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Investigating the risk and protective factors of ageing at work: a reflexive thematic analysis

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Abstract:	<p>The ageing of the working population and the sustainability of work over the life cycle is a key challenge for many European countries, especially in the light of legislation raising the retirement age for workers. With this in mind, we conducted 25 interviews with the aim of exploring what can be considered as risk and protective factors for work sustainability in ageing. Through reflexive thematic analysis, we identified two key themes that encapsulated a range of perspectives observed through the company's employee data. These themes reflected a range of perceptions of the risk and protective factors of ageing in the workplace.</p> <p>The study also revealed suggestions from the employees themselves about potential company interventions to improve their long-term well-being at work. This study can therefore serve as a basis for extending this type of intervention within the company under study, as well as in other similar companies.</p>
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Investigating the risk and protective factors of ageing at work: A reflexive thematic analysis

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Abstract

BACKGROUND

The ageing of the working population and the sustainability of work throughout the life cycle represent a significant challenge for many European countries, particularly in relation to the implementation of legislation raising the retirement age.

OBJECTIVE

The objective of this study was to examine the physical, psychological and social risk and protective factors that influence the sustainability of work during the ageing process.

METHODS

Twenty-five interviews were conducted, followed by a reflexive thematic analysis, with the aim of gathering the perspectives of a company's employees regarding factors related to ageing in the workplace.

RESULTS

Two key themes emerged from the analysis, encapsulating the participants' different perceptions of risk and protective factors. Among the physical risk factors were those related to stress caused by job characteristics, which affect physical health. In addition, the study identified continuous shift work as a significant risk factor, which affects both physical health and the ability to reconcile work and family life. In addition, the responsibility of caring for dependent elderly family members and childcare responsibilities were highlighted as social factors that may affect employees' well-being.

CONCLUSIONS

The study provides a useful basis for the implementation of company interventions to improve the work sustainability of older employees, with possible applications in other similar companies.

1. Introduction

In today's world, many European countries are faced with the challenge of a growing elderly population, which inevitably affects the ageing dynamics of the workforce. Biologically, ageing comes with a gradual deterioration of various physiological systems, coupled with changes in the physical and mental capacities of workers [1,2,3]. The ageing workforce alongside a need to extend working life is expected to contribute to an increased incidence of work-related symptoms and illnesses, resulting in significant financial, social, medical and emotional burdens at national levels across Europe.

Italy not only has the highest percentage of elderly people, but it also has the highest average age of its population, at 47.6 years, compared with the European average of 44.1 years [4].

In 2011 the pension system in Italy was further modified by article 24 of the Legislative Decree. 201/2011 (so-called “Fornero Reform”)[5] , which implemented an overall review of state pension age and retirement. On the retirement age side, the main innovations concerned the progressive increase over the years and the gender levelling of retirement age among all categories of workers (employees, public and private, self-employed) to the value of 66 years and 7 months from 1 January 2018.

A subsequent update of the requirements was the one that came into force on 1 January 2019, defined on the change that occurred in 2013-2016. On this occasion, an increase of a further 5 months was noted, thus bringing the retirement age to 67 years old, thus making Italy one of the EU countries with the highest retirement age. Ongoing demographic changes are leading to a decline in the proportion of the population of working age in the European Union [6], while at the same time the relative number of pensioners is increasing. Forecasts for the coming decades predict a significant increase in the proportion of older people in the total population. As a result, this trend may put increased pressure on the working-age population to prolong their working careers, which may have various physical and psychological consequences.

The adaptation of workplaces to accommodate older workers is increasingly recognized as essential for fostering a productive and inclusive work environment. As the workforce ages, businesses are beginning to appreciate the myriad benefits that older employees bring, including their extensive experience, higher morale, and lower turnover rates compared to younger cohorts. This trend is particularly significant given that maintaining employment beyond the age of 50 is correlated with improved overall health and enhanced social participation, which benefits not only the workers themselves but also their families and society at large [7]. Workplace accommodations for older workers can significantly impact their job satisfaction and overall well-being. Research indicates that the provision of adequate support and accommodations is crucial for enhancing the likelihood of older workers receiving the necessary adjustments to their work environment.

