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Original Research

French Translation and Validation of the Victorian Institute of Sports Assessment for Gluteal Tendinopathy Questionnaire

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Abstract

Background: Developed in 2015, the Victorian Institute for Sport Assessment for Gluteal Tendinopathy (VISA-G) is the first patient-reported outcome measure tool specifically designed to measure the severity of disability associated with greater trochanteric pain syndrome. There is currently no French version of the VISA-G questionnaire.
Objective: To translate the VISA-G questionnaire into French (VISA-GF) and to test its psychometric performances.
Design: Cross-sectional study, validation study.
Setting: Clinics in Liège, Belgium and in France.
Patients: Participants with greater trochanteric pain syndrome and control asymptomatic participants.
Interventions: Not applicable.
Main Outcome Measures: French translation of the VISA-G and psychometric performances of the questionnaire tested using internal consistency, construct validity and test-retest reliability with a 7-day interval.
Results: The eight items of the VISA-G questionnaire were translated without any difficulties. The psychometric validation study included 106 participants (median age 53 [58-64] years old, 65 women [61.3%]). The questionnaire discriminates well between pathologic (n = 52) and asymptomatic participants (n = 54). Moreover, we found a good internal consistency and excellent test-retest reliability for the VISA-GF questionnaire. We also confirmed the construct validity and did not find any floor or ceiling effects.
Conclusions: The VISA-GF has been shown to be a valid and reliable way to measure the severity of disability associated with greater trochanteric pain syndrome in French-speaking participants.

Introduction

Greater trochanteric pain syndrome (GTPS) describes intermittent or continuous pain at, or around, the greater trochanter of the femur, aggravated with activity and affected side-lying position.[1] Despite risk factors for GTPS remaining poorly understood, a higher prevalence in women, in older people, and in people with back pain or lower femoral neck angle has been reported in the literature.[1,2]

In 2015, Fearon et al[3] developed a condition specific outcome score to evaluate the degree of severity of disability associated with GTPS in patients with this condition. Similarly to the other questionnaire developed by the Victorian Institute for Sport Assessment (VISA), the VISA for Gluteal Tendinopathy (VISA-G) questionnaire has been developed and consists of eight questions, with a maximum score of 100 points. Through a validation study performed with Australian participants experiencing GTPS and controls, they demonstrated their questionnaire as valid in regards of internal consistency, test-retest reliability and construct validity.

Since its development in 2015, the VISA-G has been translated into Danish[4] but no French version is currently available, unlike VISA-A (achilles tendinopathy), VISA-P (patellar tendinopathy), and VISA-H (proximal hamstring tendinopathy) questionnaires that have been already translated in French.[5-7] Since the VISA-G is the first patient-reported outcome measure tool specifically designed to measure the severity of disability associated

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with GTPS, it is valuable to provide versions that can be used by populations other than English-speaking ones. Therefore, we aimed to provide a French version of the VISA-G and test its psychometric properties in a population of people with GTPS.

Materials and Methods

French Translation of the VISA-G

Following the agreement from the original authors of the VISA-G, we followed a five-stage validated template for the translation and cultural adaptation process of the questionnaire.[8] During stage one, initial translation, the VISA-G questionnaire was translated from English to French by two independent bilingual translators having French as their mother tongue. During stage two, synthesis of the translation, the two translators synthetized the results of their two translations and agreed on a first consensual translated French version of the VISA-G (VISA-GF). Next, in stage three, "back translation, two other bilingual translators with English as their mother tongue, blinded to the original version of the VISA-G, independently translated the French VISA-GF back into English. In stage four, expert committee, a committee composed of the four translators, a French language professional, and a medical doctor specialized in physical and rehabilitation medicine, met to consolidate all of the versions of the questionnaire and develop what would be considered the prefinal version of the questionnaire for field testing. The committee reviewed all of the translations and reached a consensus on any discrepancy. They also ensured equivalence between the source and target version in four areas: semantic, idiomatic, experiential and conceptual equivalences. Finally, stage five, test of the prefinal question, consisted of a pretest of the prefinal VISA-GF questionnaire by administrating this scale to a sample of participants with GTPS. The purpose was to investigate how the participants interpreted each item and to ensure that no remaining language issues were present in the questionnaire. Following this last step and taking into account potential last changes to increase understandability of the questionnaire, the French version of the VISA-G (VISA-GF) was considered as the final one.

