Obesity Surgery
https://doi.org/10.1007/s11695-024-07460-6

ORIGINAL CONTRIBUTIONS

Translation and Validation of the Brazilian Version of the European Obesity Academy Questionnaire on Patients' Motivations for Seeking Metabolic and Bariatric Surgery

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Received: 2 May 2024 / Revised: 1 August 2024 / Accepted: 6 August 2024

Abstract

Purpose Understanding patients' motives for undergoing metabolic and bariatric surgery (MBS) is key to managing postoperative expectations. We aimed to translate and validate the 14-item European Obesity Academy Questionnaire on Expectations about Surgical Treatment (EOAQ-EST) to Brazilian Portuguese for research and clinical use.

Materials and Methods This study included a total of 198 candidates for MBS at a reference academic hospital in Brazil from January 2021 to February 2022. We followed Beaton and Bombardier's guidelines for translation and cultural adaptation, including translation, back-translation, comparative analysis, expert review, pilot testing, and the creation of the final version of the questionnaire. Reliability was tested with McDonald's omega, and internal validity was assessed using confirmatory factor analysis (CFA).

Results The final version was applied to 161 patients, 85% female, with a mean age of 46.4 ± 10.3 years and a mean BMI of 48.3 ± 8.2 kg/m^2. Validity was supported by a bifactorial model (95% *CI* 0.044–0.104, $p = 0.08$), excluding one item (improved fertility) due to a floor effect. The reliability analysis showed that the 13 remaining items were internally consistent, with a McDonald's ω of 0.625.

Conclusions The Brazilian-Portuguese version of EOAQ-EST proved to be user-friendly, consistent, and reliable. This questionnaire may assist multidisciplinary teams in effectively addressing patients' expectations concerning metabolic and bariatric surgery (MBS) outcomes.

Keywords Bariatric surgery · Motivation · Psychometry · Surveys and questionnaires · Validation

Key Points
- The Brazilian-Portuguese version of the EOAQ-EST was translated and validated with reliability.
- Psychometric reliability analyses highlight this validation study.
- The EOAQ-EST can be a clinically useful measure of motivations for patients seeking MBS.

Introduction

Metabolic and bariatric surgery (MBS) is a safe and effective treatment for severe obesity [1]. It often results in significant weight loss (WL) and control of obesity complications typically measured parameters as critical surgery outcomes [2]. However, a growing body of research has shown that understanding treatment goals from the patient's perspective is essential for achieving successful and sustainable WL [3]. Patients who undergo MBS may have unrealistic expectations of weight loss, leading to dissatisfaction and frustration after surgery, which in turn may contribute to recurrent weight gain and loss at follow-up [2–5].

Understanding patients' motivations for seeking surgery as a treatment for obesity and their expectations for surgical outcomes is essential for multidisciplinary healthcare professionals to plan interventions that help patients set realistic goals. Achieving satisfaction with surgical outcomes will encourage patients to pursue sustained weight loss and its health benefits [6–9]. To objectively evaluate patients' expectations, it is necessary to use a structured and validated tool that can be comparable through different settings. In 2014, Fischer et al. published the European Obesity Academy Questionnaire on Expectations about Surgical Treatment (EOAQ-EST), a tool to assess motivations and expectations regarding MBS [9]. The authors applied it to 248 male and female candidates for MBS in

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Germany, finding that the mean expected excess weight loss (EWL) was 71.8%, indicating unrealistic weight loss goals and overestimation of the effect of the surgical intervention. Regarding the reasons for undergoing MBS, most of the female participants stated that they expected "improved physical activity," "improved mental health," "improved self-esteem," and "reduction in clothing size." This questionnaire was later validated in Nordic countries, with WL and improved comorbidities ranked as the most important reasons for seeking MBS [10].

Studies on patients' motivations to undergo MBS are still scarce and mostly weight-centric. Furthermore, existing questionnaires are predominantly available in English, lacking translation and cultural validation for use in diverse linguistic and economic contexts [9, 10]. Brazil has emerged with the second-highest absolute number of MBS procedures worldwide, as reported in the 8th IFSO Global Registry report [11]. However, there is currently no assessment tool translated into Brazilian Portuguese that could be widely utilized in both research and clinical settings to enhance patient care. This study aimed to translate and culturally adapt the English version of the EOAQ-EST into Brazilian Portuguese to allow further validation.

