

REVIEW ARTICLE

Screening tools for frailty in primary health care: A systematic review

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Frailty is the loss of resources in several domains leading to the inability to respond to physical or psychological stress. The evaluation of frailty is generally carried out using the Comprehensive Geriatric Assessment. For this evolving and potentially reversible syndrome, screening and early intervention are a priority in primary health care, and general practitioners require a simple screening tool. The aim of the present work was to review the literature for validated screening instruments for frailty in primary health care setting. A search was carried out on PubMed and Cochrane Central in June 2011. A total of 10 instruments screening for frailty in primary health care were listed, analysed and compared. It is difficult to show which tool today is the best for screening for frailty in the elderly in primary care settings. Two instruments are potentially suitable – the Tilburg Frailty Indicator and the SHARE Frailty Index. In addition, these instruments require validation in larger studies in primary health care settings and with more quality criteria. **Geriatr Gerontol Int 2012; ●●: ●●–●●.**

Keywords: frail elderly, frailty, literature review, primary health care, screening.

Introduction

General practitioners (GPs) are increasingly confronted with frail elderly patients. The notion of frailty has gradually gained a hold in medical discourse through the identification of an elderly population at risk of death or of events affecting their autonomy. The word indicates a state of instability, with the risk of functional loss as a result of events that are sometimes quite minor.¹ Although there is a consensus on the subject of the existence of this “frailty syndrome,” there is no consensus on its definition. Authors regularly publish new definitions of frailty in an attempt to produce an accepted gold standard. For instance, Fried defines frailty as a clinical syndrome in which three or more of the following criteria are present: (i) unintentional weight loss; (ii) patient-reported feeling of exhaustion;

(iii) slow walk; (iv) muscular weakness and; (v) low level of physical activity.² Among these authors, frailty is seen as being potentially reversible. The frailty syndrome is reported to affect 7% of elderly patients aged over 65 years, and 25–40% of those aged 80 years or over,² but the absence of any consensus definition is a problem. For instance, van Iersel *et al.* reported that in a sample of 125 elderly people, the prevalence of frailty ranged from 33% to 88% according to the evaluation tool implemented.³

Assessment of frailty in elderly patients is at present carried out using the Comprehensive Geriatric Assessment (CGA).⁴ This is a multidimensional, interdisciplinary diagnostic procedure that aims to identify a whole set of medical, functional and psychological problems in elderly patients. The aim is to establish a care plan. The procedure enables the measurement and analysis of a complex situation (that of the frail elderly person) by converting qualitative elements into quantitative elements (scores). The usefulness of the CGA is well-established: when followed up by targeted action, it improves functional state⁵ and cognitive performances of the patients,^{5,6} it reduces medical costs,^{7,8} the use of hospital facilities and the number of placements in

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institution.⁶ However, the effects on mortality is the subject of controversy.⁶ Several studies have shown the positive effects of an evaluation of this type in primary care.^{9–11} The usefulness of the CGA appears well-established. The element that appears discriminant is the organization of health-care interventions around the elderly patient. At present, several modes of organization after screening and assessment of frail elderly patients are being tested. The early results are encouraging.^{12,13}

Frailty leads to recurrent hospitalization, institutionalization, acute events and also death. As this syndrome appears evolutive and potentially reversible, screening and early intervention should therefore be a priority in primary care networks.^{14,15}

This being so, what are the possible lines of action? Although the frailty of elderly patients is a direct concern for GPs, medical literature has given it little attention.¹⁶ It is difficult to integrate the CGA into the day-to-day practice of GPs on account of increasing administrative, financial and time constraints, or for lack of a technical platform for the administration of the various tests.¹⁷ GPs are not always well-informed on the general state of their elderly patients, or their loss of autonomy when this occurs.^{18,19} Although no study has compared the clinical judgement of GPs in their place of practice with CGA results for the screening for frailty, the study by Chodosh *et al.* does nevertheless show that the screening performances of GPs are enhanced when they have received training in geriatrics.²⁰

Several studies have proposed instruments to measure frailty. Some are complex, others simple. Abellan Van Kan *et al.* offer gait speed as a tool with the capacity to identify frail older adults.²¹ However, these instruments have been the subject of a recent review of the literature showing that their psychometric properties are poor, and few measures have been validated in a primary health-care setting.²² According to de Vries *et al.* the Frailty Index seems to be the most suitable instrument to measure frailty, but this tool is complex, the psychometric properties need to be explored far more extensively and it has not been validated in a primary health-care setting. It is therefore unlikely that it would be suitable for GPs.

