

Tilburg University

Frailty viewed from a nursing perspective

Gobbens, R.J.J.; Uchmanowicz, I.

Published in:
SAGE Open Nursing

DOI:
[10.1177/23779608221150598](https://doi.org/10.1177/23779608221150598)

Publication date:
2023

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):
Gobbens, R. J. J., & Uchmanowicz, I. (2023). Frailty viewed from a nursing perspective. *SAGE Open Nursing*, 9, 1-7. <https://doi.org/10.1177/23779608221150598>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Frailty Viewed From a Nursing Perspective

SAGE Open Nursing
Volume 9: 1–7
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/23779608221150598
journals.sagepub.com/home/son



Robbert J. J. Gobbens, RN (not practicing), MSc, PhD^{1,2,3,4} 
and Izabella Uchmanowicz, RN, PhD^{5,6} 

Abstract

Introduction: More and more researchers are convinced that frailty should refer not only to physical limitations but also to psychological and social limitations that older people may have. Such a broad, or multidimensional, definition of frailty fits better with nursing, in which a holistic view of human beings, and thus their total functioning, is the starting point.

Purpose: In this article, which should be considered a Practice Update, we aim at emphasizing the importance of the inclusion of other domains of human functioning in the definition and measurement of frailty. In addition, we provide a description of how district nurses view frailty in older people. Finally, we present interventions that nurses can perform to prevent or delay frailty or its adverse outcomes. We present, in particular, results from studies in which the Tilburg Frailty Indicator, a multidimensional frailty instrument, was used.

Conclusion: The importance of a multidimensional assessment of frailty was demonstrated by usually satisfactory results concerning adverse outcomes of mortality, disability, an increase in healthcare utilization, and lower quality of life. Not many studies have been performed on nurses' opinions about frailty. Starting from a multidimensional definition of frailty, encompassing physical, psychological, and social domains, nurses are able to assess and diagnose frailty and conduct a variety of interventions to prevent or reduce frailty and its adverse effects. Because nurses come into frequent contact with frail older people, we recommend future studies on opinions of nurses about frailty (e.g., screening, prevention, and addressing).

Keywords

frailty, nursing, community-dwelling older people, Tilburg Frailty Indicator

Received 25 July 2022; revised 18 November 2022; accepted 24 December 2022

Introduction and Purpose

With the growing ageing population worldwide (United Nations Department of Economic and Social Affairs, 2015), frailty is increasingly becoming an important issue because it is associated with older age. A systematic review showed that the prevalence of frailty was 15.7% among community-dwelling people aged 80 to 84 years and 26.1% among people aged 85 years or older (Collard et al., 2012). Frail community-dwelling older people have a high risk for disability (Vermeiren et al., 2016), an increase in healthcare utilization (e.g., hospitalization and institutionalization) (Kojima, 2018; Vermeiren et al., 2016), increased healthcare costs (Kojima, 2019), lower quality of life (Kojima et al., 2016), and premature death (Ekram et al., 2021; Vermeiren et al., 2016). For example, frail older people have a 1.6-to-2.0-fold risk for disability (referred to risk for loss of performing activities of daily living), a 1.2-to-1.8-fold risk for hospitalization, and a 1.8-to-2.3-fold risk for mortality (Vermeiren et al., 2016). It is therefore important to identify

these older people at an early stage and to carry out appropriate interventions so that the occurrence of adverse outcomes is prevented or delayed. However, how frailty should be defined remains controversial.

¹Faculty of Health, Sports and Social Work, Inholland University of Applied Sciences, Amsterdam, the Netherlands

²Zonnehuisgroep Amstelland, Amstelveen, the Netherlands

³Department of Family Medicine and Population Health, Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium

⁴Tranzo, Tilburg School of Social and Behavioral Sciences, Tilburg University, Tilburg, the Netherlands

⁵Department of Nursing and Obstetrics, Faculty of Health Sciences, Wroclaw Medical University, Wroclaw, Poland

⁶Institute of Heart Diseases, University Hospital, Wroclaw, Poland

Corresponding Author:

Robbert J. J. Gobbens, Faculty of Health, Sports and Social Work, Inholland University of Applied Sciences, De Boelelaan 1109, 1081 HV Amsterdam, the Netherlands.

