



REVIEW ARTICLE

# How does retirement really affect physical health? A systematic review of longitudinal studies

Gabriela Nazar<sup>1</sup> , María-Francisca Cabezas<sup>1</sup>, Carlos-María Alcover<sup>2</sup> ,  
Elena Soto-Contreras<sup>1</sup>, Daniel Reyes-Molina<sup>1</sup>, Claudio Bustos<sup>1</sup> and Ana María Leiva<sup>3</sup>

<sup>1</sup>Department of Psychology, Universidad de Concepción, Concepción, Chile; <sup>2</sup>Health Sciences Faculty, Universidad Rey Juan Carlos, Madrid, Spain and <sup>3</sup>Facultad de Ciencias Sociales y Comunicacionales, Universidad Santo Tomas, Sede Valdivia, Chile

**Corresponding author:** Gabriela Nazar; Email: [gnazar@udec.cl](mailto:gnazar@udec.cl)

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## Abstract

Considering the demographic shift towards an ageing population, the financial threats that arise after retirement and the ongoing debates about extending working life, it is crucial to thoroughly understand the impact of retirement on the health of older individuals. This article presents a systematic review conducted according to the standards established by PRISMA statement CINAHL and APA PsycArticles databases by EBSCOhost, Pubmed, Scopus and Web of Science, for longitudinal studies published between 2013 and 2023. The aim of the review was to synthesise evidence of the effects of retirement on health, for example physical functioning, morbidity or mortality. From 1,757 records, 19 papers were included. Twelve longitudinal studies consistently linked retirement to declining physical function, increased disease prevalence and higher all-cause mortality risk. The evidence did not show a clear conclusion on biomarkers as health outcomes. The article identifies five explanatory mechanisms behind the retirement–health relationship: working conditions, retirement types, financial security, lifestyle changes and social participation. Retirement can have some adverse effects on health; however, the health consequences of withdrawal are likely to vary by pre-retirement factors. These findings carry implications for the current debate of extending working life and the social security system for older people.

**Keywords:** health outcome; longitudinal studies; retirement; systematic review

## Introduction

Retirement from work represents a milestone in the life course that poses challenges and opportunities to older people (Wang and Shultz 2010). With the increase in life expectancy, there are pressures from different sectors to extend working life

(Madero-Cabib *et al.* 2019; OECD 2019). Worldwide, life expectancy at birth is 73 years and can reach more than 80 years in developed countries (WHO 2023). This fact, along with a weakened pension system, prompts older people to remain active at work beyond the legal retirement age (Kuitto and Helmdag 2021; Martin 2018). Moreover, raising employment rates in this group is one of the strategies to solve current social security demands (Madero-Cabib *et al.* 2019) and trends worldwide indicate that people are retiring later than previous generations mainly because of economic demands (OECD 2013).

Due to this pressure, there is an increased interest in the post-retirement life. The cessation of work activity is experienced in multiple ways (Amabile 2019) and, despite the vast individual variability, the literature recognises the reduction of income as one of the main consequences. Notwithstanding, the exit from the labour market also has psychosocial effects that could be more a determinant of retirement satisfaction than the reduction of income (Osborne 2012). For example, new arrangements in social relationships and networks and, in some cases, the experience of loss of social groups and the recognition and status conferred by work might have detrimental effects on life post-retirement (Cruwys *et al.* 2019). In other cases, retirement represents the freedom to have more personal time and to pursue activities that have usually been postponed (De Preter *et al.* 2013; Hansson *et al.* 2019; Topa and Pra 2018). So, as a result of the current debate about postponing the retirement age forced by the sustainability of the pension systems and labour force rates, there are also reasons to extend working life, regardless of the mandatory age (Bratun and Zurc 2022).

The relationship between health and retirement is a complex one that has been widely studied. It has been reported that good health status and perceived health are reasons to extend work life (Jennen *et al.* 2021). Accordingly, bad health predicts retirement intentions and early retirement (Rad *et al.* 2017; Ten Have *et al.* 2015). There is evidence that chronic conditions (Jennen *et al.* 2021), multimorbidity (Ten Have *et al.* 2015), work stress (Toczek *et al.* 2022), mental health functioning (Harkonmäki *et al.* 2006) and self-rated-health (Jonsson *et al.* 2019; van Rijn *et al.* 2014) among others, influence retirement decisions.

