

Available online at www.sciencedirect.com

Public Health

journal homepage: www.elsevier.com/puhe

Original Research

Measuring positive health: for now, a bridge too far



Cecilia A.C. Prinsen*, Caroline B. Terwee

Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Epidemiology and Biostatistics, Amsterdam Public Health Research Institute, Boelelaan 1117, Amsterdam, The Netherlands

ARTICLE INFO

Article history:

Received 12 September 2018

Received in revised form

19 February 2019

Accepted 26 February 2019

Available online 8 April 2019

Keywords:

Positive health

Measurement

Outcome measurement instrument

Instrument development

Ranking

Content validity

ABSTRACT

Objectives: Huber et al. introduced a new concept ‘positive health’, defined as ‘the ability to adapt and self-manage in the face of social, physical and emotional challenges’ and suggested a conceptual model comprising six domains covering 32 aspects. Our aim was to generate items and pilot test an outcome measurement instrument for measuring ‘positive health’ in Dutch adult citizens.

Study design: A mixed-method study: a literature search, a qualitative study with interviews and a quantitative ranking study for the development phase, to be followed by a content validity study for the validation phase.

Methods: We developed items based on the concept elicitation study of Huber et al. A ranking study with end users, Dutch citizens and members of an Expert Group was performed for item reduction. Content validity of the prefinal questionnaire was evaluated.

Results: A prefinal 46-item questionnaire was developed. The results of the content validity study, however, showed major concerns with regard to relevance, comprehensiveness and comprehensibility of the questionnaire.

Conclusions: Because of major concerns regarding the conceptual model of ‘positive health’, it was not possible to develop a valid questionnaire to measure ‘positive health’. Future research should focus on the refinement of the conceptualization of ‘positive health’ before an adequate measurement instrument could be developed that can be used for outcome measurement purposes.

© 2019 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

Introduction

In 2011, a new concept of health was introduced by Huber et al.: ‘health as the ability to adapt and to self-manage, in the face of social, physical, and emotional challenges’.¹ This new

concept was proposed because the World Health Organization definition of health, that is, ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’,² was considered no longer adequate,³ and it was felt that there was a need for a more dynamic definition of health.⁴

* Corresponding author. Amsterdam UMC, location VUmc, Department of Epidemiology and Biostatistics, De Boelelaan 1089a, 1081 HV Amsterdam, The Netherlands. Tel.: +31 20 4445903.

E-mail address: c.prinsen@vumc.nl (C.A.C. Prinsen).

<https://doi.org/10.1016/j.puhe.2019.02.024>

0033-3506/© 2019 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

In a mixed methods study, Huber et al.³ asked various stakeholders in concept elicitation interviews and focus group sessions about indicators of health. A wide range of indicators were identified and categorized into six domains (i.e. bodily functions, mental functions and perception, spiritual/existential domain, quality of life, social and societal participation and daily functioning), including 32 underlying aspects of health (Table 1). Each aspect was given a patient-centred definition. This operationalization of the new concept of health was named ‘positive health’ and was suggested to be used for (online self-) monitoring purposes and in the empowerment of patients in ‘shared decision-making’ (i.e. by asking which domain or aspect the patient would like to improve).³

The next step in the operationalization of this new concept of health was to develop an outcome measurement instrument to measure the domains and aspects of ‘positive health’. According to textbooks^{5,6} and guidelines, such as those of the International Society for Pharmacoeconomics and Outcomes Research Patient-Reported Outcomes (PRO) Content validity Good Research Practices Task Force⁷ and the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN),⁸ instrument development starts with construct definition and concept elicitation, followed by item generation and pilot testing to ensure content validity. The first part (construct definition and concept elicitation) was already conducted by Huber et al., as described previously. The aim of the present study was to generate items and pilot test an outcome measurement instrument for measuring ‘positive health’ in Dutch adult citizens.

Methods

Study design

We performed a mixed-method study, including a literature search, a qualitative and quantitative ranking study among relevant stakeholders for the development phase, followed by a content validity study.

