French-Canadian Cross-Cultural Adaptation of the SWAL-QOL and the SSQ and A Preliminary Psychometric Assessment for Their Use in an Oculopharyngeal Muscular Dystrophy (OPMD) Population

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Abstract

Purpose. Patient-reported outcomes (PRO) assessing dysphagia are considered an essential component of clinical trials to consider how patients feel and function in response to treatments. The selected PRO needs to be translated in several languages using a systematic process ensuring its validity and equivalence for use in multicenter clinical trials. The main objective was to conduct the French-Canadian cross-cultural adaptation of the SWAL-QOL (FC SWAL-QOL) and the SSQ (FC SSQ) among an oculopharyngeal muscular dystrophy (OPMD) population.

Methods. The principles of the International Society for Pharmacoeconomics and Outcomes Research Task Force method were followed for the FC SWAL-QOL and the FC SSQ. Cognitive interviews were conducted with 28 participants with OPMD. Known groups validity was assessed by comparison of the FC SWAL-QOL and the FC SSQ scores between groups of participants with OPMD known to differ in dysphagia severity, according to their drinking test score (n=21).

Results. Equivalence issues were addressed during the cognitive interviews. Scores on the FC SSQ differed between the two groups divided by drinking test scores suggesting good known groups validity. Only two scales of the FC SWAL-QOL showed known group validity; the difference in the mean composite score was not significant, but this could be due to the small sample size.

Conclusion: The SWAL-QOL and the SSQ were successfully translated into French-Canadian and adapted to an OPMD population. Additional validation should be considered depending on the intended population. The FC SSQ was better at discriminating dysphagia severity in a small sample size of OPMD participants.

Introduction/background

Oculopharyngeal muscular dystrophy (OPMD) is a progressive neuromuscular disease with a wide international distribution, but with the largest number of cases found in the Canadian province of Quebec due to a genetic founder effect [1-3]. Major symptoms include eyelid ptosis, oropharyngeal dysphagia and proximal limb weakness. Swallowing difficulties typically appear after age 45 initially with solid foods and later with liquids [4-6]. Oropharyngeal dysphagia in OPMD may be assessed by a variety of semi-quantitative tests, such as manometry and videofluoroscopy, and patient-reported outcomes (PRO) questionnaires [7]. PROs are increasingly used and recommended as endpoints in clinical trials, to supplement performance-based measures and laboratory tests [8]. In the field of dysphagia, there are a number of PRO questionnaires differing by their evaluation purpose, psychometric properties and target populations [9,10]. However, these questionnaires are not specifically designed to assess oropharyngeal dysphagia in OPMD and do not cover the entire symptom spectrum [11]. Two questionnaires, the Swallowing Quality of Life instrument (SWAL-QOL) and the Sydney Swallow Questionnaire (SSQ), were found to have at least some evidence of content validity for OPMD [11] and therefore were chosen to be pretested as two potential outcome measures for use in clinical trials.

The SWAL-QOL is a PRO intended to be a non-disease-specific measure of quality of life for patients with oropharyngeal dysphagia [12]. This questionnaire covers ten quality of life domains pertaining to dysphagia (30 items) and includes a Dysphagia Symptom Battery (DSB) assessing the frequency of swallowing-related specific symptoms (14 items). The ten domains of the SWAL-QOL are: *burden, eating duration, eating desire, food selection, fear, mental health, social functioning, communication, sleep and fatigue*. Responses to each item are provided on a 5-point Likert scale. Scales are converted to a 0 to 100 metric, where a score of “0” represents the worst score [13]. A composite SWAL-QOL score can be derived by averaging the ten scale scores (excluding the DSB) [14]. The SWAL-QOL’s psychometric properties have been documented among patients with oropharyngeal dysphagia of different etiologies and scale items showed good internal consistency (Cronbach’s Alpha = 0.80 to 0.94 across the 10 domains), discriminant validity, convergent validity, known groups validity and test-retest reliability (ICC = 0.59-0.91) [15]. The SWAL-QOL has also been validated with patients with oral and oropharyngeal cancer [16,17], laryngeal cancers [18], amyotrophic lateral sclerosis (SLA) [19] and in one study in oculopharyngeal muscular dystrophy [20]. When applied to an OPMD population in the U.S., the SWAL-QOL showed evidence of construct validity. However, it also had several limits, including floor/ceiling effects, possible construct underrepresentation, and low specificity of certain scales [20].

