also consider other non-standard employment relationships (e.g. subcontracting, temporary agency work) and other precarious forms of work that may well carry additional risks and that are often overlooked in terms of OSH measures either at employer or client level.¹² Likewise, it is also necessary to consider the impact of specific working conditions as OSH risks for future action (e.g. low income, low resources, contractual issues).
- **Stakeholders**, including interest groups for mental health promotion, social partners and industry representative organisations should **integrate a special focus on LSES workers and PSRs** into their actions (**campaigns and initiatives**), for example by considering low-skilled occupations in sectors and activities or by focusing on specific vulnerable employees' groups.
- Multi-stakeholder approaches are needed. General health and employment actions for LSES workers should include OSH and PSRs and seek synergies with actions by OSH stakeholders.
- When tackling workers directly, ensure that the **right channels and information features** are used to reach the specific target groups (e.g. social media for young workers, language aspects for migrant workers).
- **Targeted labour inspection activity** could support other national approaches. Labour inspectors are increasingly inspecting for PSRs. They too need to include low status and manual workers in their actions. A specific focus might be helpful to find the best support and intervention methods for vulnerable and hard-to-reach groups.
- National authorities should place **special emphasis on SMEs**, given that evidence suggests that they have a lower awareness of PSRs and have fewer resources and knowledge to address PSRs.
- **European and national social partners play an important role in the development of sectoral/multi-employer collective agreements** aimed at the development of targeted actions for LSES workers for specific occupations or activities. Such agreements should address PSRs.
- **Mechanisms are needed to give LSES workers a voice** in workplace prevention and ensure that they can participate in decisions related to OSH and PSRs and also that they are included in collective bargaining. Barriers to workplace engagement and coverage by collective bargaining

¹² See also EESC (2023) for a recent opinion on the matter:

<https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/precarious-work-and-mental-health>

include age (younger and older workers), ethnicity, language and cultural factors, and SES (e.g. part-time, self-employed, temporary agency) of workers.

- Exposure to risk factors for MSDs and physical hazards are also PSR factors. LSES workers are typically very much exposed to MSD risk factors and heavy physical work. **PSRs and physical risks, including MSDs, should be addressed together in OSH interventions for LSES workers.**
- For the future, in **planning for critical events**, such as the COVID-19 pandemic, account must be taken of PSRs, and in particular risks faced by frontline workers who are often of LSES.

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Annexes

I) Full methodological process for study execution

Scoping literature review protocol

This annex provides a step-by-step guide of the research process followed by the team working on the contract. It illustrates in detail the operational choices and the various stages in the scoping literature review (SLR) throughout the search, collection, screening and analysis of the literature included in the final study document.

This illustration of the methodology is divided into two main stages. First, in the SLR Data Collection process we explain in detail the selection criteria of documents and how these were searched and collected. The search involved a systematic identification via database engines and a holistic exploration of relevant websites. It also included two extra categories ('Others' and 'Grey Literature') with additional sources coming from either previous research (particularly at European Agency for Safety and Health at Work (EU-OSHA) level), snowballing of references and further search into missing content or non-scholar sources.

Second, in the SLR Data Analysis section we show how the consistent number of identified sources was filtered throughout *screening and analysis* towards final selection of relevant findings. This research has employed the Zotero reference manager, various Excel datasets and a light analysis via NVivo coding that assisted the development of results presented in the discussion (section 4.1).

The data collection phase of the research was designed based on a delicate balance between scientific rigour and practical requirements for the development of a rich and informative study. Four categories of sources were employed:

7. **A. Search engine publications:** Obtained from a systematic search through dedicated engines (PubMed, Scopus, Web of Science and Google Scholar) by means of an agreed set of keywords and strings to be employed for data collection (maximum of 800 publications captured through the four databases).
8. **B. Other publications:** This category initially allowed to introduce a selection of previously known scientific literature on the study subject and later allowed to perform a consistent snowballing process for developing further enquiries, for example on specific sectors and workers' backgrounds.
9. **C. Grey literature:** This category was reserved for storing all grey literature documents, including institutional literature (e.g. international, European and other level stakeholder organisations dealing with occupational safety and health (OSH) issues and labour relations, and including items such as funded studies, sponsored research, working papers, policy briefs, strategies) and other levels of grey production (e.g. produced by EU-level networks, syndicates and other public/private organisations, and including position papers, statements, surveys). This was also useful for collecting and storing previous EU-OSHA publications akin to this study.
10. **D. Good practices data:** As no original fieldwork was included in study planning, this final category included all potential grey sources for good practices to be included for the study (i.e. websites, institutional documents, factsheets, etc.) as well a consultation with EU-OSHA including also its national focal points.

Table 1 shows the choices of the **research parameters** (verified by EU-OSHA) regarding five categories for search and inclusion of all sources (*literature typologies, publication date, geographical scope, language, typology of literature sources*). These criteria thus verified admissibility of all publications and their relative findings in the study.

Table 1. Parameters of the research project

Research Parameters for Sources Inclusion	
CATEGORY	DETAILS
Literature Typologies	Scientific literature: Peer-reviewed academic publications; scientific literature produced by research institutes, books and relative chapters; PhD dissertations in the field.
	Institutional literature: Literature by international, European and stakeholder organisations dealing with OSH issues and labour relations (e.g. funded studies, sponsored research, working papers, policy briefs, strategies).
	Grey literature: Literature produced by EU-level networks, syndicates and other public/private organisations (e.g. position papers, good practices, surveys), and so on.
Publication Date	Time range was adjusted to between 2000 and 2023, however emphasis is stressed on findings in the 2015-2023 period , as this was particularly useful when trying to detect more recent trends (i.e. digitalisation). Likewise, strong emphasis was placed on recent findings for COVID-19 effects. Nonetheless, few exceptions could be made in case of need for citation of topical literature (e.g. Karasek, 1979).
Geographical Scope	Theory background on psychosocial risks (PSRs) and mental health outcomes: global scope , as multiple theory contributions come from academia in industrialised countries. Whenever possible, EU studies were favoured over other international ones. In addition, in case of employing arguments from other systematic literature reviews, the research team ensured that a substantial number of EU Member States were involved in the samples.
	Specific analysis of workers' groups and sectors: European scope (particularly EU Member States), in line with the specific study objectives and research questions. Therefore, when the research involved a specific cohort/group of workers, these had to be developing the job in a European country. Note that in the lack of available European data, the review exceptionally included a couple of examples for illustrative purposes (e.g. Ahmadi et al., 2022 for ancillary health & care workers in section 2.2.3 or Cheng et al., 2021 on LSES and digitalisation in section 1.2.2).
	Good practices: High priority was given to European scope (particularly EU Member States). Good practices from other countries were also considered in the clear lack of a sufficient number of EU practices (particularly countries with akin OSH frameworks, such as Australia, Canada and New Zealand).
Language	The main focus language of the SLR was English .
	Additional screening of Spanish, Catalan, Italian, French and German publications.
Sources Typology	Databases with search engine: Five in total. Three Academic (Web of Science, Scopus, PubMed); Two other (Google Scholar for literature, Google Web for good practices).
	Ad hoc website list: Initial list produced by the research team, which was later adjusted and expanded.
	Others: a. Previous research from the tenderer (i.e. NOTUS) and from b. the contracting authority (EU-OSHA), c. other publications outside the scope of the systematic identification, d. snowballing references extracted from encountered and previously known literature.

