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Review

The contribution of occupational factors on frailty

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ABSTRACT

Introduction: Frailty is a clinical condition characterized by enhanced vulnerability to stressors and increased risk of developing dependency and/or mortality. It has been described as the multidimensional and dynamic condition that cannot be easily disentangled from psychosocial determinants. To date, the possible role of occupational factors on frailty development and its progression at advanced age are not yet fully understood. The aim of this work is to provide a comprehensive overview of existing evidence exploring the relationship between multiple occupational issues (e.g., employment history, workplace risk factors, organizational job characteristics) and frailty.

Methods: A systematic search and revision of available literature addressing the contribution of occupational factors on the quantitative and qualitative aspects of frailty in the elderly was performed in the Pubmed, Scopus, and ISI Web of Science databases.

Results: The major weaknesses of existing literature reside in the heterogeneous operationalization of frailty and the limited description of the workplace factors. Nevertheless, an association between life-course occupational conditions and frailty was documented. In particular, intrinsically harder, manual, or blue-collar occupations emerged as possible determinants of the frailty manifestation and severity at older age.

Conclusions: Our preliminary results do not allow extrapolating definite conclusions. Further studies are needed. However, it seems that a significant relationship exists between the life-course occupation and frailty at advanced age. From a public health and social geriatric perspective, this work may provide the basis to define future innovations for preventing frailty at elderly adopting a life-course approach.

1. Introduction

Frailty is defined as a "medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death" (Fried et al., 2001; Morley et al., 2013; Vermeiren et al., 2016). Frailty indeed captures the biological decline of ageing individuals and represents an extremely interesting condition for public health (Cesari, Pérez-Zepeda, & Marzetti, 2017; Cesari et al., 2016). In fact, frailty may replace the obsolete concept of "chronological age" shifting the traditional paradigms towards the more accurate and clinically relevant "biological age" (Cesari et al., 2016).

Interestingly, the conceptual framework of frailty moves away from an organ- and disease-based approach, privileging a more comprehensive and functional-focused model (Bergman et al., 2007). In fact, although no operational definition or model of frailty is currently unanimously accepted, there is a consistent and growing body of evidence suggesting that frailty is multidimensional and determined by the failure of multiple biological functions (Azzopardi et al., 2016; Cesari, Gambassi, van Kan, & Vellas, 2014; Hoogendijk, van Kan, Guyonnet, Vellas & Cesari, 2015). The comprehensive approach to frailty is particularly necessary when it is conceived under a public health viewpoint, as the condition around which healthcare systems and social organizations for the health care might be adapted for better addressing the clinical and social needs of the ageing population. It is thus not surprising that the frailty concept has been perceived by several authors under a broader perspective in order to include social determinants (e.g., socio-economic position, social participation) because these factors can play an important role in the risk profiling of the individual (Gobbens, Luijkx, Wijnen-Sponselee, & Schols, 2010).

Unfortunately, to date, epidemiological evidence looking at how occupational factors (e.g., employment history, type of work organization, job tasks, workplace exposures, occupational risk factors) affect the development and trajectories of frailty at older age is still lacking. Given the global ageing phenomenon, the topic is of crucial importance.

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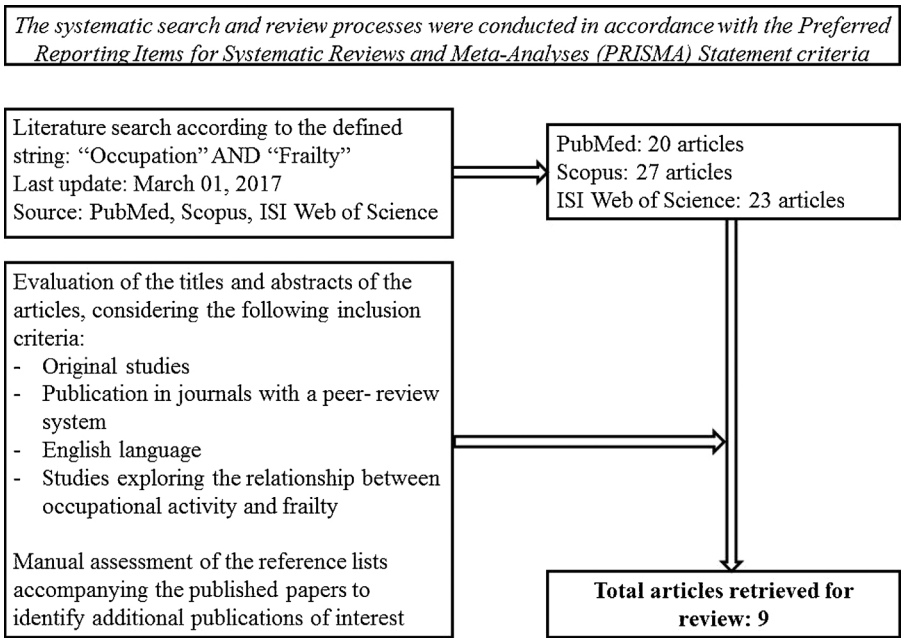

