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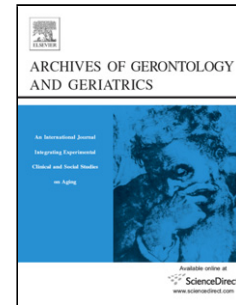
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Assessing the social dimension of frailty in old age: a systematic review

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Highlights

- There are several frailty assessment tools with different social components
- The social dimension has the less weight in the detection of frailty
- Social support and social activities are the most frequently social components
- There are ambiguous and subjective questions distributed by frailty assessment tools

Abstract

Introduction: Different concepts of frailty have resulted in different assessment tools covering distinct dimensions. Despite the growing recognition that there is an association between frailty and social factors, there's a lack of clarity on what is being assessed in terms of "social aspects" of frailty.

Objective: This paper provides a review of frailty assessment instruments (screening tools and severity measures) with a special focus on their social components.

Methods: Systematic review of studies published in English between 2001 and march 2018 in the PubMed database using a combination of MeSH Terms and logical operators through inclusion and exclusion criteria.

Results: A total of 27 assessment tools including at least one social question were identified. Three instruments focuses exclusively on social frailty, whereas the weight of social dimensions in the other instruments ranges between 5% and 43%. Social activities, social support, social network, loneliness and living alone were the social concepts most represented by the social components of the various frailty instruments.

Conclusion: Social components of frailty vary from instrument to instrument and cover the concepts of social isolation, loneliness, social network, social support and social participation.

Keywords: frailty; social networks; loneliness; isolation; social support, social activities.

1. Introduction

Resulting from an increasingly aging world population, frailty has become an emerging public health priority (Cesari et al., 2016). It is presented as a state of increased vulnerability that describes elderly people with a high risk of adverse health outcomes such as falls, hospitalizations, disability, permanent institutionalization, and death (Rodríguez-Mañás et al., 2013; Yeolekar & Sukumaran, 2014; Zaslavsky et al., 2012).

Although the theoretical foundations of frailty are well established in the literature, the concept has developed over time, leading to a variety of one- and multidimensional models (Buckinx et al., 2015; Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013; Gobbens, Luijckx, Wijnen-Sponselee, & Schols, 2010a; Hogan, MacKnight, Bergman, & Steering Committee, 2003; Markle-Reid & Browne, 2003; Mohandas, Reifsnnyder, Jacobs, & Fox, 2011; Zaslavsky et al., 2012). Among the most well-known models of frailty (Clegg et al., 2013), the biological one emerges as a one-dimensional conceptualization based on physical functioning that is based on five components – weight loss, exhaustion, low energy expenditure, slowness, and weakness (Fried et al., 2001); the deficit accumulation model assumes a combination of symptoms, diseases, conditions, and disability that is expressed in a Frailty Index (Cesari, Gambassi, Van Kan, & Vellas, 2014; Mitnitski, Mogilner, & Rockwood, 2001; Rockwood & Mitnitski, 2007) that allows a multidimensional understanding of the concept (Searle, Mitnitski, Gahbauer, Gill, & Rockwood, 2008; Walston & Bandeen-Roche, 2015).

Whereas the biomedical perspective is predominant in the literature (Clegg et al., 2013), contemporary definitions of frailty postulate the presence of a complex interaction between physical, psychological, social and environmental factors (Buckinx et al., 2015; Hogan et al., 2003; Markle-Reid & Browne, 2003; Mohandas et al., 2011; Zaslavsky et al., 2012). Different models of frailty were thus translated into different operational definitions of the concept, and to different screening tools and severity measures (Buta et al., 2016; de Vries et al., 2011; Dent, Kowal, & Hoogendijk, 2016). According to Sternberg, Schwartz, Karunanathan, Bergman, and Clarfield's (2011) systematic literature review on the identification of frailty, the most commonly used components are physical function, gait speed, and cognition; death, disability and institutionalization are the most common outcomes. Although these authors highlight the need for further clarification of the role of cognitive and mood elements in the frailty construct, no specific mention was made on its social dimension.

Regardless of the growing recognition that there is a clear association between social factors (e.g., socioeconomic and social support) and frailty, the social components of frailty

have only been recently explored within frailty assessment tools (Coelho, 2015; de Vries et al., 2011; Sutton et al., 2016; Theou, Brothers, Mitnitski, & Rockwood, 2013). Bunt, Steverink, Olthof, Schans and Hobbelen (2017) in a recent scope review of “social frailty” in older adults concluded that it can be understood as a multidimensional concept with a diversity of general and/or social resources, social behaviours and activities, and self-management abilities which all have a function in adding or affecting social needs fulfilment. By these means, social frailty can be defined as a continuum of being at risk of losing, or having lost, resources that are important for fulfilling one or more basic social needs during the life span. The authors also argue that there may be relevant factors to the concept of social frailty which differ in their importance and which can be underestimated and neglected, suggesting the need for a specification of these factors. In this sense, this paper provides a review of frailty assessment instruments with social components. It is intended to understand how social components have been operationalized and the extent of importance they are given in such screening tools and severity measures.

2. Methodology

A review of articles published and available in the PubMed electronic database was carried out within a time horizon from January 2001 to March 2018. The following Medical Subject Headings (MeSH) and logical operators were used as strategy: "frail or frailty" AND "aged or elderly or older" AND "social or social isolation or loneliness or social support or social network or social marginalization or socioeconomic factors".

