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Assessment of malnutrition in patients with head and neck cancer: a multidimensional approach

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Chapter 4. Evaluation of change in dietitians' perceived comprehensibility and difficulty of the Patient-Generated Subjective Global Assessment (PG-SGA) after a single training in the use of the instrument
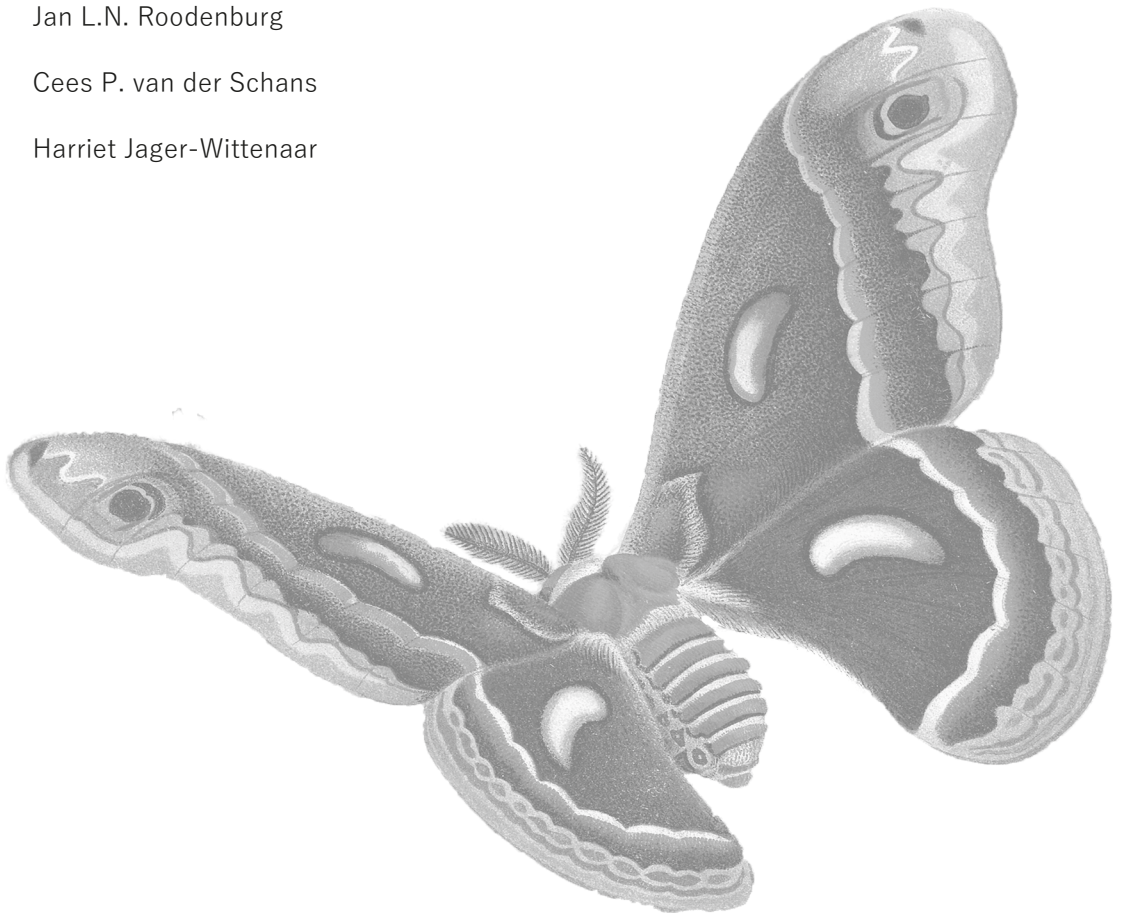
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Abstract

Background: The Patient-Generated Subjective Global Assessment (PG-SGA) is an instrument to assess malnutrition and its risk factors. Some items of the PG-SGA may be perceived as hard to comprehend or difficult by healthcare professionals. The objective was to evaluate if and how dietitians' perceptions of comprehensibility and difficulty of the PG-SGA change after a single training in PG-SGA use.

Methods: In this prospective evaluation study, Dutch PG-SGA-naïve dietitians completed a questionnaire regarding perceived comprehensibility and difficulty of the PG-SGA before (T0) and after (T1) receiving a single training in instrument use. Perceived comprehensibility and difficulty were operationalized by calculating item and scale indices for comprehensibility (I-CI, S-CI) and difficulty (I-DI, S-DI) at T0 and T1. An item index of 0.78 was considered acceptable, a scale index of 0.80 was considered acceptable, and a scale index of 0.90 was considered excellent.