Data Collection Process for Literature in Sources Categories A, B and C

In the first part of the process, we provide an account of the methodology followed for the first three categories (A, B, C). For A, the search of engine-stored publications was conducted through a selection of keywords that were classified under semantic groups ('keywords families') to prepare a series of formulas for systematic search. Ultimately, the final list of keywords included:

1A: OSH PSRs descriptors (TERMS THAT DO NOT NEED TO SPECIFY WORKING POPULATION)

Work-life Conflict* OR Work life balance OR Job insecurity OR Job instability OR Job Demand* OR Workload OR Shift Work* OR Work Overload OR Work Intensity OR Work Intensification OR Information Overload OR Technostress OR Working hours OR Organisational justice OR Job strain OR Effort reward OR Work organisation OR Work design

1B: PSRs descriptors (TERMS THAT DO NEED TO SPECIFY WORKING POPULATION)

Psychosocial OR role ambiguity OR role conflict OR role clarity OR Time Pressure OR Technology OR Digitalisation OR Digital Transformation OR Social support OR Autonomy OR Communication OR Harassment OR Bullying OR Mobbing OR Emotional Demand*

2: Mental Health descriptors (TERMS THAT DO NEED TO SPECIFY WORKING POPULATION)

Mental OR Psychosomatic OR Health complaints OR Anxiety OR Depression OR Stress OR Burnout OR Exhaustion OR Suicide

3A: Low Socioeconomic Status descriptors (TERMS THAT DO NOT NEED TO SPECIFY WORKING POPULATION)

Low-paid OR dirty, dangerous demanding OR dirty dangerous difficult

3B: Low Socioeconomic Status descriptors (TERMS THAT DO NEED TO SPECIFY WORKING POPULATION)

Low status OR socioeconomic OR Low-skilled OR Low-qualified OR Vulnerable OR Social class OR Poor

4A: Workers' Sectors/Occupations/Groups descriptors (TERMS THAT DO NOT NEED TO SPECIFY WORKING POPULATION) (UNBIASED)

Call centre workers OR Platform Workers OR Delivery Workers OR Domestic worker OR Domiciliary Care OR On Call Work* OR Essential Workers OR Frontline Workers OR Precarious Work* **(AND NOT 4C)**

4B: Workers' Sectors/Occupations/Groups descriptors (TERMS THAT DO NEED TO SPECIFY WORKING POPULATION) (UNBIASED)

Cleaning OR Transport OR Construction OR Temporary OR Agriculture OR Seasonal OR Migrant* OR Immigrant* OR Non-standard OR Female OR Women OR Young OR elder* OR senior **(AND NOT 4C)**

4C: Workers' Sectors/Occupations/Groups descriptors for Health & Care only (TERMS THAT DO NEED TO SPECIFY WORKING POPULATION) (DEDICATED)

Ancillary Care OR Caregiver OR Home Care OR Social Care OR healthcare OR domestic personnel OR domestic worker OR domestic employee OR social care AND NOT (Nurses OR physician OR doctor OR health professionals)

5: Occupational health and safety descriptors on Good practices

Risk Prevention OR Intervention OR Good Practices OR Strategy OR Organisational Support OR Help OR Counselling OR Meditation OR Mindfulness OR Risk Assessment OR Occupational Health and Safety Strategies OR Regulation OR Corporate Action OR Corporate Social Responsibility OR Policies OR Prevention Campaign

6: WORKING POPULATION descriptors

Employment OR employee* OR Workers OR Working population OR Occupation* OR Workplace OR work related OR sector* OR occupation* OR job

The selection above represented a mediated choice between the research team and EU-OSHA, as some obstacles occurred during the research due to added difficulty in identifying the low socioeconomic status (LSES) target group. For example, the sectors and groups' formula run into a health & care bias due to the extremely high number of papers on professional, higher-skilled and high socioeconomic status (HSES) health & care (e.g. doctors, nurses, hospital healthcare workers, especially in the COVID-19 context). Therefore, one further semantic family was introduced (4C: Workers' Sectors/Occupations/Groups descriptors for Health & Care only) and was also used as an excluding parameter for better exploring other sectors and workers' groups.

Next, the research team also agreed with EU-OSHA a series of research formulas to be employed in the search engines.

Formula for answering research questions 1 and 2 (PubMed, SCOPUS, WoS):

- a. **{{(1A OR (1B AND 6)) OR (2 AND 6)} AND {3A OR (3B AND 6)}} → This is PSRs & Mental health at work on LSES Specific**
- b. **{{(1A OR (1B AND 6)) OR (2 AND 6)} AND {4A OR (4B AND 6) AND NOT 4C}} → This is PSRs & Mental health at work on Sectors & Groups (Not Health & Care)**
- c. **{{(1A OR (1B AND 6)) OR (2 AND 6) AND (4C AND 6)}} → This is PSRs & Mental health at work on Health & Care workers only**

REDUCED FORMULAS (FOR GOOGLE SCHOLAR)

- a. **6 AND (1B OR 2 AND 3B)**
- b. **6 AND (1B OR 2 AND 4A/B) AND NOT 4C**
- c. **6 AND (1B OR 2 AND 4C)**

Formula for answering research question 3 (PubMed, SCOPUS, WoS):

- d. **{{(1A OR (1B AND 6)) OR (2 AND 6)} AND {3A OR (3B AND 6)} AND 5} → This is PSRs & Mental health at work on LSES Specific and good practices**