The articles were selected using the following inclusion criteria: a) reference to frailty as the main term; b) a sample consisting of persons aged 60 years or over; c) studies published in English; d) studies that describe and test the operationalization of multidimensional assessment tool specifically developed for the assessment and identification of frailty; e) studies including the assessment of frailty by at least one social variable/question. As exclusion criteria: a) review articles; b) studies with modified versions of the original frailty assessment tool, with the exception of the Frailty Index; c) studies with subsequent use of the frailty assessment tools.

After analysing the abstracts obtained in the initial research, authors proceeded to the full reading of the articles whenever the methodological part of the study was less enlightening. References were also analysed to include and identify studies that presented other tools, as well as systematic reviews of frailty instruments. No checklist was applied to assess the methodological quality of the studies. A grid was built based on the study

objectives, assessment methodology and operationalization of frailty, in order to analyse the articles.

3. Results

The review procedure is described in Fig.1. Of the 2257 potentially eligible articles, 22 articles attending all inclusion and exclusion criteria were selected, corresponding to 22 assessment tools. After consulting frailty literature, 5 frailty assessment tools were added, making a total of 27 instruments. No other studies were identified after a bibliographic analysis of the selected articles. Table 1 presents each of the frailty instrument and its social components.

INSERT FIGURE 1

INSERT TABLE 1

The self-reported Barber Questionnaire (Postal Screening Questionnaire- PSQ) (Barber, Wallis, & McKeating, 1980) is a 9 item multidimensional screening tool which identifies individuals who may be at risk of dependency. This questionnaire assesses functional status, psychosocial functioning, neurosensory deficits, self-reported health, social support and previous year hospital admissions. It's easy to understand, self-administer and positive answers to any item are considered an indicator of being in "at risk" state.

The Frailty Staging System (FSS) (Cacciatore et al., 2005; Lachs et al., 1990) is a functional impairment index divided into seven domains: disability, mobility, cognitive function, visual function, auditory function, urinary continence and social support, distributed by 11 items that are scored whenever there is a loss of function. The social dimension is operationalized with a question that indicates the presence or absence of social support and allows the identification of the social network.

The Sherbrooke Postal Questionnaire (SPQ) (Hebert, Bravo, Korner-Bitensky, & Voyer, 1996) is a tool for the screening of community-dwelling elderly at risk for functional decline. It comprises six items about living alone, medication, walking, eyesight, hearing and memory. The individual is considered to be in functional risk if one or more physical factors are present or if he does not return the questionnaire. In this tool, living alone is not considered a risk factor.

The Frailty Index (FI) results from an accumulation of deficits. It can be easily constructed from any database containing binary deficits, counting the number of deficits present and dividing by the number of total deficits considered (Mitnitski et al., 2001; Searle et

al., 2008). In the present review, eight studies using the FI were found: FI(1)(Myers, Drory, Goldbourt, & Gerber, 2014); FI(2)(McKenzie, Ouellette-Kuntz, & Martin, 2015); FI(3)(Ma et al., 2016); FI(4) (Young, Glaser, Spector, & Steves, 2016); FI(5) (Bäckman et al., 2017); FI(6) (Dent, Dal Grande, Price, & Taylor, 2017); and (FI-J) (Yamanashi et al., 2015) and Evaluative Frailty Index for Physical Activity (EFIPA) (de Vries, Staal, Olde Rikkert, & Nijhuis-van der Sanden, 2013). Each of them presents different items of social domain related to work, social isolation, loneliness, social activities, social network, social support, housing problems, lifestyle and socio-demographics characteristics.

The Groningen Frailty Indicator (GFI) (Schuermans, Steverink, Lindenberg, Frieswijk, & Slaets, 2004; Steverink, Slaets, Schuurmans, & van Lis, 2001) is a screening tool for determining the level of frailty in institutionalized or community-dwelling individuals. The GFI consists of 15 items that focus on the loss of functions and resources in four domains of functioning: physical (mobility, physical fitness, vision, hearing, nutrition and morbidity), psychological (mood and anxiety), cognitive (memory) and social (emotional isolation).

The Vulnerable Elders Survey-13 (VES-13) (Saliba et al., 2001) was developed to identify vulnerable community-dwelling older people, defined as persons aged 65 and older at risk of death or functional decline. The final score is given by 13 questions, taking into consideration age, self-rated health status, and functional disabilities. The age score is given according to the age range, with 0 points for people between 65-74 years old, 1 point for ages between 75-84 and 3 points for age equal to or greater than 85 years.

The Frailty Index Comprehensive Geriatric Assessment (FI-CGA) is a tool intended to simplify the clinical assessment of frailty (Jones, Song, Mitnitski, & Rockwood, 2005). It is a FI built on the basis of a Comprehensive Geriatric Assessment (CGA) standard. Specifically, the FI-CGA is constituted by an Impairment Index, and by a Comorbidity Index, being its final score obtained by the sum of both indexes divided by 14. While the Comorbidity Index aims to assess the burden of disease, the Impairment Index is a multidimensional tool composed by ten domains: cognition, emotion, communication, mobility, balance, urinary and faecal continence, nutrition, activities of daily living and social domain. Here the FI-CGA scores on the existence of formal home support and if the person lives alone.

The Edmonton Frail Scale (EFS) (Rolfson, Majumdar, Tsuyuki, Tahir, & Rockwood, 2006) assesses frailty in nine domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, continence and functional performance. It is composed of 11 questions. Social support is assessed by the existence of someone who can meet one's needs. The maximum score is 17, representing the highest level of frailty possible.

It is presented as a scale of easy handling and application, allowing the evaluation of frailty in different degrees.