On the other hand, much research, particularly in developed countries, addresses retirement's effects on individuals' health; however, these results are inconclusive (van der Heide *et al.* 2013). Even though health depreciates over time, some studies have asserted that retirement leads to an improvement in general health and perceived health (Coe and Zamarro 2011; Latif 2012), a substantial decrease in mental and physical fatigue and depressive symptoms (Westerlund *et al.* 2010) and an increase in physical activity from sedentary occupations (Glasson *et al.* 2023). In contrast, other studies state that retirement significantly increases the diagnosis of chronic conditions, such as cardiovascular disease (CVD) and cancer (Behncke 2012), increases difficulties associated with mobility and daily activities (Dave *et al.* 2008) and raises the probability of poor self-reported health (Che and Li 2018). Other findings reported mixed effects, particularly when analysing biomarkers such as blood pressure, diabetes indicators and cholesterol (Gorry and Slavov 2021).

Factors such as reasons for labour force withdrawal (Han 2021), retirement timing (Calvo *et al.* 2013), socio-economic position (van Zon *et al.* 2016), partial or total retirement (Han 2021), health conditions and presence of chronic disease before retirement

(Westerlund et al. 2010) are reported as influencing the effects of retirement on health status.

In the context of the rapid ageing of the population, financial threats after retirement and the current debate about extending working life, it is important to understand the effects of retirement on the health status of older workers. With the ageing process, there is a natural detriment to health; however, retirement is a turning point in the life course that inevitably transforms not only daily living activities but also people's identity, all of which impacts health and well-being (van der Heide et al. 2013). To date, some reviews have addressed the retirement–health relationship; however, they focus on particular health conditions such as CVD (Xue et al. 2020), mental health problems (Kolodziej and García-Gómez 2019), psychological morbidity (Mukku et al. 2018), depression (Dang et al. 2022), cognitive functioning (Atalay et al. 2019), lifestyle behaviours (Vansweevelt et al. 2022) and mortality (Sewdas et al. 2020). Other reviews refer to retirement from particular groups, such as athletes (Montero et al. 2022) and nurses (Markowski et al. 2020). To a lesser extent, reviews focus on chronic conditions, the leading cause of mortality worldwide (World Health Organization 2023) and the main responsible of the disease burden. Moreover, authors have stated that reaching final consensus is not always possible due to the methodological challenges and comparability of the studies (Garrouste and Perdrix 2020). Together with the recent amount of scientific evidence and the current demands from public policy, this study aims to systematise recent scientific evidence regarding the main effects of retirement on health, including chronic conditions and mortality from longitudinal studies.

## Methods

This systematic review was conducted in accordance with the standards established by the PRISMA statement (Page et al. 2021). The PRISMA checklist can be found in the supplementary material (Table S1). The study was endorsed in the prospective international register of systematic reviews PROSPERO (Prospero Code: CRD42023427317).

### Search strategy for study identification

The search strategy followed the guidelines of the Peer Review of Electronic Search Strategies (PRESS) (McGowan et al. 2016). A systematic search was carried out in CINAHL and APA PsycArticles databases by EBSCOhost, Pubmed, Scopus and Web of Science. The general search phrase was limited by title, abstract and keywords and was: ('retirement' OR 'pensions' OR 'pension') AND ('physical health' OR 'chronic disease' OR 'chronic illness' OR 'chronic condition' OR 'morbidity' OR 'mutimorbidity' OR 'cardiovascular disease' OR 'kidney disease' OR 'musculoskeletal disease' OR 'respiratory disease') AND ('cohort stud\$' OR 'longitudinal stud\$' OR 'longitudinally' OR 'prospective stud\$' OR 'follow-up stud\$' OR 'follow-up' OR 'retrospective stud\$') NOT ('systematic review' OR 'meta-analysis' OR 'cross-sectional' OR 'qualitative'). The literature search was conducted in July 2023 and was limited to studies from 2013 onwards published in English. The complete search strategies are presented in the supplementary material (Table S2).