Regarding the impact of intermittent or continuous exposure to challenging work conditions on declining work capacity in older age, the literature points to several factors that may pose a risk. These factors include elements such as shift work and night work [8,9,10,11], as well as consistently high physical demands over the course of a career, which are associated with a marked decline in physical capacity [12] and an increased likelihood of developing musculoskeletal disorders (MSDs) or reporting musculoskeletal injuries [13,14,15].

Emotional well-being, coping strategies and acceptance of illness are internal factors that can promote sustained productivity [16,17]. External influences on productivity include autonomy, flexibility and support from colleagues [16,18,19]. These internal and external factors have been identified as important determinants of work ability [20], job performance [21] and retention in the workforce [22].

It is expected that adaptations made in response to health problems can maintain work productivity by matching an individual's internal and external resources to their demands. The Job Demands-Resource (JDR) model proposes that resources such as autonomy and social support, when combined with demands, influence performance outcomes, including productivity [23]. Previous research suggests that personal adaptations and job accommodations (e.g., autonomy and flexibility) are critical for job retention [22], as well as for work ability and productivity [19]. According to the JDR model, these adaptations are aimed at maintaining a balance between resources and demands. In addition, Social Cognitive Theory (SCT), a well-known health behaviour model, extends the JDR model by including personal cognitive factors, work and home environments, and individual behaviour in a triangular relationship with organisational outcomes [24]. Based on findings from previous research, the JDR model and SCT, adaptations that affect an individual's demands and resources, and therefore productivity, can be categorised into work, personal and relational domains.

The study is set in a manufacturing company operating in the automotive metalworking sector in Northern Italy.

The automotive manufacturing context, like many other industries, has historically shown a significant gender gap, particularly in blue collar roles. Even in Italy, this gender gap is significant in the typical metalworking industry of the automotive assembly line [25].

Blue collar roles in this sector often involve production, assembly lines, maintenance and repair. These roles have traditionally been male dominated due to a number of factors including social norms, stereotypes and the physical demands of the job. Women are under-represented in these roles, resulting in a significant gender gap [26].

Efforts are underway to address this gap, driven by the recognition of the importance of diversity and inclusion to the success and sustainability of the industry. However, the gender gap in the automotive metalworking sector, particularly in white-collar roles, remains a challenge in Italy and elsewhere.

Adaptation to health challenges does not happen randomly, but is a dynamic process influenced by individual characteristics, the nature of work and interpersonal relationships within and between people and their circumstances.

This study is important because qualitative analysis allows individual perceptions, experiences and concerns about the ageing process to be explored, picking up nuances that would not emerge from quantitative data alone. Very useful for identifying risk and protective factors that may affect the ability to work safely and in good health.

Knowing the risk and protective factors perceived by workers helps companies to design targeted interventions to improve the well-being of older workers. These may include physical adaptations (such as changes to work equipment), improvements to safety policies, or the development of specific training programmes to promote long-term inclusion and health.

By collecting detailed information, companies can implement more effective prevention strategies to reduce the risks associated with ageing, improving not only the quality of life of older workers but also productivity and overall safety at work.

The following research questions were formulated on occupational well-being in the context we analysed:

(1) what are the risk factors of ageing work.

(2) what are the protective factors of ageing work

2. Method

We conducted this qualitative research as part of a larger mixed-methods research project investigating the risk and protective factors of ageing at work in a metalworking factory in northern Italy. Qualitative methodology using a social constructivist epistemological framework was chosen for this preliminary part because it allowed us to analyse the risk and protective factors perceived by the workers both inductively and deductively. These interviews also aimed to lead us to the next stage of constructing a questionnaire, as well designed as possible, on the workers' perceptions. For this part of the study, semi-structured interviews were used in a way that allowed the interviewees to answer freely, in order to bring out any factor that was fundamental to them. The research question was chosen in order to understand the in-depth experiences of participants and their socially constructed reality through a reflexive analytical process.