Results: A total of 35 participants completed the questionnaire both at T0 and T1. All item indices related to comprehensibility and difficulty improved, although I-DI for the items regarding food intake and physical exam remained below 0.78. Scale indices for difficulty and comprehensibility of the PG-SGA significantly changed (p<0.001) from not acceptable at T0 (S-CI=0.69; S-DI=0.57), to excellent for comprehensibility (S-CI=0.95) and acceptable for difficulty (S-DI=0.86) at T1.

Conclusions: The findings of this study suggest that significant improvement in PG-SGA-naïve dietitians' perception of comprehensibility and difficulty of the PG-SGA can be achieved quickly by providing a one day training in the use of the PG-SGA.

Introduction

The Scored Patient-Generated Subjective Global assessment (PG-SGA; Copyright FD Ottery, 1996, 2001, 2006) was developed as a modification of the Subjective Global Assessment[1] and can be used to assess malnutrition in the sense of undernutrition, and its underlying risk factors.[2,3] The PG-SGA includes a patient-generated component and a professional component, thus providing cumulative insight from both perspectives in the nutritional status of the patient. The PG-SGA was first validated in the oncology setting[3-6], and has subsequently been validated in other settings, such as nephrology and geriatric settings.[7,8]

Recently the PG-SGA has been translated and culturally adapted for the Dutch setting.[9] During the pilot testing of the prototype of the Dutch version, the perceived level of difficulty and comprehensibility of the PG-SGA were explored. Whereas patients perceived the patient-generated component of the PG-SGA as sufficiently easy and comprehensible, healthcare professionals perceived comprehensibility of the professional component as acceptable, but the level of difficulty as not acceptable. The concept of comprehensibility reflects the level of clarity of an instrument, as perceived by the user. The related concept of difficulty reflects the level of both knowledge and skills of the user of the instrument. Perceived lack of comprehensibility of an item, e.g., due to use of vocabulary that does not correspond with the respondents' education level, reduces understandability and may increase perceived difficulty of this item.[10-12]

We hypothesized that perception of comprehensibility may change positively by providing explanation of the meaning of each item of the PG-SGA and perception of difficulty may change positively by providing background information, instruction and/or training regarding the PG-SGA.[12] Since in daily practice dietitians are healthcare professionals that

often work with the PG-SGA, in this study we aimed to evaluate if and how perceived comprehensibility and difficulty changes after a training providing lectures (rationale and evidence base), as well as hands-on practice with the PG-SGA, in an omnifarious sample of dietitians.

Materials and methods

Sample and data collection

In this prospective evaluation study, characteristics of perceived difficulty and comprehensibility of version 3.6 of the Dutch PG-SGA at baseline and after receiving a full day training in the use of the PG-SGA were evaluated in a convenience sample of dietitians. Dietitians located at The Netherlands were informed about the training through social media and email. The training was developed in collaboration with the originator of the PG-SGA, and accredited for dietitians by the Dutch Foundation on Accreditation of Competence Stimulating Activities for healthcare workers. Because the PG-SGA had only recently become available in the Dutch language, professionals had little to no experience with the Dutch version of the instrument. All 79 persons that registered for the training were approached to participate in the study. Participants that were not trained at bachelor or higher level as a dietitian were excluded from the study. A lecture that explained the rationale behind the PG-SGA and a lecture demonstrating use of the PG-SGA and its electronic version were provided in the morning. In a workshop in the afternoon, attendees practiced with the PG-SGA, including the physical exam, and discussed the use and interpretation of the PG-SGA.

Three weeks prior to the training, registered professionals were invited to complete a home assignment and were informed about the project. Professionals gave their written consent before participating in the study. At baseline (T0), participants were asked to first complete both the patient and professional component of the PG-SGA, preferably with a patient, and subsequently to complete the online questionnaire. The second measurement (T1) followed directly after the training, at the training site. At T1, attendees were asked to complete a paper version of the questionnaire to stimulate immediate completion of the questionnaire, to prevent loss to follow-up. To further prevent loss to follow-up, five days after the training a reminder was sent to participants who did not complete the questionnaire at the training site. These participants were asked to complete an online version of the questionnaire.

The Medical Ethics Committee of the University Medical Center Groningen ruled that no permission was needed to perform the study (reference M14.165328), because the study was not under regulation of the 'Medical Research Involving Human Subjects Act' (WMO).