Psychometric Performances of the VISA-G

To ensure that the VISA-GF was valid and reliable, as the English version was, an evaluation of its psychometric properties was carried out. Therefore, we recruited both participants with GTPS and controls and investigated the VISA-GF internal consistency, construct validity, and test–retest reliability. The VISA-G is a self-administered questionnaire that has been completed in a paper format by the participants themselves in the presence of an investigator (M.G.).

Population

French-speaking participants with a medical doctor's confirmed diagnosis of GTPS (anamnesis, clinical examination, and echography) were recruited in different clinics in Liège, Belgium, and in France. Exclusion criteria were rheumatoid polyarthritis, coxarthrosis, bone-related disorders, hip surgery, specific comorbidities that could affect physical activity, and 3-month anterior use of corticosteroids. Control participants were recruited through social media in Belgium and France with no specific inclusion or exclusion criteria.

All participants provided informed consent. The study protocol was approved by the Medical Ethics Committee of the CHU Liège.

Discriminative Power

The ability of the VISA-GF to discriminate between participants with GTPS and asymptomatic participants was examined with the hypothesis to find worse results with pathological participants when compared to asymptomatic ones.

Internal Consistency

Internal consistency is defined as the degree of interrelatedness among the items[9] and is measured with the Cronbach's alpha coefficient. This coefficient ranges from 0 to 1 with higher values representative of higher internal consistency. It has been recognized that a value between 0.7 and 0.9 reflects a good internal consistency of the scale without significant risk of redundancy of items.[9,10] To measure internal consistency, we first measured a global alpha coefficient for the VISA-GF questionnaire. We also assessed the impact of deleting each item on the total internal consistency. Finally, we measured the correlation of each item with the global score of the VISA-GF. Pearson (r_p) or Spearman (r_s) correlation, used in function of normality of distribution of the variables, was considered weak if <0.2, between 0.2-0.4 as acceptable, between 0.4-0.6 as good, and > 0.6 as strong.[11]

Construct Validity

Construct validity ensures that the scale truly measures what it is supposed to measure. For this purpose, we also administrated the Short-Form 36 (SF-36) questionnaire to all of the participants, which is a generic quality of life questionnaire and we made prior hypothesis about the convergent and divergent validity of the different subscales of the SF-36 and the VISA-GF. The construct validity was considered good if at least 75% of our hypotheses are confirmed by analyses.[12] The following hypotheses were formulated:

-Because they are measuring similar concepts, we expected to identify moderate to strong correlations (convergent validity) between the VISA-GF and the following subscales of the SF-36: physical function (PF), role limitation due to physical health (RP), general health (GH), and bodily pain (P);

-Because they are measuring different concepts, we expected to identify weak correlations (divergent validity) between the VISA-GF and the following subscales of the SF-36: Emotional well-being (MH), role limitation due to emotional problems (RE), and vitality (VIT).

Test-Retest Reliability

Test–retest reliability reflects the capacity of a questionnaire to be reliable and to produce the same scores for repeated measurements in participants whose health has not changed. To measure test–retest reliability, participants were asked to complete the VISA-GF a second time, approximatively 7 days after follow-up. For some patients, the second administration of the VISA-GF was performed by phone. All participants had to confirm that no health change occurred between the two administrations of the questionnaire to be included in this psychometric analysis. Test–retest reliably was assessed with the intraclass coefficient correlation (ICC) and its 95% confidence interval (95% CI). We used a two-way mixed method for absolute agreement. ICC improves as it approaches 1 and the reliability is already considered as acceptable with an ICC of 0.7.[13]

We also measured the standard error of measurement (SEM) by dividing the SD of the difference between test and retest by the square root of 2 ($SD_{diff}/\sqrt{2}$). The SEM represents how much measured test score is spread around a true score. Concomitant with the SEM, we measured the smallest detectable change (SDC) by multiplying SD_{diff} by 1.96. The SDC refers to the minimal amount of change (in this case, the number of points on a scale from 0 to 100 points), before the observed change can be considered to be a true change of score and not potentially an error of measurement.[10]

Floor and Ceiling Effects

Floor and ceiling effects were considered to be present when at least 15% of the population had the lowest or the highest scores.[12] When floor or ceiling effects are present, participants with the minimum or maximum score cannot be distinguished from one another, reducing the discriminative power of the questionnaire.