2.1 Recruitment and selection of participants

The interviews for this study were conducted on the company premises between the months of November and December 2022. The selection of participants was overseen by the Health and Safety

Executive (HSE) manager, who employed a purposive sampling strategy to ensure that a diverse cross-section of the workforce was represented. The objective was to construct a heterogeneous convenience sample, with due consideration given to a range of demographic and professional factors. The objective was to ensure balanced perspectives across male and female employees, hence gender diversity was prioritised. Furthermore, age was considered as a factor in order to capture insights from different generational cohorts. Furthermore, the sample comprised employees from a variety of occupational roles, encompassing diverse positions and responsibilities within the organisational hierarchy. Another significant consideration was the length of service, with the objective of eliciting perspectives from both novice employees and those with more extensive tenure at the company. The deliberate inclusion of diversity in the sample was intended to provide a comprehensive view of safety perceptions across different segments of the workforce. The demographic characteristics of the participants are presented in Table 1.

2.2 Data Collection Procedures

The data collection process was designed with meticulous attention to ethical compliance and participant comfort. Prior to each interview, participants were provided with comprehensive information regarding the interview procedure, including notification that the sessions would be audio recorded. The participants were explicitly informed and consented to the audio recording. Those who preferred not to be recorded were offered an alternative transcription method, carried out by the interviewer. This ensured that all participants who expressed a desire to take part were able to do so, irrespective of their comfort level with being recorded. A total of 25 interviews were conducted in person by the doctoral candidate who was leading the research project. The use of a single interviewer facilitated the maintenance of consistency across interviews and the reduction of variability in data collection. Moreover, the process was overseen by both the PhD supervisor and the scientific director of the project, with the objective of guaranteeing compliance with ethical standards and maintaining academic rigour.

The scheduling of the interviews was conducted in a manner that took into account the availability and professional commitments of the workers, adopting a flexible approach with the aim of minimising disruption to their regular activities while encouraging maximum participation. The duration of each interview was approximately 25-30 minutes which permitted an exhaustive examination of the participants' perspectives on safety within the company. The main purpose of conducting interviews prior to the construction of the questionnaire is to be able to construct it in a way that is as appropriate as possible to the needs and perceptions of the workers themselves.

2.3 Analysis: reflexive thematic analysis

The interviews were recorded and transcribed verbatim, with all identifiable participant information removed. The data were analysed using Braun and Clarke's reflexive thematic analysis [27,28] a qualitative analysis technique that takes into account self-perceptions and stereotypes in relation to the research questions. The research commenced by familiarising oneself with the data through listening to each recording, taking notes, and reading each anonymous transcript. Initial codes were created based on the data using inductive and deductive coding. Conceptual links between the codes were explored, and themes, sub-themes, and conceptual links were diagrammed. The researcher (GB) reviewed the initial thematic framework and consolidated several sub-themes into combined themes and then CE reviewed a sample of the coded transcripts providing some further comments on themes and sub themes with certain themes/sub themes merged and renamed. They then described the story behind each theme and made any necessary adjustments during the data processing stage. The analysis was best suited to the Job Demands-Resources model [23, 29, 30,31] as the focus on experience in the data lent itself to this form of analysis [28].

3.Results

The metal industry poses health risks to its older workforce due to heavy machinery, repetitive tasks and awkward postures. These factors may cause musculoskeletal issues. Long-term exposure to loud noise or dangerous substances can lead to long-term health problems. Shift work impedes recovery and disrupts the work-life balance. However, older workers can offset cognitive decline and maintain productivity with extensive experience and skills. Flexible work schedules and targeted health policies can help older employees remain active in their roles for longer. Interviews show that supporting older workers in the metal industry requires understanding risk and protective factors.

The first theme focused on risk factors and had two initial sub-themes relating to physical and social factors. The theme of physical factors presented several sub-themes: a) the impact of physical strain on physical health; b) perception of workload in the long run; c) inadequate workstations; d) the criticality of shifts on the body.

Theme 1a: Risk factors related to physical factors

a) Physical strain impacts on physical health

Many of the participants emphasised the perception of the physical impact this work has on their physical health. A number of participants emphasised the specific problems they felt this work has

caused them. Mainly they described problems and chronic pain in their backs, knees and wrists, regardless of their seniority in the job, although, as one would expect, those who have been doing this work for longer present the problems more pronounced.

"I have three final lumbar hernias and now I have discovered three more cervical hernias. So I was, in 2019, stuck with my back and there I discovered all these things here, because the vertebra out pinched the sciatic nerve, so I was stuck for four months." [Participant 11, Female]

As a type of serious work, some participants highlight the critical issues related to the repetitiveness of the movements, which, as mentioned above, mainly cause damage to the musculoskeletal system. What emerges is not so much the weight of the physical objects that have to be moved but having to do so in a "serial and repetitive" manner that at the end of the working day, and repeated over time, was described as burdensome.