- e. **{{(1A OR (1B AND 6)) OR (2 AND 6)} AND {4A OR (4B AND 6) AND NOT 4C} AND 5** → This is PSRs & Mental health at work on **Sectors & Groups (Not Health & Care) and good practices**
- f. **{{(1A OR (1B AND 6)) OR (2 AND 6) AND (4C AND 6)} AND 5** → This is PSRs & Mental health at work on **Health & Care workers only and good practices**

REDUCED FORMULAS (FOR GOOGLE SCHOLAR) (see also section 4.4):

- d. **6 AND (1B OR 2 AND 3B) AND 5**
- e. **6 AND (1B OR 2 AND 4A/B) AND 5 NOT 4C**
- f. **6 AND (1B OR 2 AND 4A/B AND 4C) AND 5**

Note that for Google Scholar, advanced search function only allows a maximum of 256 characters (between 35 and 60 words) in total. It is also known that nesting terms in parenthesis and rank findings do not work like other scientific databases. Google Scholar has a confidential algorithm and prefers most cited/ranked publications in findings, in addition to showing decreasing importance to various keywords.¹³ As a consequence, it was deemed necessary to chain the formula to working population descriptors first (6) and then to produce reduced formulas fitting the strict word limit.

However, due to practical constraints, the Research Team also proposed a scoping limitation for literature collection in this research project (i.e. 800 publications through systematic features). After agreement with EU-OSHA, the final limits for distributed capturing were:

- a. (300 per formula a. *LSES Specific*)
 - **PubMed:** Top 200-headline references
 - **Scopus:** Top 40-headline references
 - **Web of Science:** Top 40-headline references
 - **Google Scholar:** Top 20-headline references
- b. (250 per formula *Sectors & Groups [Not Health & Care]*)
 - **PubMed:** Top 170-headline references
 - **Scopus:** Top 30-headline references
 - **Web of Science:** Top 30-headline references
 - **Google Scholar:** Top 20-headline references
- c. (50 per formula *Health & Care Workers only*)
 - **PubMed:** Top 20-headline references
 - **Scopus:** Top 10-headline references
 - **Web of Science:** Top 10-headline references
 - **Google Scholar:** Top 10-headline references
- d. (100 per formula *Good Practices 1: LSES*)
 - **PubMed:** Top 50-headline references

¹³ For more information, see: <https://guides.library.ubc.ca/greylitforhealth/greyliterature/advancedgoogle#:~:text=Google%20Scholar%20has%20a%20256,only%20the%20first%201000%20results>

- **Scopus:** Top 20-headline references
 - **Web of Science:** Top 20-headline references
 - **Google Scholar:** Top 10-headline references
- e. (50 per formula *Good Practices 2: Other sectors*)
- **PubMed:** Top 20-headline references
 - **Scopus:** Top 10-headline references
 - **Web of Science:** Top 10-headline references
 - **Google Scholar:** Top 10-headline references
- f. (50 per formula *Good Practices 3: Health & Care*)
- **PubMed:** Top 20-headline references
 - **Scopus:** Top 10-headline references
 - **Web of Science:** Top 10-headline references
 - **Google Scholar:** Top 10-headline references

Having set up the full procedure, the researchers introduced the combined keywords into selected repositories with a search engine (three academic, Google Scholar), allowing for the weighted capturing of references coming out of the search engines through the Zotero collector tool. Zotero is a widely used tool in academia for generating literature collections akin to a specific topic. It hosts a variety of functions that allow researchers to speed up literature identification, collection and referencing. Thus, at the beginning of the process (1) the researchers introduced the specific query formula into the engine and obtained the desired number of sources to be collected from the engine screen. Next, (2) they activated the collector to select the actual sources to be exported into Zotero. As a third step (3) the software automatically introduced extended reference to the selected publications in the collection of the project. This procedure is most useful for quickly obtaining access to the full reference, URL of access and abstract of the publications. The process was repeated for all formulas into all engines according to the scoping limits described above and until reaching the desired amount of 800 publications. Having completed the process of data collection, the research team also fine-tuned the list by employing the 'duplicate' items function of the software. This allowed to scan throughout the entire library collection for duplicate documents while allowing eliminations of multiple versions. The team merged all duplicates and exclusively maintained the oldest entry. This was considerate appropriate, because in a non-automated process a researcher would naturally skip a previously identified document found during inspection.

Once the revision of the Zotero library collection was completed, the team employed the export function of the software to move all references and required metadata into a specific Excel dataset for beginning the analysis.

For what concerns categories **B. Others** and **C. Grey Literature**, the research team acknowledged that the highly targeted study research necessarily required a certain degree of flexibility for ensuring that all tender specification objectives are achieved by the final document. As such, it was deemed necessary to maintain a scoping focus by introducing these two sub-collections of publications coming from a variety of sources. This was considered as **a backdoor into the ad hoc SLR process**, particularly if in need to add additional literature according to scoping need. Examples include (among others) specific EU-OSHA research connected to the main topics of the study, previous publications based on research team expertise, snowballing references and additional enquiries into those fields of the study not sufficiently captured by the systematic search. This was particularly relevant in later stages, since the systematic search was still lacking in more specific information on certain sectors (e.g. hospitality and tourism, customer services, agriculture) and required further ad hoc investigation. For this part of the process, there were no scoping limitations foreseen.

Data Analysis Process for Literature in Sources Categories A, B and C

The first level analysis of the collected literature happened by means of an ad hoc generated Excel dataset. This included various control questions for analysis that would relate the sources to our research objectives (e.g. EU focus? Relevant to research questions? Which ones?) and if the publications would fit with some preliminary agreed criteria (e.g. publication type, time frame of the publications). To initiate the filtering process, the **first-level screening on the literature (Screening)** was performed through reference and abstract check so as to collect data on the relevance of the publications. However, in case of doubt over certain elements (e.g. workers' sample size and typology), the team also carried out a quick scanning of relevant document sections in search of revealing details answering the control questions displayed below. See Table 1 for more details.