The SSQ was developed to assess the severity of oropharyngeal dysphagia in individuals with oropharyngeal dysphagia of neuromuscular origin [21,22]. It is a 16-item questionnaire with responses based on 100 mm long visual analogue scales and 1 item scored on a 0-5 scale. A score of 0 represents the lowest severity of dysphagia and a score of 1700 is the highest severity. Its usefulness appears complementary to the SWAL-QOL since it addresses swallowing symptoms that are not covered by the latter, such as difficulty with different types of food and liquid (hard, soft and dry foods/thin and thick liquids). These symptoms were considered important for dysphagia assessment in patients with OPMD, following expert review [11]. The reliability and validity of the SSQ were documented in participants with oropharyngeal dysphagia of various etiologies, but not specifically in people with OPMD. The SSQ was informative in a study evaluating the effect of cricopharyngeal dilation in patients with OPMD (SSQ score before dilatation = 1108 ± 273 versus 298 ± 189 after dilatation (mean $\pm$ SD), $p = 0.0001$) [23].

The SWAL-QOL and the SSQ were originally designed for an English-speaking population, but were cross-culturally adapted and validated in different languages and cultures, including French France [24,25]. As French-Canadian is noticeably different from the French spoken in France, our research team identified the need for a French-Canadian version of the SWAL-QOL and the SSQ. The main objective of this study was to conduct the French-Canadian cross-cultural adaptation of the SWAL-QOL (FC SWAL-QOL) and the SSQ (FC SSQ). The second objective was to establish the known groups validity by testing differences between two groups of OPMD participants known to differ in dysphagia severity.

Materials And Methods

The principles of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Task Force for the translation and cultural adaptation of PRO questionnaires were followed [26]. First, a

back-translation process was conducted. Then, known groups validity, which refers to the degree to which an instrument can demonstrate differences between groups known to be clinically different, was assessed in a cross-sectional study with a sample of OPMD participants [27]. In-depth cognitive debriefing interviews were conducted later on, after noticing that many participants reported problems with the clarity of certain items.

Back-translation process

SWAL-QOL. Consent from the original authors for a Canadian cross-cultural adaptation was obtained from Colleen McHorney. A first translation from English to French (VF1) was obtained from a certified professional translator. The French France version of the SWAL-QOL from Khaldoun et al. (2009) was used as a reference for the second forward translation (VF2). Differences between VF1 and VF2 were discussed by a review committee and reconciliation of the forward translations was achieved by consensus (VF3). The review committee was composed of 4 native French-Canadians: a registered dietitian, a doctoral candidate (CC), two expert researchers in neuromuscular diseases (CG and BB) and a certified professional translator. VF3 was subsequently back-translated into English (VE1) by a separate certified professional translator. VE1 was then compared to the original version by the review committee. Clarification was sought from the questionnaire authors as required. All revisions were made using a consensus approach. Exceptionally, as several changes were made to VF3, the back-translation step was repeated (VE2) to clarify how the new wording would work. Finally, the reviewed French-Canadian (FC) version (VF4) was proofread by a research professional and checked for readability.

SSQ. Consent from the original authors for a Canadian cross-cultural adaptation was obtained from Michal Szczesniak. The French France version of the SSQ has not been published at the time of our study. Therefore, a first translation from English to French (VF1) was obtained from a certified professional translator and a second translation (VF2) was prepared by two members of the committee (CC and CG). The same steps as mentioned above were followed, except we concluded that a second back-translation was not necessary because only minor changes were made after the back-translation.

Cross-sectional study for the assessment of known groups validity.

Participants (n=21 French-Canadian speaking) were recruited among the registry of the Saguenay Neuromuscular Clinic (Quebec, Canada). A stratified sampling based on age and sex was used. Participants were selected if they were 50-70 years old, had molecular confirmation of OPMD, were able to provide informed consent and self-reported dysphagia. They were excluded if they had a diagnosis of any other neuromuscular disorder or a second condition that could cause dysphagia. The FC SWAL-QOL and the FC SSQ were self-administered in the presence of an evaluator. A standard operating procedure (SOP) was developed for the evaluator to provide standardized examples to participants in case they asked for clarification regarding the meaning of a question. Presence of dysphagia was assessed using the 80 ml drinking test, a simple screening test for the detection of dysphagia in OPMD [28]. It consists of the subject drinking 80 ml of cold water as quickly as possible without choking. Failure to drink 80 ml of water in less than 8 seconds suggests the presence of dysphagia (sensitivity = 87% and specificity =

77%) [29]. The 80 ml drinking test was administered by two trained evaluators using a standard operating procedure. Two trials were performed and the mean was calculated.