Materials and Methods

This cross-sectional study included patients who were candidates for MBS at a referral teaching hospital in Brazil from January 2021 to February 2022. Inclusion criteria were adults aged 18 years or older at the interview, with the cognitive ability to understand the informed consent and the questionnaire, and candidates for primary MBS with BMI ≥ 40 kg/m^2 or ≥ 35 with associated clinical conditions. The patients in this study agreed to participate by signing an informed consent form.

As there was no existing Brazilian-Portuguese version, permission was obtained from the primary authors of the original questionnaire [9], with authorization by e-mail from Dr. Lars Fisher. The study was approved by the Institutional Ethics Research Committee (CAAE no. 4.488.229/4.735.640). Written informed consent was obtained from all participants. The study followed Beaton and Bombardier's guidelines for the cultural adaptation of the questionnaire into Brazilian Portuguese, with translation, back-translation, comparative analysis, expert review, and pretest [12, 13]. Figure 1 summarizes the study's methodology, organized into four steps.

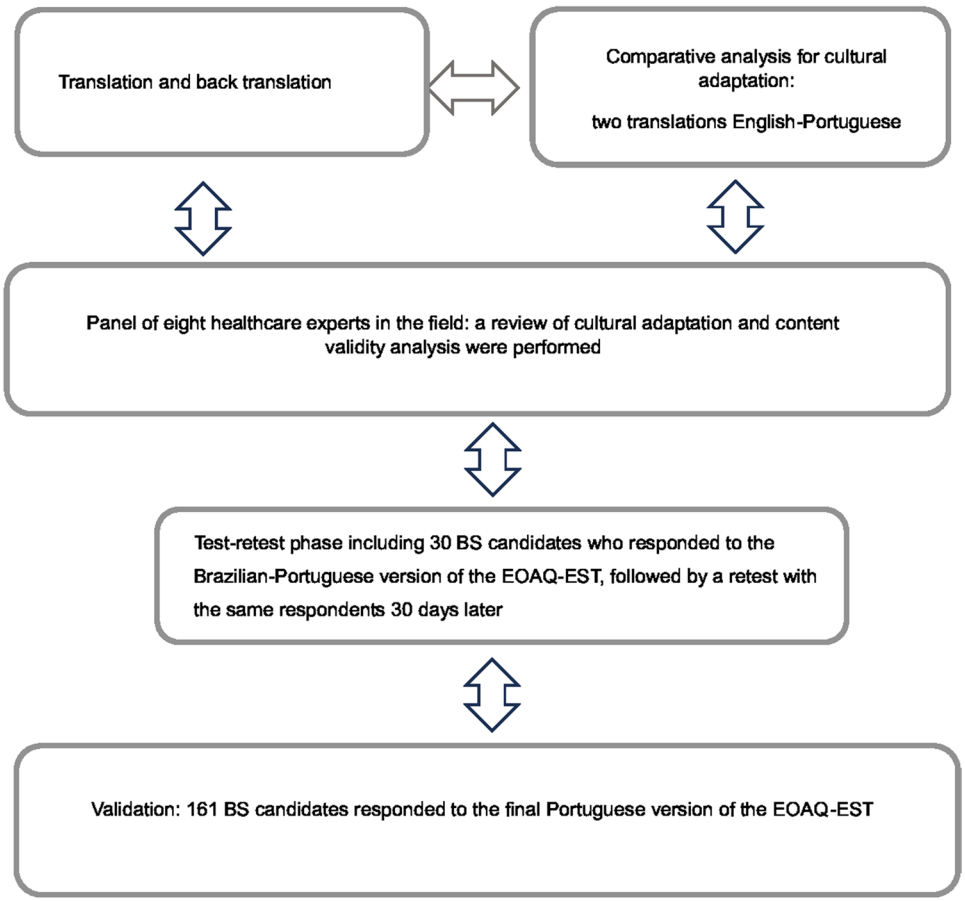

Fig. 1 Methodological steps: translation (English-Portuguese) and back-translation (Portuguese-English), content analysis by the panel of healthcare experts, test–retest with bariatric surgery candidates using the culturally adapted questionnaire, and validation study by factor analysis

Questionnaire

The EOAQ-EST consists of three parts:

- Part 1 — Includes demographic and general clinical data such as age, education level, occupation, family composition, height, weight, obesity-related medical conditions, and their treatment.
- Part 2A — Assesses the expectations of body image change after MBS using human figure drawings of Stunkard's silhouettes [14]. Part 2B has two questions about the expectations before and after MBS and the desired weight to achieve.
- Part 3A — Includes a list of 14 reasons influencing the decision to undergo MBS, with responses on a Likert scale ranging from 1 to 5 (not important, somewhat important, reasonably important, important, very important). Part 3B has the three most important reasons for the patient.