"With time, it's logical, posture, having to do many pieces, repeated movements, you can create problems" [Participant 4, Male]

b) Perception of workload in long run

Related to the previous sub-theme, the impact of prolonged physical exertion generates the perception of not being able to sustain this work in the long run and the concern for the younger generation who have joined the company less time.

"I got sick after 27 years but with the rhythms and manners with which we work now, in my opinion, in 5/6 years these kids won't be able to do it anymore" [Participant 11, Female]

Accompanying this perception, some participants pointed out that work becomes more demanding as they get older, and it is difficult to maintain the rhythms over time. It is important to keep in mind the retirement age in Italy, which is around 67 years, and these jobs start to be wearing long before, not allowing one to retire in an acceptable condition.

"It's quite demanding, so to think that you have to keep these rhythms at 65, I mean I can already see it now that I'm 52, it's more tiring than when I was 35 or 45." [Participant 8, Male]

c) Inadequate workstations

According to the perceptions of some participants, physical risk factors are also to be linked to inadequate workstations that would be totally unsuitable for carrying out the work. Some participants pointed out that the company had made efforts to make workstations more ergonomic but had failed

to fully meet workers' needs. It is also important to bear in mind that this is a blue-collar job that cannot be easily changed when the type of work requires one to assume certain positions for a long time.

"Me having problems with my back, I have to work sitting down and they gave me a chair, but the workstation is not adequate to be sitting down, because I have my arms like this, I have to work with my bottom up because we have the seats that in my opinion are not suitable for the work we do, because they have the seat of the bottom touching the ark, so I always have my back not resting."
[Participant 11, Female]

"In other words, they invented the sitting position to make it easier for people with problems, but in reality, the position has not been adapted. I in the past I don't know where to put my feet, I should cut my legs, because if I put my legs, I'm back with the chair again." [Participant 12, Female].

d) Criticality of shifts on the body

Working on a shift system, i.e., outside the regular 9 a.m. to 5 p.m. working hours, is frequently required in workplaces which operate on a 24-h schedule [32]. A wide variety of shift work schedules currently exist to accommodate the needs and expectations of modern society. Schedules may differ by length, number of consecutive shifts or shifts per week, speed, and/or direction of rotation and the presence or absence of night work. The company in question operates on a full-time basis, with employees working six days a week and 24 hours a day, with a six-hour shift and a night shift one week a month [33].

Several participants pointed out how the shifts disrupt their rest and how in the long term they begin to pay the consequences.

"You get home, and you are always tired, you can't rest and even when you could" [Participant 4, Male]

Interestingly, one participant also pointed out that initially, doing the night shift was cool because it allowed them to have the rest of the day free.

"At the beginning doing the night was, for me, cool, because I had never done it in my life."
[Participant 15, Male]

Theme 1b: Risk factors related to social factors

a) Elderly parents and family responsibilities

Among the factors highlighted as risks related to social factors, some participants highlighted the presence of elderly relatives in the family and different family responsibilities. Interestingly, this is highlighted not only by the female participants but also by the men, and in both cases, it was felt to become more burdensome with advancing age, which makes it increasingly difficult to reconcile work with these kinds of responsibilities.

"It would be advisable to request that the company work twice at night, from midnight to 6 in the morning." Once the children have retired for the night, the individual in question proceeds to work. Upon completion of their shift, they return home, where they care for their children before undertaking other responsibilities. The hope is that these other responsibilities do not require their attention until the following day. Finally, they retire for the night. As they age, this process becomes increasingly challenging." [Participant 1, Male].

b) Shifts and life balance

Role theory [34,35] posits that employees possess limited resources for fulfilling their role, such as time or energy. Consequently, working excessive hours or shift work results in employees having less time and energy available during the hours classically reserved for private life. In this sub-theme, some participants confirmed this theory, pointing out the tiredness that characterises the end of a work shift that does not allow them to devote themselves to private life in the way they would like. This is particularly problematic when children are present, especially if they are still young. It is noteworthy that this phenomenon also affects the male population in this specific context.