Project group

The project group of this study consisted of a project coordinator (C.P.), a project leader (Dr. M. Huber, founder of the Institute for Positive Health) and a principal investigator (C.T.). As the development of an outcome measurement instrument requires expertise on the construct of interest,⁷ an Expert Group was established including clinicians, end users, methodologists and researchers from 11 healthcare institutions in the Netherlands (n = 19, five clinicians/researchers from Public Health Services, 10 [academic] clinicians/researchers, one policy maker, two experts from knowledge centres on health issues and one representative from the patient society). The study was initiated by the Institute for Positive Health and coordinated at the VU University Medical Center in Amsterdam, the Netherlands.

Item generation

We developed items based on findings from the concept elicitation phase, performed by Huber et al.¹ We aimed to identify items from well-known validated instruments that could cover the 32 aspects, of ‘positive health’. A set of questionnaires was identified from the medical literature based on expert judgement by the first author (C.P.), by searching PubMed, Google and databases such as the PROQOLID database⁹ and a Dutch database of measurement instruments¹⁰ using the names or description of the aspects as search terms and evaluated for its content. Questionnaires were selected if they were considered commonly used, well-validated and measured one or more of the aspects of ‘positive health’, according to the authors, who are experts in PRO measurement (C.P. and C.T.). One to maximum four individual items were selected from the questionnaires for each aspect of ‘positive health’ that best matched the patient-centred definition of one or more of the aspects of ‘positive health’ and were easy to read, according to the authors (C.P. and C.T.). New items, including response options, were formulated when no existing item/instrument could be identified that matched the patient-centred definitions of the 32 aspects for

Table 1 – Six domains of health indicators, including 32 aspects of health as developed by Huber et al.^{1,3}

Bodily functions	Mental functions and perception	Spiritual/existential dimension	Quality of life	Social and societal participation	Daily functioning
Medical facts	Cognitive functioning	Meaning /meaningfulness	Quality of life /well-being	Social and communicative skills	Basic ADL
Medical observations	Emotional state	Striving for aims/ideals	Experiencing happiness	Meaningful relationships	Instrumental ADL
Physical functioning	Esteem/self-respect	Future prospects	Enjoyment	Social contacts	Ability to work
Complaints and pain	Experiencing to be in charge /manageability	Acceptance	Perceived health	Experiencing to be accepted	Health literacy
Energy	Self-management		Flourishing	Community involvement	
	Resilience, sense of coherence		Zest for life	Meaningful work	
			Balance		

ADL, activities of daily living.

'positive health'. This resulted in a preliminary long list of items.

Members of the Expert Group were asked to review the proposed set of items supposed to cover each aspect, identify additional relevant items or questionnaires, identify the most appropriate items for each aspect and guide new item construction in case it was felt that the aspect was insufficiently covered by the proposed items. This resulted in a long list of items that was included in a ranking study for item reduction (described in the following section).

Item reduction

A ranking study was conducted to select the most relevant items to retain in the questionnaire.¹¹ Participants of the ranking study were stakeholders, including Dutch citizens (representing patients and people from the general population), end users (i.e. epidemiologists, general practitioners, Public Health Service (GGD) employees, researchers) and members of the Expert Group. The selection of citizens was based on input from an insurance company for healthcare professionals and their families (i.e. IZZ/VGZ). Participants were invited by email and instructed to put the items for each of the 32 aspects in order of relevance, given the patient-centred definitions.¹ If participants felt that important items were missing, or knew of items available from existing questionnaires that better represent the given patient definition(s), they were encouraged to report this. Items that were considered most relevant were included in the prefinal questionnaire. For feasibility purposes, we aimed to include a maximum of four questions per aspect.

Pilot testing to ensure content validity

We pilot tested the prefinal questionnaire to ensure content validity.^{7,12} According to the COSMIN taxonomy, content validity is defined as the degree to which the content of an instrument is an adequate reflection of the construct to be measured and refers to the relevance, comprehensiveness and comprehensibility of the items of a questionnaire.^{8,13} Relevance refers to whether all items are relevant for measuring the construct of interest, for the target population and for the intended context of use. Comprehensiveness refers to whether all key concepts are included.