Fig. 1. Flow diagram of literature search.

On one hand, policy changes are introduced to extend working lives in order to preserve the sustainability of public welfare systems. On the other hand, the extension of working life may entail to extended occupational risks, such as prolonged exposure to hazardous workplaces and/or performance of hard or excessively demanding jobs. It is important to investigate whether and through which mechanisms lifetime occupational activities may impact on the future health status of the individuals. The understanding how health and safety risk factors in workplaces modify the health trajectories is of special interest for promoting "healthy ageing" in the population (Michel, & Sadana, 2017; World Health Organization, 2015).

The aim of the present article is to provide a comprehensive and critical overview of the existing evidence exploring the relationship between occupational factors and frailty status at older age. This work may provide the basis for improving our knowledge on the possible long-term consequences of occupational risk factors and support the identification of preventive measures to protect the health of workers following a life-course approach.

2. Methods

2.1. Search strategy

A systematic search and review were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement criteria (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2010). The review process was conducted on the PubMed, Scopus, and ISI Web of Science databases in order to identify the epidemiological studies specifically exploring the contribution of life-long occupational factors on the quantitative and qualitative aspects of frailty in older persons. The initial search took place in October 2016. The last consultation of the aforementioned databases was carried out in 1st March 2017.

2.2. Data collection

Titles, abstracts and full texts of identified studies were examined applying the following predefined eligibility criteria:

- Human studies published in peer-reviewed scientific journals;
- Published in English;
- Exploring the relationship between occupational activities and frailty outcomes.

All studies not resembling such selection criteria were excluded from the analysis. Considering the lack of a unique operational definition of frailty, studies assessing frailty outcomes in relation to occupational factors were all included irrespective of the adopted assessment tool. In the current formative phase of knowledge, this may provide a broader set of data useful for an initial, comprehensive approach to the topic. The reference lists accompanying the selected papers were also explored to identify additional articles of potential interest for our work (Fig. 1). The methodological quality of the retrieved evidence was assessed by two independent authors to identify any potential source of bias. This is summarized in Table 1 and thoroughly discussed in the upcoming sections. Additionally, considering that the retrieved studies resulted heterogeneous in terms of settings, methodological designs and outcome measures, a narrative synthesis of extrapolated data was proposed.

3. Results

The association between occupational factors and frailty has been investigated in the studies summarized in Table 2.

In 2005, Woo et al. (2005) conducted a cross-sectional study analyzing the social determinants of frailty in a Chinese population of subjects aged 70 years and older. The authors differentiated job activities as white-collar occupations versus others. Interestingly, they reported that frailty (measured according to a 62-item index covering physical health, cognitive, and psycho-social domains) was significantly lower in men who had engaged in white-collar jobs compared to others.

In a subsequent cross-national survey (Alvarado, Zunzunegui, Béland, & Bamvita, 2008) carried out in Latin-American subjects aged 60 years and older, low-skilled, blue-collar occupations were significantly associated with greater age-adjusted risk of frailty compared to higher level, white-collar activities. Unfortunately, missing data concerning specific occupational risks experienced by these job categories do not allow to fully understand the contribution that the "quality" of jobs may have on the frailty outcome. Similarly, Herr et al. (2015) conducted cross-sectional analyses in a French cohort of ≥70 year old persons for assessing the impact of different life-long carriers of socioeconomic inequalities on frailty at advanced age. They