"Upon returning home, one is invariably fatigued, unable to rest, and even when one is able to, for instance on Sundays, one is unable to sleep peacefully. In fact, I wake up at seven in the morning, as I have established a routine of times and activities. Consequently, I do not experience a restful night's sleep." [Participant 5, Male]

"I arrive at eight and leave at 6:30/7, so there is not much time left." [Participant 8, Male].

The second theme that emerged from the in-company interviews was workers' perceptions of having protective factors during their ageing at work. Once more, with reference to the JD-R model, it is possible to identify the resources defined by Bakker and Demerouti as 'those physical, psychological, social or organisational aspects of work that are and/or function to achieve work objectives, reduce work demands and associated physiological and psychological costs and stimulate personal growth, learning and development' [23].

The key theme of protective factors encompasses three further sub-themes: social factors, interventions that the company could deploy, and personal factors. The social factors, in turn, present

two sub-themes: a) personal contribution in relationships; b) support and quality of relationship from colleagues and superiors.

Theme 2a: Protective factors related to social factors

a) Social Factors

Some participants emphasised the importance of their personal contribution in order to maintain a good climate within the working environment. It was emphasised that it is natural for someone to bring their personal problems to work, and this can affect the mood in which they approach the working day, and this can spill over to the work group.

“It's all about how you take things, if you take them with the serenity, with the tranquility that goes into everything” [Participant 8, Male]

b) Support and quality of relationship from colleagues and superiors

Christian et al. [36] found that social support from colleagues and the quality of relationship with one's supervisor were important components of work resources from the perspective of the JD-R model. Supervisor support encompasses a range of behaviours, including the provision of care and support to subordinates, the recognition of their contributions, the provision of assistance with work-related issues, and the facilitation of their skill development [37, 38]. Peer support, in contrast, refers to the degree of assistance provided by colleagues.

Peer support is defined as the degree of assistance provided by work colleagues [39]. This encompasses the provision of assistance, tangible help and information [40,41]. The provision of support by immediate supervisors and colleagues can enhance employees' sense of comfort within the organisation by satisfying their needs for esteem, approval and affiliation [42]. In alignment with the extant literature, numerous participants in our interviews emphasised the support and quality of the relationship with colleagues and superiors as a protective factor.

“If there is a problem, we give each other advice, i.e., people are willing to invest their time, even if they also have a considerable amount of work, but they help you, they support you, there is an exchange of opinions and ideas.” [Participant 12, Female].

“It is beneficial to have a positive relationship with one's superior. I had a conflict with my wife, and together with the department head, I spent two months at home because I was unable to focus on work.” [Participant 5, Male].

Theme 2b: Intervention from the company

a) Psychological support within the company

It is notable that several participants requested psychological support within the company. Some reported that they had already undertaken an external psychological course, but it would still be useful to have an internal reference within the company for issues related to the company context. It emerged that many respondents believe it would be useful for those who have roles in which they have to manage other people.

“But, perhaps, having the possibility, for those who have certain roles and where perhaps they have to manage many people, of having a figure (psychologist) where if needed they can perhaps go and talk or in any case understand if there are things that can be found that can lend a hand in terms of managing anxiety, tension, stress and so on.” [Participant 6, Male]

b) Benefit from different tasks and rotation

It can be argued that rotation benefits psychological health by reducing the stressors associated with repetitive work and an imbalanced workload. In a study on boredom at work, Loukidou et al. [43] found that repetitive and monotonous jobs were associated with psychological distress, depression and feelings of hostility. Furthermore, it is possible that employees' psychological health is positively affected by rotation because the workload is more balanced than in single-task jobs, which improves physical health (as described in the following section). In addition to the reduction of these stress factors, rotation also provides some resources. Warr [44] summarised ten potential environmental determinants of well-being, two of which are variety and opportunities to utilise skills. As described above, these are assumed to be provided by rotational jobs.

In accordance with the extant literature, several participants underscored the potential for the company to implement this intervention to enhance the well-being of its employees.

“More to stimulate you, try turning around and seeing the company with other eyes, rather than producing, producing, producing.” [Participant 15, Female]

Theme 2c: Personal factors

a) Leisure time

It is widely acknowledged that engaging in physical activity serves as a coping strategy to alleviate the effects of stress and burnout [45,46]. Indeed, there is a strong correlation between the enhancement of physical activity and enhanced well-being, as well as a reduction in job-related stress

[47]. For instance, employees who remain consistently inactive experience job stress levels that are four times higher than their consistently active counterparts.