### **Selection of studies and eligibility criteria**

All those articles that met the search phrase were considered. Then, only those articles that met the following inclusion criteria were selected: (1) participants in stages before and after retirement; (2) participants in the pre-retirement phase who have no clinical conditions, hospitalisation or diagnosis with a specific disease before retirement; (3) the main results of the study are physical functioning, morbidity or mortality; (4) results are measured at least twice, before and after retirement; and (5) the studies have a prospective or retrospective longitudinal design. Articles were excluded if: (1) the outcomes related exclusively to mental health, lifestyle behaviors (e.g., physical activity, sleeping habits, smoking, alcohol consumption), perceived health and/or cognitive functioning; (2) participants retired on disability or received a disability pension; and (3) they featured cross-sectional study designs, qualitative studies, meta-analyses, reviews and letters to the editor.

### **Data extraction**

For the selection process, the Rayyan platform was used (Harrison *et al.* 2020; Ouzzani *et al.* 2016). Selected articles were reviewed independently by three reviewers (GN, M-FC and ES-C) and any discrepancies were discussed with a fourth reviewer (AM-L) until agreement was reached. Data extraction was performed in three stages. First, duplicate records obtained from the databases were eliminated. Second, three reviewers (GN, M-FC and ES-C) selected the records that met the inclusion criteria by reading the title and abstract of the articles. Third, when decisions could not be made from the title and abstract alone, documents were retrieved to run a full text review (GN, M-FC and ES-C).

### **Risk of bias**

The quality of the included studies was assessed by the Newcastle Ottawa Scale (Wells *et al.* 2014), a widely accepted and used scale for the analysis of the risk of bias in observational studies of these dimensions. This scale evaluates the selection of the sample, the comparability between studies and the determination of exposure, and evaluates the risk of bias from 1 to 9. As a cut-off point, a score greater than 7 was considered low risk of bias and less than 7 high risk (see the supplementary material in Table S3). Nine of the 19 studies showed a low risk of bias for all applicable criteria regarding the study design. Fifteen studies complied with six to seven of the criteria assessed and three of them achieved eight to nine criteria. The studies that scored  $\geq 5$  points were included ( $n = 19$ ), assessed by two independent reviewers (M-FC and ES-C) (details are in the supplementary material in Tables S3 and S5).

### **Data synthesis strategy**

We synthesised the evidence from the included studies and presented relevant information in summary tables and figures. The stratification of the selected studies was represented by the PRISMA flow chart (Figure 1). A narrative synthesis of the findings of the included studies was provided and the main information is presented in Table S4 (Supplementary Material).

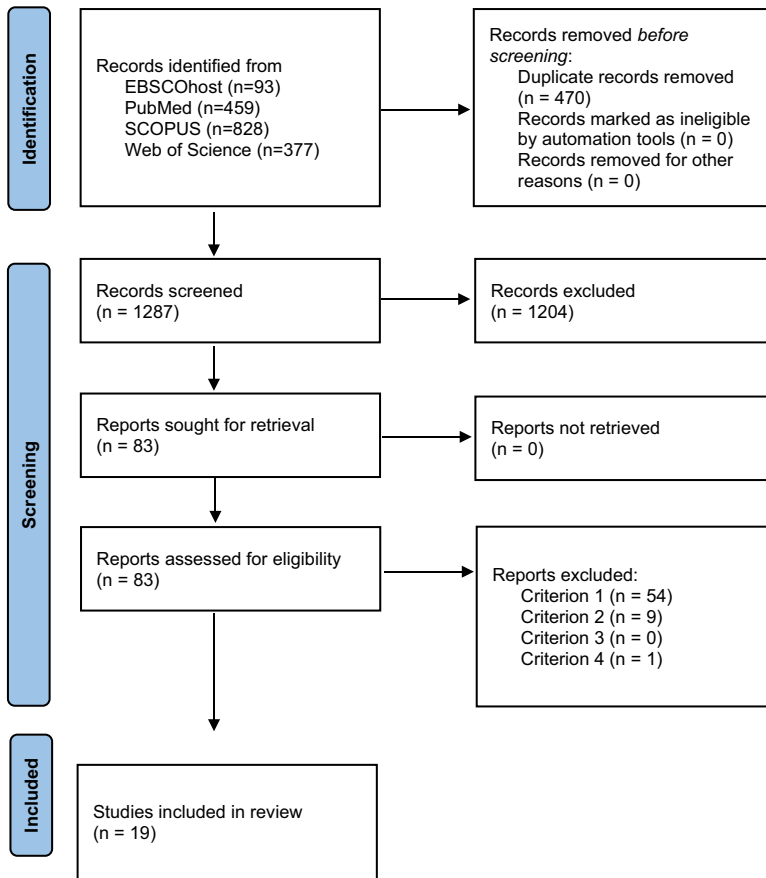


Figure 1. Study selection flow chart according to the PRISMA statement (Page et al. 2021).

