Outcomes Priorities for Olders Persons with Sarcopenia

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Abstract

Objectives—To evaluate patients' preferences for sarcopenia outcomes.

Design—Discrete-choice experiment (DCE).

Setting and participants—Community-dwelling individuals aged over 65 years suffering from sarcopenia recruited in Belgium, France, Germany, Italy, Spain and Switzerland, who visited the clinic and were cognitively able to understand and fill out the survey.

Methods—In the DCE survey, participants were repetitively asked to choose which one of two patients suffering from sarcopenia deserves the most a treatment. The two patients presented different levels of risk for five pre-selected sarcopenia outcomes: quality of life, mobility, domestic

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activities, fatigue and falls. The DCE included 12 choice sets. Mixed logit panel model was used to estimate patients' preferences and latent class model was conducted to identify profiles of responses.

Results—A total of 216 sarcopenic persons were included for the analysis (68% women; mean age 78 years). All five pre-selected sarcopenia outcomes were shown to be significant. Overall, the most important sarcopenia outcome was mobility (30%) followed by the ability to manage domestic activities (22%), the risk of falls (18%), fatigue (17%) and quality of life (14%). The latent class model identified two classes of respondents. In the first class (probability of 56%), participants valued mobility the most (42%) followed by ability to manage domestic activities (23%) and risk of falls (17%). In the second class, fatigue was the most important outcome (27%) followed by domestic activities (19%) and risk of falls (19%). No statistically significant associations between the latent classes and socio-demographic characteristics were found.

Conclusion/implications—This study suggests that all five pre-selected outcomes were important for sarcopenic older individuals. Overall, the most important outcomes were mobility and ability to manage domestic activities, although variations in preferences were observed between respondents. This could help in incorporating patient preferences when designing appropriate solutions for individuals with sarcopenia.

Introduction

It is now largely acknowledged that sarcopenia represents an individual as well as a considerable public health burden [1–3] that can lead to a plethora of health consequences. Recently, a systematic review tried to provide a valid list of outcomes associated with sarcopenia identified through published studies [4]. Little is however known about how the patients themselves value these outcomes. Understanding which sarcopenia outcomes are the most important is highly relevant for clinicians when trying to understand patients` concerns. In addition, improved insights into patients' preferences on sarcopenia outcomes might and should have an impact on the design of future treatments and of the necessary clinical studies (e.g. incorporation of primary endpoints). Product development and acceptance can benefit from knowledge about what patients value and what they prefer in the context of their disease and available treatment options [5].

To get insight into important sarcopenia outcomes, as a first step, we identified and prioritized the five most important outcomes for patients with sarcopenia based on consecutively a systematic review, focus groups with patients and expert discussions [6]. As a next step, it is important to know how patients make trade-offs between these outcomes. This study aimed therefore to assess the preferences of participants across Europe for sarcopenia outcomes using a discrete-choice experiment (DCE).

Methods

In the DCE survey, participants were presented with a series of choices and asked in each to select the patient among two hypothetical patients suffering from sarcopenia which one needed the most a treatment. The hypothetical patients were described by a set of attributes which were further specified by attributes` levels. Good research practices for stated-preference studies were followed [7, 8].

Attributes and levels

The identification and prioritization of sarcopenia outcomes was conducted following a 4-step procedure: a literature review, an expert consultation, focus groups with participants suffering from sarcopenia and an expert meeting. More details about these four stages are presented in Beaudart et al. [6]. The five sarcopenia outcomes included in the DCE were mobility, quality of life, ability to manage domestic activities, level of fatigue and risk of falls (see Figure 1A).

Experimental design

A subset of choice sets to be presented to the respondents was selected based on efficient design using Ngene software (Version 1.1.1, http://www.choice-metrics.com). A total of 24 choice tasks was designed and blocked into two versions of the questionnaire containing 12 choice tasks each. A dominance test - a choice set with one hypothetical patient that is clearly better than the other - was added to assess reliability of respondents' choices [9]. An example of a choice task is shown in Figure 1B.

Questionnaire

The questionnaire was paper-based. Data on participants' demographics and socioeconomic characteristics were also collected. The English version of the questionnaire was pilot tested with 10 sarcopenia experts/clinicians and 20 sarcopenic older persons to check interpretation problems, face validity and length of the questionnaire. Only minor changes to layout were made. The questionnaire was then translated into additional languages. The questionnaire is available upon request from the corresponding author.

Subject selection and data collection

The study was conducted in six European countries (between November 2017 and December 2018) in community-dwelling persons 65 years of age and older suffering from sarcopenia and visiting the clinic. Sarcopenia was diagnosed according to valid published definitions (EWGSOP, FNIH, IWGS) [10–12]. Only participants who were cognitively able to understand and fill out the questionnaire were included. The questionnaire was completed by the participant at the clinic or at home. In line with common rules-of-thumb for minimum sample size [13], a minimum of 200 respondents was targeted.

Approval for this study was obtained from the Medical Ethics Committee of the University of Liège that coordinated the project and in participating centers that required ethics approval for a DCE questionnaire study.