Cognitive debriefing.

The comprehensibility and cultural equivalence were assessed using cognitive interview techniques. Item relevance was also assessed when a participant spontaneously addressed it.

SWAL-QOL. Cognitive debriefing was conducted with a group of 21 French-Canadian-speaking participants that were part of a larger OPMD outcome measures study at our center. 13 out of 21 participants had participated earlier in the cross-sectional study for the assessment of known groups validity and therefore had previously completed the FC SWAL-QOL. OPMD participants were recruited using the same inclusion/exclusion criteria as those in the cross-sectional study. The FC SWAL-QOL was separated into approximately equal blocks of items that were randomly assigned to the participants. Participants were asked by an evaluator (C.C.) to answer the questions and explain the reason for each of their responses, using probing techniques [30]. A minimum of 5 participants per block was targeted. Blocks were assigned to additional participants until saturation was reached.

SSQ. Cognitive debriefing interviews were conducted with a group of seven participants subsequently recruited after the cross-sectional study, using a maximal variation sample (age, sex, education level, dysphagia duration). Each participant completed the FC SSQ. Then, participants were asked by an evaluator (C.C or J.F.) to explain the reason for each of their responses, using probing techniques.

Analysis.

Cognitive debriefing results were reviewed independently by both evaluators (CC and JF) who then discussed the findings. Any discrepancies were resolved through discussion and the review committee was consulted if needed. Semantic, experiential and conceptual equivalences in translations were assessed using Guillemín's taxonomy [31]. **Semantic equivalence** relates to items' similarities of vocabulary and grammar. **Experiential equivalence** refers to the existence of the item in the cultural context. **Conceptual equivalence** relates to the meaning between cultures. Descriptive analyses were performed for personal and clinical characteristics of the participants and the scores of both questionnaires. **Known groups validity.** Mean FC-SWAL-QOL and FC-SSQ scores were compared across two groups defined by drinking test scores. It was hypothesized that participants with a mean drinking test time less than 8 seconds would have lower FC SSQ scores and higher FC SWAL-QOL scores, indicating a less severe dysphagia. A Mann-Whitney test was used to compare the mean scores; $P < 0.05$ was considered significant. The magnitude of the differences were calculated according to the formula of Gray and Kinnear for nonparametric effect size estimators [32].

This study was conducted with the ethical approval of the *Centre intégré universitaire de santé et services sociaux du Saguenay-Lac-St-Jean* (CIUSSS), Québec, Canada.

Results

Back-translation process

SWAL-QOL. Issues related to **semantic equivalence** were observed when analyzing the French France version (VF2). As an example, the word “*glaires* [phlegm]” (item 11) is not used in spoken French in Quebec, and the word “*gêne* [distraction]” (item 31) is more employed to express shyness than inconvenience. Therefore, other terms were chosen for the reconciliation version (VF3). In addition, grammatical issues were encountered during reconciliation of VF1 and VF2. For example, it was particularly challenging to translate the Likert scale items for items 1 to 7, and the back-translation (VE1) showed that the intended meaning amongst each scale point was not reached at our first attempt. The original response options “Very much true, Quite a bit true, Somewhat true, A little true, Not at all true” were then adapted this way: “*Tout à fait vrai, Très vrai, Plutôt vrai, Un peu vrai, Pas vrai du tout*”. A better fit of the items with the original meaning was finally obtained, as shown by the second back-translation (VE2): Completely true, Very true, Quite true, Slightly true, Not at all true”.

SSQ. Experiential and conceptual equivalence issues were observed during reconciliation of VF1 and VF2, specifically with items 4 and 17. The problem with item 4 was that “Mornays” was mentioned as an example of soft food, which is a French sauce that is not typically part of the French Canadians diet and could not be known by patients. The author of the SSQ was contacted and “*coquille St-Jacques*” (a preparation of scallops in a creamy sauce topped with cheese) was chosen, instead of Mornays, because it is well-known by French-Canadians. Greater precision was also required for the wording of item 17 “How much does your swallowing problem interfere with your enjoyment or quality of life?” because the word “enjoyment” is expressed by different words in French, such as “*plaisir* [pleasure]” and “*bonheur* [happiness]”, which have subtly different conceptual meanings. The authors of the SSQ explained that this item was related to disruption of a patient’s ability to enjoy life because of swallowing dysfunction. By consensus, the word “*bien-être* [back-translation: well-being]” was retained. No grammatical difficulties were encountered in translating the SSQ into French.