Email: robbert.gobbens@inholland.nl



The term “frail elderly” was introduced by Monsignor Charles F. Fahey and the United States Federal Council on Aging. In 1978 they defined frail elderly as “persons, usually, but not always, over the age of 75 years, who because of an accumulation of various continuing problems often require one or several supportive services in order to cope with daily life” (Tavani, 1978). Many definitions of frailty have followed. The debate is still ongoing as to whether frailty should be considered as a concept that is exclusively focused on physical limitations that older people may have or whether other domains of human functioning should be included as well. An example of the first view is the definition that “frailty is a biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, causing vulnerability to adverse outcomes” (Fried et al., 2001). This conceptual definition is operationalized by the phenotype of frailty, a frequently used measure of frailty, consisting of five components: slowed walking speed, low energy expenditure, unintentional weight loss, low grip strength, and exhaustion (Fried et al., 2001). The phenotype of frailty is based on a “cycle of frailty.” This model assumes that clinically measurable frailty features, and the decline in physiological reserve, are the result of a cycle of factors, including chronic under-nutrition, sarcopenia, disease, and a reduced resting metabolic rate (Fried et al., 2001).

However, more and more researchers are convinced that frailty should refer not only to physical limitations but also to psychological and social limitations that older people may have. If the definition of frailty focuses solely on physical limitations, then the total functioning of the human being is not considered. This can lead to fragmentation of care (Gobbens et al., 2010a; Markle-Reid & Browne, 2003) and, subsequently, to a reduction in the quality of care and quality of life of frail older people. Such a broad, or multidimensional, definition of frailty fits better with nursing, in which a holistic view of human beings, and thus their total functioning, is the starting point. In this article, which should be considered a Practice Update, we aim at emphasizing the importance of the inclusion of other domains of human functioning in the definition and measurement of frailty. To this end, we present, in particular, results from studies in which the Tilburg Frailty Indicator (TFI) (Gobbens et al., 2010b) was used. This is an example of a multidimensional frailty instrument characterized by good psychometric properties in comparison with other instruments (Sutton et al., 2016). Moreover, we will focus on community-dwelling older people, because most older people live independently in the community. Ageing in place is frequently used to refer to people growing old in their own homes; this phenomenon is stimulated by the government policies in Western countries (Cutchin, 2003). In addition, most older people prefer to live in their own familiar environment for as long as possible (Gilleard et al., 2007). Then, we provide a description of how district nurses view

frailty in older people. Finally, we will present interventions that nurses can perform to prevent or delay frailty or its adverse outcomes.

Discussion of Topic

A Multidimensional Assessment of Frailty

A multidimensional definition of frailty is as follows: “Frailty is a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables and which increases the risk of adverse outcomes” (Gobbens et al., 2010a). This definition is accompanied by an integral conceptual model of frailty that expresses the relationships between three domains of frailty (physical, psychological, and social), adverse outcomes (disability, an increase in healthcare utilization, and premature death), and life-course determinants of frailty (e.g., age, education, lifestyle, life events, and environment). The integral conceptual model of frailty provided a framework for the development of an instrument to assess frailty, the TFI.

The TFI is a user-friendly, self-report questionnaire containing 15 components. Eight components belong to physical frailty, four components to psychological frailty, and three components to social frailty. The physical components are physically unhealthy, unintentional weight loss, difficulty in walking, difficulty in maintaining balance, poor hearing, poor vision, lack of strength in the hands, and physical tiredness. The four components that refer to psychological frailty are memory problems, feeling down, feeling nervous or anxious, and unable to cope with problems. Social frailty consists of living alone, lack of social relations (referring to loneliness), and lack of social support. Using the TFI for assessing frailty fits well with nursing because this questionnaire is used to assess the total functioning of an older person. Many studies that were conducted in different countries have shown that the TFI is a valid and reliable instrument to assess frailty in community-dwelling older people, such as in the Netherlands (Gobbens et al., 2010b), Poland (Uchmanowicz et al., 2014), Brazil (Santiago et al., 2013), China (Dong et al., 2017), Iran (Mazoochi et al., 2020), and Taiwan (Lin et al., 2021).

The Importance of a Multidimensional Assessment of Frailty

Mortality. In a sample of 479 Dutch community-dwelling people aged 75 years or older, the TFI predicted mortality using a follow-up of 7 years with an unadjusted hazard ratio of 1.168 (95% confidence interval [CI] 1.109–1.231). The Dutch study also demonstrated that not only physical frailty predicted mortality but also psychological frailty, with hazard ratios of 1.295 (95% CI 1.200–1.398, P value <.001) and 1.194 (95% CI 1.047–1.363, P value .008),

respectively. In other studies conducted in the Netherlands (Gobbens et al., 2020b), Brazil (Santiago et al., 2018b), and 11 European countries (Theou et al., 2013) using the TFI, the results for predicting mortality were at least acceptable; only a study among 2,420 Dutch community-dwelling people aged ≥ 65 years qualified this association as poor (Op Het Veld et al., 2019a).