Comprehensibility refers to whether items, response options, and instructions are understood by the target population as intended.⁸ Content validity was systematically evaluated and judged in light of the construct and target population of interest.⁸ The Expert Group was asked for each aspect of 'positive health' if the proposed item(s) was relevant for measuring the aspect, given the patient-centred definition (yes/no); whether the aspect was adequately covered by the proposed item(s) and whether the item and response options were appropriately worded (yes/no). Experts were encouraged to provide additional items or alternative wordings if they answered 'no' on one or more of the questions. They were also asked if the items in total sufficiently covered the construct of interest that was defined as 'the ability to adapt and to self-manage'. Finally, we planned to ask a new sample of Dutch citizens and end users to evaluate the relevance, comprehensiveness and comprehensibility of the proposed outcome measurement instrument to evaluate content validity from the perspective of the target population and end users.

Results

Item generation

A total of 40 existing questionnaires identified from the literature ([Appendix 1](#)) were used to select relevant individual items from these questionnaires. The final long list of items that resulted from consultation with the Expert Group consisted of 172 items (range: 2 to 14 items per aspect).

Item reduction

The 172-item questionnaire (available on request from the authors) was sent to the group of stakeholders ($n = 89$). All participants completed the ranking questionnaire between January and March 2016, representing 56 (63%) Dutch citizens, 23 (26%) end users and 10 (11%) members of the Expert Group. Seventy-one percent were female, and the age ranged from 31 to 73 years.

The results of the ranking study are summarized in [Table 2](#). The prefinal questionnaire that resulted from the ranking study consisted of 46 items that purported to measure 32 aspects, covering six domains of 'positive health'.

Table 2 – Results of the ranking study.

Domains	Number of items in the ranking questionnaire	Ranking ^a		Number of most relevant items selected ^b
		Lowest ranking	Highest ranking	
Bodily functions	29	1.44	7.76	10
Mental functions and perception	46	1.61	7.65	12
Spiritual/existential domain	22	1.92	5.20	5
Quality of life	22	1.31	4.27	6
Social and societal participation	34	1.35	9.29	8
Daily functioning	19	1.15	5.74	5
Total number of items selected				46

^a On a scale from 1 to 10, where 10 is considered most relevant.

^b Top ranking, depending on the distribution of the rank ordering for each aspect.

Pilot testing

The 46-item prefinal questionnaire (available on request from the authors) was sent to all members of the Expert Group to evaluate the relevance, comprehensiveness and comprehensibility of the questionnaire that purported to measure 'positive health'. A total of 11 experts (58%, four clinicians/researchers from Public Health Services, five [academic] clinicians/researchers, one policy maker and one expert from a knowledge centre on health issues) reflected on the content of the questionnaire, and one (academic) expert provided some general comments by telephone.

Relevance

Experts argued that the rationale for including some items was unclear. For example, sleep and sexual functioning were mentioned in the patient-centred definition of 'physical functioning'. However, experts questioned why these items were included to cover the aspect 'physical functioning', while other important aspects of physical functioning were not. Experts also argued that not all items, such as 'sexual functioning' and 'meaningful work', are considered relevant to everyone.

Furthermore, it was mentioned that not all aspects were clearly defined by the given patient-centred definitions, and it was not clear whether the questionnaire aimed to measure the frequency or intensity of complaints or satisfaction with these aspects.

Comprehensiveness

The majority of experts found that the domain 'quality of life', as defined by the patient-centred definition, was comprehensively covered by the included items for each of the six aspects. Similar results were found for the domain 'daily functioning' with the exception of the aspect 'health literacy' and for the domain 'social and societal participation' with the exception of the aspect 'community involvement'. Some experts considered these aspects comprehensively covered but others did not or were unsure. Within the domains 'bodily functions', 'mental functions and perceptions' and 'spiritual/existential', some aspects were considered adequately covered, whereas others were not (Table 3).