The Prisma-7 (Raïche, Hébert, & Dubois, 2008) developed from the Program on Research for Integrating Services for the Maintenance of Autonomy (PRISMA Project)(Hébert, Durand, Dubuc, & Tourigny, 2003), is a community-dwelling self-administered screening questionnaire. It consists of seven questions (yes/no) that explore socio-demographic variables, autonomy and support; three or more positive answers identify elderly individuals at risk of disability. Prisma-7 is the only assessment tool found that includes gender as a frailty component.

Resulting from the Integral Conceptual Model of Frailty (ICMF), the Tilburg Frailty Indicator (TFI) (Gobbens, van Assen, Luijckx, Wijnen-Sponselee, & Schols, 2010b) is a self-report assessment tool composed by two parts: Part A includes questions on the determinants of frailty, divided by ten questions on sociodemographic data, lifestyle, morbidity, life events and environment. These variables are not scored, nor are they part of the final score in assessing frailty; Part B assesses frailty through 15 items divided physical, psychological and social dimensions. Also deriving from the ICMF, the Comprehensive Frailty Assessment Instrument (CFAI) (De Witte et al., 2013a) is a screening tool for assessing frailty in community-dwelling people that has no clinical judgments. It is a fast and easy self-administration tool, whose final score is given by the different quotation of 23 factors. CFAI assesses frailty in four dimensions: physical, psychological, social and environmental. The social dimension is constituted by two measures similar to those proposed by the ICMF, but operationalized in different ways: social loneliness and social support network (De Witte et al., 2013b).

The Social Frailty Phenotype (SFP) (Garre-Olmo, Calvó-Perxas, López-Pousa, De Gracia Blanco, & Vilalta-Franch, 2013) was operationally defined using a deficit accumulation model, with questions about living alone, social network, and social support. The authors in their study, adopting the hypothesis that the accumulation of deficits increases frailty, created operational definitions of three separate phenotypes of frailty (Physical Frailty Phenotype, Mental Frailty Phenotype, Social Frailty Phenotype) composed by different indicators that are rated as present / absent.

The Easycare Two-Step Older Persons Screening (Easycare-TOS) (Van Kempen et al., 2013; van Kempen, Schers, Philp, Olde Rikkert, & Melis, 2015) is presented as being the only instrument specifically designed to be used in primary care and is divided into two steps. The first one works as patient screening, assessing in 14 questions the functioning of somatic, psychological and social domains. The patient is then classified as frail, not frail or unclear; those considered frail or unclear go on to the second step in which a structured evaluation will

be performed by a clinical professional. The decision of whether there is frailty or not is based on a clinical reasoning rather than on a final score, and derives from implicit and explicit information on the factors that make the patient more or less frail. While the first step assesses the social domain through questions of loneliness and social network, the second step assesses the social context: safety, environment, social network, and social activities.

The G erontop ole Frailty Screening Tool (GFST) (Tavassoli et al., 2014) was developed to be administered to persons aged 65 years and over, without physical disability and acute clinical disease. It consists of an initial questionnaire about symptoms and/or signs divided into six components of frailty (living alone, weight loss, fatigue, mobility, memory and slowness), which aims to attract the attention of the general practitioner to the presence of a state of frailty. The social component is reflected in a single question related to the presence of social isolation. In the second part, the general practitioner expresses his/her own view about the frailty status of the individual, through a subjective evaluation.

The Comprehensive Model of Frailty (CMF) (De Witte et al., 2013a; Kwan, Lau, & Cheung, 2015), is an instrument composed by 44 items that are scored in the presence of a deficit. The CMF results from the addition of 12 items that assess the deficits in the psychological, social/family, environmental and economic domains to a FI with 32 items (FI-32) concerning to physical, functional and psychocognitive well-being. Regarding the social domain, the deficits were indicated by living alone and having social activities at a frequency less than weekly and having no spouse or children to confide with.

The Kihon Checklist (Arai & Satake, 2015; Satake et al., 2016) was developed by the Japanese Ministry of Health, Labor and Welfare to identify vulnerable older adults as those at a higher risk of becoming dependent. It is a self-reporting tool that consists of 25 (yes/no) questions divided into the following domains: instrumental, social, activities of daily living, physical functions, nutritional status, oral function, cognitive function and depressive mood. All the items are scored in the presence of a deficit, and the higher the score in each domain, the greater the risk of requiring support or care in that domain. In the social domain, the KCL presents 4 questions related to social network, social support and social participation.

The self-reported Questionnaire to define Social Frailty Status (QSFS) used in the study of Makizako et al. (2015) aims to evaluate the state of social frailty through simple questions in the following domains: daily social activity, social role and social relationships. It presents two questions taken from the Kihon-Checklist (Fukutomi et al., 2015) and one question from the Geriatric Depression Scale (Yesavage, 1988). Of the seven items initially proposed, only five were used to define social frailty status: living alone, going out less frequently than last year, not visiting friends at times, not feeling helpful to friends or family, and finally not talking with

someone every day. Participants who reported the presence of none of these social deficits were considered to be non-frail; those who reported 1 deficit were considered to be pre-frail; and who reported 2 or more deficits were considered to be frail.

The Frailty Groupe Iso-Ressource Evaluation (FRAGIRE) (Vernerey et al., 2016) is a frailty-screening instrument that can be administrated by a public health social worker without medical training. It presents 19 questions regarding physical, cognitive, functional, psychosocial/family, and environmental, cultural, sexual and nutritional status. We only consider the socio-cultural dimension indicated by the authors, however, the authors included questions about loneliness and financial situation as belonging to the environmental domain. It turns out that FRAGIRE is the only Frailty assessment tool that reports the use of the internet as a socio-cultural factor.