Disability. With regard to disability, mostly referring to having difficulties with performing activities of daily living, the multidimensional assessment of frailty by the TFI showed that cross-sectional results were excellent in three studies (Gobbens et al., 2010b; Mulasso et al., 2016; Zhang et al., 2020) and acceptable in two studies (Coelho et al., 2015; Dong et al., 2017), reflected by areas under the curve (AUC) between 0.8–0.9 and 0.7–0.8, respectively. These findings are confirmed by longitudinal studies in the Netherlands and Brazil (Gobbens et al., 2012, 2020a; Santiago et al., 2018b), but two other Dutch studies concluded that the prediction of disability by the TFI was poor (Daniels et al., 2012; Op Het Veld et al., 2019a), expressed by a positive predictive value of 42.6% and a negative predictive value of 75.2% (Op Het Veld et al., 2019b).

Healthcare Utilization. The assessment of frailty is usually determined by the actual or estimated condition of the person at the time of assessment and therefore usually does not take into account the presence of acute conditions that may affect the determination of frailty status (Hogan et al., 2017). This contributes to variation in the assessment of the relationship between frailty and healthcare utilization across settings. Individuals who have been frail for a period of time may have consistently higher levels of healthcare use during retrospective and prospective follow-up periods, whereas individuals with frailty due to transient conditions may have temporarily higher levels of healthcare use for only a short period of time (Ge et al., 2020). Studies have examined the relationship between frailty and healthcare utilization using retrospective or prospective data in different populations. Cross-sectional studies conducted to date, which were based on patient-reported frequency of use of healthcare resources, have shown that frailty is associated with an increased likelihood of using primary care physicians, specialists, emergency departments, and hospitals (Dent et al., 2016; Hoeck et al., 2012; Roe et al., 2017).

Similar findings have been shown by a prospective cohort study using the TFI (Gobbens et al., 2012). Using this instrument, it was observed among community-dwelling older people that frailty was significantly associated with reporting personal care, reporting nursing care, informal care (Gobbens et al., 2010b), and hospitalization (Daniels et al., 2012); other studies qualified the AUC for an increase in healthcare utilization as poor, such as hospitalization (Dong et al., 2017) and visits to a general practitioner (Mulasso et al., 2016). Although the association between frailty and healthcare

utilization in specialty outpatient care is less studied than inpatient care, some studies indicate that frailty is also positively associated with utilization of specialty outpatient services. For example, in Singapore it was shown that multidimensional frailty assessed with the Edmonton Frail Scale (Rolfson et al., 2006) was associated with recurrent hospital admissions (Tan et al., 2017).

Lower Quality of Life. Kojima et al. (2016) presented a systematic review and meta-analysis in which they demonstrated a consistent inverse association between frailty and quality of life among older adults living in the community. However, frailty was predominantly defined physically, reflected by the use of the phenotype of frailty. Studies that include the TFI also showed that frailty is associated with a lower quality of life (Coelho et al., 2015; Gobbens et al., 2012; Gobbens & van Assen, 2014). For instance, a cross-sectional study conducted among 1,031 Dutch community-dwelling older people (≥ 65 years) showed that the prediction of quality of life by physical frailty was improved after adding psychological and social frailty. The psychological frailty component “feeling down” significantly improved the prediction of all quality-of-life domains (physical health, psychological, social relations, and environmental) (Gobbens et al., 2013). In another Dutch study among 484 older people, using a longitudinal design, frailty also predicted quality of life; four physical components, feeling down, and lack of social support predicted quality of life, even after controlling for sociodemographic characteristics of the participants and diseases (Gobbens & van Assen, 2014). These results are confirmed by studies in other countries, such as the study by Coelho et al. (2015); in a sample of 252 Portuguese community-dwelling older people the TFI domains predicted 42.1% of the quality-of-life variance measured by the world health organization quality of life questionnaire-older adults module. Also, another multidimensional frailty measure, the Multidimensional Prognostic Index, predicted lower quality of life among 6,244 participants with a mean age of 71.8 years using a follow-up period of 10 years (Veronese et al., 2022).