Comprehensibility

The opinions about the comprehensibility varied considerably. For example, five experts indicated that the comprehensibility of the aspect 'physical functioning' was acceptable, whereas five other experts reported the exact opposite, and one expert was unsure. Similar conflicting results were found for another 10 aspects (Table 3). It was argued that the comprehensibility was difficult to assess for some aspects because the definitions were unclear and difficult to understand, for example, the patient definitions for of 'meaningfulness' and 'balance' were considered unclear. In addition, some words or phrases were considered as either outdated or formulated in a difficult way, and it was noted that response categories should be standardized across all

items. Furthermore, it was stressed that the comprehensibility of the instrument would be an issue for people with low literacy levels.

Feedback from experts

Experts raised several concerns with regard to the validity of the construct 'positive health' and the conceptual model and the reliability and feasibility to measure it with one questionnaire.

With regard to the validity of the construct 'positive health', it was questioned whether the domains and aspects indeed measure 'positive health' or rather aspects of quality of life. Furthermore, the names of the aspects do not always fully cover the given patient definitions. For example, it was argued that the term 'medical observations' does not cover the given definition of 'the impression that a person gives towards others of being healthy'. It was argued that the given patient-centred definition of what is called 'resilience' does not correspond to what is known from the medical literature about resilience and related concepts; that 'manageability' is not similar to 'mastery' and that 'perceived control' is a broader construct than 'self-management'.

With regard to the (content) validity of the conceptual model, there were concerns about the relevance of aspects within domains. It was argued that there is overlap across aspects within a domain. For example, the aspects 'experiencing happiness', 'enjoyment' and 'zest for life' in the quality of life domain show overlapping content. It was also felt that the aspect 'medical facts' concerns objective observations from a healthcare professional, which cannot be reported by patients. It was therefore argued that this aspect should be removed from the conceptual model. Furthermore, it was not always clear to what domains certain aspects belong to. It was questioned, for example, whether sexual functioning truly belongs to the aspect 'physical functioning' and why the aspect 'basic activities of daily living' belongs to the domain 'daily functioning', while the aspect 'physical functioning' is included in the 'bodily functions' domain.

There were also concerns regarding the comprehensiveness of the conceptual model. It was argued that part of the definition of 'positive health' (i.e. 'the ability to adapt') was not sufficiently covered with the 46 items included in the questionnaire. Also, important aspects, such as aspects on competency, being hopeful, long-lasting social contacts, self-acceptance, stress, vitality and worries, were considered to be missing from the conceptual model.

With regard to the reliability and feasibility to measure 'positive health' with one questionnaire, it was stressed that measuring aspects with only one single item (i.e. 'experiencing to be in charge/manageability', 'resilience', 'acceptance' and so on) is methodologically not sound because of low reliability of single items. On the other hand, two experts mentioned that the total number of 46 items is considered too much.

Finally, it was planned to ask Dutch citizens and end users to evaluate the relevance, comprehensiveness and comprehensibility of the prefinal questionnaire. However, based on the problems regarding relevance and comprehensiveness of

Table 3 – Results of the pilot testing.

