Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

Explaining frailty by lifestyle

Robbert J.J. Gobbens[a,b,*], Marcel A.L.M. van Assen[c,d]

[a] Faculty of Health, Sports and Social Work, Inholland University of Applied Sciences, Amsterdam, The Netherlands
[b] Zonnehuisgroep Amstelland, Amstelveen, The Netherlands
[c] Department of Methodology and Statistics, Tilburg School of Social and Behavioral Sciences, Tilburg University, Tilburg, The Netherlands
[d] Department of Sociology, Utrecht University, The Netherlands

ARTICLE INFO

ABSTRACT

Objective: To determine whether the effects of lifestyle factors on frailty can be adequately addressed by asking a single self-report question.
Design: Cross-sectional study.
Setting: A sample of Dutch citizens completed the web-based questionnaire "Seniorenbarometer".
Participants: 610 persons aged 50 years and older.
Measurements: Seven lifestyle factors were assessed: smoking, use of alcohol, intake of vegetables, intake of fruit, having breakfast, exercise, and teeth brushing. The single self-report question of lifestyle was: "Overall, how healthy would you say your lifestyle is?" Frailty was measured by the Tilburg Frailty Indicator.
Results: Age was positively associated with a healthy lifestyle (less smoking, more intake of vegetables, fruit and eating breakfast). The lifestyle factors did not improve the prediction of total, physical, psychological, and social frailty, after controlling for the single self-report question.
Conclusion: Our study suggests that one general self-report lifestyle question, rather than a list of specific lifestyle factors, suffices for predicting frailty.

© 2016 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Frailty is a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which increases the risk of adverse outcomes, and is influenced by many variables (Gobbens, Luijkx, Wijnen-Sponselee, & Schols, 2010a,2010b). Well-known adverse outcomes of frailty are activities of daily living disability (Boyd, Xue, Simpson, Guralnik, & Fried, 2005), hospitalization (Fried et al., 2001), institutionalization (Rockwood et al., 2005), and premature death (Fried et al., 2001). An unhealthy lifestyle, characterized by dietary problems, smoking and alcohol use can lead to the onset of frailty (Bortz, 2002; Fries, 2002; Morley, Haren, Rolland, & Kim, 2006; Woo, Chan, Leung, & Wong, 2010). Prevention of an unhealthy lifestyle by health care professionals such as general practitioners and nurses therefore could possibly limit frailty and adverse outcomes in the older population.

In the Tilburg Frailty Indicator (TFI), a self-report questionnaire for measuring frailty in older persons, lifestyle is assessed using the question "Overall, how healthy would you say your lifestyle is?", and offering three categories of answers (healthy, not healthy/not unhealthy, unhealthy). Previous research using the TFI confirmed that older people with an unhealthier lifestyle were more frail, also after controlling for sex, age, education, income and multi-morbidity (Gobbens, van Assen, Luijkx, Wijnen-Sponselee, Schols, 2010a; Gobbens, van Assen, Luijkx, Wijnen-Sponselee, & Schols, 2012). One explanation for this association is attribution bias by the respondents; if the respondent feels bad, (s)he might reason that this is because (s)he has a poor lifestyle (Gobbens, van Assen et al., 2010a). The present study examines whether the TFI question incorporates the effects of lifestyle factors on frailty, and if it predicts frailty after controlling for effects of these lifestyle factors. The study's main contribution is to answer the question whether the effects of lifestyle factors on frailty can be adequately addressed by asking a single self-report question.

2. Methods

2.1. Study sample

The "Seniorenbarometer" is a web-based questionnaire (www.seniorenbarometer.nl) assessing the opinions of a panel of Dutch older people (aged 50 years and above) about different aspects of

* Corresponding author at: Faculty of Health, Sports and Social Work, Inholland University of Applied Sciences, De Boelelaan 1109, 1081 HV, Amsterdam, The Netherlands
E-mail address: robbert.gobbens@inholland.nl (R.J.J. Gobbens).

life. Older people can volunteer and participation is always without obligation (Gobbens, Luijkx, & van Assen, 2013). From May to June 2012, 837 respondents completed at least part of the questionnaire, of whom 610 filled out the part on background characteristics, frailty, and lifestyle. Medical-ethics approval was not necessary under Dutch legislation, as particular treatments or interventions were not offered or withheld from participants (Central Committee on Research inv. Human Subjects, 2010). Informed consent, in terms of information-giving and maintaining confidentially, was respected.

2.2. Measures

2.2.1. Individual lifestyle factors

We assessed seven lifestyle factors: smoking, use of alcohol, intake of vegetables, intake of fruit, having breakfast, exercise, and tooth brushing (see Table 1 for operationalization).