GPs first need a simple screening instrument enabling detection of the frail elderly as reliably as possible; this would then enable them to submit the patient identified as frail to a more complete geriatric assessment, followed by targeted interventions.¹⁶ In 2008, the Canadian and American Geriatric Advisory Panel (GAP), through a complete review of the literature on frailty, sketched out the “ideal” screening tool for frailty.²³ According to their recommendations, it should include the five following components: (i) fatigue reported by the patient; (ii) physical perfor-

mance; (iii) walking; (iv) number of comorbidities; and (v) nutritional state. It can be noted that in practice, few GPs use validated instruments.¹⁷

The aim of the present work was to review the different tools screening for frailty in the elderly in primary health care available in the literature, to determine which is today the best instrument to assist GPs in this task, and to explore perspectives for the future.

Materials and methods

A systematic review of the literature was carried out using the PubMed and Cochrane Central databases. The search was carried out on articles published since the starting date of the databases up to 25 June 2011. The following keywords were used: “screening instrument”; “tool”; “instrument”; “mass screening”; “questionnaire”; and “primary health care”, combined with the keywords “frail elderly”. The potentially relevant articles were identified from perusal of the abstracts, or of the articles as a whole. Research has included articles in the only available systematic review on this subject by de Vries *et al.*²²

To select relevant studies, the following inclusion criteria were used:

- The main aim of the study was the development of a screening tool for frailty in the elderly and/or the psychometric evaluation of an instrument of this type (validity, reproducibility, reliability).
- The tool studied comprised several items relating to different aspects of frailty.
- The tool was compared to a more complete geriatric evaluation, or to a CGA measure.
- The tool was tested in a primary health care setting and/or in a non-hospitalized population.

The exclusion criteria were as follows:

- The study provided no figures concerning psychometric properties.
- The study included hospitalized patients.
- The study included only patients with a frailty characteristic already present (for instance only patients with a history of cancer).

The first and second authors of this paper (T Pialoux and J Goyard) independently selected the various possible tools. They then compared their selections with a third author (B Lesourd) and, after inclusion and exclusion criteria, agreed on a list of relevant and available tools (Fig. 1). The initial agreement was determined by means of an agreement score.

In a second step, the authors independently analyzed each study: sample description, exclusion criteria, administration mode, language, administration time and the geriatric measure used as a reference for concluding to frailty (Table 1).

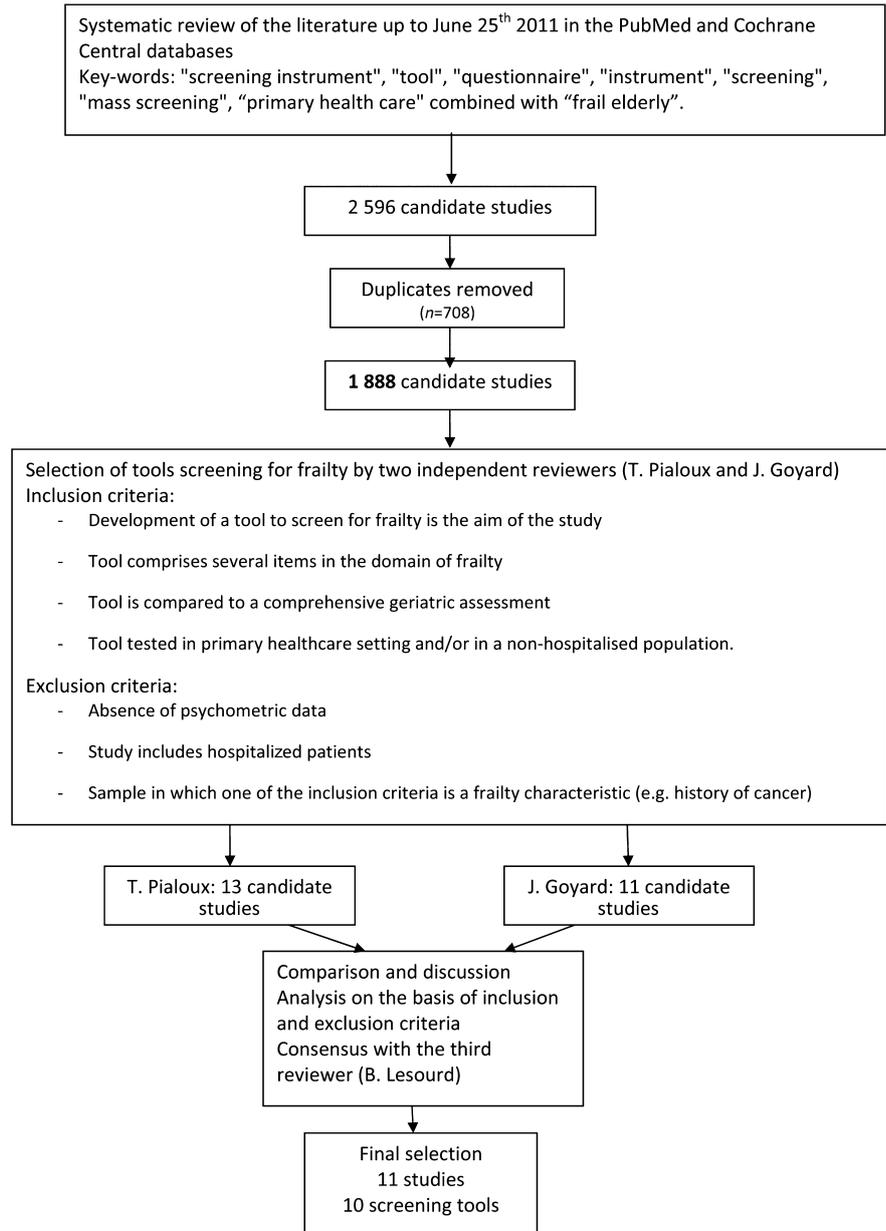


Figure 1 Method.