Domain	Aspect	Item	Relevance yes	Relevance no	Relevance unknown	Comprehen- siveness yes	Comprehen- siveness no	Comprehen- siveness unknown	Comprehen- sibility yes	Comprehen- sibility no	Comprehen- sibility unknown	
Bodily functions	Medical facts	1	5	4	2	2	7	2	7	3	1	
	Medical observations	2	5	3	3	3	3	5	2	7	2	
	Physical functioning	3–6	6	2	3	4	3	4	5	5	1	
	Complaints and pain	7–8	8		3	7	2	2	6	3	2	
Mental functions and perception	Energy	9–10	9		2	7	1	3	5	5	1	
	Cognitive functioning	11–12	9		2	4	3	4	5	4	2	
	Emotional state	13–15	7		4	5	3	3	3	5	3	
	Esteem/self-respect	16–17	8	1	2	7	3	1	6	2	3	
	Experiencing to be in charge/manageability	18	8		3	6	3	2	7	2	2	
	Self-management	19–20	9		2	5	3	3	5	3	3	
	Resilience, sense of coherence	21	7	1	3	4	6	1	6	2	3	
	Comprehensibility	22	7	2	2	5	3	3	3	4	4	
	Spiritual/existential dimension	Meaning/meaningfulness	23	8		2	8		2	6	2	2
		Striving for aims/ideals	24–25	7		3	6	1	3	5	2	3
Future prospects		26	8		2	4	3	3	5	4	1	
Quality of life	Acceptance	27	7		3	5	2	3	6	4		
	Quality of life/well-being	28	7		3	7	1	2	6	3	1	
	Experiencing happiness	29	9		1	9		1	6	4		
	Enjoyment	30	8		2	8		2	4	6		
	Flourishing	31	8		2	8		2	4	3	3	
	Zest for life	32	8		2	8		2	4	3	3	
	Balance	33	9		1	8	1	1	4	4	2	
Social and societal participation	Social and communicative skills	34	8		2	6	2	2	7	1	2	
	Meaningful relationships	35–36	8		2	6	2	2	3	5	2	
	Social contacts	37	8		2	6	3	1	6	2	2	
	Experiencing to be accepted	38	8		2	7		3	5	3	2	
	Community involvement	39–40	6	1	3	5	3	2	3	4	3	
Daily functioning	Meaningful work	41	8		2	7	1	2	6	4		
	Basic ADL	42–43	7		3	7		3	4	4	2	
	Instrumental ADL	44	8		2	8		2	6	3	1	
	Ability to work	45	9		1	9		1	8	1	1	
	Health literacy	46	6	1	3	5	3	2	4	5	1	

ADL, activities of daily living.

Data expressed as total numbers of experts.

the questionnaire that were found in the first part of the pilot test, it was decided to early terminate the study.

Discussion

We developed a questionnaire consisting of 46 items to measure the 32 aspects of ‘positive health’, based on the concept elicitation study and resulting conceptual model of ‘positive health’ proposed by Huber et al.¹ The questionnaire was found to have an inadequate content validity. Experts encountered problems with the relevance, comprehensiveness and comprehensibility of the questionnaire, mainly due to lack of clear patient-centred definitions and concerns with regard to the conceptual model of ‘positive health’. The question was raised whether the present conceptual model of ‘positive health’ is an adequate reflection of health or rather a reflection of aspects of life that influence health.

There is, however, broad interest in the new concept of health. It is considered appealing and addresses other aspects than patients’ illness solely. It focusses on patients’ strengths rather than their weaknesses, which is considered important in the patient management. So how can this discrepancy between the conceptual appeal and difficulties in the development of an instrument be explained? The results of our study show that the conceptual model of ‘positive health’ and its intended application has not yet been fully worked out.

It should be kept in mind that the validation of a measurement instrument and the validation of the underlying theories about the construct cannot be disentangled. When a construct is newly developed, the construct definition and theory might not yet be strongly developed. Validation is an iterative process in which validation results should be used to further develop the theory, which in turn provides a stronger basis for further validation of the measurement instrument.⁶ This process has also taken place for other multidimensional constructs such as participation or quality of life. The results of this study should be used to further refine the construct of ‘positive health’.

First, the construct ‘positive health’ is a very broad, multidimensional construct, with various different aspects that either reflect health or influence health. The question is whether such a broad construct can be measured in a standardized, valid and reliable way with only one instrument. Instead, perhaps a selection of relevant aspects should be measured separately with different (unidimensional) instruments. To decide on this, it should first be very clear what is purported to be measured. For example, it should be clear if the construct of ‘positive health’ refers to patients’ experiences or perceptions with different aspects of health, their level of (aspects of) health and/or their satisfaction with (aspects of) health. This was not defined by Huber et al.¹ when they developed the conceptual model of ‘positive health’.