Statistical Analysis

The data were processed using the SPSS Statistics 24 (IBM Corporation, Armonk, NY) software package. The results were considered statistically significant at the 5% critical level.

The normality of the variables was checked by examining the histogram, the quantile-quantile plot, the Shapiro-Wilk test, and the difference between the mean and the median values. Quantitative variables following a Gaussian distribution were expressed as mean $\pm$ SD; quantitative variables not following a Gaussian distribution were expressed as median (percentile 25 - percentile 75); qualitative variables were described by absolute and relative (%) frequencies.

Difference of clinical characteristics between pathologic and asymptomatic participants were tested with the Student *t*-test or the Mann Whitney *U* test, depending on the distribution of the variables. Discriminative power of the questionnaire was assessed by measuring the VISA-G total score difference between GTPS and controls groups through a logistic regression (using the groups as the dependent variable and age and gender as independent variables).

With the exception of discriminative power which includes both pathological and asymptomatic participants, all the other analyses of psychometric properties have been run only on the population of interest: participants with GTPS. Indeed, because the VISA-GF intends to measure the severity of disability associated with GTPS, we decided to perform psychometric analyses only on the restricted population experiencing GTPS. According to Terwee et al[12] a minimal number of 50 pathological participants is necessary for psychometric performance assessments. With 52 symptomatic participants, we therefore ensured enough statistical power for our analyses.

Results

French Translation of the VISA-GF

The 8 items of the VISA-G questionnaire were translated without any difficulties. The pretest revealed no issues with understanding the French-translated version of the VISA-GF. The VISA-GF is available in Appendix S1.

Psychometric Performances of the VISA-GF

Population

A total of 106 adults (median age 53 [58-64] years old, with 65 women [61.3%]) were recruited for this study with 52 with a clinically confirmed GTPS and 54 asymptomatic participants. More than half of the population was recruited in Belgium (n = 58, 54.7%) (Table 1).

Quantitative variables presented as median (percentile 25- percentile 75), qualitative variables presented as absolute and relative (%) frequencies.

Discriminative Power

The median total score of the VISA-GF was 60.5 (43-71) for GTPS participants, compared to 100 (100-100) for asymptomatic participants (gender and age-adjusted

Table 1
Characteristics of the population and score for VISA-GF and SF-36 questionnaires

	GTPS group (n = 52)	Asymptomatic group (n = 54)	*P* value	Adjusted *P* value‡‡
Age (years)	59.5 (42.2-66.0)	42 (24.0-58.2)	.03	
BMI (kg/m^2)	25.2 ± 2.98	25.2 ± 3.04	.94	
Gender				
Women	39 (75.0)	26 (48.1)	.005	
Country				
Belgium	33 (63.5)	25 (46.3)	.08	
France	19 (36.5)	29 (53.7)		
GTPS				
Right	30 (57.7%)			
Left	22 (42.3%)			
Bilateral	3 (6%)			
VISA-GF total score	60.5 (43-71)	100 (100-100)	<.001	<.001
SF-36 PF	57 (40-85)	100 (90-100)	<.001	<.001
SF-36 SoF	81 (62-97)	75 (50-87)	.7	.12
SF-36 RP	25 (0-75)	100 (100-100)	<.001	<.001
SF-36 RE	50 (0-100)	100 (100-100)	.12	.53
SF-36 MH	56 (48-71)	64 (52-77)	.23	.36
SF-36 VIT	40 (30-55)	54.5 (40-65)	.006	.008
SF-36 BP	45 (31-63)	100 (79.6-100)	<.001	<.001
SF-36 HG	60 (41-75)	75 (60-85)	.003	.004

‡*P* value obtained from logistic regression including age and gender as covariates.
BMI = body mass index; GTPS = greater trochanteric pain syndrome; PF = physical functioning; SoF = social functioning; RP = role limitation physical; RE = role limitation emotional; MH = mental health; VIT = vitality; BP = body pain; HG = general health; VISA = Victorian Institute for Sport Assessment for Gluteal Tendinopathy French.