## Results

Figure 1 presents the flow chart for systematic reviews proposed by the PRISMA declaration. A total of 1,757 potential articles were identified. Subsequently, after the exclusion of duplicates in the databases, the selection and eligibility criteria were applied. Finally, 19 articles were included for the synthesis in this review: ID1: Byles et al. (2016); ID2: Dinh et al. (2022); ID3: Halleröd et al. (2013); ID4: Haapanen et al. (2022); ID5: Kalousova and Leon (2014); ID6: Kang and Kim (2014); ID7: Lallukka et al. (2023); ID8: Mänty et al. (2018); ID9: Mänty et al. (2016); ID10: Nie et al. (2020); ID11: Okamoto et al. (2018); ID12: Pedron et al. (2020); ID13: Sato et al. (2023); ID14: Stenholm et al. (2014); ID15: Stevens et al. (2021); ID16: van den Bogaard and Henkens (2018); ID17: Wu et al. (2016); ID18: Xue et al. (2017); ID19: Yuan et al. (2021).

## Study characteristics

Table S4 (supplementary material) summarises the general characteristics of the studies, including year of publication, population, sample size, age range, instruments/measures used, results and conclusions.

Studies were published between 2013 and 2023, and data mainly come from European countries and the USA. Three studies included data from multiple countries. Of the 19 studies, 15 had a representative sample of the population, with sample sizes between 1,000 and 4,000 participants ( $n = 9$ ), which included both men and women ( $n = 16$ ) in the age range from 45 to 75. One study was developed in a female sample (ID7). Gender was one of the main variables used in the stratified analysis (ID1, ID6, ID12, ID13, ID18) and there was one study (ID4) that included a particular occupational group (retired business executives and managers).

Most articles reported a longitudinal design ( $n = 7$ ), five studies declared a prospective design (ID6, ID10, ID11, ID14, ID18) and three studies used a longitudinal cohort design (ID1, ID4, ID7). Regarding the follow-up time, ten studies considered 11 to 20 years (ID2, ID7, ID8, ID9, ID10, ID11, ID12, ID14, ID17, ID18), six reported between six and ten years (ID3, ID4, ID5, ID6, ID13, ID15) and three studies reported one to five years (ID1, ID16, ID19).

The studies analysed indicated a diversity of methods for controlling bias. Most aim to control inter-individual heterogeneity and, to a lesser extent, the time effect.

All studies reported at least one strategy to address inter-individual heterogeneity. Among them there were: confirming proportionality in multinomial odds ratios and the hazard ratio (ID4, ID6, ID17); sensitivity analysis (including E-values) (ID10, ID13, ID19); mixed models analysis for both fixed effects and random effects within individuals (ID2, ID5); mixed-effect growth curve models, including fixed effects and random effects (ID7); linear regression analyses with generalised estimation equations (GEEs) using an exchangeable correlation structure to control for the intra-individual correlation between repeated measurements (ID8, ID14); the propensity score method to deal with potential observed endogeneity (ID11), regression discontinuity design (RDD) (ID12, ID18); linear probability models estimated by the fixed-effects instrumental variable (FEIV) method (ID13); the conditional change method (cross-lagged) (ID16); inverse-probability-of-attrition weights (IPAW) to account for potential selective attrition at follow-up (ID17); and Heckman two-stage procedure to address the potential self-selection bias (ID19).

A few studies addressed the control of time-varying covariates. A time-dependent variable was used in a survival analysis to determine whether risk was constant over time (ID6, ID9) and time-dependent covariates were added to determine the effect of risk factors in a discontinuous regression analysis (ID18).