Cross-sectional study for the assessment of known groups validity.

Table 1 summarizes the participants’ characteristics and mean scores for the SWAL-QOL scales, DSB, composite score, and SSQ. As hypothesized, the group with the lower mean drinking test time had a significantly lower mean FC SSQ score, with an effect size of 0.52 (Table 2). However, mean composite FC SWAL-QOL did not differ significantly, with an effect size of 0.41. Only 2 scales (*burden* and *eating duration*) showed significant differences; those scales had the larger effect sizes (0.60 and 0.75).

Cognitive debriefing

SWAL-QOL. Participants (n = 21) were age 60.7 ± 6.9 years and 9/21 were females. Mean dysphagia duration was $10.1 \text{ years} \pm 5.7$. 25 % had some post-secondary education, 35 % were high school graduates, 25 % had less than a high school education and 15 % were college graduates. Each item was

addressed by 5 to 7 participants. **Semantic equivalence issues** were found for item 12 and item 19. When asked the meaning of item 12 "*Avoir des hauts-le-cœur* [Gagging]", most of the participants (6/7) understood it as vomiting and one participant referred to having food stuck in the throat causing a gag reflex. Item 19 "*Avoir des aliments ou des liquides qui ressortent par la bouche* [Food or liquid dribbling out of your mouth]" was misinterpreted by the participants as regurgitation. **Experiential equivalence** issues were also observed for two items. Items 9 and 26 were problematic as the term "*s'étouffer* [choking]" was interpreted in two different ways. In the first case, participants identified situations in which food was blocking the airway, preventing them from breathing. In the second case, participants described the experience of having a blockage sensation in the throat causing them to spit out food, but they still can breathe. **A conceptual equivalence** issue was observed for item 33 "*Mon problème de déglutition me frustre* [My deglutition problem frustrates me]". 3 out of 5 participants interpreted the word "frustrates" as "to be angry" and two participants described situations in which they would like to eat normally, like other people do. Lastly, problems inherent to the original questionnaire were observed, such as ambiguity and vagueness for some items. For example, participants did not consistently interpret item 1 "*Gérer mes troubles de déglutition* [Dealing with my swallowing problem]". Some participants referred to the day-to-day coping strategies they use to avoid choking, while other participants referred to coping strategies in specific contexts, like eating in a restaurant. Two other items were found problematic because of their double-barreled nature (items 11 and 15). Finally, items 24, 37, 39, 40, and 41, pertaining to *communication*, *social*, *fatigue* and *sleep* scales were considered irrelevant to dysphagia by some participants.

SSQ. Mean age of participants ($n = 7$) was 62.7 years $\pm$ 6.4 and 4/7 were females. Mean dysphagia duration was 10.7 years $\pm$ 6.4. 1 had some post-secondary education, 4 were high-school graduates, 1 had less than a high school education and 1 was a college graduate. Item 8 was found to have a **semantic equivalence** issue because the term "*amorcer la déglutition?* [starting a swallow?]" is mostly a technical term and was not understood by many participants. The main issue with the SSQ was **experiential equivalence**, with the examples given for food textures and liquid consistencies in items 2 to 6. For example, when questioned about difficulty with hard foods (item 5), many people agree that they did have difficulty with steak and raw vegetables like carrots, but not with raw fruit, like an apple or a pear, which made it difficult for them to give an accurate answer. The term "difficulty" itself appears to be conceptually problematic because it can have subtly different meanings, such as not swallowing easily or having any problem when swallowing. For example, some participants acknowledged they did have difficulty because they use strategies to prevent swallowing problems with food and drink, such as taking small bites. On the other hand, other participants considered themselves as not having difficulty because they were using effective strategies. Vagueness was a problem for some items, such as items 12, 16 and 17, leading participants to various interpretations. For example, when asked "*Aujourd'hui, comment évaluez-vous la gravité de votre problème de déglutition?* [How do you rate the severity of your swallowing problem today?]" (item 16), participants thought about impacts on social life, severity of blockage in the throat, discomfort related to secretions, life-threatening symptoms and food limitations.

