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COMPOSITE AUTONOMIC SYMPTOM SCALE (COMPASS 31): TRANSLATION AND LINGUISTIC VALIDATION IN MARATHI

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ABSTRACT **Objective:** A clinical questionnaire for the evaluation of relevant autonomic symptoms has been considered necessary for several years to assess the severity and distribution of symptoms and the autonomic capacity of patients with autonomic disorders. COMPASS 31 is a refined, internally consistent, and markedly abbreviated quantitative measure of autonomic symptoms. So far, a reliable Marathi version of the COMPASS 31 was not available although it is needed for a more standardized clinical evaluation of patients with autonomic complaints. The translations provide a required uniform, internationally comparable and still comprehensive questionnaire that delivers valid and reliable data. **Materials And Methods:** The goal of the research was to translate and linguistically validate the Composite Autonomic Symptom Scale (COMPASS 31) in Marathi. There were two phases of the research. The first phase involved translating the Composite Autonomic Symptom Scale (COMPASS 31) from English to Marathi. To verify test-retest validity and reliability, the translated version was field-tested in the second phase. Phase 1 of this study was carried out as per the recommendations given by the American Academy of Orthopedic Surgeons (AAOS). **Results:** Using Spearman correlations, test-retest reliability was evaluated by comparing the overall score and domain scores obtained from the English and Marathi versions of COMPASS 31. Between the Marathi and English versions, there was a positive association for the overall score ($r = 0.99$, $P<0.001$) as well as for the scores for each specific domain. The internal consistency was very good (alpha value > 0.9). Overall, there was nearly perfect agreement (single measures value >0.8) with a p-value that was statistically significant ($p <0.01$). **Conclusion:** In conclusion, this study offers a highly internally consistent and reliable translation of COMPASS 31 into Marathi that yields results that are precisely representative of the original English version.

KEYWORDS : Autonomic dysfunction Linguistic Validation COMPASS 31 Marathi Language

INTRODUCTION

Autonomic dysfunction (AD) refers to impairments in the autonomic nervous system (ANS), which regulates involuntary bodily functions, such as heart rate, blood pressure, digestion, and thermoregulation. In older adults, AD is a prevalent concern due to the natural degeneration of the ANS with age, as well as the increased likelihood of comorbidities such as diabetes, cardiovascular diseases, and neurodegenerative conditions like Parkinson's disease and dementia, all of which can exacerbate autonomic impairments(1).

As the aging population continues to grow, the clinical relevance of autonomic dysfunction becomes increasingly significant. Research indicates that approximately 30-50% of older adults experience some form of AD, manifesting through symptoms like orthostatic hypotension, urinary incontinence, and impaired thermoregulation(2). These symptoms are not only distressing but are also linked to increased mortality and morbidity and are associated with HRQOL in this population, as AD can contribute to falls, syncope, and cardiovascular events.(3)

Age-related changes in the ANS often involve a decline in parasympathetic function and an overactivity of the sympathetic nervous system, which may lead to increased arterial stiffness, altered heart rate variability, and impaired blood pressure regulation (4). Such changes can significantly affect the quality of life in older adults and pose challenges in managing the associated comorbidities effectively.

Given the widespread prevalence and potential consequences of autonomic dysfunction in older adults, early identification and targeted interventions are critical. Diagnosing autonomic dysfunction in older adults can be challenging, as the symptoms may be attributed to other conditions. A comprehensive evaluation, including a detailed medical history, physical examination, and specific tests to assess autonomic function, is often necessary. COMPASS 31 is a reliable, valid and significantly shortened tool for quantifying autonomic symptoms(5). It builds on the original ASP and COMPASS, using a simplified scoring method, making it well-suited for broad use in both autonomic research and clinical practice(6). Thus, the study aimed to translate and validate the COMPASS 31 questionnaire in the Marathi language for a more standardized clinical evaluation of patients with autonomic complaints in Maharashtra. The translations offer a standardized, internationally comparable, and comprehensive questionnaire that ensures valid and reliable data collection.