PG-SGA

The PG-SGA (*Online supplement 1*) consists of a patient-generated and a professional component. First, the patient-generated component includes four topic-specific Boxes designed to be completed by the patient. Box 1 addresses weight history. Box 2 addresses food intake. Box 3 addresses nutrition impact symptoms and other factors hindering food intake. Box 4 includes activity and function, and is based on the Eastern Cooperative Oncology Group (ECOG) performance status.[13] Second, the professional component includes five Worksheets and is completed by the healthcare professional. Worksheet 1

instructs on how to score the percentage weight loss. Worksheet 2 addresses conditions that may increase nutritional risk. Worksheet 3 addresses metabolic stress. Worksheet 4 includes a nutrition-focused physical examination. Worksheet 5 categorizes the overall global assessment of the patient. Categories include Stage A = Well nourished; Stage B = Moderately malnourished or suspected malnutrition; and Stage C = Severely malnourished.[4] Finally, a score is generated that guides triage recommendations for interdisciplinary interventions.

Comprehensibility and Difficulty

Comprehensibility and difficulty were measured using a questionnaire, which is available upon request. The questionnaire was pretested for clarity in three final year Bachelor Students Nutrition and Dietetics. The questionnaire opened with four items on demographics. Furthermore, it included 14 items regarding perceived comprehensibility and 14 items on difficulty of the PG-SGA. For both comprehensibility and difficulty, questionnaire items 1-4 referred to Box 1-4 of the PG-SGA. Questionnaire items 5-8 referred to Worksheet 1-3. In our preceding study we found that Worksheet 4 (Physical Exam) may be perceived difficult by professionals.[9] Therefore, more questions (item 9-12) were posed on Worksheet 4 as compared to other Boxes and Worksheets. Item 13 and 14 related to Worksheet 5 (Global Assessment Categories) and the nutritional triage recommendations, respectively.

To be able to differentiate between the level of comprehensibility and difficulty, both concepts were included in the questionnaire in this study. As proposed by Lynn and others, a four-point scale (1= very unclear/very difficult; 2= unclear/difficult; 3= clear/easy; 4= very clear/very easy) was used to avoid having a neutral and ambivalent midpoint.[14-16]

Scores 1 and 2 were considered 'not present', and scores 3 and 4 were considered 'present'.[14-16] For each item, an item comprehensibility index (I-CI) and an item difficulty index (I-DI) were calculated at T0 and T1. The I-CI and I-DI indicate the level of knowledge and level of clarity of each item as perceived by the respondents, respectively. I-CI and I-DI scores can range from 0-1, and were calculated by dividing the number of respondents that considered the item to be 'present' by the total number of respondents. In accordance with our previous study, I-CI and I-DI$\geq$0.78 were considered acceptable.[9] An item score <0.78 requires further analysis of the item.[17] I-CI and I-DI scores of all items were averaged into a weighted summarized scale comprehensibility index (S-CI) and a scale difficulty index (S-DI) for the full PG-SGA. The S-CI and S-DI reflect respondents' perceived overall knowledge and overall comprehensibility level of the instrument, respectively. S-CI$\geq$0.80 and S-DI$\geq$0.80 were considered acceptable scores, S-CI$\geq$0.90 and S-DI$\geq$0.90 were considered excellent scores.[17,18] Item non-response was excluded from calculation of the index scores. Transparency of response was provided by reporting item response and overall response percentages.

Data management and statistical analyses

We performed power analysis for S-DI because in a pilot study S-DI was rated 0.55 by healthcare professionals, i.e. not acceptable, whereas S-CI was rated 0.81, which is already acceptable.[9] A minimal sample of 8 dietitians was considered sufficiently powered to detect a change of S-DI from 0.55 to S-DI 0.80 (cutoff for acceptable), with estimated variability 0.25 (allowing a type I error α =0.05, and a type II error β =0.20).[19]

Although S-CI and S-DI scores can range from 0 to 1, they can be considered nominal scores, transformed to weighted average scores. Therefore, the non-parametric Wilcoxon signed rank test was used to test significance of differences in distribution of participants' comprehensibility and difficulty indices at T0 and T1. The Mann-Whitney U test was used to compare distribution of T0 results of participants that completed the questionnaire both at T0 and T1 to distribution of T0 results of participants that were lost to follow up. Participants that were lost to follow-up were not included in the analysis. However, to test robustness of the results, T0 scores of the missing participants were imputed to the T1 scores, and the Wilcoxon signed rank test was used in a sensitivity analysis. All statistical tests were performed using SPSS24 (IBM) and significance level was set at p=0.05.