Statistical analyses

Data analysis was carried out using Nlogit software, version 5.0. Data of participants who failed the dominance test were excluded.

First, a panel mixed logit model (estimated using 1,000 Halton draws) was used which allows to capture heterogeneity by estimating the standard deviation of the parameter's distribution. A standard deviation significantly different from zero is interpreted as evidence of significant preference heterogeneity for the attribute/level in the sample. Analyses were conducted for the whole sample as well as per country. All variables were included as effects-coded categorical variables that were normally distributed. Using effect coding, mean attributes are normalized to zero and preference weights are relative to the mean effect of the different levels of the attribute.

Using the range method [8], the relative importance of attributes was calculated by measuring the difference between the highest and lowest coefficient for the levels of the respective attribute. The relative importance is then calculated by dividing the attribute-specific level range by the sum of all attribute level ranges.

Second, a latent class model was used to determine preference profiles of respondents [14]. To determine the number of classes, we selected the model with the best fit based on the Akaike information criterion. To investigate if the latent classes differed according to patients' characteristics, Chi squared tests and multinomial logistic regression were used to test whether parameters significantly differed across latent classes. These analyses were conducted with IBM SPSS 24™.

Finally, subgroup analyses were conducted to investigate potential differences between countries and socio-demographics variables. The mean age was used to create a dummy variable, and high education level included participants with a diploma from secondary school, college or university. To assess if preferences are significantly different between subgroups, a joint model taking scale heterogeneity into account [15] was estimated using interaction terms to capture systematic differences in preference between subgroups.

Results

Participants' characteristics

A total of 245 questionnaires were completed and returned. Of those, 29 participants failed the dominance test and were excluded from the final analysis. Participants who failed the dominance test did not differ in age, gender and education level, and inclusion of these patients in an additional analysis did not affect the results and conclusions. The final sample consisted of 216 participants (46 from Belgium, 30 from France, 18 from Germany, 50 from Italy, 39 from Spain and 33 from Switzerland). The respondents had a mean age of 77.9 years, and 68% were female. Sample characteristics are shown in Appendix Table 1. On average, the task difficulty was seen as moderate with an average score of 4.22 (SD: 1.46), based on responses to a seven-point scale (one for extremely easy).

Mixed logit models

The panel mixed logit model results are presented in Table 1. All five pre-selected sarcopenia outcomes were significant and thus important for respondents. All coefficients had the expected sign. Overall, the most important sarcopenia outcome was mobility (30%) followed by the ability to manage domestic activities (22%), the risk of falls (18%), fatigue (17%) and quality of life (14%). Given the significant standard deviation for most coefficients (with the exception of quality of life), variations in preferences between participants were observed for all attributes.

The relative importance of attributes per country is shown in Appendix Figure 1. Mobility was the most important sarcopenia outcome in five out of the six countries. In Spain, ability to manage domestic activities was the most important outcome, followed by risk of falls and mobility. In all countries, all five pre-selected sarcopenia outcomes were significant and some variations in preferences between respondents were observed, especially for mobility.

Latent class model

The latent class model identified two classes of respondents with class probabilities of 56% and 44%, respectively (see Table 2). In the first class, participants valued mobility the most (42%) while fatigue was the most important outcome (27%) in the second class. When assessing the differences of the individual patient characteristics between the latent classes, no statistical significant differences were found.

Subgroup analyses

Some significant differences between countries and subgroups were observed (see Appendix Table 2). In comparison with Belgium (the reference country), respondents from France, Germany and Spain has a significant lower preference for the ability to manage domestic activities. Quality of life was significantly more important in Switzerland than in Belgium. Age and gender did not have a significant effect on respondents' preferences. Participants with high education level gave more importance to ability to manage domestic activities.

Discussion

This study suggests that all five pre-selected sarcopenia outcomes included in the DCE were important for participants. As sarcopenic older persons are affected with regard to their muscle mass, muscle strength and physical performance, mobility is often restricted in these patients. In a previous work dedicated to develop a health-related quality of life questionnaire in individuals suffering from sarcopenia, 18 out of the 55 items of the scale were targeting mobility [16]. It is therefore not surprising that this outcome is of huge importance in our study. The second most important outcome is "ability to manage domestic activities". The loss of muscle strength can impact several activities of daily living such as household tasks (like opening a bottle or jar, carrying and storing heavy objects), and older adults know that not being able to manage domestic activity may eventually mean admission to nursing home. The latent class model identified also a profile of respondent with a preference for the outcome "fatigue". In our previous publication aiming to identify the attributes to include into this DCE [6], the outcome "fatigue" was not identified based on

literature review and experts` opinion, but only during focus groups with sarcopenic older persons. Amelioration of fatigue should thus be considered as a very important therapy outcome for sarcopenic patients, as also found in patients with rheumatoid arthritis [17]. This finding further highlights the need and importance to involve patients into research planning and to investigate patients' preferences.