Table 1. Control fields for first-level analysis of SLR

Basic Information (Import from Zotero and basic classification)	Screening (First-level qualitative analysis in Excel dataset)
- Reference (<i>listed alphabetically, by author</i>) + URL link of access - Abstract (<i>only if potentially relevant</i>) ONLY A: - Search Engine? (<i>PubMed, SCOPUS, Web of Science, Google Scholar</i>) - SLR Query formula? (<i>LSES Specific, b. Sectors & Groups [No HC], c. Health & Care, d. LSES Good prac. 1, Sec/Gr Good prac. 2, HC Good prac. 3</i>)	- Publication Type? (<i>Book, Book Chapter, Journal Article, Web Content, Working Paper, Report, Other</i>) - Relevant to research questions? (Y/N) - Which ones? (<i>1-2-3 or sub-questions*</i>) - EU focus? (= <i>does it deal with European cases, data, theory?</i> Y/N/NA) - Country/ies? - Robust Research Methods/Theorisation (Y/N/NA) - Which ones? (<i>Can be one or multiple: 1. High Ranking; 2a. Qualitative, 2b. Quantitative; 3. Good Practices</i>) - Preliminary keywords of interest (if relevant) - Comments 1 (<i>i.e. preliminary arguments useful for analysis, features to be considered, quick arguments for rejection</i>) - Eligible for 1st round? (Y/N)

Once the first-level screening was completed through the auxilium of the Excel, the team began operations relative to **full scanning of the selected texts (first) and NVivo coding (second)**. The research team developed a set of codes akin to the main topics of the study, as they sought to identify key components of the research (e.g. LSES target, both in sociodemographic terms and sectors/occupations/employment; typology of study; PSR factors at work; mental health outcomes). Initially, the researchers acquired a 'feeling' of the available literature as to understand the quantity and quality of the findings through noting down the relevance towards study subject (e.g. PSR–mental health relationship, availability of LSES components in the analysis, strategies for defining LSES workers) or **the need to expand into certain areas required by study development** (e.g. expanding the search to further workers' typologies and groups). The papers that already showed high relevance for the study were included for coding in NVivo. Indeed, the software was initially tested through highlighting the main findings on the correlations between risk factors and mental health outcomes. However, this initial process soon led the way for **the parallel development of three snowballing processes** that helped in expanding the selection of relevant literature for the study. The resulting publications were also screened, scanned and analysed according to the above-mentioned methodology.

It is worth noting that the need to break down the analysis into three different groups possibly covering LSES dimensions (showing how the target population can be a difficult and elusive category for analysis, as described in section 0) prevented further meta-analysis on a broader level. In addition the project was not scoped as a systematic literature review. Rather, **NVivo software was mainly employed as a coding assistant** helping the researchers to scan the publications for **second-level analysis** and to

highlight the definitive presence of the main elements of interest for the study. These were then **noted and introduced into a second Excel dataset with a summary of coded findings** that would then assist the drafting of this document. The categories included for this second dataset are shown below. Only publications that eventually displayed sufficient content relevant for study finalities were ultimately included and used in the main document.

Table 2. Control fields for second-level analysis of SLR

Control Fields for Second-level Analysis (second Excel dataset)	
FIELD	CONTENT
SHORT REFERENCE / URL	Short reference to the publication (Author1_Year) + Hyperlink.
SECTOR TARGET 1: Sociodemographic Population	Noting whether the target population of workers in the study belongs to any specific background (e.g. men, women, migrant, ageing, young or other vulnerable groups).
SECTOR TARGET 2: Sector-specific occupations	Indicating the typology of workers inside the industry sector to which the analysis is dedicated (e.g. healthcare or social care, and clarification on either specialised or manual workers).
COUNTRY COVERAGE	Indicating the country or countries of reference of the sample/cohort employed in the study.
TYPE OF STUDY (DESIGN AND SAMPLE)	Indicates quantitative or qualitative study design. Provides details on the typology of study under exam (e.g. cross-sectional, longitudinal or systematic literature, meta-review, fieldwork interviews) and the number of workers analysed by the sample.
PSR factors at work 1: Work organisation	Indicates which PSR factors related to the structure of work organisation are evidenced as ultimately connected with mental health outcomes in the literature.
PSR factors at work 2: Social factors in the workplace	Indicates which PSR factors stemming from social interactions in the work environment are evidenced as connected with mental health outcomes in the literature.
(Adverse) Outcomes 1: Mental Health	Indicates which key negative mental health outcomes are shown in association with the PSR factors analysed before.
(Adverse) Outcomes 2: Organisational	Indicates which negative outcomes at company/organisation level are observed in the literature (if any) and related to adverse effect in the health of the workers (e.g. presenteeism, absenteeism).
(Other) Outcomes 3	Any other interesting findings that may relate to arguments required by SLR analysis (e.g. if the document only refers to extent of PSR exposure without calculating associations with mental health, if there is mention of positive outcomes relative to meaningful work or work engagement practices). This also included evidence on COVID-19 and digitalisation .
COMMENTS 2	Other quick notes that the researchers took in consideration when screening the published data.

Overall, the total numbers of the research included:

- **621 publications** (800 minus 179 duplicates identified through Zotero and immediately purged) that were collected **via systematic features** and screened according to the foreseen methodology. In the final version of the study, only **28 publications** were employed. This was due to various reasons, the most prominent of which were: the inclusion of more recent/updated/relevant papers snowballed through identification from initial authors present in the systematic search; the snowballing of further targeted papers (e.g. industry sectors and workers' groups) that the systematic search was ultimately unable to capture; the highly specific requirement to target a set of criteria (e.g. recent publications, LSES workforce focus, European workers-dedicated) that ultimately constrained the selection.
- **209 additional publications** that were obtained throughout an initial list of selected publications based on the tenderer's expertise, and that were later nurtured by in-depth scoping of publications on specific workers' groups and sectors (see above). Ultimately, from the 209 scoped publications that were acquired through different rounds of snowballing, **112 were included** in the final study after screening and analysis.
- **59 grey literature** sources were also accumulated throughout the initial listing and the successive rounds of snowballing. As shown below, the final number of grey items included in this study amount to **47 documents**, a majority of which based on EU-OSHA previous research, but also including the works of other European and international institutions (e.g. European Commission, European Parliament, ILO, OECD, EESC) or stakeholder organisations (e.g. Mental Health Europe¹⁴).

Overall, this research project has led to comprehensive exploration of 889 written sources across scientific and grey literature, of which 189 have been selected for inclusion in the study and that match the full list of references located before the Annexes. Note that this total does not include material on good practices, whose process and research numbers are detailed below.