Results

In total, 56/79 (79%) professionals responded at T0, of which 47 (60%) were considered eligible and gave their consent. Of these 47 professionals, 35 (75%) completed the questionnaire both at T0 and T1 and were included in the analysis. Reasons for not completing the post-training questionnaire were lack of time and absence during the training. Two out of 35 participants were not currently practicing as dietitians. Characteristics of the participants that completed the questionnaire both at T0 and T1 are presented in Table 1. Indices and response rates for comprehensibility and difficulty of the PG-SGA are reported in Table 2. Online supplement II presents summarized frequency of scores 1,2,3 and 4 at both T0 and T1. Overall, comprehensibility and difficulty indices significantly improved after the training (p<0.01). At T0, comprehensibility and difficulty of the PG-SGA were not perceived acceptable on scale level (S-CI=0.69; overall response 93%; S-DI=0.57, overall response 92%). After the training, comprehensibility was

perceived as excellent on scale level (S-CI=0.95; overall response 97%) and difficulty of the PG-SGA was perceived as acceptable (S-DI=0.86, overall response 96%). S-CI improved in 30 participants and remained stable in 5 participants. S-DI improved in 29 participants, remained stable in 2 participants and decreased in 4 participants.

At T0, the lowest I-CI was found on the item concerning Worksheet 2 (Disease and relation to nutritional requirements; I-CI=0.38), and the highest I-CI were found for the items regarding Worksheet 1 (Scoring Weight Loss; I-CI=0.94). At T0, lowest I-DI scores were found on the items regarding Worksheet 4 (Physical Exam; I-DI=0.13-0.35). Furthermore, the highest I-DI score was found on the item concerning Box 3 (Symptoms; I-DI=0.80) and the items regarding Worksheet 1 (Scoring Weight Loss; I-DI=0.84-0.88).

At T1, all items had I-CI scores above the threshold of 0.78. Furthermore, maximum I-CI score of 1.0 was reached in Worksheet 1 items (Scoring Weight Loss), Worksheet 5 (Global Assessment Categories), and Total PG-SGA Score. At T1, the I-DI for items concerning Box 2 (Food intake [I-DI=0.76]) and Worksheet 4 (Physical Exam [I-DI=0.53-0.71]) still scored below the threshold of 0.78. Moreover, maximum I-DI score of 1.0 was reached on items concerning Box 4 (Activity and Function), Worksheet 1 (Scoring Weight Loss), Worksheet 5 (Global Assessment Categories), and Total PG-SGA Score.

Distribution of T0 indices for comprehensibility and difficulty of participants that were lost to follow up was not significantly different from those of participants that completed the questionnaire both at T0 and T1 (p=0.15, resp. p=0.21). After the T0 scores of the missing participants were imputed to the T1 scores, median improvement of comprehensibility and difficulty indices remained significant between T0 and T1 (p<0.01).

TABLE 1: Characteristics of dietitians that participated in exploration of perceived comprehensibility and difficulty of the PG-SGA before and after training in its use

Characteristics	n	%
Participants	35	100
Dietitian	33	94
Other[a]	2	6
Working setting[b]	45	100
General Hospital	17	38
Geriatrics/Nursing home/Rehabilitation	10	22
Primary Care	7	16
Academic Hospital	4	9
Tertiary Care Health Centre	4	9
Other	3	7
Field of interest[b]	75	100
Oncology	14	19
Gastroenterology/Diabetes	13	17
Malnutrition	9	12
Lung disease	7	9
Nephrology	6	8
Geriatrics	6	8
Pediatrics	5	7
Other	15	20
Reason for registering for the PG-SGA training[b]	38	100
Interest in PG-SGA	9	24
Interest in malnutrition assessment	8	21
The opportunity was provided	6	16
Interest in malnutrition screening	5	13
Interest in the electronic version of the PG-SGA (PG-SGA app)	4	11
Interest in improving nutrition care	3	8
Professional development	2	5
Interest in PG-SGA SF	1	3
	Median	Min-Max
Years of work experience	14	0-38

[a] 1 teacher in Program Nutrition and Dietetics, 1 junior researcher with background in dietetics

[b] More than 1 setting, and/or field of interest, and/or reason for registering possible per participant

TABLE 2. Comprehensibility and Difficulty Indices and Response Rates Scored by Dietitians for Items of the PG-SGA at T0 and T1