This study approached the third part of the questionnaire to explore the patient's motivations for MBS, covering emotional and social improvements to physical- and health-related benefits.

Translation

Forward and Back-Translation

All translations were done by a translation company specializing in healthcare. First, an English-to-Portuguese translation was performed and then subjected to a comparative cultural adaptation analysis. A Portuguese-to-English back-translation was then performed, and after the comparative analysis, a second translator repeated the same procedures.

Content Validity

An expert panel comprised eight healthcare professionals: one bariatric surgeon, two endocrinologists, one psychiatrist, two psychologists, and two dietitians. They evaluated the content validity of the translated instrument. The panel verified three aspects: (a) semantic correction, an adaptation of the questionnaire to the Brazilian culture, (b) the potential of each item of the questionnaire to represent the construct of expectation, and (c) the suitability for application to the target population. The agreement analysis was verified quantitatively and qualitatively by comparing the experts' responses.

Test–Retest (Pilot Study)

The translated EOAQ-EST was initially administered to five MBS candidates for preliminary testing, and several adjustments were made based on their feedback. Subsequently, the pre-final version was refined into a final version and administered to 30 patients. After 30 days, the final version was readministered to the same participants to assess its reliability (test–retest phase).

Sample Size

The sample size was determined based on the item-subject ratio, following recommendations for validation studies [12, 13]. It was calculated that 10 individuals were needed for each of the 16 questionnaire items, resulting in a target sample size of 160 participants. The researcher approached 163 MBS candidates in the preoperative outpatient clinic, and all agreed to participate in the study, signing informed consent. However, two patients were excluded from the study because they could not complete the questionnaire due to their psychological condition at the time. One patient had idiopathic intracranial hypertension with recurrent migraines and, upon answering the questionnaire, was asked to stop due to unwellness and difficulty thinking. The other had an emotional breakdown while answering the questionnaire and was unable to complete the answers. Both patients were welcomed at this time of crisis by the researcher, who is a clinical psychologist.

Statistical Analysis

Descriptive analysis included data on the participants' sociodemographic and clinical characteristics. The intraclass correlation coefficient (ICC) was used to estimate the stability of the construct over time through the correlation between scores at two-time points (test–retest).

Confirmatory factor analysis (CFA) is a robust technique for estimating the validity of the covariance structure of the response items that make up the scale. CFA was used to investigate the factor structure of the 14-item motivation questionnaire (Part 3A). Model fit was evaluated using the following goodness-of-fit indices: root-mean-square error approximation (RMSEA), comparative fit indices (CFI), parsimony normal fit (PNFI), and sample-size-adjusted Bayesian information criterion (SABIC) [15]. Competing factorial models were tested to determine plausible structures: unidimensional, bifactorial, and hierarchical models [16–18]. Initial exploratory analyses (not shown) suggested a possible structure of a general factor (G) and two secondary factors labeled as social (S) and personal (P). The latter factor (P) could

alternatively be decomposed into lower-order personal (P′) and healthcare (H) factors. Two questionnaire items (Q5 and Q14) did not fit the tested factorial models, and their contribution to the retained factor was uncertain. After testing 79 possible combinations, we selected the best-fitting model for questionnaire validation. Because Cronbach's alpha coefficient of internal consistency violates assumptions that the responses to individual items of a given scale are normally distributed, have equal variance, and equally explain the underlying construct, McDonald's omega (ω) coefficients were calculated as comprehensive reliability indicators of each retained subscale for the final factorial model.

To avoid bias, the invariance between the responses of groups of participants can be tested by multigroup CFA. However, as the gender ratio in our sample was highly unbalanced, during the validation phase of the study, male participants were excluded from the analysis due to their small number.

The female participants were stratified into two groups: those younger than 48 and those 48 years old or older. The cut-off age of 48 corresponds to the median age of menopause in Brazilian women [19, 20]. The two age groups were compared using a general linear model regarding body mass index, schooling, current employment, hypertension, and diabetes.

Analyses were performed with R 4.2.2 software [21] using the packages *lavaan* [22] and *semTools* [23].

Results

The final version of the questionnaire was applied to 161 patients, 85% female, with a mean age of 46.4 ± 10.3 years and a mean BMI of 48.3 ± 8.2 kg/m^2. As male patients were excluded during the validation phase, data from 137 women were used for the analysis. Their sociodemographic and clinical characteristics are summarized in Table 1.