The interRAI Home Care Frailty Scale (Morris, Howard, & Steel, 2016) is derived from a subset of items of the interRAI Home Care assessment instrument. It provides a comprehensive view of the person's risk of decline and is composed by 29 items belonging to 6 categories: function, movement, cognition and communication, social life, nutrition and clinical symptoms. In the social domain, this assessment tool presents three questions related with the social engagement: decline, reduced and withdrawal from social activities.

The Social Frailty Index (SFI) (Teo, Gao, Nyunt, Wee, & Ng, 2017), is an index constructed on the basis of data collected from the Singapore Longitudinal Ageing Studies Wave 1 (SLAS-1) cohort (Niti, Yap, Kua, Tan, & Ng, 2008). Social Frailty was operationalized and assessed through socio-demographic variables and self-reported survey questionnaires in 7 questions about: living alone, no education, absence of a confident, infrequent contact, infrequent social activities, financial difficulty and socioeconomic deprivation.

In overall, results show that besides SFP, QSFS and SFI, which included items assessing social frailty status only, the assessment tools presenting greater proportion of social items are the PRISMA-7 (43%), PSQ (33%), FI-J (27%) and CFAI (26%). On the other hand, there is a small number of social issues in favour of physical and psychological issues in FI (2) (7%), FI (4) (5%) and FI (5) (5%) being these the instruments that present a smaller emphasis attributed to the social dimension.

Although there are questions with different formulations, it is possible to group the social items of each tool into different domains (see table 2). Social activities and social support were the domains more often represented, followed by social network, loneliness and living alone. Social activities include questions about frequency and participation, and social support includes questions related to emotional and instrumental support, emergency need and support in general. As for the social network, the questions allow identifying the existence,

composition, size and strength of the social network. The assessment tools directly question the experienced feeling of emotional loneliness or social loneliness. Socio-demographic, lifestyle, work, social context, cultural and social role are the less numerically expressive domains.

INSERT TABLE 2

4. Discussion

To date, and to the best of the authors' knowledge, this is a first review carried out on the diverse set of social components included in frailty assessment tools. Most relevant results show that (i) there's a great diversity of social components being assessed in the currently available screening tools and severity measures of frailty; (ii) when compared to the physical and psychological dimensions, the social dimension has the less weight in the detection of frailty within each instrument (with the exception of three instruments); (iii) most frequent social components include social activities, social support, social network, loneliness and living alone.

When considering the diversity and extent of social components found in this review, there are ambiguous and subjective questions distributed by the different frailty assessment tools. For example, the question "Does the patient ever miss the presence of other people around him?" of the GFI (Steverink et al., 2001) similar to the question "Do you sometimes miss having people around you?" of the TFI (Gobbens et al., 2010b) were considered in the present review as belonging to the loneliness domain. However, according to the TFI authors the question is related to social relations. Due to the subjective nature of this question, the pertinence arises from the fact that the same question can assess different factors of social frailty, reason why it is defended that the factors that constitute social frailty should be mirrored in clear and concrete questions concerning what is in fact intended to assess.

The existence of different evaluation instruments reflects the ambiguity present in the concept and in the operationalization of frailty over the past decade (Dent et al., 2016; Mohandas et al., 2011; van Kan et al., 2010), and may cause problems of evidence in comparing studies regarding the prevalence, risk factors and intervention outcomes (Aguayo et al., 2017; Bouillon et al., 2013; Collard, Boter, Schoevers, & Oude Voshaar, 2012; Karunanathan, Wolfson, Bergman, Béland, & Hogan, 2009; Roppolo, Mulasso, Gobbens, Mosso, & Rabaglietti, 2015). It is known that the most widely used multidimensional assessment tool in frailty assessment studies is TFI and there is still no standard gold frailty

measurement (Dent et al., 2016; Sutton et al., 2016); however because it is not a fixed index, the FI is the only tool capable and more likely to cover a greater diversity of social factors, giving a greater weight and percentage to this domain due to the freedom of choice of the items that each investigator can introduce (de Vries et al., 2011; Mitnitski et al., 2001).

The relationships between frailty and sociodemographic variables such as being female, advanced age, low educational level, low socioeconomic status and housing context are already explored in the literature (Alvarado, Zunzunegui, Beland, & Bamvita, 2008; Collard et al., 2012; De Labra et al., 2018; Etman, Burdorf, Van der Cammen, Mackenbach, & Van Lenthe, 2012; Guessous et al., 2014; Herr, Robine, Aegerter, Arvieu, & Ankri, 2015; St John, Montgomery, & Tyas, 2013; Woo, Zheng, Leung, & Chan, 2015), however, it is one of the least expressive domains. Depending on the model of frailty, these can be included as determinants or as components of frailty, giving as an example the residential environment that emerges as a determinant in ICMF and that in CFAI appears as a frailty component. The introduction of some of these variables as social components of frailty should be discussed in further studies.

Looking at the most frequent social components, social support is a complex term that may cover a diverse set of domains (Haber, Cohen, Lucas, & Baltes, 2007; Moser, Stuck, Silliman, Ganz, & Clough-Gorr, 2012; Sherbourne & Stewart, 1991). Mirroring its ambiguity, we have as example a study that considers social support as being part of the environmental domain (Chen, Chen, Lue, Tseng, & Wu, 2014). Being one of the most consensual factors of social frailty, the operationalization of this concept can bring benefits in the understanding and detection of frailty. Allied to this concept of social support we have social network. From the assessment tools found, the CFAI formulates a question that allows the measurement of the size of the family network by dividing the answer into three levels. However, no assessment tool formulates questions about the family arrangement nor does it distinguish the type of family support. Family-dependent older people with a restricted support network are more present among frail elder who have high levels of loneliness (Hoogendijk, Suanet, Dent, Deeg, & Aartsen, 2016; Op Het Veld et al., 2015). Moreover, multigenerational family arrangement can contribute to the increase of social support received and consequently to the reduction of frailty (Duarte, Fernandes, Rodrigues, & Nóbrega, 2013).