Items	Comprehensibility T0 (N=35) I-CI[a] T0 (N response)	Comprehensibility T1 (N=35) I-CI[a] T1 (N response)	Difficulty T0 (N=35) I-DI[b] T0 (N response)	Difficulty T1 (N=35) I-DI[b] T1 (N response)
Box 1	0.86 (N=35)	0.97 (N=33)	*0.74* (N=35)	0.88 (N=34)
Box 2	*0.69* (N=35)	0.79 (N=33)	*0.57* (N=35)	*0.76* (N=34)
Box 3	0.89 (N=35)	0.94 (N=33)	0.80 (N=35)	0.94 (N=33)
Box 4	0.80 (N=35)	0.97 (N=33)	*0.76* (N=33)	1.00 (N=31)
Worksheet 1 explanation	0.94 (N=32)	0.97 (N=35)	0.88 (N=32)	0.94 (N=34)
Worksheet 1 items	0.94 (N=32)	1.00 (N=34)	0.84 (N=32)	1.00 (N=35)
Worksheet 2	*0.38* (N=32)	0.97 (N=35)	*0.50* (N=32)	0.97 (N=35)
Worksheet 3	*0.77* (N=31)	0.94 (N=35)	*0.72* (N=32)	0.97 (N=35)
Worksheet 4 explanation	*0.50* (N=32)	0.94 (N=32)	*0.35* (N=31)	*0.70* (N=33)
Worksheet 4 muscle	*0.41* (N=32)	0.91 (N=35)	*0.16* (N=32)	*0.53* (N=32)
Worksheet 4 fat	*0.44* (N=32)	0.94 (N=35)	*0.13* (N=32)	*0.59* (N=32)
Worksheet 4 fluids	*0.50* (N=32)	0.97 (N=35)	*0.19* (N=32)	*0.71* (N=35)
Worksheet 5	*0.75* (N=32)	1.00 (N=34)	*0.60* (N=30)	1.00 (N=34)
PG-SGA point score	0.81 (N=32)	1.00 (N=35)	*0.69* (N=29)	1.00 (N=35)
	S-CI[c] *0.69*	S-CI[c] 0.95	S-DI[d] *0.57*	S-DI[d] 0.86
Overall item response	93%	97%	92%	96%

[a]I-CI=Item Comprehensibility Index; [b]I- DI=Item Difficulty Index; [c]S-CI=Scale Comprehensibility Index; [d]S-DI=Scale Difficulty Index

Italics: below acceptable level of 0.78 for I-CI and I-DI respectively, and 0.80 for S-CI and S-DI respectively

Discussion

The results of this study show that perceived comprehensibility and difficulty of the PG-SGA improved significantly in a sample of PG-SGA-naïve dietitians, after providing information and hands-on training in the use of the PG-SGA. While perceived comprehensibility improved to an acceptable level for all components of the PG-SGA, perceived difficulty for the physical examination and food intake remained under the predefined cut-off for acceptability. Overall scores for comprehensibility improved from

not acceptable at baseline to excellent after the training. Overall scores for difficulty improved from not acceptable at baseline to acceptable after the training.

The items related to the physical examination were perceived the most difficult component of the PG-SGA, in accordance with the findings of the pre-testing of the Dutch version of the PG-SGA.[9] Scores on difficulty improved after a single training, but not to an acceptable level, implying perceived difficulty of the physical examination could still improve. Scores on comprehensibility for items related to the physical examination did improve to an acceptable level, implying that the explanation of the physical examination was helpful to clarify Worksheet 4 (Physical examination). It is unclear why participating dietitians regarded the physical examination of the PG-SGA clear but difficult. A possible explanation would be that some dietitians did not feel confident to examine and interpret signs of loss or deficit of muscle and/or fat in their own patients after a single training. These dietitians may need repeated hands-on training and practice. It is not reported how often professionals actually receive training in the use of nutritional assessment tools such as PG-SGA or the SGA, and how lack of training may influence the results of the physical exam. We hypothesize that sufficient knowledge and experience could improve perceived difficulty of the physical exam and additionally may lead to more reliable results. A recent study showed that dietitians that received training in the use of the PG-SGA presented good reliability in assessment (intraclass correlation of 0.90 [$p<0.001$]).[20] Results from a study on interrater reliability (IRR) utilizing the SGA indicate in the same direction.[21] In that study, more experienced professionals (>5 years after graduation) utilizing the SGA showed similar results (IRR range of 89-100%) when compared to a well-trained and experienced dietitian (>20 years after graduation), whereas less experienced professionals

(1-2 years after graduation) showed an IRR range of 56-100% when compared to the same dietitian.[21]