No comment was raised about the relevance of the items. However, some participants felt that the questionnaire was incomplete because it had no question about pharyngo-oral secretions.

Finalization

In order to achieve better equivalent translations, revisions were made for items 12, 19 and 33 of the FC SWAL-QOL and item 8 of the FC SSQ). No changes were made for the other items, in order to respect the conceptual meaning of the original version. The final versions of the FC SWAL-QOL and the FC SSQ are available in Supplementary File S1 and S2.

Discussion

The French-Canadian versions of the SWAL-QOL and the SSQ were generated following the ISPOR principles in order to preserve the meaning and the structure of the original English version. Specific issues related to French language differences between Canadian and French France were highlighted at the beginning of the process, therefore confirming the need for a Canadian adaptation. The back-translation step facilitated the identification of problematic items, but did not address all equivalence issues. This supports cognitive debriefing as an essential step to avoid inaccurate data resulting from respondents' misunderstanding of items, as stressed by ISPOR principles [26]. We have not revised questionnaires to resolve all ambiguities noted by participants because some ambiguities were judged inherent to the original questionnaires, including the issue with the word "choking" in items 9 and 26 of the SWAL-QOL. In addition, we have not modified the examples of food given in items 2 to 6 of the SSQ because the modification of these items would yield to a new measure with different contents. Such problems are likely to impact reliability, as participants may interpret the meaning of the items in different ways. The use of a standard operating procedure (SOP) may partly address this issue by providing standardized answers in cases where the participants ask for clarification regarding an item's meaning.

Known groups validity was supported for the FC SSQ, but was not supported for the FC SWAL-QOL composite score, with only two scales reaching significant differences in mean scores (*burden* and *eating duration*). In the SWAL-QOL validation study with a U.S. OPMD population (n = 114), those two scales were the most severely affected domains and correlated with dysphagia duration (R = -0.29 and -0.30, respectively, p < 0.01) [33]. Weaker correlations were found for *fear*, *mental health* and *communication* scales (R = 0.20 to -0.21) and no significant correlations were found for the other scales, which is consistent with our results. As stressed by Youssef *et al.*, some SWAL-QOL scales may not be pertinent to the construct of dysphagia-related quality of life in OPMD, such as the *sleep* scale, the *communication* scale and the *fatigue* scale. As a result, most items identified by participants as having questionable relevance to dysphagia pertained to those latter scales. This may explain why those scales failed to discriminate participants according to their drinking test times. No difference was observed in the DSB scores of the two groups of participants. One hypothesis is that the frequency of specific swallowing-related symptoms may not accurately reflect the severity of dysphagia in OPMD, because of the slowly progressive nature of the disease and the patient's ability to compensate over time for the swallowing

problems with changes in diet or the use of other coping strategies [34,11]. Coping strategies, which are not addressed by the SWAL-QOL, are important aspects of the construct of dysphagia in OPMD [35]. Therefore, the DSB may suffer from construct underrepresentation when applied to OPMD, which represents an important threat to validity.

In the Youssof study, the composite SWAL-QOL score was found to have known groups validity by differentiating participants with long or short dysphagia duration (composite Score = 50.4 ± 19.6 versus 59.9 ± 21.2 (mean $\pm$ SD), $p = 0.02$). Known groups validity was not supported for the composite score in our study because the difference between the two groups was not significant. However, an effect size of 0.41 was found, which suggests an insufficient sample size to detect significant differences. However, despite the small sample size, the SSQ discriminated between our subgroups of participants, with an effect size (0.52). This is especially important in the context of clinical trials in rare diseases, where group size is usually relatively small, knowing that a small effect size will require a larger sample size [36]. In addition, an instrument with a large effect size will show a higher mean improvement following treatment than an instrument with a smaller effect size [37].

One unexpected result was that the FC SSQ scores of the participants with a drinking test time less than 8 seconds were more than twice higher than the upper limit of the normative range (234 [IC: 193 – 277]) [38]. These results suggest that individuals with OPMD may experience dysphagia symptoms even though they have a rapid drinking test time. This is consistent with the fact that swallowing difficulty with liquids appears later in OPMD, compared to difficulty with solid foods. Consequently, the drinking test with water may not be sensitive enough to identify dysphagia at an earlier stage of the disease. We think that increasing the viscosity of the liquid could enhance the sensitivity of the drinking test, as it was found to be successful at increasing the sensitivity of radionuclide pharyngoesophageal transit studies in OPMD participants [39]. This needs to be studied further.