Loneliness, on the other hand, is neither a one-dimensional construct nor synonym of objective social isolation. People may be alone without feeling lonely and may feel lonely when they are with others. Hence, an alternative name for loneliness has been "perceived social isolation" (Hawkey, 2015). A recent study points to the existence of a relationship between frailty and psychosocial factors, and that depressive symptomatology, social isolation and feelings of loneliness are progressively higher when frailty increases among different groups:

robust, pre-frail and frail (Mulasso, Roppolo, Giannota, & Rabaglietti, 2016). Loneliness is associated with frailty (Gale, Westbury, & Cooper, 2017; Herrera-Badilla, Navarrete-Reyes, Amieva, & Avila-Funes, 2015) and poor social functioning (Hoogendijk et al., 2016). People living alone, including those who are frail, have a lower availability of personal care and greater social and financial vulnerability (Bilotta et al., 2010). Some tools use social isolation and others loneliness as social components. It is known that both concepts have a relationship with frailty, but new studies would be necessary to understand and to distinguish which one best evaluates frailty.

Regarding to social activities, such as gatherings, leisure activities and religious activities, visiting friends and family and talking with neighbours, these have shown to be associated with a lower probability of frailty (Chen et al., 2014); but none of the instruments included in this review specifies the type of social activities under assessment, reporting an overall set of behaviours. We point out that cultural factors and cross-cultural differences, such the religious activities, may also have an impact on the social dimensions of frailty, by building social networks (Lim & Putnam, 2010) and increasing social support (Roh et al., 2015). However more studies would be necessary to explore this relationship.

As a component of frailty, work has found to have little expressiveness in the instruments considered in this review. Future studies should explore relationship between work and frailty, being particularly relevant to distinguish different types of work that can be carried out by the older population. A recent study has shown that volunteering is associated with a lower cumulative probability of frailty, being a more significant predictor than paid work or taking care of children (Jung, Gruenewald, Seeman, & Sarkisian, 2010). Allied to work, the feeling of usefulness towards friends and family may refer to its social role, but it appears in a single instrument under review. It has been documented the existence of a relationship between social role and frailty (Makizako et al., 2015) and that it can influence the social network of contacts (Hlebec, Mrzel, & Kogovšek, 2009) as well as to predict significantly the future onset of disability in instrumental activities of daily living (Fujiwara et al., 2003). However, there is a shortage of studies sustaining this association.

Finally, it seems to be consensual in the literature the insertion of lifestyle items such as smoking, drinking and physical inactivity as belonging to the social domain and its relation with the increase of frailty (de Labra, Guimaraes-Pinheiro, Maseda, Lorenzo, & Millán-Calenti, 2015; Etman, Kamphuis, Van Der Cammen, Burdorf, & Van Lenthe, 2015; Kojima, Iliffe, & Walters, 2015; Ortolá et al., 2015; Peterson et al., 2009; Van Oostrom et al., 2017; Woo, Goggins, Sham, & Ho, 2005; Woo et al., 2015). A recent study indicates that a general self-report question about lifestyle (e.g., "Overall, how healthy would you say your lifestyle is?") is

preferable than enumerating a list of factors, being sufficient to predict frailty (Gobbens & van Assen, 2016). The lack of consensus on lifestyle items that may arise as determinants or as components of frailty suggests the need to rethink the relationship of lifestyle with frailty as well as its way of inquiry in future studies.

For the future, we advocate the creation of a definition and operationalization of social frailty internationally capable of being translated into a new tool in order to add predictive power to any assessment of frailty (Berrut et al., 2013; Buta et al., 2016; Dent et al., 2016). It is also suggested the longitudinal study of the social components listed in this review in the prediction of frailty and adverse outcomes. Previous longitudinal studies showed that social frailty predicted few adverse outcomes and that the physical dimension was the most important predictor (Coelho, Paúl, Gobbens, & Fernandes, 2015; Gobbens & van Assen, 2012; Gobbens, Van Assen, Luijkx, & Schols, 2012). However, the accumulation of social deficits was associated with significant increases in mortality risk (Armstrong et al., 2015), disability risk (Teo et al., 2017) and the social frailty phenotype was able to predict the risk of mortality almost as much as physical frailty in the study of Garre-Olmo, Calvó-Perxas, López-Pousa, De Gracia Blanco, & Vilalta-Franch (2013). Recently, the study of Makizako et al., (2018) reports that social frailty may precede and lead to the development of physical frailty.

As strengths of the present study, it is important to highlight the identification, organization and systematization of the different social components most frequently used by different frailty assessment tools. It is estimated that in collecting these components, this study contributes to the understanding and convergence of a definition of multidimensional frailty as a complex and dynamic system between social, biological and psychological factors. As limitations it can be indicated that this review has been restricted exclusively to a single database, to the English language and the exclusion of studies where frailty was not a main term, because there may be studies that relate social factors to synonyms of frailty. Thus, there may be different operationalisations of the concept in a population that has not been defined as frail. It should also be stressed that the inclusion of modified versions of the assessment tools could result in an increase of identified social factors.

In general, the number of multidimensional assessment tools found in this review study reflects the lack of consensus on the concept of frailty and its assessment in the last 17 years. Social components of frailty vary from instrument to instrument and cover the concepts of social isolation, loneliness, social network, social support and social participation. However, the factors that constitute social frailty should be mirrored in clear and concrete questions concerning what is in fact intended to assess. In this sense, it is important that future studies

identify which social components of frailty contribute the most to define a state of increased vulnerability and a greater risk of adverse outcomes.