It should also be clear how the concept of ‘positive health’ relates to other multidimensional constructs such as participation and quality of life. The main difference might be the focus on ‘ability to adapt and to self-manage’. However, it was argued that ‘the ability to adapt’ was not sufficiently covered in the current questionnaire.

Furthermore, because ‘positive health’ includes various personal factors, it is not straightforward to link this construct to well-known and generally accepted conceptual models of health outcomes, such as the Wilson and Cleary model¹⁴ or the International Classification of Functioning, Disability and Health model,¹⁵ which hampers the acceptability of the conceptual model of ‘positive health’. There was discussion in the project group whether the conceptual model of ‘positive health’ needed to be modified before developing a questionnaire. The authors suggested several changes to the conceptual model before drafting the first questionnaire, but the Institute of Positive Health did not want to make any changes to the conceptual model.

Second, it should be clear to whom the measurement of ‘positive health’ will be relevant, that is, the target population. Is the entire construct of ‘positive health’ relevant for all patients or only for patients with, for example, chronic conditions? In this respect, it should also be considered what would be practically feasible to measure in terms of length of the questionnaire and completion time.

Third, refinement of the purpose of measurement is warranted, that is, is the instrument intended for evaluative or diagnostic/prognostic purposes?¹⁶ In the evaluation of treatment effect, it is likely that health aspects that are considered most relevant by patients might differ from those considered by clinicians. This may clarify some of the lack of content validity found. Based on the current conceptual model of ‘positive health’, the Institute for Positive Health offers a tool for (online self-) monitoring purposes and shared decision-making. While the suggestion to discuss health rather than disease is considered appealing, the results of our study indicate that the validity of the scores of this tool should be questioned. We recommend not to use scores at all, and the tool may be less appropriate for evaluative purposes.

At present, the state of the art in outcomes research and the trend in, for example, the implementation of value-based health care is to measure a limited, standardized set of core outcome domains (also known as a core domain set, core outcome set¹⁷ or Standard Set¹⁸) that are most relevant for both patients and healthcare professionals.¹⁹ There is a shift ongoing from measuring broad concepts, such as quality of life, towards measuring a smaller selection of most relevant (sub)domains of quality of life, such as physical function, fatigue and depression. The selection of instruments to measure (core) outcome domains is increasingly being directed towards the use of unidimensional, multi-item instruments, preferably based on item response theory (IRT).²⁰ Interpretation of scores of such unidimensional instruments is more straightforward than that of multidimensional instruments: in the latter case, an overall sum score inadequately reflects the individual subdomains. Therefore, instead of trying to measure everything, a better approach might be to measure only a selected set of relevant domains or aspects. For almost all domains and aspects of ‘positive health’, validated instruments are already available. For example, Patient-Reported Outcomes Measurement Information System (PROMIS)[®] has developed multiple unidimensional item banks (i.e. based on IRT) for relevant constructs such as anxiety, depression, physical functioning, pain interference,

fatigue, sleep disturbance, ability to participate in social roles and activities and satisfaction with social roles and activities.²¹ But also well-known, validated instruments based on classical test theory (CTT) are available, such as the connor-davidson resilience scale (CD-RISC) to measure 'resilience',²² the Affect Balance Scale to measure 'balance',²³ the Health Literacy Questionnaire to measure 'health literacy'²⁴ and so on. However, choices need to be made regarding what to measure in order to limit patient burden when completing (too) many questionnaires.

This study has limitations. First, although the definition of 'positive health' is patient centred, the present study lacked patient involvement. Second, the Dutch citizens included in the stakeholder group who participated in the ranking study were mainly healthcare professionals. A content validity study in people from the general population was planned but because many concerns were expressed with regard to the conceptual model of 'positive health', such a study was considered not useful at this time.

Conclusion

Our study revealed major concerns with regard to the conceptual model of 'positive health'. Therefore, it was not possible to develop a valid questionnaire to measure 'positive health'. Future research should focus on further refinement of the construct 'positive health' and its conceptual model before a reliable and valid instrument can be developed that can be used for outcome measurement purposes.