Nurses' Views on Frailty

Previously, we noted that it is important to identify frail older people at an early stage. This is a task that should be performed especially by primary healthcare professionals, including district nurses. These professionals have the best insight into the functioning of older people in their own environment. Therefore, it is relevant to know their opinions on frailty. Yet, not many studies have been conducted so far that have taken this as their subject. Nurses should identify frail older adults in their practice using validated screening and assessment tools and refer patients and their caregivers to providers for support and interventions. However, uncertainty about the definition of frailty exists among community

nurses (Britton, 2017). In Scotland, community nurses defined frailty as vulnerability, loss, and complex comorbidity. According to these nurses, little attention was paid to systematic screening and assessment of frailty (Papadopoulou et al., 2021). In studies among healthcare professionals in the United Kingdom, Italy, and Sweden, including nurses, it was found that professionals emphasize the importance and the need of a holistic interdisciplinary approach to frailty (Coker et al., 2019; Gustafsson et al., 2012; Obbia et al., 2020). For example, Swedish healthcare professionals suggested to include domains such as “being negatively influenced by personal qualities,” “not being considered important,” and “being hindered by the physical milieu and defective community service” in the definition of frailty (Gustafsson et al., 2012).

Nursing Interventions

Nurses play a key role in assessing and diagnosing frailty and providing timely interventions to prevent both frailty and complications in frail individuals.

It is essential that health professionals, including nurses, who work with older people in primary care and community settings know how to assess frailty and can take appropriate action. The interventions that frail people can benefit from vary widely and often need to be individually tailored. Therefore, starting from a broad approach to frailty, encompassing the physical, psychological, and social spheres, nurses are able to assess and diagnose frailty and carry out a variety of interventions to prevent or reduce frailty and to prevent or delay its adverse effects (Uchmanowicz et al., 2018). Uchmanowicz et al. (2018) indicated that nurses can implement many interventions, which include strategies related to nutrition and diet, adherence and polypharmacy, falls and support, exercise and training, and mood and cognition (see Table 1). By implementing these strategies, nursing teams can implement their own care plans for frail elderly patients. Care strategies should be focused on maintaining homeostatic balance. To be able to meet the needs of frail elderly patients, collaboration among healthcare professionals is necessary, and interventions should be coordinated. This requires healthcare professionals to have the ability to collaborate as well as the willingness to look beyond the boundaries of their own discipline (Hoff, 2021).

Conclusions

We conclude that there is a lot of evidence that multidimensional assessment of frailty is important. This is further substantiated by some studies comparing the associations between unidimensional frailty (the phenotype of frailty) and multidimensional frailty (the TFI) with adverse outcomes (Roppolo et al., 2015; Santiago et al., 2018a). A Brazilian study, including 302 people aged ≥ 60 years, concluded that these measures identify different groups of frail older people, but both are suitable to be used by healthcare

professionals (Santiago et al., 2018a). This conclusion is fully supported by an Italian cross-sectional study (Roppolo et al., 2015); however, it was also observed that the AUC of the TFI for disability was higher in comparison with that of the phenotype of frailty (0.83 vs. 0.77).

Table 1. Nursing Interventions Regarding Frailty.

Nutrition and diet	
○	Educating the older person and caregivers
○	Identification of nutritional risk factors and appropriate screening
○	Implementing a tailored treatment plan considering preferences, resources, and needs of the older person
○	Providing effective communication between the older person and the multidisciplinary team
○	Providing psychosocial support
Adherence and polypharmacy	
○	Educating the older person and caregivers
○	Scheduling regular follow-up visits
○	Simplifying dosage regimens
○	Using individual daily dose packaging systems
○	Providing effective communication between the older person and the multidisciplinary team
○	Providing psychosocial support
○	Discussing preferences of the older person and goals in treatment decisions
Falls and support	
○	Educating the older person and caregivers
○	Assessing the history of past falls
○	Preventing orthostatic hypotension
○	Providing effective communication between the older person and the multidisciplinary team
○	Providing psychosocial support
Exercise and training	
○	Educating the older person and caregivers
○	Implementing individual exercise programs
○	Implementing multicomponent training
○	Improving physical and functional fitness, gait, balance, and strength
○	Improving muscle strength, endurance, and maximum aerobic power, and reduces fatigability in an older person
○	Providing effective communication between the older person and the multidisciplinary team
○	Providing psychosocial support
Mood and cognition	
○	Educating the older person and caregivers
○	Screening for cognitive decline
○	Implementing activities including learning strategies used to recall verbal and visual information
○	Utilizing external memory aids such as notes, calendars, or other resources
○	Implementing training in self-assertiveness
○	Providing effective communication between the older person and the multidisciplinary team
○	Providing psychosocial support

Because older adults diagnosed with frailty have an increased risk for adverse outcomes, identifying frailty is an essential part of comprehensive care.