For each tool, the presence or absence of items recommended as essential by the GAP was also ascertained (fatigue reported by the patient, physical performance, walking, number of comorbidities and nutritional state), as were the results for the different psychometric properties (Table 2). The quality of the included article was assessed independently by the first and second authors (TP and JG) using an assessment scale for measurement properties of health status questionnaire developed by Terwee *et al.* in 2007.²⁴ The following criteria were used: content validity, internal consistency, criterion validity, construct validity, agreement, reliability, responsiveness, floor and ceiling effects, and interpretability

(Table 3). Details of this quality scale are developed in the article of Terwee *et al.*²⁴

Results

The bibliographic search yielded 2596 articles: 2448 from PubMed and 108 from Cochrane Central. After removal of duplicates ($n = 708$), 1888 candidate studies were listed. The first author (TP) selected 13 studies and the second author (JG) selected 11 studies. The two raters independently assessed the instrument on content and agreed on 85% of the scorings. Disagreement was solved by discussion with the third author

Table 1 Description of studies

Tool/study	Inclusion	Exclusion	No. items	Mode of administration	Language	Administration duration	Reference geriatric assessment
Screening letter ²⁵	102 subjects ≥ 70 years/ randomly selected among GP patients	Subjects who had already undergone a geriatric assessment	9 simple items	Self-administered questionnaire	English	–	CGA by geriatrician
Sherbrooke postal questionnaire ²⁶	842 subjects ≥ 75 years/ random selection from electoral lists	Subjects living in an institution	6 simple items	Self-administered questionnaire	French	–	SMAF scale by nurse in the home
Functional assessment screening package ²⁷	109 subjects ≥ 62 years/ geriatric consultation	–	16 simple items or measures	Non-medical staff	English	8–12 min	CGA by geriatrician
Screening instrument ²⁸	150 subjects ≥ 65 years/ social centres, rehabilitation, retirement homes, geriatric consultation	MMSE < 25 /no registration with GP/no telephone	16 simple items	–	English	5 min	CGA by geriatrician
Strawbridge questionnaire ²⁹	48 subjects ≥ 63 years/ geriatric consultation	Unable to walk/effort impossible/legal guardianship/living in an institution	16 simple items	Self-administered questionnaire	English	–	CGA by geriatrician
PRISMA-7 ³⁰	594 subjects ≥ 75 years/ random selection from electoral lists	Living in an institution	7 simple items	Self-administered questionnaire	French	3 min	SMAF scale
Bright tool ³¹	120 subjects ≥ 75 years/ randomly selected among GP patients	Cognitive disturbances	11 simple items	Self-administered questionnaire	English	–	MDS-HC by nurse in the home
Self-administered test ³²	100 subjects ≥ 65 years/ geriatric consultation	–	49 simple items	Self-administered questionnaire	Italian	–	MCPS by geriatrician
Tilburg frailty indicator ³³	245 and then 275 subjects (1 year later) ≥ 75 years/ random selection from electoral lists	–	15 simple items	Self-administered questionnaire	Dutch	14 min	CGA by trained interviewers
SHARE-FI ³⁴	31 115 subjects ≥ 50 years/ SHARE survey	–	5 simple items plus grip measured on a dynamometer	Non-medical staff	–	–	No CGA Mortality physical, social and cognitive data from the SHARE survey

CGA, Comprehensive Geriatric Assessment; GP, general practitioner; MCPS, Marigliano-Cacciafesta Polyopathological Scale; MDS-HC, Minimum Data Set for Home Care; MMSE, Mini-Mental State Examination; SMAF, Système de Mesure de l'Autonomie Fonctionnelle.