[Table S4. Supplementary material characterisation of the included studies]

### **Retirement measures**

Retirement measures include self-report of retirement status; transitions into retirement based on participants' age (e.g., early retirement age and official retirement age or full-time statutory retirement age); part-time retirement; voluntary or involuntary retirement; reasons for retirement; retirement date; and pension type (Table S4 (supplementary material)).

### **Health outcomes**

The most common health outcome was physical functionality (ID1, ID2, ID4, ID7, ID8, ID9, ID14, ID19), measured by the Medical Outcomes Study Short Form SF-36

health questionnaire, followed by health conditions that are physician-diagnosed cardio-metabolic diseases (ID6, ID10, ID11, ID16). Health outcomes also included biomarkers (e.g., glycosylated haemoglobin, total cholesterol:high density lipoprotein (HDL; good) cholesterol ratio, blood pressure) (ID12, ID13, ID16, ID18); subjective health, assessed by the SF12 questionnaire or single items (ID3, ID12); frailty (ID5, ID15), assessed by a questionnaire based on five criteria of the phenotype developed by Fried and associates (Fried et al., 2001); and cancer (ID11, ID16). Less frequent were health status, assessed by the self-reported number of chronic health conditions up to a maximum of 12 conditions (ID15); restricted mobility and pain (ID3); and diseases such as lung problems, arthritis and rheumatism, cataracts, fracture and Parkinson's disease (ID16), all assessed using a self-report questionnaire.

Three studies include all-cause and cause-specific mortality (ID10, ID11, ID17) extracted from the registration system and spouse or partner interview.

### *Association between retirement measures and health*

The effects of retirement on health are organised according to the health variable addressed. They are summarised in Table S4 (supplementary material).

#### *Direct effects*

Regarding *physical functioning* and using the same measure (SF-36), findings were in the same direction, that is, retirement was significantly associated with a decrease in physical functioning (ID1, ID2, ID4, ID7, ID14, ID19). Byles et al. (2016) informed of a relative increase in physical dysfunction scores after retirement, with differential effects on men and women. Accordingly, Dinh et al. (2022) concluded that health deteriorated faster in non-employed adults aged 50 to 70 than in employed participants over the 15-year follow-up (ID2).

Regarding the *prevalence of diseases or health problems* after retirement, the findings were not completely consistent. One study concluded that the number of physical functioning difficulties increased every ten years by 0.17 (95% CI 0.04 to 0.29) when in full-time work and by 0.46 (95% CI 0.41 to 0.50) in retirement after adjusting for covariables (ID14). In Finland, Haapanen et al. (2022) identified five physical functioning trajectories based on latent groups from ten health conditions. The authors informed that a one-year increase in retirement age was associated with a decreased likelihood of being classified in the worst physical functioning trajectories. In the same line, another study found that, compared with participants not employed, employed participants had a longer period before the onset of diabetes and stroke (ID11) and participants who were voluntarily and involuntarily retired showed higher risk of stroke and CVD compared with the still employed (ID6). Two studies informed positive effects of retirement on CVD. Retirees showed a 2.2 percentage-point decrease in the risk of heart disease [coefficient 0.022 (95% CI: -0.031 to -0.012)] than workers (ID13), and retirement was associated with lower diastolic blood pressure and waist circumference over time (ID18), reducing the risk of heart disease. Other studies informed that the main explanation for post-retirement global health was pre-retirement health but not retirement circumstances (ID3).



The relationship between retirement and *mortality* showed similar results in the three studies that addressed it (ID10, ID11, ID17). Compared with employed participants, retired participants faced an increased risk of all-cause mortality (Hazard Ratio [HR]): 1.27, CI: 1.17–1.37 (ID10). Accordingly, Okamoto in Japan (ID11) found that employed people lived 1.91 years longer (95% CI: 0.70 to 3.11) compared with those not employed. Similarly, Wu *et al.* (2016) found that, among healthy retirees, being one year older at retirement was associated with an 11 per cent lower risk of all-cause mortality (95% CI 8% to 15%), independent of a wide range of confounders. Unhealthy retirees also had a lower all-cause mortality risk when retiring later (HR 0.91, 95% CI 0.88 to 0.94).