Healthcare providers, especially nurses, should recognize not only elderly patients but also elderly patients with concurrent frailty, requiring intensified therapeutic interventions tailored to their individual needs. However, we found few studies focusing on nurses' opinions about frailty and within it certain themes, such as the tasks involved in screening, prevention, and addressing frailty. Because nurses come into frequent contact with frail older people, we recommend future studies on this topic.

Some limitations of our study should be mentioned. First, we mainly used the TFI as an example to demonstrate that a multidimensional assessment is important, but more instruments with good characteristics are available, such as the Edmonton Frailty Scale (Rolfson et al., 2006) and the Frailty Index (Mitnitski et al., 2001). A second limitation is that we focused on community-dwelling older people. We must be aware that there are also many frail older people in hospitals and nursing homes. Results of studies in these settings were not highlighted.

Finally, nurses have an important task regarding frailty. They should use a multidimensional instrument like the TFI to identify this at-risk group, followed by interventions aiming to prevent or delay adverse outcomes of frailty and improve quality of life of older people.


Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Robbert J. J. Gobbens  <https://orcid.org/0000-0001-6225-5189>
Izabella Uchmanowicz  <https://orcid.org/0000-0001-5452-0210>

References

- Britton, H. (2017). What are community nurses experiences of assessing frailty and assisting in planning subsequent interventions? *British Journal of Community Nursing*, 22(9), 440–445. <https://doi.org/10.12968/bjcn.2017.22.9.440>
- Coelho, T., Santos, R., Paul, C., Gobbens, R. J., & Fernandes, L. (2015). Portuguese version of the Tilburg Frailty Indicator: Transcultural adaptation and psychometric validation. *Geriatrics & Gerontology International*, 15(8), 951–960. <https://doi.org/10.1111/ggi.12373>
- Coker, J. F., Martin, M. E., Simpson, R. M., & Lafortune, L. (2019). Frailty: An in-depth qualitative study exploring the views of community care staff. *BMC Geriatrics*, 19(1), 47. <https://doi.org/10.1186/s12877-019-1069-3>
- Collard, R. M., Boter, H., Schoevers, R. A., & Oude Voshaar, R. C. (2012). Prevalence of frailty in community-dwelling older persons: A systematic review. *Journal of the American Geriatrics Society*, 60(8), 1487–1492. <https://doi.org/10.1111/j.1532-5415.2012.04054.x>
- Cutchin, M. P. (2003). The process of mediated aging-in-place: A theoretically and empirically based model. *Social Science & Medicine* (1982), 57(6), 1077–1090. [https://doi.org/10.1016/s0277-9536\(02\)00486-0](https://doi.org/10.1016/s0277-9536(02)00486-0)
- Daniels, R., van Rossum, E., Beurskens, A., van den Heuvel, W., & de Witte, L. (2012). The predictive validity of three self-report screening instruments for identifying frail older people in the community. *BMC Public Health*, 12, 69. <https://doi.org/10.1186/1471-2458-12-69>
- Dent, E., Hoon, E., Karnon, J., Newbury, J., Kitson, A., & Beilby, J. (2016). Frailty and health service use in rural South Australia. *Archives of Gerontology and Geriatrics*, 62, 53–58. <https://doi.org/10.1016/j.archger.2015.09.012>
- Dong, L., Liu, N., Tian, X., Qiao, X., Gobbens, R. J. J., Kane, R. L., & Wang, C. (2017). Reliability and validity of the Tilburg Frailty Indicator (TFI) among Chinese community-dwelling older people. *Archives of Gerontology and Geriatrics*, 73, 21–28. <https://doi.org/10.1016/j.archger.2017.07.001>
- Ekram, A., Woods, R. L., Britt, C., Espinoza, S., Ernst, M. E., & Ryan, J. (2021). The association between frailty and all-cause mortality in community-dwelling older individuals: An umbrella review. *Journal of Frailty & Aging*, 10(4), 320–326. <https://doi.org/10.14283/jfa.2021.20>
- Fried, L. P., Tangen, C. M., Walston, J., Newman, A. B., Hirsch, C., Gottdiener, J., Seeman, T., Tracy, R., Kop, W. J., Burke, G., & McBurnie, M. A. (2001). Frailty in older adults: Evidence for a phenotype. *Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, 56(3), M146–M156. <https://doi.org/10.1093/gerona/56.3.m146>
- Ge, L., Yap, C. W., Heng, B. H., & Tan, W. S. (2020). Frailty and healthcare utilisation across care settings among community-dwelling older adults in Singapore. *BMC Geriatrics*, 20(1), 389. <https://doi.org/10.1186/s12877-020-01800-8>
- Gilleard, C., Hyde, M., & Higgs, P. (2007). The impact of age, place, aging in place on the well-being of the over 50s in England. *Research on Aging*, 29(6), 590–605. <https://doi.org/10.1177/0164027507305730>
- Gobbens, R. J., Boersma, P., Uchmanowicz, I., & Santiago, L. M. (2020a). The Tilburg Frailty Indicator (TFI): New evidence for its validity. *Clinical Interventions in Aging*, 15, 265–274. <https://doi.org/10.2147/cia.s243233>
- Gobbens, R. J., Luijckx, K. G., & van Assen, M. A. (2013). Explaining quality of life of older people in the Netherlands using a multidimensional assessment of frailty. *Quality of Life Research*, 22(8), 2051–2061. <https://doi.org/10.1007/s11136-012-0341-1>
- Gobbens, R. J., Luijckx, K. G., Wijnen-Sponselee, M. T., & Schols, J. M. (2010a). Toward a conceptual definition of frail community dwelling older people. *Nursing Outlook*, 58(2), 76–86. <https://doi.org/10.1016/j.outlook.2009.09.005>
- Gobbens, R. J., & van Assen, M. A. (2014). The prediction of quality of life by physical, psychological and social components of frailty in community-dwelling older people. *Quality of Life Research*, 23(8), 2289–2300. <https://doi.org/10.1007/s11136-014-0672-1>