Author statements

Acknowledgements

The authors thank all members of the Expert Group for their valuable input throughout the study: M Boers, C Boom, M Bouman, S Cremer, M de Been, ML Essink-Bot, MJ Gijsberts, M Huisman, F Koedijk, BD Onwuteaka-Philipsen, JJJM Rademakers, M ten Have, A van Bergen, C van Campen, P van Nierop and J Wolf. They thank ME de Lang for conducting the ranking study, the stakeholder panel for their time spent completing the ranking study and M Huber, J Kievit and ME van den Akker for reviewing the manuscript.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. As this project does not involve vulnerable patients or study subjects as defined by the Dutch Medical Research in Human Subjects Act (WMO), the study was exempted from ethical approval in the Netherlands.

Funding

The research has received funding from VGZ, the Netherlands, under project no D3961.

Competing interests

C.P. declares that she has no conflict of interest. C.T. declares that she has no conflict of interest. M. Huber, who was part of the project group, is the developer of the original conceptual model of 'positive health'. The authors, as well as the members of the Expert Group were not involved in the development of the conceptual model of 'positive health'.

Informed consent

Informed consent was obtained from all individual participants prior to their participation in the ranking study. Participation was entirely voluntary, and data were handled confidentially.

Author contributions

C.P. coordinated the study, developed the ranking questionnaire, analysed the data, wrote the manuscript and reviewed it for important intellectual content. C.T. conceptualized the study protocol together with Dr. M. Huber from the Institute for Positive Health, developed the ranking questionnaire, analysed the data, wrote the manuscript and reviewed it for important intellectual content. All authors have given final approval of the version to be published and agreed to be accountable for all aspects of the work.

REFERENCES

1. Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, et al. How should we define health? *BMJ* 2011;343:d4163.
2. WHO. Constitution of the World health organization. 2006. http://www.who.int/governance/eb/who_constitution_en.pdf. [Accessed 10 September 2018].
3. Huber M, van Vliet M, Giezenberg M, Winkens B, Heerkens Y, Dagnelie PC, et al. Towards a 'patient-centred' operationalisation of the new dynamic concept of health: a mixed methods study. *BMJ Open* 2016;6:e010091.
4. Jadad AR, O'Grady L. How should health be defined? *BMJ* 2008;337:a2900.
5. Streiner DL, Norman GR. *Health measurement scales - a practical guide to their development and use*. 3rd ed. New York: Oxford University Press; 2003.
6. de Vet HC, Terwee CB, Mokkink LB, Knol DL. *Measurement in medicine*. Cambridge University Press; 2011.
7. Patrick DL, Burke LB, Gwaltney CJ, Leidy NK, Martin ML, Molsen E, et al. Content validity—establishing and reporting the evidence in newly developed patient-reported outcomes (PRO) instruments for medical product evaluation: ISPOR PRO good research practices task force report: part 1—eliciting concepts for a new PRO instrument. *Value Health* 2011;14:967–77.
8. Terwee CB, Prinsen CAC, Chiarotto A, Westerman MJ, Patrick DL, Alonso J, et al. COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. *Qual Life Res* 2018;27:1159–70.
9. <https://eprovide.mapi-trust.org/about/about-proqolid>.
10. www.meetinstrumentenzorg.nl.
11. Marx RG, Bombardier C, Hogg-Johnson S, Wright JG. How should importance and severity ratings be combined for item