When using *biomarkers* as health outcomes of retirement, results are not conclusive. Pedron *et al.* (2020) indicated an increase in risk factors for cardiovascular disease after retirement, such as high cholesterol and hypertension (ID12). On the other hand, a study in China concluded that retirement may be beneficial for health risk factors such as blood pressure or central obesity (ID18), and Sato *et al.* (2023) in Japan concluded that retirement was associated with a 2.2 percentage-point decrease in the risk of heart disease among retirees, compared with workers (ID13).

### *Indirect effects*

Authors also reported some intervenient variables in the health–retirement relationship. Thus, the effects of retirement on health varied according to specific conditions/variables such as sex (ID1), occupational class (ID7), working conditions (ID5, ID7, ID9), social health insurance (ID19), type of retirement (ID6) and group membership after retirement (ID15). In men, retirement was associated with a 25 per cent relative increase in mean physical dysfunction score ( $p < 0.001$ ) and in women the increase was 17 per cent ( $p < 0.001$ ) after adjusting for covariates (ID1). Lalluka *et al.* (2023) in Finland analysed physical functioning according to occupational class and found that, by retirement, physical functioning declined with a deeper amount among the higher class compared to lower-class retirees (e.g., manual workers). The predicted scores were 86.1 (95% CI: 85.2–86.9) for higher class and 82.2 (95% CI: 81.5–83.0) for lower-class old-age retirees (ID7). The study of Mänty *et al.* (2018) reached similar results (ID8).

Effects of retirement were also analysed according to the physical working conditions before retirement, such as physical workload and occupational environmental hazards, concluding that, during the retirement transition, physical health functioning in the higher adverse exposure groups improved significantly compared to the lower exposure groups (ID:9). Accordingly, Kalousova and Leon (2014) stated that participants in average or high-rewards work did not benefit from retirement by follow-up, and participants in low-reward jobs had the most detrimental consequences for health when they did not retire (ID5). Similarly, van den Bogaard and Henkens (2018) in 20 European countries and Israel concluded that retirement from jobs with high physical demands was related to a relative improvement in overall self-rated health compared to those who remain at work (ID16). Social health insurance was another factor influencing physical functioning post-retirement. Authors conclude that delaying retirement can alleviate the physical functioning limitation of older adults; however, different



types of social health insurance buffered late retirement's beneficial impact on older adults' physical health, showing that the main effect was weakened (ID19).

The last relevant intervenient variable in the retirement–health relationship was group memberships. More group membership after retirement consistently predicted subjective and objective indicators of higher physical health via higher physical activity. That is, post-retirement group memberships predicted higher subsequent physical activity ( $b = 0.20$ ,  $p = 0.009$ ), and physical activity predicted a decreased frequency of the onset of chronic health conditions four years later ( $b = 0.15$ ,  $p = 0.011$ ) (ID15).

## Discussion

This systematic review addressed the causal effect of retirement on health, from the analysis of 19 longitudinal studies or similar, published from 2013 to 2023.

When the outcome is physical functioning, findings from this review indicate a negative association with retirement. However, these effects are moderated when comparing groups according to job types, social insurance system and type of retirement. The decline after retirement is more significant for higher-class workers with better working conditions, low physical demands and involuntary retirement.

The studies reviewed found more chronic diseases in retired than non-retired workers in terms of the number of diseases and the years before the onset of chronic conditions. Previous reviews that focused on CVD informed that retirement increased CVD events among European retirees, with no significant effect found in the United States (Xue et al. 2020). Westerlund et al. (2010) in France found that retirement did not change the risk for major chronic diseases. Our results also suggest some indirect effects of retirement on chronic conditions through changes in lifestyle behaviour and group membership.

Regarding mortality, the three studies analysed reported adverse effects of retirement on mortality. Another recent review concluded no association between early retirement and mortality compared with working until retirement. On-time retirement was associated with a higher risk of mortality compared with working beyond retirement; however, when adjusting for prior health, on-time retirement was not associated with mortality (Sewdas et al. 2020).

As seen previously, there is a lack of consistency in the results regarding the health–retirement relationship even when addressing the same variables and measures. Among the reasons for these conflicting results may be methodological aspects such as the study samples (e.g., age range), the measures of health outcomes and the statistical analysis. Also, difficulties in the comparability of the results come from the intervenient variables included and from the indirect effects of retirement on health based on particular conditions. A proposal of these effects is explained below.