- Gobbens, R. J., van Assen, M. A., Luijckx, K. G., & Schols, J. M. (2012). The predictive validity of the Tilburg Frailty Indicator: Disability, health care utilization, and quality of life in a population at risk. *The Gerontologist*, *52*(5), 619–631. <https://doi.org/10.1093/geront/gnr135>
- Gobbens, R. J., van Assen, M. A., Luijckx, K. G., Wijnen-Sponselee, M. T., & Schols, J. M. (2010b). The Tilburg Frailty Indicator: Psychometric properties. *Journal of the American Medical Directors Association*, *11*(5), 344–355. <https://doi.org/10.1016/j.jamda.2009.11.003>
- Gobbens, R. J. J., van Assen, M., Augustijn, H., Goumans, M., & van der Ploeg, T. (2020b). Prediction of mortality by the Tilburg Frailty Indicator (TFI). *Journal of the American Medical Directors Association*, *22*(3), 607.e1–607.e6. <https://doi.org/10.1016/j.jamda.2020.07.033>
- Gustafsson, S., Edberg, A.-K., & Dahlin-Ivanoff, S. (2012). Swedish Health care professionals' view of frailty in older persons. *Journal of Applied Gerontology*, *31*(5), 622–640. <https://doi.org/10.1177/0733464810396874>
- Hoeck, S., François, G., Geerts, J., Van der Heyden, J., Vandewoude, M., & Van Hal, G. (2012). Health-care and home-care utilization among frail elderly persons in Belgium. *European Journal of Public Health*, *22*(5), 671–677. <https://doi.org/10.1093/eurpub/ckr133>
- Hoff, J. T. (2021). Frailty syndrome: Implications for nursing practice. *Journal for Nurse Practitioners*, *17*(10), 1204–1207. <https://doi.org/10.1016/j.nurpra.2021.09.012>
- Hogan, D. B., Maxwell, C. J., Afilalo, J., Arora, R. C., Bagshaw, S. M., Basran, J., Bergman, H., Bronskill, S. E., Carter, C. A., Dixon, E., Hemmelgarn, B., Madden, K., Mitnitski, A., Rolfson, D., Stelfox, H. T., Tam-Tham, H., & Wunsch, H. (2017). A scoping review of frailty and acute care in middle-aged and older individuals with recommendations for future research. *Canadian Geriatrics Journal*, *20*(1), 22–37. <https://doi.org/10.5770/cgj.20.240>
- Kojima, G. (2018). Frailty as a predictor of nursing home placement among community-dwelling older adults: A systematic review and meta-analysis. *Journal of Geriatric Physical Therapy*, *41*(1), 42–48. <https://doi.org/10.1519/jpt.0000000000000097>
- Kojima, G. (2019). Increased healthcare costs associated with frailty among community-dwelling older people: A systematic review and meta-analysis. *Archives of Gerontology and Geriatrics*, *84*, 103898. <https://doi.org/10.1016/j.archger.2019.06.003>
- Kojima, G., Iliffe, S., Jivraj, S., & Walters, K. (2016). Association between frailty and quality of life among community-dwelling older people: A systematic review and meta-analysis. *Journal of Epidemiology and Community Health*, *70*(7), 716–721. <https://doi.org/10.1136/jech-2015-206717>
- Lin, C. H., Liu, C. Y., & Rong, J. R. (2021). Psychometric properties of the Taiwanese version of the Tilburg Frailty Indicator for community-dwelling older adults. *Healthcare*, *9*(9), 1193. <https://doi.org/10.3390/healthcare9091193>
- Markle-Reid, M., & Browne, G. (2003). Conceptualizations of frailty in relation to older adults. *Journal of Advanced Nursing*, *44*(1), 58–68. <https://doi.org/10.1046/j.1365-2648.2003.02767.x>
- Mazoochi, F., Gobbens, R. J. J., Lotfi, M. S., & Fadayevatan, R. (2020). Diagnostic accuracy of the Tilburg Frailty Indicator (TFI) for early frailty detection in elderly people in Iran. *Archives of Gerontology and Geriatrics*, *91*, 104187. <https://doi.org/10.1016/j.archger.2020.104187>