Table 2 Description of instruments

Tool/study	Patient-reported fatigue	Physical performance	Walking	No. comorbidities	Nutritional state	Psychometric properties compared to CGA
Screening letter ²⁵	+	-	-	-	-	Se = 0.95/Sp = 0.68
Sherbrooke postal questionnaire ²⁶	-	-	+	-	-	Se = 0.75/Sp = 0.52
Functional assessment screening package ²⁷	-	+	+	-	+	Kappa = 0.77-1/Se = 0.70-0.95/Sp = 0.64-0.95
Screening instrument ²⁸	-	+	+	-	-	Se = 0.65-0.93/Sp = 0.50-0.96
Strawbridge questionnaire ²⁹	-	+	+	-	+	Inter-evaluation agreement = 0.67/kappa = 0.29
PRISMA-7 ³⁰	+	-	+	-	-	Se = 0.78/Sp = 0.74
Bright tool ³¹	+	+	+	-	-	Kappa = 0.77/ α = 0.77/Se = 0.65/Sp = 0.84
Self-administered test ³²	-	-	+	+	+	Similar classification for 48% of the subjects
Tilburg frailty indicator ³³	+	+	+	-	+	Kappa = 0.79/ α = 0.73/Pearson's corr. coeff. (<i>t</i>) significant (<i>P</i> < 0.001)
SHARE-FI ³⁴	+	+	+	-	+	Compared to non-frail odds ratio for mortality among frail >1/Spearman's corr. coeff. significant (<i>P</i> < 0.001)

corr. coeff, Correlation coefficient; Se, sensibility; Sp, specificity.

Table 3 Assessment on psychometric properties

Tool/study	Content validity	Internal consistency	Criterion validity	Construct validity	Agreement	Reliability	Responsiveness	Floor and ceiling effects	Interpretability
Screening letter ²⁵	?	0	?	+	0	0	0	0	0
Sherbrooke postal questionnaire ²⁶	+	0	?	+	0	0	?	0	0
Functional assessment screening package ²⁷	?	0	+	+	+	0	0	0	?
Screening instrument ²⁸	?	0	?	+	0	0	0	0	0
Strawbridge questionnaire ²⁹	+	0	+	+	0	-	0	0	0
PRISMA-7 ³⁰	+	0	+	+	0	0	0	0	0
Bright tool ³¹	+	+	?	-	0	+	0	0	0
Self-administered test ³²	+	?	?	?	0	0	0	0	0
Tilburg frailty indicator ³³	+	+	+	+	?	+	+	0	?
SHARE-FI ³⁴	+	+	0	+	0	0	+	-	?

+, Tool fulfills the mentioned criterion; -, tool does not fulfill the mentioned criterion; ?, doubtful design or method/0, no information found.

(BL). After analysis of the articles for inclusion and exclusion criteria, a consensus was reached on 11 articles studying 10 tools. One recent study that did not meet the inclusion criteria was retained because of its potential interest for the screening of frailty in primary care settings.³⁴

Description of studies

In 1980, Barber *et al.* developed a self-administered questionnaire to screen for frailty (the Screening Letter) using nine simple items to explore autonomy, subjective health status, hearing, eyesight and past hospitalizations.²⁵ The study randomly recruited 102 elderly subjects aged over 70 years among the patients of several GPs in urban zones. Compared with the CGA, sensitivity (Se) was 0.95 and specificity (Sp) 0.68.

The Sherbrooke Postal Questionnaire is a self-administered questionnaire validated by Hébert *et al.* in 1996.²⁶ It comprises six simple items concerning the person's immediate circle, medication, walking, eyesight and memory. Elderly subjects aged over 75 years were recruited randomly from electoral lists in Sherbrooke (Quebec, Canada). The final sample comprised 842 subjects. The comparison of the frailty screening results with results on the SMAF scale³⁵ and a CGA carried out by a nurse in the home gave the following values: Se 0.75 and Sp 0.52.

Moore *et al.* developed the Functional Assessment Screening Package.^{27,36} Eight areas of frailty are explored by way of items or simple measures: autonomy, eyesight, hearing, upper limb mobility, urinary incontinence, memory, depression and nutrition. This survey was carried out in the setting of geriatric consultations (Los Angeles, California) on a sample of 109 new patients aged over 62 years. The measure, administered by non-medical staff, is validated in English and requires 8–12 min to complete. Results were compared with the opinion of a geriatrician after CGA. Each item was compared with the reference tool. For the different items, inter-rater reliability (Kappa) ranged from 0.77 to 1, Se from 0.70 to 0.95 and Sp from 0.64 to 0.95.

The Screening Instrument analyzes the following frailty domains: autonomy, falls, depression and urinary incontinence by way of 12 simple items.²⁸ Maly *et al.* carried out a study that recruited 150 subjects aged over 65 years in churches, social centers for the elderly, retirement homes for people with low income and rehabilitation centres for the elderly. The measure takes 5 min to administer. When compared with a CGA, the Se values for the different areas of frailty ranged from 0.65 to 0.93 and Sp from 0.50 to 0.96.

Matthews *et al.*, in a study comprising 48 subjects aged 63 years or over, tested the Strawbridge Questionnaire. This is a self-administered English-language questionnaire.²⁹ It uses 16 simple items to explore the

domains of eyesight, hearing, cognition, nutrition and physical performance. In a second stage, the subjects underwent a CGA. The agreement between the opinion of the geriatric specialist after CGA and the questionnaire classification was 0.67 (Kappa 0.29).