Table 3. Total number of screened and selected sources for study execution, divided across literature categories

Typology of Literature	Data Collection (All stages)	Included in Study after Analysis
Search Engine: Publications	621	28
Others: Snowballing of Publications	209	112
Others: Grey Literature	59	47
Cross TOTALS	889	189

Data Collection and Analysis Process for Good Practices listed in Sources Category B

For the selection of **good practices**, the research team departed from an originally agreed list of websites included in the sources category B. This displayed multilevel institutional websites (e.g. EU institutions, institutional and project-dedicated OSH networks, national authorities) as well as other research institutes dedicated to occupational health issues. Individual cases were included in yet another Excel dataset, and possible repositories were manually explored in search of relevant information. As a guidance, the researchers kept the keywords from the systematic search as reference, as well as verifying the LSES target groups (e.g. sociodemographic profile or industry sector) and

¹⁴ See: <https://www.mhe-sme.org/>

typology of PSR management or prevention activity (e.g. preventive or management nature of activity, public/private initiative, changes to workers' behaviour vs organisational interventions).

At methodological level, the selection and analysis of content including reviewed practices has followed **a very similar approach to the first-level analysis via Excel dataset**. Although the typology of sources included some publications, the great majority of items consisted in URLs of informative websites, institutional reports, factsheets and other typologies of secondary grey literature that had already been elaborated in the enquiry. To these, the research team added **a new round of snowballing for further practices** and the responses to the EU-OSHA request to its national focal points of December 2022. The researchers employed most of the same classification categories already used in the previous Excels. All potentially compatible practices were filtered for information on the preventive/managing activities, their country of location, robustness in previous identification methods (e.g. criteria that were employed for their recognition as such), and typology of workplace where the good practice was taking place that could also include potentially LSES workers (e.g. sector and workers' groups). The final selection consisted of a double approval process of a selection of practices by EU-OSHA that would include a balance between typology of intervention and geographical distribution (north-south-west-east Europe).

In terms of **research numbers**, out of the original 48 items included in the first data collection experience, 10 practices were retained at first-level screening, which were then further analysed and maintained when filtered through possible selection criteria. Later, a snowballing operation brought this forward to 16 potential items, which were screened down to 11 and eventually classified in 10 practices plus one extra source for further analysis. Lastly, we received the collection of answers from the EU-OSHA national focal points and extracted from these documents 29 items for the dataset. Of these, 12 passed the first-level screening, while deeper analysis led to the inclusion of four practices and the exposition of seven further items that could lead to other practices.

Table 4. Good practices screening progress up to progress report

Stages of Data Collection (B. Website Exploration)	Data Collection	First-level Screening	Second-level Analysis + Criteria
1. First Data Collection (Oct. '22)	48	10	10
2. Snowballing GP (Nov. '22)	16	11	10 (+1*)
3. Snowballing NFP (Dec. '22)	29	12	4 (+7*)
Cross TOTALS	93	33	32

* Includes other potential cases that would require further enquiries (e.g. research projects, insufficient details, etc.)

EU-OSHA reviewed the 32 possible cases/data sources and provided extensive feedback on cases to be discarded and those to be investigated further. At **Draft Final Report stage, 15 good practices** were presented to the contracting authority following the format of visualisation employed in section 3.2 of this study.

Posterior discussion on achieving a geographical balance, ensuring a representative sample of both individual and organisational measures, and achieving a more refined focused on activities targeting potential LSES workers led to **the final inclusion of 10 good practices** and the admission of an extra-European case due to exceptionally good results.

II) Best evidence synthesis: Analysis of Findings (section 4)

- 1) Roman numbers indicate the number of times the item is mentioned across various sources.
- 2) Outcomes marked with * are Organisational Outcomes of PSRs exposure possibly connected to Mental Health issues.
- 3) Table Glossary: *Proxy* (effects conducive to presence of mental health issues); *Mediator* (factor supported by evidence that can either improve or worsen PSRs exposure, as encountered in the literature); *Protective Factor* (features of work that can reduce PSRs exposure, as encountered in the literature); *Good Practice* (arguments for PSR management and prevention from the literature).

Table 5. Analysis of findings for LSES Dimension Type IA (occupational status and socioeconomic variables)

LSES Dimension Type IA: Occupational Status & Socioeconomic Variables				
Potential LSES Workers' Status - Occupation	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Low SES (Dieker et al., 2019; Svane-Petersen et al., 2020)	• Acknowledged LSES individuals by the literature • Tend to have a less healthy lifestyle and work in more disadvantaged conditions than HSES	• Lack of job resources (Variety of contexts) (e.g. less job rewards, less job control)	• Worse self-rated both physical and mental health • Higher risk of depressive disorders	• <i>Evidence</i>: Work factors contribute more than lifestyle factors to worse self-reported health. Lack of job resources may contribute more than job demands (Dieker et al., 2019)
Manual Occupations (Björkenstam et al., 2021; Arisa-de la Torre et al., 2019)	• Professions more likely to employ LSES workers		• Poorer mental health (II) • <i>Proxy</i>: Higher risk of prescription of antidepressants and/or psychiatric care • <i>Proxy</i>: Diagnosis of mental health disorders	• <i>Evidence</i>: Manual occupations across both genders are also greatly influenced by both employment and family/household status for the impact on mental health (Arisa-de la Torre et al., 2019)
Low and Unskilled Occupations (Greiner and Arensman, 2022; De Moortel et al., 2014)			• Higher suicide risk • Poorer mental wellbeing	• <i>Evidence</i>: Indication of sectoral differences across risk rates (Greiner and Arensman, 2022, but see also Svane-Petersen et al., 2020) • <i>Mediator</i>: Men further exposed due to social roles (e.g. male breadwinner model) (see gender-specific findings in Table 'LSES Dimension Type IB: Sociodemographic Variables' below) • <i>Protective factor</i>: 'Active jobs' (moderated by high control facing high demands) moderate suicide risks for low/unskilled workers (Greiner and Arensman, 2022)

LSES Dimension Type IA: Occupational Status & Socioeconomic Variables				
Potential LSES Workers' Status - Occupation	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Essential/Frontline Workers (Dutch, 2022; Esteve-Magalí et al., 2021; Utzet et al., 2022)	- Category of jobs required for the well-functioning of society, highlighted by COVID-19 pandemic - Solid <i>proxy</i> for LSES: more likely to be employed in unskilled and semi-skilled activities (manual), they are paid less than non-essential employees (-2.08% estimate) and work more physically proximate to others (link to COVID-19 exposure)	- Long work hours - Work shifts - Excessive workload - Low job control - Job insecurity	- Poorer mental health (III) <i>Proxy</i>: Increased use of tranquilisers and opioid analgesics	<i>Evidence</i>: Contrasting evidence on exposure to job insecurity, strongly influenced by sector during the pandemic <i>Mediator</i>: Gender Bias. since women experienced higher emotional demands, job strain and medical substance use (Utzet et al., 2022) (see gender-specific findings in Table 'LSES Dimension Type IB: Sociodemographic Variables' below)
Gig Workers (EU-OSHA, 2022a; Bérastégui 2021; Apouey et al., 2020)	- Highly digitalised work environment (platform work) - High presence of potentially LSES vulnerable groups (e.g. young, migrant) - Spotlight on their increased role during the COVID-19 pandemic	- Low social support - Poor work–life balance - Job insecurity - Excessive workload - Low organisational support - Work injustice	- Stress (II) - Anxiety (II) - Exhaustion/Burnout	<i>Protective Factor</i>: Contrasting evidence was found for food delivery riders, where stress and anxiety were lower than other precarious workers during COVID-19. Work Autonomy and Physical Activity during lockdown (Apouey et al., 2020)