Notably, dietitians experienced some difficulty in interpreting an item from the patient-generated component. Although scores for item comprehensibility for Box 2 (Food intake) improved to an acceptable level after training, scores on difficulty remained slightly below an acceptable level, with an I-DI of 0.76. Box 2 is one of the four Boxes designed to be completed by patients. Difficulty of these items may be perceived differently when tested in a patient population as compared to a sample of professionals. During the pilot testing of the prototype of the Dutch version in a small sample of patients, the level of difficulty and comprehensibility of Box 2 was perceived acceptable.[9] Additionally, a different study reported that patients with cancer found the patient-generated component of the PG-SGA not difficult and not hard to understand.[22] We suggest to test the patient-generated component of the PG-SGA in a larger sample of patients, representing different patient populations, to evaluate whether adjustment or further explanation is needed.

Interestingly, some participants perceived the PG-SGA as more difficult after the training, despite improvement in perceived comprehensibility. These participants may have been unaware of a lack of knowledge or experience in performing the PG-SGA assessment prior to the training. After the training, they may have improved their understanding of the PG-SGA and consequently may be more conscious of a possible lack of knowledge or experience. In that case, dietitians may also profit from repeated practice and hands on training with the PG-SGA.

This is the first study that evaluated changes in perception of difficulty and comprehensibility of the PG-SGA after training in an omnifarious sample of dietitians. The results are of interest because a single training can be done quickly and at low expenses.

The study has some limitations. First, due to the design of the study, we did not have access to a control group. The effects of the training may have been positively influenced, and some improvements may have resulted from increased familiarity of participants with the PG-SGA at T1, when compared to T0, due to repetition. However, we attempted to temper the potential positive effect of repetition by incorporating an interval of three weeks between inviting participants to complete the questionnaire at T0 and repetition at T1.[23] Second, in this study we assessed only short term effects of the training. As a result of the "single training" design, we did not acquire data on longer term effects of the training and thus it is unclear how the level of perceived comprehensibility and difficulty changes over time. Third, the training subject was the PG-SGA, and about 40% of participants reported to have registered for the training because of an interest in the (electronic version of the) PG-SGA or PG-SGA SF. These dietitians may be more interested in the PG-SGA than average, and subsequently have a more positive view of the PG-SGA than average. Therefore, some response bias cannot be ruled out. However, we tried to encourage all types of dietitians to enroll by limiting the registration fee and by awarding accreditation points. Moreover, scale difficulty and scale comprehensibility were well under acceptable scores at T0 (S-CI=0.69, S-DI=0.57), not indicating the results were influenced by a positive attitude prior to the training. Fourth, participants were almost exclusively dietitians, which makes it difficult to generalize the results to other healthcare professionals. However, dietitians are amongst the professionals most likely to work with the PG-SGA in practice. Finally, 25% of participants were lost to follow up. However, distribution of baseline results for comprehensibility and difficulty of respondents that were lost to follow up did not significantly differ from those of respondents that completed the questionnaire both times, thus loss to follow up appears random. If the baseline scores of the missing

participants are imputed to the T1 scores, perceived level of comprehensibility and difficulty would still significantly have improved between T0 and T1 (α <0.001).

Perceived comprehensibility and difficulty are concepts related to each other.[11,12] We hypothesize that providing sufficient clarity is conditional to be able to accurately identify and overcome concerns with difficulty of the PG-SGA. A dual approach towards improving clarity and knowledge and skills may lead to greater confidence in the use of the PG-SGA among dietitians, which in turn could further stimulate implementation of the PG-SGA in practice. To further improve perceived level of difficulty, supplemental information such as online materials or instruction videos for dietitians may be helpful. Furthermore, we suggest to independently start training the skills to adequately perform a nutrition-focused physical assessment during the education of dietitians, preferably with practice sessions involving actual patients. In The Netherlands, several Programs on Nutrition and Dietetics have incorporated training in the use of the PG-SGA in their curriculum already.

Conclusion

The findings suggest that significant improvement in PG-SGA-naïve dietitians' perception of difficulty and comprehensibility of the PG-SGA can be achieved quickly by providing training in the use of the PG-SGA. While perceived comprehensibility improved to an acceptable level for all components of the PG-SGA, perceived difficulty for the physical examination still required further improvement after a single training, suggesting supplemental information and/or more training may be needed for PG-SGA-naïve dietitians to ensure an acceptable level of perceived difficulty of all components of the PG-SGA, including the physical exam.

Acknowledgements

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