### *Underlying mechanism in the retirement–health relationship*

#### *The occupational class and working conditions effect*

From this review, the effects of retirement on health differ according to job type. Studies stated that the health risks of retirement are higher for people in good-quality jobs, from higher occupational classes and with less-physically-demanding

jobs. Previous research pointed out that low work quality shows a strong relationship with the desire to retire early (Böckerman and Ilmakunnas 2020; Dal Bianco *et al.* 2015; Sundstrup *et al.* 2021); this suggests that voluntary exit from a negative situation and the relief from work-related stress and strain it brings have positive effects on health.

Another research pointed out that bad working conditions before retirement have a detrimental effect on the health of retirees, regardless of retirement timing. Thus, improving the work environment rather than modifying the retirement age should be prioritised to promote health and reduce mortality (Hoertel *et al.* 2022).

### *Changes in lifestyle behaviour after retirement*

Another explanation of the retirement effect on health derived from changes in lifestyle after retirement. Although the evidence is not conclusive, authors suggest that the transition to retirement leads to lifestyle changes that can increase the risk of adverse health outcomes. Changes in physical activity play a key role (Eibich 2015; Vigezzi *et al.* 2021). A recent review concluded that retirees were mostly engaged in passive leisure activities such as reading or watching TV, and less engaged in physical activities (Sharifi *et al.* 2023). However, the analysis of the effects of retirement on physical activity emphasises the interactions with past occupational activity and pre-retirement physical activity. The evidence consistently suggests that physical activity decreases with retirement from physically demanding jobs but increases with retirement from sedentary jobs (Glasson *et al.* 2023; Pasanen *et al.* 2023; Zantinge *et al.* 2014). Notwithstanding this, the prevalence of physical activity in older adults is low, and sedentary time is high. Moreover, studies show that retirement increases weight and body mass index (BMI) (Feng *et al.* 2020), particularly in women (Godard 2016) and in workers who retired from physically demanding jobs. The decrease in physical activity and the increase in adiposity are risk factors for CVD that seem to be key mechanisms through which retirement affects health (Xue *et al.* 2020).

On the other hand, people who retired involuntarily tended to increase their alcohol consumption (Zantinge *et al.*, 2014); this together with disturbed sleep were the lifestyle behaviours most associated with poor self-rated health at retirement (Storeng *et al.* 2020).

Although, with additional leisure time, retirees can practice healthier habits and for some there is an improvement in their lifestyle habits after retirement (e.g., drinking, walking, frequency of heavy exercise and sleep time) (Motegi *et al.* 2016), there is evidence that changes in lifestyle behaviour after retirement may affect health (Insler 2014; Zhu 2016).

### *Financial security and social security effect*

The articles included in this review were run in occidental countries, meaning that results are influenced by each mandatory retirement age and particular social security system that influences post-retirement economic conditions. Income tends to decrease after retirement, and together with the weaknesses of security systems and the increase in health costs might derive from financial insecurity. Research stated that finances are a primary concern at retirement (Gettings and Anderson 2021) and subjective financial security predicts retiree health (Cruwys *et al.* 2019) and mortality (Chetty *et al.* 2016).

This could be particularly stressful when retirement is not a voluntary experience (Rhee et al. 2016).

### *Voluntary or involuntary retirement*

Retirement is experienced differently when it is voluntary or involuntary, so it is expected to influence health in a different manner. Involuntary and forced retirement has negative effects on self-rated health (Rhee et al. 2016), mental health (Mosca and Barrett 2014) and life satisfaction (Dingemans and Henkens 2014). Moreover, results show that voluntary retirees have a higher level of subjective well-being than involuntary retirees not only in the short but also in the long term (Radó and Boissonneault 2020). The negative effect of forced retirement on health has been explained due to financial insecurity (Atalay and Barrett 2022), lack of financial control (Rhee et al. 2016) as well as a loss of social interaction (Cruwys et al. 2019). Each of these factors might have indirect negative effects on health since subjective financial security and social connectedness have been found to predict mental health and physical health (Cruwys et al. 2019).