Table 6. Analysis of findings for LSES Dimension Type IB (sociodemographic variables)

LSES Dimension Type IB: Sociodemographic Variables				
Potential LSES Workers' Status - Occupation	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Gender (e.g. Milner et al., 2019; Campos-Serra et al., 2013)	• For LSES men , higher probability to assume main breadwinner role in the family leads to increased job and income insecurity pressure	• Job precariousness • High physical demands • Long working hours • Low organisational support • Low job control	• Poor mental health • Depression	• <i>Mediator</i> : Men apparently more vulnerable to job precarity and insecurity (Milner et al., 2021)
	• For LSES women , gender segregation in the labour market is a reality as they tend to be further exposed to emotional demands and work-life balance issues (e.g. household and children care)	• Long working hours • High emotional demands • Low job control • Work-family conflict	• Poor mental health • Depression (II)	• <i>Evidence</i> : LSES women tend to have higher rates of temporary employment, involuntary part-time work and low wages, as well as more unstable employment trajectories (Campos-Serna et al., 2013) • <i>Mediator</i> : Women more sensitive to long working hours (Milner et al., 2021; Franklin et al., 2022)
Young (Shields et al., 2021)	• Research focus on young and precarious workers (proxy for LSES) • COVID-19 implications had strong implication in industries employing young LSES workers	• Increased job strain • Effort-reward imbalance • Lack of organisational justice • Low organisational support • Job insecurity	• Poor mental health • Depression	• <i>Evidence</i> : COVID-19 made psychosocial work environment poorer in terms of safety (Shields et al., 2021) • <i>Mediator</i> : Age mediates exposure to workplace bullying, role conflict, sexual harassment and work injustice (young workers more vulnerable) (Shields et al., 2021)
Migrant (Nieuwenhuijsen et al., 2015; Gosselin et al., 2021; Diaz-Bretones et al., 2020)	• Although not all migrants are LSES, they hold a frequent presence among lower-skilled or precarious positions	• Lack of recovery opportunities (time off, breaks) • High physical demands • Low job control • Low organisational support • Job insecurity • Workplace discrimination	• Stress • Depression • Anxiety • Poor mental health	• <i>Evidence</i> : Wider exposure to workplace discrimination and bullying compared to local workers (Diaz-Bretones et al., 2020) • <i>Mediator</i> : 'Healthy Migrant' hypothesis (young, optimistic, healthy) where no association with adverse outcomes was encountered. Yet danger of underreporting (e.g. different cultural approaches to mental health; employer judgement) (Diaz-Bretones et al., 2020)

Table 7. Analysis of findings for LSES Dimension IIA (occupations with third-party focus)

LSES Dimension Type IIA: Industry Sectors Employing High Shares of LSES (Focus on Users/Patients/Customers Services)					
LSES Workers' Industry	LSES Workers' Typology - Groups	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Hospitality & Tourism	Food servers, hotel housekeepers, cleaners, food preparation assistants	- Food servers are considered as an extra occupation at risk, due to greater exposure to social relations' risks relative to interaction with customers - The sector is vulnerable to endemic seasonality of tourism, Arjona-Fuentes et al., 2019) - LSES workers are acknowledged as a typical worker profile in the sector (Chela-Alvarez et al., 2021) - Women workers are a particularly vulnerable group in the sector (Chela-Alvarez et al., 2023)	- Long working hours (II) - Shift work (IV) - Sexual harassment (II) - Third-party violence (psychological) (V) - Work–family conflict (II) - Job insecurity (II) - Emotional demands ('deliver service with a smile', Xiong et al., 2023) - Work overload - Lack of organisational support - Time pressure	- Poor mental wellbeing * Proxy: Presenteeism (II) - Stress (II) - Burnout (II) - Anxiety (II) - Depression (II) * Proxy: absenteeism * Proxy: Turnover intentions	Evidence: Research gap on COVID-19 (and consequential digitalisation for ensuring social distancing) effects on psychosocial work environment of food service industry (Ayachit and Chitta, 2022) Evidence: For LSES women in the hotel sector, additional work–family conflict factors are living with co-habitants (and dependants in need of care), low social support in life, income instability, being the main caretaker at home and being younger (Chela-Alvarez et al., 2023) Evidence: A side positive effect of bullying for professions in the sector was recorded as the increase in co-workers' support and cohesive workers' groups (Ram, 2018) Protective Factor: An improved work–life balance can act as protective factor against adverse PSR exposure (Chela-Alvarez et al., 2023) Protective Factor: Organisational support (supervisor and co-workers) can have a more important role in moderation of job demands than job control (Ariza-Montes et al., 2018) Good Practices: For hotel staff, improve the job demands resource balance and improve work–life balance (Chela-Alvarez et al., 2021); improve services and support for family management of workers (Chela-Alvarez et al., 2023)
	Customer service workers (mixed samples)	Between 70% and 80% of European workforce consists of service workers at risk of emotional demands resulting from the interpersonal nature of work (Duarte et al., 2020)	- Emotional dissonance (customers) (IV) - Lack of organisational support (II) (colleague/supervisor) - Role conflict - Third-party violence (psychological) - Work–family conflict (II)	- Anxiety - Exhaustion - Affective discomfort - Stress * Proxy: Absenteeism - Poor mental wellbeing	Evidence: Contrasting results show that lack of organisational support (e.g. dealing with stressful situations with a manager or co-workers) is seen as riskier than emotional demands from customers (Duarte et al., 2020)
	Call-centre workers (voice-to-voice)	'Vulnerable workers' group in the category include women and precarious/temporary workers	- Emotional dissonance (II) - Low job control (II) - Low job resources - Excessive workload (II) - Third-party violence (psychological) (II) - Lack of organisational support (colleague/supervisor)	* Proxy: Turnover intentions - Affective discomfort	Evidence: Unregulated ICT technological innovation (aka digitalisation) for work execution in this line of work can promote precarity of labour relations and loss of social and labour rights (Roque, 2016) Protective Factor: A supportive work climate and having autonomy in the job contributes to employee wellbeing (Molino et al., 2016) Good Practices: For call centres, increase job resources, provide training on emotional dissonance and supervisor training (multiple authors) Good Practices: Social partners' dialogue can stimulate representation and foster OSH practices for the sector (Roque, 2016)
	Retail workers (face-to-face)	Sources in the studies mainly dealt with grocery, supermarkets and clothes sale business activities	- Time pressure - Excessive workload - Lack of organisational support (colleague/supervisor) - Shift work - Long working hours - Lack of recovery opportunity	- Burnout * Proxy: Short sickness absence (e.g. Sumanen et al., 2017; Harkko et al., 2021)	Evidence: Short shift interval is accounted as one of the strongest factors for short sickness absence (Shiri et al., 2021) Protective Factor: Good organisational support (colleague/supervisor) and low job demands as protective factors (Kalienene et al., 2021)