In light of the preceding literature, it is not entirely unexpected that some of our participants identified sporting activity as a protective factor.

“Doing sports could be a way” [Participant 1, Male]

b) Work and life separate

Empirical evidence indicates that an optimal work-life balance for employees is associated with enhanced life satisfaction, marital satisfaction, family performance, family satisfaction, parental satisfaction, and leisure satisfaction [48].

Similarly, some of our participants observed that once they leave the workplace, they cease to consider it until the next shift. Furthermore, this phenomenon is also related to the concept of job sustainability.

“I leave work and stop thinking about work... when I leave here, I completely switch off until the next shift. I never let work enter my personal life. This is how you save yourself” [Participant 3, Male].

“In my case sustainability is about me finishing my 6 hours and then getting home.” [Participant 13, Female].

c) Character traits

According to Mäkikangas and Kinnunen [49], how individuals perceive work situations as stressful depends partly on their personal characteristics. Even when confronted with the same stressful factor, individuals may assess its impact on their well-being differently, depending on their unique personality traits. In essence, personality traits can either dampen or amplify the impact of the stressor [32].

This was also highlighted by some participants in our interviews, who pointed out that some of their personality traits acted as a protective factor with regard to their organisational well-being.

“I know how to be quite patient” [Participant 7, Male],

d) Psychological support

As highlighted above, some participants found it beneficial to undertake psychological support outside the company. In their opinion, this also helped them to deal with work situations in which they found themselves and to be able to take their minds off work.

“Then from a personal point of view I have a psychological path outside which I think also helps me a little not to keep my head always on work.” [Participant 3, Male]

4. Discussion

This study examines the factors affecting work sustainability for aging employees in physically demanding industries, particularly the metalworking sector, using the Job Demands-Resources (JD-R) model as a framework. The research examines the complex interrelationship between multiple risk factors and protective elements that influence the well-being and productivity of workers as they progress through their careers and age. The study examines the ways in which factors such as workplace conditions, health status, job demands and personal circumstances can either pose a risk or offer protection to older employees. The study examines the manner in which these elements interact dynamically over time, with the potential for their effects on worker outcomes to be either compounded or mitigated.

Physical risk factors emerge as a primary concern. Workers frequently cited repetitive tasks, awkward postures, and heavy machinery use as causes of chronic pain and musculoskeletal disorders. This aligns with existing occupational health literature, which documents the cumulative effects of physical demands like manual labor and prolonged standing. As workers age, they become acutely aware of the growing mismatch between their physical capabilities and job demands, a situation exacerbated by extended working careers due to changing retirement policies.

Inadequate workstations further compound these physical challenges. Despite company efforts to improve ergonomics, many participants felt the interventions were insufficient, especially for jobs requiring prolonged static postures. This underscores the need for ongoing workplace adaptations to meet the evolving needs of aging workers, a concern shared across industries reliant on manual labor.

Shift work emerged as another significant physical and social risk factor. It disrupts circadian rhythms and impairs natural recovery processes, leading to fatigue and poor-quality rest. This aligns with broader research linking irregular work hours to both physical and psychological stress. Shift

work also severely impacts work-life balance, leaving little time or energy for personal life, particularly for those with caregiving responsibilities.

Social factors, especially caregiving for elderly relatives or children, present additional challenges. Workers struggle to balance these responsibilities with demanding work schedules, often leading to increased psychological stress. This is particularly problematic for older workers who may already be coping with physical fatigue and health issues [50].

Despite these challenges, the study identified several protective factors. Social support from colleagues and superiors was frequently mentioned as crucial for sustaining well-being at work [51]. This aligns with the JD-R model's emphasis on the importance of resources—both physical and social—in reducing work demands and enhancing job satisfaction. Workers with strong relationships with peers and supervisors reported feeling more supported and better able to manage stress, highlighting the importance of positive workplace culture and interpersonal dynamics.

Psychological support was highlighted as a needed intervention. Many participants suggested that access to a company psychologist could help manage anxiety, stress, and tension related to both personal and professional challenges. This reflects the growing recognition of mental health as a crucial component of occupational well-being, especially for older workers facing unique stressors.