When interpreting these findings, some limitations should be considered. First, the cognitive debriefing was done after the cross-sectional study for known groups validity, and minor changes were made to both translations after the cognitive debriefing analysis. Therefore, mean scores on the questionnaires could slightly differ for the two translations. Second, we did not compare the scores of the SWAL-QOL and the SSQ with a physiologic measure of dysphagia, but rather used the 80 ml drinking test, a useful screening test in the clinical evaluation of patients with OPMD. Metrological properties of the drinking test should be further documented.

Conclusion

The French-Canadian versions of the SWAL-QOL and the SSQ were obtained following a rigorous procedure, as recommended by the ISPOR principles for the cross-cultural adaptation of PRO questionnaires. The FC SWAL-QOL and the FC-SSQ can be used in clinical research and clinical practice to assess swallowing disorders in a French-Canadian population. The use of a standard operation procedure (SOP) is strongly recommended to maximize reliability. Additional validation should be

considered depending on the intended population. As a preliminary psychometric assessment, the FC SSQ showed to have a better discriminative power than the FC SWAL-QOL when using a small sample size of OPMD participants. However, cognitive debriefing revealed problems related to experiential equivalence that could not be resolved in order to respect the conceptual meaning of the original version. Therefore, an improved dysphagia PRO should be developed for swallowing-related outcomes in OPMD.

Declarations

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Code availability: Not applicable.

Authors' contributions: Not applicable.

Ethics approval: This study was performed at the Hôpital de Jonquière, Centre intégré universitaire de santé et services sociaux (CIUSSS) du Saguenay-Lac-St-Jean and was conducted with the ethical approval of CIUSSS du Saguenay-Lac-St-Jean, Québec, Canada.

Consent to participate: All participants have provided informed consent form.

Consent for publication: Not applicable.

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Tables

Table 1
Participants' characteristics (N = 21) and mean scores
for the FC SWAL-QOL scales, DSB, composite, and FC
SSQ

	Mean (SD) or N (%)
Age (yrs)	61.7 (6.3)
Dysphagia duration (yrs)	10.7 (5.8)
Men	11 (52.4)
80ml drinking test (seconds)	15.0 (14.2)
SWAL-QOL	
Composite	61.0 (14.8)
DSB	57.1 (14.4)
Burden	47.6 (24.6)
Eating desire	86.1 (20.5)
Eating duration	32.7 (22.5)
Food	75.6 (14.5)
Comm	70.2 (24.8)
Fear	57.7 (18.6)
Mental	63.1 (28.0)
Social	77.9 (20.6)
Fatigue	46.8 (26.4)
Sleep	51.8 (26.9)
SSQ	711 (319)

DSB: Dysphagia Symptom Battery

Table 2
Known groups validity of the FC SWAL-QOL and the FC SSQ

	Less than 8 seconds N = 9 Mean (SD)	8 seconds and more N = 12 Mean (SD)	P-value	Effect size
SWAL-QOL				
Composite	66.2 (12.3)	57.1 (15.8)	0.13	0.41
DSB	58.2 (15.6)	56.3 (14.1)	0.70	0.11
Burden	61.1 (19.2)	37.5 (37.5)	0.02*	0.60
Eating desire	89.8 (10.8)	83.3 (25.6)	0.81	0.07
Eating duration	48.6 (17.1)	20.8 (18.7)	< 0.01**	0.75
Food	79.2 (12.5)	72.9 (15.8)	0.38	0.24
Comm	72.2 (24.0)	68.8 (26.4)	0.75	0.09
Fear	61.1 (15.9)	55.2 (20.8)	0.38	0.24
Mental	70.0 (30.0)	57.9 (26.6)	0.28	0.29
Social	82.8 (16.2)	74.2 (23.3)	0.51	0.18
Fatigue	48.1 (30.8)	45.8 (24.0)	0.92	0.04
Sleep	48.6 (31.5)	54.2 (24.0)	0.86	0.06
SSQ	556 (293)	827 (298)	< 0.05*	0.52

Mann-Whitney test

Supplementary Files

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