Conflicts of interest

None.

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None.

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Figure 1: Flow diagram of Frailty Assessment Tools selection.

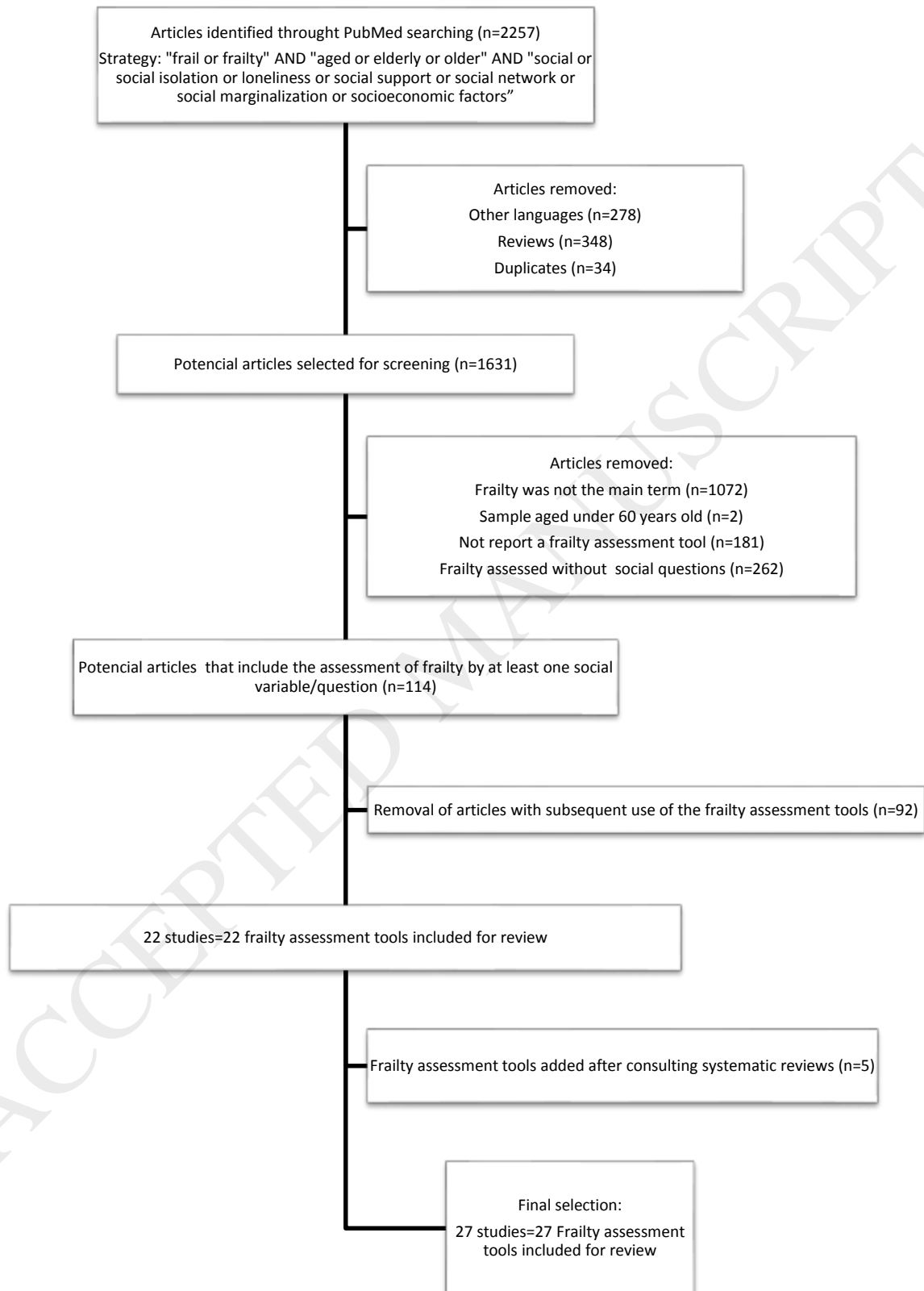


Table 1: Social components present in the frailty assessment tools.

Frailty assessment tool		Questions/Items referring to social components	
	N items (Total)		N(%)
Postal Screening Questionnaire (PSQ)	9	Do you live on your own? Are you without a relative you could call on for help? Are you confined to your home through ill health?	3(33)
Frailty Staging System (FSS)	11	Who will be able to help you in case of illness or emergency?	1(9)
Sherbrooke Postal Questionnaire (SPQ)	6	Do you live alone?	1(17)
Frailty Index (FI)	FI (1)	40 Work limitations; Social activities limitations; Loneliness.	3(8)
	FI (2)	42 Changes in social activities; Social isolation; Loneliness.	3(7)
	FI (3)	68 Smoking and drinking; Participation in social activities; Physical exercise; Work; Housework; Sleep quality.	6(9)
	FI (4)	39 Social network (During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?) Social activities (During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities - like visiting friends, relatives, etc.?)	2(5)
	FI (5)	38 Do you feel lonely? Daily contact with other people through meetings, phone, contacts, emails, etc.	2(5)
	FI (6)	35 Problems with transport when you want to go out; Marital status; Family's money situation; Current family structure (lives alone).	4(11)
	FI-J	15 Less outdoor activity; Fewer hobbies or interests; Less contact with neighbours; Less friendships other than neighbours.	4(27)
	EFIPA	50 Do you feel lonely? When you need help, are there people who are willing and able to help you? Are there activities that someone else has taken over for you recently? Are there enough organized activities for you nearby? Do you have problems getting out for organized activities (e.g., problems with transportation to get to them)? Do you have any housing problems? Do you have enough help from professionals?	7(14)
Groningen Frailty Indicator (GFI)	15	Do you sometimes experience emptiness around yourself? Do you sometimes miss people around yourself? Do you sometimes feel abandoned?	3(20)
Vulnerable Elders Survey-13 (VES-13)	13	Age	1(8)
Frailty Index – Comprehensive Geriatric Assessment (FI - CGA)	14	Social: Institutionalized; Uses formal home supports; Living alone (Deficit)	1(7)
Edmonton Frail Scale (EFS)	11	When you need help, can you count on someone who is willing and able to meet your needs?	1(9)