The PRISMA-7 questionnaire was validated in 2007 by Raïche *et al.*³⁰ It is a self-administered questionnaire developed in French, and takes 3 min to administer. It uses seven simple items to explore the following: gender, autonomy, close circle and walking. In the validation study, 594 subjects aged 75 years or over were recruited randomly from electoral lists. Each subject then underwent a geriatric assessment using the SMAF scale (*Système de Mesure de l'Autonomie Fonctionnelle*), a scale comprising 29 complex items that was validated by Hebert *et al.* in 2001. Se was 0.78 and Sp 0.74.³⁵

The Bright Tool is a self-administered questionnaire validated in English in 2008 by Kerse *et al.*³¹ It uses 11 simple items to explore the domains of autonomy, close circle, walking, falls, cognition, executive functions, mood and patient-perceived health status. The frailty threshold is a score of 3 out of 11. A total of 120 subjects aged 75 years and over were recruited from two GP surgeries. The tool was compared with the Minimum Data Set for Home Care (MDS-HC; a complete geriatric evaluation exploring all the areas of frailty through validated measures) carried out by a nurse in the home. Inter-rater reliability (Kappa) was 0.77, internal consistency (α) was 0.77, Se 0.65 and Sp 0.84.³⁷

In 2010, Amici *et al.* published an article studying a self-administered questionnaire, the Self-Administered Test (SAT), comprising 49 simple items exploring the following domains: neurological functions, cardiac and pulmonary function, continence, locomotion, eyesight, hearing, nutrition and cognitive functions.³² This tool generates a classification of subjects according to five levels of frailty: "slight, medium, medium serious, serious and very serious". A total of 100 patients aged over 65 years were recruited in a geriatric consultation. Each subject underwent a geriatric assessment using the Marigliano-Cacciafesta Polypathological Scale (MCPS).³⁸ This scale also enables classification of subjects in the same five frailty categories. Using the MCPS, 45% of the subjects were classified in a similar manner, 45% who were classified at a "better" level on the SAT were classified "worse" on the MCPS, and conversely 7% who were classified "worse" on the SAT were classified "better" on the MCPS.

The Tilburg Frailty Indicator is a measure developed by Gobbens *et al.*³³ A total of 245 subjects aged 75 years and over (and 275 1 year later) were randomly recruited from municipal registers. This instrument is a self-administered questionnaire validated in Dutch requiring 14 min on average to administer. It comprises 15 simple items subdivided into three domains: physical, psychological and social. Autonomy, close circle,

cognition, mood and physical performance are analyzed. Each subject underwent a geriatric assessment (all frailty domains were analyzed using validated scales or assessments by trained investigators) at the time of recruitment and 1 year later. The frailty threshold is 5 out of 15. Inter-rater reliability (Kappa) was 0.79 and internal consistency (α) was 0.73. For each item and each frailty domain, the Pearson correlation coefficient (r) was statistically significant in comparison with the reference measure. The predictive value of this tool was statistically robust ($P < 0.001$) for quality of life, autonomy and resorting to care.

Metzelthin *et al.*, in a study including 687 subjects aged 70 years and over recruited in GP surgeries, compared the psychometric properties of the following three instruments: The Sherbrooke Postal Questionnaire (SPQ), the Groningen Frailty Indicator (GFI) and the Tilburg Frailty Indicator (TFI).³⁹ Internal consistency (α) was 0.26 for the SPQ, 0.73 for the GFI and 0.79 for the TFI.

In 2010, Romero-Ortuno *et al.* proposed a new frailty screening instrument in a primary care setting: the SHARE Frailty Instrument (SHARE-FI).³⁴ Although this instrument did not meet the inclusion criteria for the present research (there is no comparison of the tool with a reference geriatric assessment), we nevertheless decided to analyze this study, which offers a potentially worthwhile measure in a primary care setting. The SHARE survey is derived from the first stage of the Survey of Health, Ageing and Retirement in Europe (SHARE, <http://www.share-project.org>), a vast survey carried out since 2004 in 12 European countries. The sample comprises 31 115 subjects aged over 50 years (17 304 women and 13 811 men), recruited randomly in national registers in the different countries. The SHARE survey, carried out in subjects' homes, includes a main questionnaire completed in the course of an interview, cognitive and physical tests, and a self-administered questionnaire. A wide range of data is collected: comorbidity, use of the health-care system, mood, housing, social support, cognitive tests, grip, walking speed, Alzheimer's disease activities of daily living (ADL), instrumental activities of daily living (IADL), subject's perception of his/her state of health and so on (the methodology is available at the following address: <http://www.share-project.org/t3/share/index.php?id=452>). Figures for mortality are collected regularly by this survey. The authors have developed a tool (freely accessed on a web-based calculator) based on five simple items and strength of grip (using a dynamometer), exploring physical exhaustion, loss of weight, strength of grip, walking speed and difficulties in the activities of daily living. When data is entered into the web-based calculator, the tool enables classification into three levels of frailty: "non-frail", "pre-frail" and "frail". For women, by comparison with the "non-frail" class,

the odds ratios for mortality are 2.1 for the "pre-frail" and 4.8 for the "frail"; among men, these odds ratios are respectively 3.0 and 6.9. In this sample, there was a statistically significant correlation ($P < 0.001$ – Spearman's correlation coefficient) between the levels of frailty proposed by the SHARE-FI and hospitalization, ADL/IADL limitations, care provision in the home and pathological cognitive test results (measures carried out in the SHARE survey).