Table 2
Results of test-retest reliability and internal consistency

	Test-retest reliability		Internal consistency		
	ICC	95% CI	Cronbach's alpha if one item deleted	Correlation r_s	*P* value
VISA-GF item 1	0.77	0.59-0.86	0.79	0.71	<.001
VISA-GF item 2	0.97	0.94-0.98	0.80	0.63	<.001
VISA-GF item 3	0.97	0.94-0.98	0.79	0.76	<.001
VISA-GF item 4	0.98	0.97-0.99	0.78	0.75	<.001
VISA-GF item 5	0.96	0.94-0.98	0.80	0.60	<.001
VISA-GF item 6	0.99	0.98-0.99	0.76	0.87	<.001
VISA-GF item 7	0.96	0.92-0.97	0.78	0.73	<.001
VISA-GF item 8	1		0.85	0.84	<.001
VISA-GF total	0.99	0.99-0.99	0.81		

CI = confidence interval; ICC = intraclass correlation coefficient; VISA-GF = Victorian Institute for Sport Assessment for Gluteal Tendinopathy French.

P value <.001) indicating that the VISA-GF questionnaire discriminates highly between GTPS and asymptomatic participants. There were no missing items in the VISA-GF.

Internal Consistency

A global Cronbach's alpha of 0.81 has been found, revealing very good internal consistency. Deleting one item at a time did not change the internal consistency of the VISA-GF. Indeed, the lowest Cronbach's alpha of 0.76 was found when deleting item 6 and the highest of 0.85 was found when deleting item eight. All items also showed strong and significant correlations with the total score of the VISA-GF questionnaire (all $r_s \geq 0.6$) (Table 2).

Construct Validity

We validated 75% (6/8) of our hypothesis of convergent and divergent validity. Indeed, moderate to strong correlations were found between the VISA-GF and the PF, RP, GH, and BP subscales of the SF-36 and low correlations were found between the VISA-GF and the VIT and SoF subscales of the SF-36. However, contrarily to our assumptions, we found significantly moderate correlations between the VISA-GF and the MH ($r_s = 0.38$) and RE ($r_s = 0.35$) subscales of the SF-36 (Table 3).

Test-Retest Reliability

The median time between the first and the second administration was 7 days (interquartile range 7-7 d). A very high test-retest reliability has been found for the

Table 3
Results for construct validity measurement

	r_s	*P* value	Hypothesis validated?
Convergent validity			
PF	0.77	<.001	Yes
RP	0.77	<.001	Yes
GH	0.55	<.001	Yes
BP	0.72	<.001	Yes
Divergent validity			
MH	0.38	.005	No
RE	0.35	.01	No
VIT	0.23	.099	Yes
SoF	0.27	.049	Yes

Hypotheses criteria: (1) convergent validity: moderate to strong correlations were expected between the Victorian Institute for Sport Assessment for Gluteal Tendinopathy French (VISA-GF) and the following subscales of the Short Form-36: Physical function, role limitation due to physical health, general health and bodily pain, (2) divergent validity: weak correlations were expected between the VISA-GF and the following subscales of the Short Form-36: Emotional well-being, role limitation due to emotional problems and vitality.
PF = physical functioning, SoF = social functioning, RP = role limitation physical, RE = role limitation emotional, MH = mental health, VIT = vitality, BP = body pain, HG = general health.

VISA-GF questionnaire (ICC of 0.99) (Table 2), which means that results of the total score of the VISA-GF were very similar between the test (median score of 60.5 (43-71)) and the 7 days after retest (median score of 61 [44.2-71]).

We found a SEM of 1.64 points and a SDC of 4.55 points.

Floor and Ceiling Effects

None of the GTPS participants obtained the lowest or the highest score to the scale, revealing the absence of floor and ceiling effects.

Discussion

After following a rigorous translation and cross-cultural adaptation processes, the French version of the VISA-G (VISA-GF) questionnaire was obtained. We found excellent psychometric performance of this translated version. Indeed, the VISA-GF revealed to be discriminant between participants with GTPS and asymptomatic participants, reliable and valid to measure the severity of disability associated with GTPS.