Prisma-7	7	Are you older than 85 years? Are you male? If you need help, can you count on someone close to you?	3(43)	
Tilburg Frailty Indicator (TFI)	15	Do you live alone? Do you sometimes miss having people around you? Do you receive enough support from other people?	3(20)	
Comprehensive Frailty Assessment Instrument (CFAI)	23	There are plenty of people I can lean on when I have problems; There are many people I can trust completely; There are enough people I feel close to; Social Network 1; Social Network 2; Social Network 3.	6(26)	
Social Frailty Phenotype (SFP)	6	Living alone; Absence of a person to help with ADL; Infrequent family contact; Infrequent friend/neighbour contact; Absence of a confidant; Lack of support for daily living.	6(100)	
Easycare Two-Step Older Persons Screening (Easycare-TOS)	First Step	14	Loneliness; Social network.	2(14)
	Second Step	8	Social context: safety, environment, social network, social activities.	1(13)
Gérontopôle Frailty Screening Tool (GFST)	6	Does your patient live alone?	1(17)	
Comprehensive Model of Frailty (CMF)	44	Living alone or with their family members; Frequency of attending social activities; Having a spouse or a child to confide with when they need emotional support.	3(7)	
Kihon Checklist (KCL)	25	Do you sometimes visit your friends? Do you turn to your family or friends for advice? Do you go out at least once a week? Do you go out less frequently compared to last year?	4(16)	
Questionnaire to define Social Frailty Status (QSFS)	5	Do you go out less frequently compared with last year? Do you sometimes visit your friends? Do you feel you are helpful to friends or family? Do you live alone? Do you talk with someone every day?	5(100)	
Frailty Groupe Iso-Ressource Evaluation FRAGIRE	19	Do you use Internet? Do you participate in sport activities (sport, art, etc.)?	2(11)	
interRAI Home Care Frailty Scale iRHCFS	29	Social engagement: decline, reduced or withdrawal from social activities.	3(10)	
Social Frailty Index (SFI)	7	Living alone; No education; Absence of a confidant; Infrequent contact (visits, calls or request for help); Infrequent social activities; Financial difficulty (To a great extent); Social economic deprivation (1-2 room flats & others).	7(100)	

Table 1: Division of different social items by domains.

Domains	Assessment Tool	Questions	Answers
Social support	PSQ	Are you without a relative you could call on for help?	Yes; No.
	FSS	Who will be able to help you in case of illness or emergency?	Actual and potential caregivers must be identified (names, addresses and phone numbers of persons who can help in case of illness or emergency).
	FI(6)	Problems with transport when you want to go out;	Yes; Sometimes; No.
	EFIPA	When you need help, are there people who are willing and able to help you?	Most of the time; Sometimes; Rarely.
	EFIPA	Do you have enough help from professionals?	Most of the time; Sometimes; Rarely.
	EFS	When you need help, can you count on someone who is willing and able to meet your needs?	Always ; Sometimes; Never.
	PRISMA-7	If you need help, can you count on someone close to you?	Yes; No.
	TFI	Do you receive enough support from other people?	Yes; No;
	CFAI	I know many people whom I can totally trust;	1- I completely disagree; 2- I disagree; 3- I neither agree/nor disagree; 4- I agree; 5- I completely agree.
	CFAI	There are enough people whom I feel a bond;	
	CFAI	There are plenty of people whom I can rely on when I am in trouble.	
	SFP	Do you have family and/or friends you could ask for help if you needed assistance?	Yes; No.
	SFP	Is there anyone special (a couple, friend, family member, and/or neighbour) that you can trust and talk to about personal matters and your feelings?	Yes; No.
	SFP	In the past 3 months, have you failed to receive help from others with shopping, food preparation, housecleaning, ironing or other personal activities even though you needed help?	Yes; No.
	CMF	Having a spouse or a child to confide with when they need emotional support;	Having no spouse or children to confide with.
	KCL	Do you turn to your family or friends for advice?	Yes; No.
	SFI	Do you have someone to confide in?	Yes; No.
Social Activities	FI(1)	Social activities limitations;	Major limitation; Minor limitation; No limitation.
	FI(2)	Changes in Social Activities;	No decline in participation in social activities (last 90 days); Decline in participation in social activities (last 90 days).
	FI(3)	Participation in social activities;	Yes; Occasionally; No.
	FI(4)	During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?	All of the time=1 Most of the time=2 Some of the time=3 A little of the time=4 None of the time=5
	FI-J	Less outdoor activity;	*
	FI-J	Fewer hobbies or interests;	*
	EFIPA	Are there activities that someone else has taken over for you recently?	Most of the time; Sometimes; Rarely.