Description of instruments

We checked whether these different tools contained items required to screen for frailty according to the GAP recommendations. Both raters agreed on 100% of these ratings. None of the tools covers all five domains; two (the Tilburg Frailty Indicator and the SHARE-FI) cover four of the domains, four (Self-Administered Test, Bright Tool, Strawbridge Questionnaire and Functional Assessment Screening Package) include three of these domains, two tools (PRISMA-7, Screening Instrument) include just two of these domains and, finally, two measures (Screening Letter, Sherbrooke Postal Questionnaire) only include one.

Assessment on psychometric properties

The quality of the included articles was assessed using an assessment scale for measurement properties of health status questionnaire developed by Terwee. Both raters (T Pialoux and J Goyard) agreed on 83% of the ratings, and the remaining 17% were resolved by consensus with the third author (B. Lesourd). Overall, the quality of these studies is poor according to the scale of Terwee. We note that only the construct validity is correct for the majority of studies. However, the Tilburg Frailty Indicator is the strongest statistically. It has six quality criteria of 10. Then, the second is the SHARE-FI with four on 10. We also found one study that makes a comparison between frailty instruments.³⁹

Discussion

There is indeed no consensus for the definition and measurement of frailty. Most studies use the CGA administered by a geriatric specialist to conclude to frailty.^{25,28,29,36} Alongside, other geriatric measures are used to conclude to frailty: the SMAF scale,^{26,30} the MDS-HC,³¹ or again the MCPS³² (these scales having been validated against a CGA). It is thus difficult to compare tools that were not all validated in relation to a single "gold standard".

The population samples used to test these instruments are widely different: from 48 to 31 115 subjects, depending on the study. Recruitment also differs from one study to another (electoral lists^{26,30,33,34} social

centres,²⁸ rehabilitation facilities,²⁸ GP consultations^{25,31} or geriatrician consultations.^{29,32,36} Modes of administration also differ: most were self-administered questionnaires, whereas two used scales completed by non-medical staff.^{34,36}

Different statistical analyses, such as sensitivity and specificity,^{25,26,28,30,31,36} Pearson's correlation coefficient³³ or Spearman's correlation coefficient,³⁴ were used to describe the statistical validity of the tool under study. The heterogeneous nature of the statistical methods makes comparisons among the different instruments difficult.

Just two studies recruited patients directly in GP consultations.^{25,31}

Two tools, nevertheless, appear as potentially relevant for screening for frailty in a primary care setting. The Tilburg Frailty Indicator is the most recent instrument.³³ The statistical results are very sound. It has been the subject of two studies implementing large samples. The results for its psychometric properties compared with the SPQ and the GFI are the best obtained among all the instruments assessed. In addition to being validated against the CGA, it is also validated as a predictive score for geriatric events linked to frailty after 1 year of follow up. It broaches four of the five domains required by the GAP. Its psychometric properties are the best according to the scale of Terwee. It has been validated in primary care. However, it is relatively long to administer for a GP (14 min).

The SHARE-FI is very promising, which is why it was selected here despite the absence of external validation with a geriatric assessment.³⁴ The instrument was developed with the clear purpose of screening for frailty among the elderly by GPs. It is based on a very large study with a very considerable population of 31 115 subjects. It classifies subjects in three categories – non-frail, pre-frail and frail. The frailty score is predictive of mortality. It covers four of the five domains required by the GAP. It takes the form of a web-based calculator that is easy to use by GPs. However, there is a lack of quality criteria and it was validated among subjects aged 50 years or more, and not specifically for subjects aged over 75 years. It requires a dynamometer for strength of grip, an instrument rarely available in a GP surgery. It should be proposed as the basis for future study assessed by GPs.

There were limitations of the present review. Some relevant studies might not have been listed, despite the work of the authors. Given that few studies have been carried out in a GP's office, studies with heterogeneous inclusions (geriatric consultation, social centres etc.) have been included. This makes the findings less unclear. The lack of a gold standard and the heterogeneous nature of the statistical methods makes comparisons among the different instruments difficult.

Conclusions

It is therefore difficult to show which tool is the best today for screening for frailty in the elderly in primary care settings. In view of these results, two instruments are potentially suitable, the Tilburg Frailty Indicator³³ and the SHARE-FI.³⁴ In addition, these instruments require validation in larger studies in primary health care settings and with more quality criteria.