- reduction in the development of health status instruments? *J Clin Epidemiol* 1999;52:193–7.
12. COSMIN methodology for assessing the content validity of PROMs – user manual. 2018. Version 1.0, <https://cosmin.nl/wp-content/uploads/COSMIN-methodology-for-content-validity-user-manual-v1.pdf>. [Accessed 10 September 2018].
 13. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *J Clin Epidemiol* 2010;63:737–45.
 14. Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA* 1995;273:59–65.
 15. International Classification of Functioning. Disability and Health (ICF) [database on the Internet]. 2001. Available from: <http://apps.who.int/classifications/icfbrowser/>.
 16. Zorginstituut Nederland. PROM cycle. <https://www.zorginzicht.nl/kennisbank/Paginas/prom-toolbox.aspx>. [Accessed 10 September 2018].
 17. Williamson PR, Altman DG, Blazeby JM, Clarke M, Devane D, Gargon E, et al. Developing core outcome sets for clinical trials: issues to consider. *Trials* 2012;13:132.
 18. Porter ME, Larsson S, Lee TH. Standardizing patient outcomes measurement. *N Engl J Med* 2016;374:504–6.
 19. Bingham 3rd CO, Bartlett SJ, Merkel PA, Mielenz TJ, Pilkonis PA, Edmundson L, et al. Using patient-reported outcomes and PROMIS in research and clinical applications: experiences from the PCORI pilot projects. *Qual Life Res* 2016;25:2109–16.
 20. Cella D, Gershon R, Lai JS, Choi S. The future of outcomes measurement: item banking, tailored short-forms, and computerized adaptive assessment. *Qual Life Res* 2007;16(Suppl 1):133–41.
 21. Patient-Reported Outcomes Measurement Information System (PROMIS®). <http://www.healthmeasures.net/explore-measurement-systems/promis>. [Accessed 10 September 2018].
 22. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety* 2003;18:76–82.
 23. Kempen GI, Ormel J. Measuring psychological well-being in the elderly. *Tijdschr Gerontol Geriatr* 1992;23:225–35.
 24. Osborne RH, Batterham RW, Elsworth GR, Hawkins M, Buchbinder R. The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health* 2013;13:658.
 3. PROMIS Pain Interference
 4. PROMIS Physical Function
 5. PROMIS Fatigue
 6. PROMIS Sleep Disturbances
 7. PROMIS Sleep-Related Impairment
 8. PROMIS Ability to Participate in Social Roles and Activities
 9. PROMIS Satisfaction with Social Roles and Activities
 10. PROMIS Emotional support
 11. PROMIS Social Isolation
 12. Affect Balance Scale
 13. CD-RISC (Connor-Davidson Resilience Scale)
 14. De Jong Gierveld Eenzaamheidsschaal (Loneliness Scale)
 15. 4DKL (Four-dimensional Symptom Questionnaire)
 16. Dutch Five-Faced Mindfulness Questionnaire
 17. EMPO (Empowerment questionnaire)
 18. EORTC-QLQ-C30
 19. Ervaren regie vragenlijst (Perceived control questionnaire)
 20. GGD Gezondheidsmonitor (Health monitor)
 21. HOOP (Hope questionnaire)
 22. IPA (Impact on Participation and Autonomy)
 23. LASA110 (Longitudinal Aging Study Amsterdam) Satisfaction with life
 24. LASA033 (Longitudinal Aging Study Amsterdam) Receiving care
 25. LASA028 (Longitudinal Aging Study Amsterdam) Self-efficacy
 26. LASA027b (Longitudinal Aging Study Amsterdam) Self-esteem
 27. LASA137 (Longitudinal Aging Study Amsterdam) Valuation of life
 28. MLQ (Meaningful Life Questionnaire)
 29. Mental Health Continuum
 30. Mijn Persoonlijke Gezondheidscheck (My personal health check)
 31. PAM (Patient Activation Measure)
 32. Positief Welbevinden Schaal (Positive wellbeing scale)
 33. Psychological Well-being Scales
 34. Remoralisatieschaal (Remoralization scale)
 35. SAIL (Spiritual Attitude and Interest scale)
 36. SF-36
 37. SOC (13-item Sense of Coherence questionnaire)
 38. USER-Participation
 39. VITA-16 (Vitality)
 40. WHOQOL-BREF

Appendix 1. Questionnaires considered for the questionnaire ‘Positive health’

1. PROMIS Global health
2. PROMIS Pain Behavior