Methodology:

The study aimed to translate and linguistically validate the Marathi version of the Composite Autonomic Symptom Scale (COMPASS 31). Ethical approval was obtained from the institutional committee (EC/OA-76/2022). The research was conducted in two phases: Phase 1 involved translating the English version of COMPASS 31 into Marathi, while Phase 2 focused on field testing the translated version to assess its test-retest reliability and validity. The translation process in Phase 1 followed the guidelines of the American Academy of Orthopedic Surgeons (AAOS) (7). Written permission for the translation was obtained via email from the author of COMPASS 31, and the Marathi translation has been copyrighted (L-148184/2024).

As per the AAOS guidelines, the translation process consists of six stages. T1 and T2 were the initial provisional Marathi translations of COMPASS 31. Translator 1 (T1) and Translator 2 (T2) both were Marathi teachers at a convent school. Discrepancies between these versions were resolved through detailed analysis, leading to the finalized T12 version. After this, the T12 version was reviewed and sent for pilot testing at five physiotherapy clinics. It was generally well received by the Marathi-speaking community, though in some cases, certain formal Marathi words were not easily understood. These issues were addressed by the expert panel, and simpler alternatives were adopted. For example, the word "atisaar" (अतिसार) for diarrhea in the T12 version was replaced with "zulab" (झुलाब). Two professionals, unaware of the original text, independently back-translated the T12 Marathi version into English, resulting in translations B1 and B2. B1 was performed by a professor and native speaker, and B2 by a retired convent school teacher. The revised final T12 version was then submitted for field testing.

Phase 2 involved field testing to assess the reliability of the translated version. Informed consent was obtained from all participants. A total of 19 participants were recruited for Phase 2, all of whom were bilingual in Marathi and fluent in English. The participants completed the COMPASS 31 twice—once in Marathi and once in English—with a three-week interval between tests.

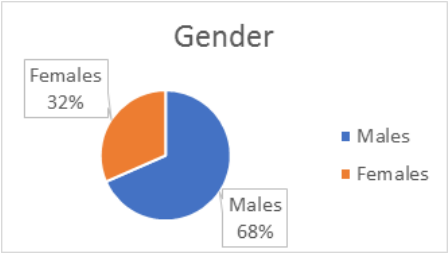
RESULTS:

All data were entered into a computer by giving a coding system, proofed for entry errors. The data obtained was compiled on a MS Office Excel Sheet. Data was subjected to Statistical Analysis using the Statistical Package for Social Sciences (SPSS v 26.0, IBM). Descriptive statistics like frequencies and percentages for categorical data and mean and standard Deviation (SD) for numerical data were performed.

Total of 19 participants were enrolled in the study with the mean age of 69.16± 7.80 (Table 1) and M:F ratio of 13:6 as depicted in Graph 1.

Table 1.

	N	Minimum	Maximum	Mean	S.D.
AGE	19	60	84	69.16	7.80



Graph 1.

Test-retest reliability was evaluated by comparing the total and domain scores from the English and Marathi versions of COMPASS 31 using Spearman correlations. A strong positive correlation was observed between the total scores of the English and Marathi versions ($r = 0.99$, $P<0.001$), with similarly positive correlations for individual domain scores, as presented in Table 2. The internal consistency was excellent, with an alpha value greater than 0.9. There was also near-perfect agreement, as indicated by single measures values above 0.8, with a highly significant p-value ($p<0.01$) as demonstrated in Table 3.

Table 2.

	English Version	Marathi Version	r value
N=19			
Total Score	23.71±11.64	23.36±11.51	0.99
Domain Score			
Orthostatic intolerance	8.32±8.14	8.42±8.21	0.99
Vasomotor	0.66±1.34	0.57±1.14	0.99
Secretomotor	6.19±3.83	6.08±3.72	0.98
Gastrointestinal	5.48±3.20	5.39±3.23	0.99
Bladder	1.51±1.56	1.45±1.56	0.99
Pupillomotor	1.56±1.06	1.46±1.03	0.96

Table 3.