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LSES Dimension Type IIA: Industry Sectors Employing High Shares of LSES (Focus on Users/Patients/Customers Services)					
LSES Workers' Industry	LSES Workers' Typology - Groups	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Health & Care	Home care workers (all)	- Home care services in greater demand than nursing homes - Structural reduction of organisational support for these workers - A domestic work setting (i.e. no witnesses) increases workplace violence risks (Clari et al., 2020)	- Excessive workload (II) - Shift work (II) - Role conflict (e.g. cleaning tasks) - Professional isolation (II) - Emotional demands - Time pressure - Third-party violence (physical/psychological) (IV) - Workplace harassment (colleagues) - Lack of organisational support (III)	- Stress (III) - Depression (III) - Anxiety - PTSD & Suicide Risks (i.e. for sexual violence) - Proxy: Sleep issues (II) * Proxy: Turnover intentions * Proxy: Absenteeism	<i>Protective Factor:</i> Emotional (demands) engagement can moderate job demands' risk, but only if not too excessive (Geisler et al., 2019) <i>Protective Factor:</i> Organisational support can reduce risks associated with violence (Phoo and Reid, 2022) <i>Good Practices:</i> Group sessions for workers; reablement programmes user-worker (Nyberg et al., 2021); Training against workplace violence (i.e. early warning systems); mindfulness can be temporarily beneficial for mental health relief, but is not effective to address root cause of stress (Gebhard and Herz, 2022)
	Home healthcare workers (HCWs) (migrant & women)	- High demand in western states attracts many foreign workers - HCWs are mostly women workers, more frequently of foreign origin	- Shift work (II) - Long working hours - Work-family conflict - Professional isolation (II) - Job insecurity (III) - High emotional demands - Excessive workload (III) - Third-party violence (physical/psychological) - Role conflict (e.g. cleaning tasks)	- Exhaustion/ Burnout - Poor health (physical/mental) (II)	<i>Evidence:</i> Contrasting evidence is provided in one study on non-adverse effect of professional isolation and live-in formula (Vianello, 2019) <i>Mediator:</i> Young age and irregular resident status can be worsening factors for worker's health (Bover et al., 2015)
	Ancillary healthcare (Sèrole et al., 2021)	- Non-medical staff performing support tasks for management/care of facilities and patients (e.g. assistants, cooks, stretcher-bearers) - Often mentioned as the 'forgotten workers' in the sector	- Time pressure - Excessive workload - High emotional demands - Lack of job resources (e.g. economic constraints)	Burnout	<i>Evidence:</i> Broad research gap on European ancillary healthcare workers <i>Evidence:</i> Hospital cleaners were the leading category experiencing burnout in the study (Sèrole et al., 2021)

Table 8. Analysis of findings for LSES Dimension IIB (focus on manual occupations)

LSES Dimension Type IIB: Industry Sectors Employing High Shares of LSES (Focus on Manual Occupations)					
LSES Workers' Industry	LSES Workers' Typology - Groups	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Cleaning	Professional cleaners (industry, domestic)	• High preponderance of female, migrant and ageing workers in the sector • Rigid structure of work organisation • High turnover and low worker retention • Stigma and social prejudice towards 'dirty work' (II)	• Low organisational support (i.e. management conflict) • Interpersonal conflict at work • Lack of job reward • Professional isolation • Job insecurity	• Poor mental health (III) • Depression • Anxiety (II) • Proxy: Musculoskeletal disorders (MSDs)	• <i>Evidence</i>: COVID-19 worsened working conditions (e.g. excessive workload, job insecurity), alongside increased exposure to health risk perception (e.g. fear of contagion) (Dias et al., 2022) • <i>Mediator</i>: Age and ethnicity can both affect mental health outcomes for old workers (Gamperiene et al., 2006) • <i>Protective Factor</i>: Organisational support and employee–customer relationships can moderate risk exposure (Bosmans et al., 2016) • <i>Good Practice</i>: Increase job reward and appreciation (López-Goñi et al., 2023)
Manufacturing & Production	Meat industry blue-collar (Cohidon et al., 2009)	• Difficult psychosocial and physical work environment • Heightened emotional demands in animal slaughter • Rigid hierarchies at work	• Time pressure • Excessive workload • Emotional demands • Long and unsociable working hours • Lack of job resources (e.g. job rewards)	• Poor health (physical/mental)	• <i>Evidence</i>: For digitalisation, advanced lean production could also hold strong implications for workers in the sector. Possible risks include reduction in job resources, increase in surveillance, excessive standardisation and teamwork conflict (Koukoulaki, 2014) • <i>Evidence</i>: Broad research gap on the impact of digitalisation on European workers' PSRs exposure and mental health outcomes (particularly for LSES context, high automation) • <i>Mediator</i>: Age and gender condition risk exposure for meat industry (Cohidon et al., 2009) • <i>Protective Factor</i>: Job satisfaction was a strong moderator for miners and blue-collar migrants in metal and other manufacturing (see Mościcka-Teske et al., 2019 and Porru et al., 2014)
	Miners (Mościcka-Teske et al., 2019)	• Difficult psychosocial and physical work environment	• High job demands (physical) • Risks of physical injury • Lack of job resources (e.g. job rewards)	• Stress (but lower levels in comparative perspective) • Proxy: Higher risk of injury	
	Migrant blue-collar (Porru et al., 2014)	• Higher occurrence of adverse outcomes in cross-sectional study between metal/manufacturing and food/catering service	• Longer working hours • Workplace discrimination • Excessive workload • Barriers of access to healthcare	• Anxiety • Depression • Proxy: Sleep issues	
	Low-skilled blue-collar in highly automated factories (Wixted et al., 2018)	• Early stage of technological transition process for most workers (EU-OSHA, 2022c)	• High cognitive demands • Low skill discretion • Low job control • Professional isolation (worker–machine)	• Stress • Proxy: MSDs	