	EFIPA	Are there enough organized activities for you nearby?	Most of the time; Sometimes; Rarely.
	EFIPA	Do you have problems getting out for organized activities (e.g., problems with transportation to get to them)?	Most of the time; Sometimes; Rarely.
	CMF	Frequency of attending social activities;	Frequency less than weekly.
	KCL	Do you go out at least once a week?	Yes; No.
	KCL	Do you go out less frequently compared to last year?	Yes; No.
	QSFS	Do you go out less frequently compared with last year?	Yes; No.
	iRHCFS	Decline in social activities;	Yes; No.
	iRHCFS	Reduced social activities;	Yes; No.
	iRHCFS	Withdrawal from activities of interest;	Yes; No.
	SFI	Infrequent social activities: assessed through a series of questions on the number and frequencies of usual participation on 6 categories of social activities using a 3-point Likert scale;	Participants that rarely or do not at all participate in all categories of social activities are considered to have this risk indicator.
Social network	FI(4)	During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?	Extremely=5 Quite a bit=4 Moderately=3 Slightly=2 Not at all=1
	FI (5)	Daily contact with other people through meetings, phone contacts, emails, etc.;	Presence; Absence.
	FI-J	Less contact with neighbours;	*
	FI-J	Less friendships other than neighbours;	*
	CFAI	Suppose you are unable to carry out the activities you usually do in the housekeeping for a certain while, whom would you be able to appeal to?	Social Network 1 (partner, son and daughter-in-law); Social Network 2 (daughter, son-in-law and grandchildren); Social Network 3 (brother or sister (-in-law), family, neighbours and friends).
	SFP	How often do you meet or talk to your closest relatives? (less than once a week)	Every day; Every 2 or 3 days; Weekly; Monthly; Once a year.
	SFP	How often do you meet or talk to your friends and/or neighbours? (less than once a week)	Every day; Every 2 or 3 days; Weekly; Monthly; Once a year.
	First Step Easycare-TOS	Social network;	Sufficient and strong social network ; Large but weak social network; Small but strong social network; Small and weak or no social network.
	KCL	Do you sometimes visit your friends?	Yes; No.
	QSFS	Do you sometimes visit your friends?	Yes; No.
	QSFS	Do you talk with someone every day?	Yes; No.
	SFI	Infrequent contact: 3 questions enquiring the frequency of visits or calls by the individual's family, friends, or loved ones, and perceived extent of help that can be obtained in their time of need	Presence of any one or more of none or no more than once a year visits from family, friends, or loved ones; None or no more than once a year calls from family, friends, or loved ones; None to a very little extent of help when they require it.
	Loneliness	PSQ	Are you confined to your home through ill health?
FI(1)		Loneliness all the time;	All the time;

			Sometimes; Never.
	FI(2)	Feels lonely;	Does not feel lonely; Feels lonely.
	FI(2)	Social Isolation;	Never or hardly ever alone, or for about one hour, during the day; Alone for long periods of time or all the time.
	FI(5)	Do you feel lonely?	Presence; Absence.
	EFIPA	Do you feel lonely?	Most of the time; Sometimes; Rarely.
	GFI	Do you sometimes feel abandoned?	Yes; No.
	GFI	Do you sometimes experience emptiness around yourself?	Yes; No.
	GFI	Do you sometimes miss people around yourself?	Yes; No.
	TFI	Do you sometimes miss having people around you?	Yes; No; Sometimes.
	First Step Easycare-TOS	Loneliness;	No loneliness; Had complaints of loneliness in the past 12 months; Unknown.
Living alone	PSQ	Do you live on your own?	Yes; No.
	SPQ	Do you live alone?	Yes; No.
	FI (6)	Lives alone;	Yes; No.
	FI-CGA	Living alone;	Institutionalized; Uses formal home supports; Living alone.
	TFI	Do you live alone?	Yes; No.
	SFP	Living alone;	Yes; No.
	GFST	Does your patient live alone?	Yes; No; Don't Know.
	CMF	Living alone;	Living alone; Living with family.
	QSFS	Do you live alone?	Yes; No.
	SFI	Who do you live with?	Alone; With others.
Socio- demographic	FI (6)	Marital status;	Yes=0; No=1.
	FI (6)	Family's money situation;	Bad; Good.
	VES-13	Age;	0-age 65-74; 1-age 75-84; 3age ≥ 85.
	Prisma-7	Are you older than 85 years?	Yes; No.
	Prisma-7	Are you male?	Yes; No.
	SFI	What is your education level?	Nil; Primary; Secondary or Institute of Technical Education; Pre-University or Polytechnic; University.
	SFI	Are you limited by your financial resources to pay for needed medical service?	Present for participants who indicate that they were limited "to a great extent".
SFI	Socioeconomic deprivation: assessed by proxy of the participant's housing type	Participants who lived in "1- to 2-room flats".	
Lifestyle	FI(3)	Smoking and drinking;	Yes; Occasionally; No.

	FI(3)	Physical exercise;	Yes; Occasionally; No.
	FI(3)	Sleep quality;	Poor quality; Good Quality.
	FRAGIRE	Do you participate in sport activities (sports, art, etc)?	Not at all; A little; Quite a bit; Very much.
Work	FI(1)	Work limitations;	Major limitation; Minor limitation; No limitation.
	FI(3)	Work performing;	Yes; Occasionally; No.
	FI(3)	Doing housework;	Yes; Occasionally; No.
Social context	EFIPA	Do you have any housing problems?	Most of the time; Sometimes; Rarely.
	Second Step Easycare-TOS	How do you evaluate the following domains in this patient? (Covers: safety, environment, social network/loneliness, social activities)	Good; Fair; Poor.
Cultural	FRAGIRE	Do you use internet?	Not at all; A little; Quite a bit; Very much.
Social role	QSFS	Do you feel you are helpful to friends or family?	Yes; No.

* English translation not available;