Although this study attempted to follow good research practices, some potential limitations exist. First, patients in this survey are younger on average than the typical sarcopenia patient. Given that we were collecting data from the patient's perspective, we had to make sure that they were cognitively intact and reliable, so the selection of a younger cohort could be partially explain by these factors. Despite the fact that patients need to be able to understand the questionnaire, they were otherwise absolutely typical to our sarcopenia population. Selection bias and limitations in generalizability of our results can therefore not be excluded. On the other hand, older sarcopenic patients are usually disabled and that disability, in many cases due to multi morbidity, may have an impact on the results that do not reflect sarcopenia, but other conditions. Second, different number of samples and gender participants from each country were collected which could also limit generalizability. Exclusion and refusals were also not systematically collected. Third, back and forward translations of the questionnaire were not done, and a pilot study was not conducted in all countries. Fourth, although a sound methodology was used to select and define attributes, it cannot be excluded that additional attributes may play a role, at least in some countries. To maintain consistency across countries, the same list of attributes as well as levels and the same design was used in all countries. In addition, other important covariates should also be acknowledged like the severity of sarcopenia in each participant which was not systematically collected in our study. Fifth, we were unable to understand the causes of the differences between countries. Finally, while DCEs are widely used, an inherent limitation is that respondents are evaluating hypothetical options. Therefore, what respondents declare they will do may differ from what they would actually do if faced with the choice in real life.

Conclusion and implications

In conclusion, this study suggests that all five pre-selected sarcopenia outcomes were highly relevant for sarcopenia patients and that the most important outcomes were mobility and ability to manage domestic activities, although variations in preferences were observed between respondents. Assessing sarcopenic older persons' preferences offers support to health professionals that want to improve sarcopenia management, to facilitate shared-decision making, and finally, those outcomes could further be useful when designing and evaluating appropriate healthcare programs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

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Brief summary

This study revealed patient preferences in sarcopenia outcomes, suggesting some variations in preference choices. This could help in involving patients when designing appropriate solutions.

A

Attributes	Levels
Patient's mobility	Outdoor mobility without difficulties
	Outdoor mobility with difficulties
	Indoor mobility only
	Chairbound or bedbound
Patient's quality of life	Good
	Fair
	Poor
Patient's management of domestic activities	Manages without difficulties
	Manages with difficulty
	Unable
Patient's level of fatigue	Tired not at all
	Moderately tired
	Tired very easily
Frequency of falls	Never
	Occasional (once in the last 6 months)
	Frequent (two or more times in the last 6 months)

B

Question 1

	Patient A	Patient B
Mobility	Indoors only	Outdoor with difficulties
Quality of life	Poor	Good
Domestic activities (such as cooking, cleaning, gardening)	Manage without difficulty	Unable
Fatigue (when doing daily activities)	Tired not at all	Tired very easily
Falls	Occasional (once in the last 6 months)	Never

	Patient A	Patient B
Which of the two patients deserve for you the most the treatment? (Tick one box only)	☐	☐

Figure 1.

A: Attributes and levels included in the DCE

B: Example choice set of the DCE questionnaire

Table 1
Results from the panel mixed logit model

Attributes and levels	Estimate (95% CI)	Standard deviation [a]	Relative importance
Constant			
Patient's mobility			**29.9%**
Outdoor mobility without difficulties	-1.1532*** (-0.94;1.37)	0.9327***	
Outdoor mobility with difficulties	0.0246 (-0.13;0.18)	0.6002***	
Indoor mobility only	0.1702* (-0.01;0.35)	0.6120***	
Chairbound or bedbound	0.9584*** (0.64;1.27)	--	
Patient's quality of life			**13.7%**
Good	-0.4732*** (-0.59;0.35)	0.0271	
Fair	-0.0213 (-0.11;0.07)	---	
Poor	0.4945*** (0.37;0.62)	0.1413	
Patient's management of domestic activities			**21.7%**
Managed without difficulties	-0.8571*** (-1.01;0.71)	0.2275**	
Managed with difficulty	0.1811** (0.07;0.29)	---	
Unable	0.6760*** (0.53;0.82)	0.2424***	
Patient's level of fatigue			**16.6%**
Tired not at all	-0.5233*** (-0.65;-0.40)	0.2258***	
Moderately tired	-0.1253** (-0.22;-0.03)	**---**	
Tired very easily	0.6486*** (0.51;0.79)	0.2419**	
Frequency of falls			**18.1%**
Never	-0.6711*** (-0.80;-0.54)	0.0828***	
Occasional (once in the last 6 months)	0.0627(-0.03;0.16)	---	
Frequent (2 in the last 6 months)	0.6083*** (0.47;0.75)	0.3428***	

[a]Standard deviations correspond to the random component of the model coefficients,

**P<0.05, ***P<0.01

Table 2

Latent class analysis and association between patients' characteristics and latent class membership

	Latent class 1 (56%) Mobility 42% Quality of life 10% Domestic activities 23% Fatigue 9% Falls 17%	Latent class 2 (44%) Mobility 18% Quality of life 17% Domestic activities 19% Fatigue 27% Falls 19%
Belgium	20%	22%
France	14%	14%
Germany	7%	9%
Italy	32%	18%
Spain	18%	18%
Switzerland	9%	19%
Older age	46%	53%
High education	47%	50%
Women	62%	71%