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LSES Dimension Type IIB: Industry Sectors Employing High Shares of LSES (Focus on Manual Occupations)					
LSES Workers' Industry	LSES Workers' Industry	LSES Workers' Industry	LSES Workers' Industry	LSES Workers' Industry	LSES Workers' Industry
Construction	Low-skilled workers (all)	• Difficult psychosocial and physical work environment • Rigid hierarchies at work • Conservative sociocultural norms in the workplace • Young workers as a particularly vulnerable group (Frimpong et al., 2022)	• Time pressure (II) • Excessive physical workload (II) • Long working hours • Low job control (II) • Role conflict (II) • Job insecurity (II) • Interpersonal conflict at work • Low job rewards	• Stress (II) • Depression (III) • Anxiety (II) • PTSD (II) • Suicide risks (II) • Burnout • Proxy: Substance abuse	• <i>Evidence</i>: COVID-19 could condition higher risk of suicide for construction workers through comparison with Eurozone-crisis (King & La Montagne, 2021) • <i>Evidence</i>: High job demands more akin to mental health outcomes than lack of job resources in this sector (Chan et al., 2020; Sun et al., 2022) • <i>Protective Factors</i>: Up to 10 identified by the literature (i.e. marital status, increased job control, increased job support, reduced job demand, reduced workplace discrimination, family-friendly job opportunities, workplace justice, positive socioeconomic measures, coping strategies) (Chan et al., 2020) • <i>Mediator</i>: Age is considered as a critical mediator factor (Frimpong et al., 2022)
Agriculture	Migrant workers	• Difficult physical work environment, only recently acknowledged as psychosocially strenuous • Difference between foreign-born farmworkers (extra-EU) and seasonal migrants (EU, temporary displacement) (Ramos et al., 2020)	• High physical demands (II) • Workplace discrimination (II) • Professional isolation (II) • Job insecurity (II) • Lack of organisational support • Lack of social support (life) • Low job rewards and autonomy (for educated seasonal workers, Montoya-García et al., 2013)	• Anxiety • Stress • Depression • Proxy: Sleep issues • Poor mental health	• <i>Evidence</i>: Future psychosocial challenges for workers in the sector include digitalisation and climate change (EU-OSHA, 2020) • <i>Evidence</i>: Healthy migrant paradigm for work conditions in foreign-born farmworkers confirmed in one research (Montoya-García et al., 2013) • <i>Good Practices</i>: Salary bonuses, adjustment of shifts for increased work-life balance, tasks variation for personnel, extra breaks, further training, social and participatory work activities, and even specific psychosocial interventions for cultural adaptation of foreign workers (Montoya-García et al., 2013)

Table 9. Analysis of findings for LSES Dimension III (quality of employment)

LSES Dimension Type III: Low-quality of Employment					
Employment Dimension (Proxy for LSES)	Sub-category	Context-based Factors	Main PSRs Exposure	Main Adverse Outcomes	Further Evidence, Mediators, Protective Factors and Good Practices Suggestions
Employment Trajectory	Low trajectory or precarious employment	Identified as persistence or transitions across low-quality employment states or downward mobility	- Income insecurity - Job insecurity (III) - Job precariousness (II) - Lack of job rewards (e.g. promotion) - Organisational restructuring - Unwanted sexual attention - Sexual harassment	- Depression (IV) - Proxy: Disability pension for depression - Anxiety (II) - Exhaustion - Substance abuse - Suicide risk - Poor mental health (III) - Poor health (physical/mental)	<i>Evidence:</i> Migrant workers are also indicated as a vulnerable group prone to job insecurity and job precariousness (Diaz-Bretones et al., 2020) <i>Mediator:</i> Male gender worsens the psychosocial effect of job insecurity and precariousness (possibly because of 'Male Breadwinner' paradigm) (Pyöriä et al., 2021)
Non-standard Work Arrangements	Temporary workers and temporary agency workers	Much higher share of low-wage and low-skilled employees among temporary workers than the average	- Job insecurity (III) - Income insecurity - High job demands - Low job resources	- Poor health (physical/mental) - Proxy: MSDs - Exhaustion (II)	<i>Evidence:</i> The relationship between contractual instability and the potential negative health outcomes is not straightforward but mediated by feelings or perceptions of job insecurity (Wagenaar et al., 2012; Thomson and Hünefeld, 2021) <i>Mediator:</i> Gender is a strong mediator for both risk exposure and protective factors (De Moortel et al., 2018) <i>Protective Factors:</i> Temporary agency workers: lower levels of job control can moderate exhaustion ((Hakanen et al., 2019)
	Part-time work	Focus on involuntary part-time workers: those working part-time because they could not find a full-time job	- High work intensity - Work availability (e.g. shifts) - Long working hours - Lack of job rewards - Work–family conflict	- Poor health (physical/mental) - Poor mental health	<i>Protective Factors:</i> Household income is another strong protective factor for underemployment (De Moortel et al., 2018)
		- Focus on marginal part-time workers: those only working 8-15 hours/week (Nielsen, 2021) - More likely to be both men and women and LSES	- Low job demands - Low decision latitude - Low organisational support - Low job satisfaction - High job insecurity	- Stress - Depression - Proxy: Sleep problems - Proxy: Pain (MSDs)	<i>Evidence:</i> Context features of work environment may intervene in the association between marginal part-time work and health (Nielsen et al., 2021)
	Independent self-employed	- Partly attributed to digitalisation of work organisation practices (e.g. platform work) - Partly identified as an effect of the Eurozone crisis	- Income insecurity (II) - Job insecurity - Job precariousness	Poor health (physical/mental) (III)	<i>Evidence:</i> More women than men are moving into more vulnerable forms of self-employment, as they are more at risk of mental health issues (Jonsson, 2021; Ferrín, 2021)

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