There are still questions unanswered. In what form should the measure be administered? A self-administered questionnaire, a postal questionnaire or a questionnaire administered by a physician, a nurse or administrative staff? When should the screening procedure be carried out? Yearly, according to the opinion of the GP, after each hospitalization, or each time a prescription is renewed? Who should undergo the screening procedure? All patients of 65 years and over, of 70 years, 75 years, 80 years, or again according to the opinion of the GP? This suggests several important lines of research.

Numerous questions are unanswered. For more than 20 years, the medical community has been attempting to define frailty, and to find robust tools to define, measure and screen for it. It might be interesting to focus efforts on training and raising awareness among GPs regarding the complexity of the elderly person, and the different areas of risk that require attention and consolidation (nutrition walking, social support etc.). Chodosh *et al.* have shown that training in geriatrics improves the abilities of GPs to recognise areas of frailty. This should be proposed as basis for future study. The improvement of systems of coordinated care for the elderly is also a key element for GPs.

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References

- 1 Pel-Littel RE, Schuurmans MJ, Emmelot-Vonk MH, Verhaar HJJ. Frailty: defining and measuring of a concept. *J Nutr Health Aging* 2009; **13** (4): 390–394.
- 2 Fried LP, Tangen CM, Walston J *et al.* Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* 2001; **56** (3): M146–M156.
- 3 van Iersel MB, Rikkert MGMO. Frailty criteria give heterogeneous results when applied in clinical practice. *J Am Geriatr Soc* 2006; **54** (4): 728–729.