- Mitnitski, A. B., Mogilner, A. J., & Rockwood, K. (2001). Accumulation of deficits as a proxy measure of aging. *Scientific World Journal*, *1*, 323–336. <https://doi.org/10.1100/tsw.2001.58>
- Mulasso, A., Roppolo, M., Gobbens, R. J., & Rabaglietti, E. (2016). The Italian version of the Tilburg Frailty Indicator: Analysis of psychometric properties. *Research in Aging*, *38*(8), 842–863. <https://doi.org/10.1177/0164027515606192>
- Obbia, P., Graham, C., Duffy, F. J. R., & Gobbens, R. J. J. (2020). Preventing frailty in older people: An exploration of primary care professionals' experiences. *International Journal of Older People Nursing*, *15*(2), e12297. <https://doi.org/10.1111/opn.12297>
- Op Het Veld, L. P. M., Beurskens, A., de Vet, H. C. W., van Kuijk, S. M. J., Hajema, K., Kempen, G., & van Rossum, E. (2019a). The ability of four frailty screening instruments to predict mortality, hospitalization and dependency in (instrumental) activities of daily living. *European Journal of Ageing*, *16*(3), 387–394. <https://doi.org/10.1007/s10433-019-00502-4>
- Op Het Veld, L. P. M., van Rossum, E., Kempen, G., Beurskens, A., Hajema, K. J., & de Vet, H. C. W. (2019b). Can the combined use of two screening instruments improve the predictive power of dependency in (instrumental) activities of daily living, mortality and hospitalization in old age? *Journal of Frailty & Aging*, *8*(4), 180–185. <https://doi.org/10.14283/jfa.2019.17>
- Papadopoulou, C., Barrie, J., Andrew, M., Martin, J., Birt, A., Raymond Duffy, F. J., & Hendry, A. (2021). Perceptions, practices and educational needs of community nurses to manage frailty. *British Journal of Community Nursing*, *26*(3), 136–142. <https://doi.org/10.12968/bjcn.2021.26.3.136>
- Roe, L., Normand, C., Wren, M. A., Browne, J., & O'Halloran, A. M. (2017). The impact of frailty on healthcare utilisation in Ireland: Evidence from the Irish longitudinal study on ageing. *BMC Geriatrics*, *17*(1), 203. <https://doi.org/10.1186/s12877-017-0579-0>
- Rolfson, D. B., Majumdar, S. R., Tsuyuki, R. T., Tahir, A., & Rockwood, K. (2006). Validity and reliability of the Edmonton Frail Scale. *Age and Ageing*, *35*(5), 526–529. <https://doi.org/10.1093/ageing/af041>
- Roppolo, M., Mulasso, A., Gobbens, R. J., Mosso, C. O., & Rabaglietti, E. (2015). A comparison between uni- and multidimensional frailty measures: Prevalence, functional status, and relationships with disability. *Clinical Interventions in Aging*, *10*, 1669–1678. <https://doi.org/10.2147/cia.s92328>
- Santiago, L. M., Gobbens, R. J. J., Mattos, I. E., & Ferreira, D. B. (2018a). A comparison between physical and biopsychosocial measures of frailty: Prevalence and associated factors in Brazilian older adults. *Archives of Gerontology and Geriatrics*, *81*, 111–118. <https://doi.org/10.1016/j.archger.2018.12.003>
- Santiago, L. M., Gobbens, R. J. J., van Assen, M., Carmo, C. N., Ferreira, D. B., & Mattos, I. E. (2018b). Predictive validity of the Brazilian version of the Tilburg Frailty Indicator for adverse health outcomes in older adults. *Archives of Gerontology and Geriatrics*, *76*, 114–119. <https://doi.org/10.1016/j.archger.2018.02.013>
- Santiago, L. M., Luz, L. L., Mattos, I. E., Gobbens, R. J., & van Assen, M. A. (2013). Psychometric properties of the Brazilian version of the Tilburg Frailty Indicator (TFI). *Archives of Gerontology and Geriatrics*, *57*(1), 39–45. <https://doi.org/10.1016/j.archger.2013.03.001>