The sample included in our study consisted of those with GTPS and healthy controls participants. Analyses revealed a significantly lower score for the VISA-GF for GTPS participants when compared to controls. A total score of 60.5 (43-71) points were found, which is very close to the score found in the Danish validation of the questionnaire (mean of 61.9 $\pm$ 5.78) but slightly higher than GTPS participants included in the validation analyses of the original English version (47.00 [42.62-50.18] points).[3] However, for asymptomatic participants, results were very similar and close to the maximal score, which reinforces the specific characteristics of this questionnaire.

The VISA-GF has a very good internal consistency (Cronbach's alpha of 0.81). Deleting item eight resulted in an improvement of the Cronbach's alpha to 0.85, which indicates that this question may reduce the internal consistency of the questionnaire. However, the difference is not major, which led us to conclude that this item does not have a negative impact on the questionnaire. Moreover, even if this item is not truly a GTPS specific question, as discussed by the authors of the original version, it provides valuable information about the actual level of activity the person is undertaking. Nevertheless, this item demonstrated a very strong correlation with the total score of the questionnaire, as it is also the case for the seven remaining items. Our data support the retention of all questions of the VISA-G questionnaire.

We have also demonstrated excellent test-retest reliability with an ICC of 0.99, which is higher compared to the Danish (ICC of 0.96) and the original English (ICC of 0.827) versions. The test-rest analysis was performed only in 26 participants in the original study, which can potentially explain the lower ICC obtained. Regarding SEM, we found a value of 1.64 points, which is close to the value found in the original version (1.88 points). The SEM means that we can be 68% confident ($\pm$1 SEM) that the "true" score of a participant can be found between -1.64 and + 1.64 points from the observed score. The smaller the SEM is, the more confident we can be in the measured score. We also found a SDC of 4.55 points. This means that the overall score of a participant has to change by 4.55 points (on a scale from 0 to 100) to be considered as a real change, and not a change due to measurement error.

We also confirmed the construct validity of the VISA-GF with 75% of our hypotheses confirmed. Authors of the original version of the VISA-G used the Harris Hip Score (HHS) and the Oswestry Disability Index (ODI) as tool to measure construct validity. Because authors found low correlations between these questionnaire (r = 0.02 and r = 0.205 respectively) and concluded that these questionnaires are measuring different constructs compared to the VISA-GF, we chose not to use these scales as a tool for measuring construct validity because of the impossibility of measuring convergent validity. The SF-36 offers a large variety of analyses possible due to the eight different domains of dysfunction analyses throughout this questionnaire, which encourages us to measure both convergent and divergent validity.

Finally, we did not find any floor or ceiling effects of the questionnaire among GTPS population. This psychometric property is important in regard to the discriminative power of the questionnaire as well as responsiveness. For example, a maximal score will not allow any improvement in the questionnaire to be seen following any type of intervention.

Limitations

Despite the rigorous methodology followed throughout the process of translating and validating the VISA-GF, our study presented some limitations. The first one is that controls were not matched to pathological participants for age and gender. However, we carefully included these two clinical characteristics as confounding variables in the analyses of discriminant validity. The rest of the psychometric properties analyses were carried out only on GTPS participants and are therefore not concerned with this limitation. Second, we used the SF-36 only as a tool to measure convergent and divergent validity. We believe an additional tool would have brought supplementary information. However, to our knowledge, no validated French version of a specific questionnaire adapted for this pathology currently exists. Third, for test–retest reliability, the second administration of the questionnaire was done by phone for some participants, in conditions that differ from the first administration. Despite this limitation, we found very high reliability of the questionnaire. Finally, because of the cross-sectional design of our study, we were unable to measure responsiveness of the VISA-GF in our population. A very recent publication revealed an acceptable responsiveness of the VISA-G and was the first publication revealing these results.[14] A prospective design could have offered us the opportunity to replicate and validate these results.

Conclusion

The VISA-GF questionnaire is now available to measure the severity of disability associated with greater trochanteric pain syndrome. The questionnaire discriminates well between pathologic and asymptomatic participants and is valid and reliable. Moreover, we found a good internal consistency and did not find any floor or ceiling effects, which confirm the excellent psychometric performances of the VISA-G.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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Disclosure

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