2.2.2. Frailty

Frailty was assessed using part B of the TFI (Gobbens, van Assen, Luijkx, Wijnen-Sponselee, & Schols, 2010b). Part B of the TFI contains fifteen self-reported questions on components of frailty, divided into the three domains physical (eight questions), psychological (four questions), and social frailty (three questions). One of the usual physical TFI components 'physically unhealthy' was replaced by 'physical inactivity' using the question 'Do you find that you can be sufficiently physically active?', as we did in a previous study (Gobbens et al., 2013). For further details regarding the TFI and its good psychometric properties, we refer the reader to previous studies (Coelho, Santos, Paul, Gobbens, & Fernandes, 2014; Gobbens, van Assen, Luijkx, & Schols, 2012a; Gobbens, van Assen et al., 2010b; Uchmanowicz et al., 2014). Moreover, a recent systematic review concluded that the TFI has the most robust evidence of reliability and validity of 38 frailty assessment instruments (Sutton et al., 2016).

2.2.3. Socio-demographic background characteristics and multimorbidity

The socio-demographic background characteristics considered were age (in years), sex, marital status (five categories), highest education attained (five categories) and satisfaction with respect to income (question 'Do you have enough money to meet your needs?', with five categories) (see Table 2). We assessed multimorbidity by asking 'Do you have two or more diseases and/or chronic disorders?' (yes/no).

2.3. Analysis strategies

Descriptive statistics were provided on all predictors (background characteristics and lifestyle factors) and dependent variables (total frailty and three frailty domains). We carried out logistic regression analyses with lifestyle factors as dependent and age and sex as independent variables, followed by regression analyses testing the effect of lifestyle on frailty. For our analyses, we created dummies for marital status ("1" married or cohabiting, and "0" rest), sex ("1" woman, "0" man), and multimorbidity ("1" yes, "0" no) (Gobbens et al., 2013; Gobbens, van Assen, Luijkx, & Schols, 2012b), and linear effects of age, education, and satisfaction with income were incorporated into the analyses.

We report results of both bivariate and sequential multiple regression analyses. The multiple regression analyses consisted of two blocks. The effect of the socio-demographic background characteristics, multimorbidity and one self-report question on lifestyle was estimated in the first block. In the second block seven individual lifestyle factors were added to the model, and using the increase in explained variance (ΔR^2), we tested whether these factors contributed to the explanation of frailty after controlling for the TFI lifestyle question (and other predictors). Using the regression coefficients of this final model we tested whether the TFI lifestyle question improved prediction of frailty after controlling for the lifestyle factors (and other predictors).

The analyses were performed using IBM SPSS Statistics 22.0 (IBM, Armonk, NY, USA).

3. Results

3.1. Participant characteristics

Table 2 shows the descriptive statistics of the 610 participants. The mean age of the participants was 70.6 years (SD = 7.3; range 52–89) with a median of 69 years. 61.6% were male, 13.8% had no or only primary education, 67.6% were married or cohabiting, and 9.3% found their income too little to meet their needs. Table 2 also presents the lifestyle characteristics of the participants.

3.2. Effects of age and sex on lifestyle

Table 3 presents the results of analyses on the effects of sex and age on the seven individual lifestyle factors. Sex (being a woman) was negatively associated with insufficiently intake of fruit and with insufficiently teeth brushing. Age was negatively associated with smoking, insufficient intake of vegetables, fruit and eating

Table 1
Operationalization of individual lifestyle factors.

Lifestyle factor	Question	Insufficient score
Smoking	How much do you smoke on average per day? (cigarettes, cigars, shag, pipe)	Smoking
Use of alcohol	How many glasses of alcohol do you drink on average per week?	Men > 21 drinks a week Women > 14 drinks a week
Intake of vegetables	How many times a week do you eat vegetables? (vegetables in casseroles also count, but a lettuce leaf on a sandwich, for example, does not count)	<7 days a week
Intake of fruit	How many days a week do you eat fruit or drink a glass of juice?	<7 days a week
Having breakfast	How many days a week do you eat breakfast? (breakfast-drink breakfast bar, muesli and the like, also count as breakfast)	<7 days a week
Exercise	How many days in the week do you exercise for at least half an hour moderate to intensive? (cycling, hiking, sports, also count)	Persons aged <55 years: ≥30 minutes a day Persons aged ≥55 years: ≥30 minutes at least five times a week
Tooth brushing	How often do you brush your teeth a week?	<14 times a week