### *Socio-cultural effects and meanings of work*

Retirement involves essential psychological and social aspects that extend the satisfaction of basic needs. It is a landmark in the life course in which the meanings attached influence how this transition is experienced. It involves changes in daily routines and social relationships that might prompt identity changes. At retirement, the meaning of work is renegotiated and retirees experience some losses such as status, meaningful social role and social connections (Gettings and Anderson 2021). This effect can be more detrimental for men than women. Traditionally, men have closer ties with work than women, and work centrality may affect retirement adjustment (Barnes and Parry 2004; Post et al. 2013).

Moreover, there is extensive evidence that beliefs and stereotypes associated with age can result in discriminatory behaviours, a less valued perception and social exclusion (Ng and Feldman 2012; Zaniboni 2015). Studies pointed out that positive self-perceptions of ageing are related to preventive health behaviours after controlling for age, education, functional health, gender, self-rated health and race (Levy and Myers 2004). An Australian longitudinal study with people older than 65 stated that poor self-perception of age increased mortality risk after adjusting for other factors including demographics, physical health, cognitive functioning and well-being (Sargent-Cox et al. 2014).

### *Social participation effect*

Findings demonstrate that one's social support network is important in promoting healthy ageing (Wu and Sheng 2019). As one reviewed study suggested, group membership has been related to health status (Stevens et al. 2021). From the social cure approach (Haslam et al. 2018), groups provide social and psychological resources that help to adjust to transitions such as retirement (Haslam et al. 2019). The social identity model of identity change (SIMIC) (Haslam et al. 2008), proposes that well-being in the context of life transitions, such as retirement, is favoured when people can maintain pre-existing social group memberships or acquire new ones. Retirement changes

daily routines and social interaction, and people can lose social connectedness and experience isolation or exclusion that exerts negative effects on health (Crowe *et al.* 2021; Stevens *et al.* 2021).

## Conclusion

From the 19 articles included in this review, 12 conclude that retirement has some negative implications for health, particularly in physical functioning, morbidity and mortality. However, the effects of retirement depend on the type of job, occupational group, security system, post-retirement group membership and type of retirement (voluntary versus involuntary).

These results are not conclusive due to the variety of samples, health measures, statistical analysis and confounding variables, which makes comparison among studies difficult. Moreover, the studies come from high-income countries so are focused on particular socio-economic and cultural contexts, which might not be representative of the challenges and opportunities that workers worldwide face during retirement transition. Pre- and post-retirement conditions, such as mandatory retirement, legal age and social security system, influence the experience of retirement. Cultural values and attitudes towards ageing, such as prejudice and discrimination of older workers, influence retirement decisions and adjustment, which in turn influence health.

Nevertheless, studies with a common health outcome using the same instrument reach similar conclusions. Equal results were found for those that assessed mortality, that is, retirement decreases physical functioning and increases the risk of mortality.

Among the main limitations of studying the relationship between health and retirement is the complex interplay between both. Some of the studies reviewed stated that the 'health selection effect' may operate, that is, the health status of those retired can be lower than that of those not retired before retirement started (ID1, ID2). To minimise the influence of reverse causation and to reduce all potential bias, studies run different analytical strategies; however, we cannot conclude a causal effect of retirement on health.

Studies included relied mainly on self-reported medical diagnoses and questionnaires and less on medical records, biomarkers, visits to health centres or health expenditures. As with any self-report measure, they are subject to recall biases.

Health after retirement has implications for the current debate of extending working life and the social security system for older people. According to the evidence, health consequences of retirement are likely to vary by pre-retirement factors (Mein *et al.* 2003).

Retirement shows benefits for more vulnerable working groups such as workers in low-quality jobs or bad working conditions. The opposite is true for workers in higher occupational classes. These suggest that there is no right time to retire that benefits the complete labour force and this could be considered when analysing public policy. Changes in the state pension age require employment policies to promote measures supporting quality jobs and occupational health, particularly in lower occupational classes. On the other hand, organisations should provide older workers with suitable working conditions and work adjustments, as well as equal access to learning experiences and opportunities, allowing older people to have a fulfilling work life.

The relationship between health and retirement is complex, and it is influenced by work-related factors (e.g., job demands) as well as individual factors (e.g., pre-retirement health). Future research should further investigate these multivariate relationships, clarifying the actual health effects of retirement.

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