Organizational interventions were also recommended. Task rotation and flexible working hours were seen as ways to reduce monotony and physical strain associated with repetitive tasks. Task rotation, in particular, was viewed as a method to balance workload and maintain physical and psychological health. This is supported by research showing that variety and opportunities to utilize different skills can enhance job satisfaction and reduce burnout. These interventions align with broader calls for workplace accommodations tailored to older workers, including ergonomic improvements, flexible schedules, and professional development opportunities.

On a personal level, participants identified leisure activities, sports, and physical exercise as effective coping strategies for managing work-related stress. Physical activity has been shown to improve both physical and mental health, reducing the risk of burnout and depression. Additionally, many emphasized the importance of work-life separation, noting that leaving work at the workplace helped maintain their well-being. This underscores the value of setting boundaries between professional and personal life, particularly in high-stress jobs.

5. Conclusion

This study provides valuable insights into the factors that influence the sustainability of work for ageing employees in the metalworking industry. Physical and social risks, particularly related to the

demanding nature of shift work and caregiving responsibilities, pose significant challenges to their long-term health and productivity. However, protective factors, such as social support and appropriate work accommodations, can mitigate these risks and enhance occupational well-being.

These findings have significant implications for organisational policies and practices, particularly within the metalworking industry and other manufacturing sectors. In order to provide adequate support for their ageing workforce, companies must implement a range of targeted interventions. For example, the implementation of ergonomic improvements, such as the investment in adjustable workstations or power-assist devices, has the potential to significantly reduce physical strain. The provision of flexible scheduling options, including the possibility of reduced hours or phased retirement, would also facilitate the accommodation of the evolving physical and personal responsibilities of older employees. Furthermore, the provision of mental health resources, such as counselling services and stress management workshops, could assist in addressing the psychological challenges associated with ageing in demanding work environments. The implementation of health promotion programmes with a focus on nutrition, exercise and preventive care would serve to enhance overall well-being. Furthermore, the establishment of knowledge transfer systems, such as mentoring programmes, would facilitate the preservation of the expertise of older workers while simultaneously reducing their physical workload. Finally, the formation of age-diverse teams could facilitate collaboration that draws upon the physical resilience of younger workers and the problem-solving abilities of their older counterparts.

Improving support for older workers raises practical challenges. Such costs may be prohibitive for smaller companies. Flexible working and gradual retirement may also affect resource management and productivity. Integrating mental health resources requires a cultural shift and may encounter resistance. Mentoring systems are beneficial but require resources and older workers. Promoting effective intergenerational teams may prove challenging due to differences between generations. Implementing these improvements necessitates strategic planning, adequate investment, and the capacity to surmount cultural and organisational resistance.

6.Limitations and future research

The study has some methodological limitations. First, a convenience sample was used, aimed at selecting a heterogeneous group in terms of seniority, gender and age, therefore difficult to generalise. Regarding age, it could be useful to carry out studies on cohorts of populations only over 50. Another limitation concerns the study population, as it included only workers from a single factory of the multinational, thus covering only a limited segment of the overall population. Future studies should therefore extend this assessment to other factories of the same company. Furthermore, the progressive

aging of the Italian workforce is a critical factor to consider. In sectors with a high percentage of physical work, the challenges of an aging workforce can impact both individuals and the wider community. Future research should focus on the vulnerabilities associated with aging, working with organizations to develop effective strategies for health promotion, workplace design, specific interventions to improve work capacity, stress management and coping strategies for an aging workforce.

Ethical Considerations. The principles of scientificity and privacy were strictly observed in the conduct of the survey. The research protocol was developed in accordance with Italian Law 101/2018 on the protection of privacy at work and complied with the provisions of the 1964 Declaration of Helsinki.

Informed Consent. Written informed consent was obtained from all participants included in this study.

Reporting Guidelines. Not applicable.

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Conflicts of Interest. Not applicable.

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Table 1. *Characteristics of the interviewed workers*

		N
Gender	Female	10
	Male	15
Age	M= 48.2 (Min:28; Max: 61)	
Role	Finisher	5
	Administration	3
	Shift reference	2
	Microtesting	3
	Press operator	4
	Quality officer	3
	Depurator	2
	Furnace loading/unloading operator	3