- Sutton, J. L., Gould, R. L., Daley, S., Coulson, M. C., Ward, E. V., Butler, A. M., Nunn, S. P., & Howard, R. J. (2016). Psychometric properties of multicomponent tools designed to assess frailty in older adults: A systematic review. *BMC Geriatrics, 16*(1), 55. <https://doi.org/10.1186/s12877-016-0225-2>
- Tan, L. F., Lim, Z. Y., Choe, R., Seetharaman, S., & Merchant, R. (2017). Screening for frailty and sarcopenia among older persons in medical outpatient clinics and its associations with healthcare burden. *Journal of the American Medical Directors Association, 18*(7), 583–587. <https://doi.org/10.1016/j.jamda.2017.01.004>
- Tavani, C. (1978). *A staff report—Public policy and the frail elderly E*. Department of Health, and Welfare.
- Theou, O., Brothers, T. D., Mitnitski, A., & Rockwood, K. (2013). Operationalization of frailty using eight commonly used scales and comparison of their ability to predict all-cause mortality. *Journal of the American Geriatrics Society, 61*(9), 1537–1551. <https://doi.org/10.1111/jgs.12420>
- Uchmanowicz, I., Jankowska-Polanska, B., Loboż-Rudnicka, M., Manulik, S., Loboż-Grudzien, K., & Gobbens, R. J. (2014). Cross-cultural adaptation and reliability testing of the Tilburg Frailty Indicator for optimizing care of Polish patients with frailty syndrome. *Clinical Interventions in Aging, 9*, 997–1001. <https://doi.org/10.2147/cia.s64853>
- Uchmanowicz, I., Jankowska-Polańska, B., Wleklík, M., Lisiak, M., & Gobbens, R. (2018). Frailty syndrome: Nursing interventions. *SAGE Open Nursing, 4*, 2377960818759449. <https://doi.org/10.1177/2377960818759449>
- United Nations Department of Economic and Social Affairs. Population Division. (2015). World population prospects. The 2015 revision. Key findings and advance tables. Working paper No. ESA/P/WP.241. New York. http://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf
- Vermeiren, S., Vella-Azzopardi, R., Beckwee, D., Habbig, A. K., Scafoglieri, A., Jansen, B., & Bautmans, I. (2016). Frailty and the prediction of negative health outcomes: A meta-analysis. *Journal of the American Medical Directors Association, 17*(12), 1163.e1161–1163.e1117. <https://doi.org/10.1016/j.jamda.2016.09.010>
- Veronese, N., Noale, M., Cella, A., Custodero, C., Smith, L., Barbagelata, M., Maggi, S., Barbagallo, M., Sabbà, C., Ferrucci, L., & Pilotto, A. (2022). Multidimensional frailty and quality of life: Data from the English Longitudinal Study of Ageing. *Quality of Life Research, 31*(10), 2985–2993. <https://doi.org/10.1007/s11136-022-03152-9>
- Zhang, X., Tan, S. S., Bilajac, L., Alhambra-Borrás, T., Garcés-Ferrer, J., Verma, A., Koppelaar, E., Markaki, A., Mattace-Raso, F., Franse, C. B., & Raat, H. (2020). Reliability and validity of the Tilburg Frailty Indicator in 5 European countries. *Journal of the American Medical Directors Association, 21*(6), 772–779.e776. <https://doi.org/10.1016/j.jamda.2020.03.019>