Variable	Cronbach's Alpha	Intraclass Correlation		Lower Bound	Upper Bound	Value	p value
Orthostatic intolerance	1.000	Single Measures	1.000	1.000	1.000	---	.000**
		Average Measures	1.000	1.000	1.000	---	.000**
Vasomotor	1.000	Single Measures	1.000	1.000	1.000	4.298	.000**
		Average Measures	1.000	1.000	1.000	4.298	.000**
Secretomotor	1.000	Single Measures	1.000	1.000	1.000	2.222	.000**
		Average Measures	1.000	1.000	1.000	2.222	.000**
Gastrointestinal	1.000	Single Measures	1.000	1.000	1.000	---	.000**
		Average Measures	1.000	1.000	1.000	---	.000**
Bladder	1.000	Single Measures	1.000	1.000	1.000	---	.000**
		Average Measures	1.000	1.000	1.000	---	.000**
Pupillomotor	1.000	Single Measures	1.000	1.000	1.000	---	.000**
		Average Measures	1.000	1.000	1.000	---	.000**
TOTAL	1.000	Single Measures	1.000	1.000	1.000	1.648	.000**
		Average Measures	1.000	1.000	1.000	1.648	.000**

DISCUSSION:

This study successfully translated and validated the Marathi version of the Composite Autonomic Symptom Scale (COMPASS 31), providing a reliable and culturally adapted tool for assessing autonomic symptoms in Marathi-speaking populations. The translation process adhered to rigorous guidelines established by the American Academy of Orthopedic Surgeons (AAOS)(7), ensuring the linguistic and cultural appropriateness of the scale. The final version was tested for reliability and validity, showing excellent internal consistency and strong test-retest reliability.

The internal consistency of the Marathi version was demonstrated by a Cronbach's alpha value exceeding 0.9, indicating that the scale reliably measures autonomic symptoms across its domains. The almost perfect agreement between test-retest scores, with single measures values above 0.8, further supports the scale's stability and reproducibility over time. These findings are in line with previous validations of COMPASS 31 in other languages, such as Hindi and Danish, where similarly high levels of reliability were observed (8,9).

One challenge encountered during the translation process was the use of certain formal Marathi terms, which were unfamiliar to some participants. For instance, the term "atisaar" (अतिसार) for diarrhea was replaced with the more commonly understood word "zulab" (जुलाब). Such adjustments were necessary to maintain clarity while preserving the scientific integrity of the tool. This highlights the importance of cultural adaptation in the translation of medical questionnaires, as literal translations may not always resonate with the target population (10).

The field-testing phase of the study confirmed that the Marathi version of COMPASS 31 was well accepted in the community, further establishing its practical utility in clinical and research settings. The positive correlations between the English and Marathi versions ($r = 0.98$, $p < 0.001$) for both total and domain scores provide strong evidence for the validity of the translation. This is consistent with the results of other language adaptations of COMPASS 31, which also reported strong cross-language correlations (8,11).

Autonomic dysfunction often presents with subtle or nonspecific symptoms in its early stages, such as dizziness, fatigue, gastrointestinal disturbances, and changes in sweating. These symptoms can be easily overlooked or attributed to normal aging, leading to delays in diagnosis. However, early detection of autonomic dysfunction is critical, especially in older adults. The COMPASS 31 total score and all subdomains have been significantly associated with reduced HRQoL in older adults. Overall, autonomic symptoms alone explained 20% of the variance of HRQoL (3).

Given the increasing focus on autonomic dysfunction in clinical practice not only in older adults but also in conditions like small fibre neuropathy(12), Parkinson's disease(13), multiple system atrophy(13), and diabetes (14), having validated tool in Marathi is crucial. This adaptation will facilitate the accurate assessment of autonomic symptoms in Marathi-speaking patients, aiding in the timely diagnosis and management of autonomic disorders.

CONCLUSION

The translated and validated Marathi version of COMPASS 31 demonstrates strong reliability and validity, making it a valuable tool for autonomic symptom assessment in Marathi-speaking populations. Future studies should explore its use in larger and more diverse patient populations to further assess its applicability across various clinical conditions.

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