- 4 Rubenstein LZ, Stuck AE, Siu AL, Wieland D. Impacts of geriatric evaluation and management programs on defined outcomes: overview of the evidence. *J Am Geriatr Soc* 1991; **39** (9 Pt 2):8S–16S; discussion 17S–18S.
- 5 Stuck AE, Siu AL, Wieland GD, Adams J, Rubenstein LZ. Comprehensive geriatric assessment: a meta-analysis of controlled trials. *Lancet* 1993; **342** (8878): 1032–1036.
- 6 Ellis G, Langhorne P. Comprehensive geriatric assessment for older hospital patients. *Br Med Bull* 2004; **71**: 45–59.
- 7 Rubenstein LZ, Josephson KR, Wieland GD, English PA, Sayre JA, Kane RL. Effectiveness of a geriatric evaluation unit. A randomized clinical trial. *N Engl J Med* 1984; **311** (26): 1664–1670.
- 8 Rubin CD, Sizemore MT, Loftis PA, Adams-Huet B, Anderson RJ. The effect of geriatric evaluation and management on Medicare reimbursement in a large public hospital: a randomized clinical trial. *J Am Geriatr Soc* 1992; **40** (10): 989–995.
- 9 Beswick AD, Rees K, Dieppe P *et al*. Complex interventions to improve physical function and maintain independent living in elderly people: a systematic review and meta-analysis. *Lancet* 2008; **371** (9614): 725–735.
- 10 Eklund K, Wilhelmson K. Outcomes of coordinated and integrated interventions targeting frail elderly people: a systematic review of randomised controlled trials. *Health Soc Care Community* 2009; **17** (5): 447–458.
- 11 Monteserin R, Brotons C, Moral I *et al*. Effectiveness of a geriatric intervention in primary care: a randomized clinical trial. *Fam Pract* 2010; **27** (3): 239–245.
- 12 Hébert R, Raïche M, Dubois M-F, Gueye NR, Dubuc N, Tousignant M. Impact of PRISMA, a coordination-type integrated service delivery system for frail older people in Quebec (Canada): a quasi-experimental study. *J Gerontol B Psychol Sci Soc Sci* 2010; **65B** (1): 107–118.
- 13 Fairhall N, Aggar C, Kurrle SE *et al*. Frailty Intervention Trial (FIT). *BMC Geriatr* 2008; **8**: 27.
- 14 Gill TM, Gahbauer EA, Allore HG, Han L. Transitions between frailty states among community-living older persons. *Arch Intern Med* 2006; **166** (4): 418–423.
- 15 Strandberg TE, Pitkälä KH. Frailty in elderly people. *Lancet* 2007; **369** (9570): 1328–1329.
- 16 De Lepeleire J, Illiffe S, Mann E, Degryse JM. Frailty: an emerging concept for general practice. *Br J Gen Pract* 2009; **59** (562): e177–e182.
- 17 De Lepeleire J, Degryse J, Illiffe S, Mann E, Buntinx F. Family physicians need easy instruments for frailty. *Age Ageing* 2008; **37** (4): 484; author reply 484–485.
- 18 Stalenoef PA, Huijnen LG, Schonck RS, Knottnerus JA, van der Horst FG, Crebolder HF. [Home visits by community health nurses can contribute to the family practitioner's knowledge of elderly patients]. *Ned Tijdschr Geneesk* 1996; **140** (49): 2464–2467.
- 19 Tremellen J. Assessment of patients aged over 75 in general practice. *BMJ* 1992; **305** (6854): 621–624.
- 20 Chodosh J, Petitti DB, Elliott M *et al*. Physician recognition of cognitive impairment: evaluating the need for improvement. *J Am Geriatr Soc* 2004; **52** (7): 1051–1059.
- 21 Abellan van Kan G, Rolland Y, Houles M, Gillette-Guyonnet S, Soto M, Vellas B. The assessment of frailty in older adults. *Clin Geriatr Med* 2010; **26** (2): 275–286.
- 22 de Vries NM, Staal JB, van Ravensberg CD, Hobbelen JSM, Olde Rikkert MGM, Nijhuis-van der Sanden MWG. Outcome instruments to measure frailty: a systematic review. *Ageing Res Rev* 2011; **10** (1): 104–114.
- 23 Abellan van Kan G, Rolland Y, Bergman H, Morley JE, Kritchevsky SB, Vellas B. The I.A.N.A Task Force on frailty assessment of older people in clinical practice. *J Nutr Health Aging* 2008; **12** (1): 29–37.
- 24 Terwee CB, Bot SDM, de Boer MR *et al*. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol* 2007; **60** (1): 34–42.
- 25 Barber JH, Wallis JB, McKeating E. A postal screening questionnaire in preventive geriatric care. *J R Coll Gen Pract* 1980; **30** (210): 49–51.
- 26 Hébert R, Bravo G, Korner-Bitensky N, Voyer L. Predictive validity of a postal questionnaire for screening community-dwelling elderly individuals at risk of functional decline. *Age Ageing* 1996; **25** (2): 159–167.
- 27 Moore AA, Siu AL. Screening for common problems in ambulatory elderly: clinical confirmation of a screening instrument. *Am J Med* 1996; **100** (4): 438–443.
- 28 Maly RC, Hirsch SH, Reuben DB. The performance of simple instruments in detecting geriatric conditions and selecting community-dwelling older people for geriatric assessment. *Age Ageing* 1997; **26** (3): 223–231.
- 29 Matthews M, Lucas A, Boland R *et al*. Use of a questionnaire to screen for frailty in the elderly: an exploratory study. *Ageing Clin Exp Res* 2004; **16** (1): 34–40.
- 30 Raïche M, Hébert R, Dubois M-F. PRISMA-7: a case-finding tool to identify older adults with moderate to severe disabilities. *Arch Gerontol Geriatr* 2008; **47** (1): 9–18.
- 31 Kerse N, Boyd M, McLean C, Koziol-McLain J, Robb G. The BRIGHT tool. *Age Ageing* 2008; **37** (5): 553–588.
- 32 Amici A, Pecci MT, Linguanti A *et al*. Self-administrated test based on the Marigliano-Cacciafesta Polypathological Scale (MCPS), as a screening tool for early identification of frailty in the elderly: a cohort study. *Arch Gerontol Geriatr* 2011; **52** (1): e60–e65.
- 33 Gobbens RJJ, van Assen MALM, Luijckx KG, Wijnen-Sponselee MT, Schols JMGA. The Tilburg Frailty Indicator: psychometric properties. *J Am Med Dir Assoc* 2010; **11** (5): 344–355.
- 34 Romero-Ortuno R, Walsh CD, Lawlor BA, Kenny RA. A frailty instrument for primary care: findings from the Survey of Health, Ageing and Retirement in Europe (SHARE). *BMC Geriatr* 2010; **10**: 57.
- 35 Hébert R, Carrier R, Bilodeau A. The Functional Autonomy Measurement System (SMAF): description and validation of an instrument for the measurement of handicaps. *Age Ageing* 1988; **17** (5): 293–302.
- 36 Moore AA, Siu AL, Partridge JM, Hays RD, Adams J. A randomized trial of office-based screening for common problems in older persons. *Am J Med* 1997; **102** (4): 371–378.
- 37 Landi F, Onder G, Tua E *et al*. Impact of a new assessment system, the MDS-HC, on function and hospitalization of homebound older people: a controlled clinical trial. *J Am Geriatr Soc* 2001; **49** (10): 1288–1293.
- 38 Martocchia A, Indiano I, Tafaro L *et al*. The evaluation of the presence of comorbidity by the Marigliano-Cacciafesta polypathology scale (MCPS) and the cumulative illness rating scale (CIRS) in elderly subjects with disability. *Arch Gerontol Geriatr* 2009; **49** (1): 150–152.
- 39 Metzeltin SF, Daniëls R, van Rossum E, de Witte L, van den Heuvel WJA, Kempen GJMJ. The psychometric properties of three self-report screening instruments for identifying frail older people in the community. *BMC Public Health* 2010; **10**: 176.