Content Validity

The translation and cultural adaptation processes resulted in no exclusion of questionnaire items. The panel of experts and researchers proposed adding several questions to the Brazilian version of the questionnaire: detailed sociodemographic characteristics, the occurrence of chronic diseases not included in the English instrument, and information on the participant's history of obesity. The analysis of the expert panel responses presented an 85% agreement rate, indicating good content validity of the EOAQ-EST. The mean of the test–retest Pearson correlation calculation was strong ($r = 0.95$, $p < 0.001$), demonstrating a high stability of the questionnaire. Table 2 summarizes the cultural adaptation process of Part 3A of the EOAQ-EST.

Table 1 Sociodemographic and clinical characteristics of female participants stratified by two age groups ($n = 137$)*

	< 48 years old $n = 82$	≥ 48 years old $n = 55$	p
Age range in years	18–47	48–66	
Age (years), mean ± SD	39.5 ± 5.6	57.2 ± 5.1	
BMI, mean ± SD (kg/m^2)	49.9 ± 8.5	46.2 ± 7.5	0.091
Schooling (years)			0.320
< 14	55 (67.2%)	45 (81.8%)	
≤ 14	27 (32.8%)	10 (18.2%)	
Working status			0.053
Working	53 (64.6%)	19 (34.5%)	
Not working	29 (35.4%)	36 (65.5%)	
Hypertension			0.579
No	32 (39%)	10 (18.2%)	
Yes	50 (61%)	45 (81.8%)	
Diabetes			> 0.999
No	58 (70.7%)	24 (43.6%)	
Yes	24 (29.3%)	31 (56.4%)	

*The test with the general linear model did not show statistically significant differences between the two age groups of women, considering body mass index, schooling, current employment, and the presence of hypertension or diabetes

Construct Validity

Figure 2 presents the best-fitting model of the 14-item motivation questionnaire by age group. The factorial structure is composed of a general factor (G) that explains most of the data variance and three secondary factors: healthcare (H), social (S), and personal (P). Item Q5, or "improved fertility," was excluded due to its low contribution to the model. However, item Q14, or "increased life expectancy," was accepted with a salient loading to the social factor (S).

Confirmatory Factor Analysis

The following goodness-of-fit indices confirmed the model's plausibility: $RMSEA = 0.076$ (95% confidence interval 0.044–0.104; $p = 0.0839$), $CFI = 0.89$, $PNFI = 0.488$, and $SABIC = 3933.30$. Furthermore, the model was invariant for females younger than 48 and those aged 48 years or older, indicating that the same factorial structure can be uniformly applicable to females of all ages.

Reliability Analysis

The values of McDonald's ω were $\omega_G = 0.625$, $\omega_P = 0.167$, $\omega_S = 0.201$, and $\omega_H = 0.417$ for G, P, S, and H factors, respectively. The general factor (G) on motivations explained most of the data variance, with the further contribution of secondary factors. The core motivations for seeking surgery

Table 2 Summary of the cultural adaptation from the original version of Part 3A of the EOAQ-EST to the Brazilian-Portuguese language

Item	Original	Translation to Brazilian Portuguese
	Please mark what you think best fits your opinion Feel free to use the whole range of answers How important are the following issues on a scale of 1 (not important for you) to 5 (very important)?	Quais os motivos que o(a) levou a procurar a cirurgia bariátrica? Abaixo temos uma lista de possíveis motivos, assinale o nível de importância para cada um deles, usando uma escala de 1–5 Qual o grau de importância desses motivos em uma escala de 1 (sem importância) a 5 (muito importante para você)?
Q1	Improved mental health	Melhorar o bem-estar emocional
Q2	Improved physical activity	Melhorar a capacidade de realizar exercícios físicos
Q3	Improved in intimacy and partnership	Melhorar o relacionamento íntimo com o(a) companheiro(a)
Q4	Reduction in clothing size	Reduzir o tamanho das roupas
Q5	Improved fertility	Melhorar a fertilidade
Q6	Improved social life (e.g., culture, meeting friends)	Melhorar a vida social (por ex. encontro com amigos, ir a festas)
Q7	Pain reduction	Diminuir dores
Q8	Improved obesity complication, such as diabetes	Melhorar o controle do diabetes, hipertensão, distúrbio do sono etc
Q9	Reduced medication needed	Diminuir o uso de medicamentos
Q10	Increased employment chance	Melhorar a oportunidade de conseguir um emprego
Q11	Better work performance	Melhorar o desempenho no trabalho
Q12	Weight loss	Perder peso
Q13	Improved self-esteem	Melhorar a auto-estima
Q14	Increased life expectancy	Aumentar os anos de vida

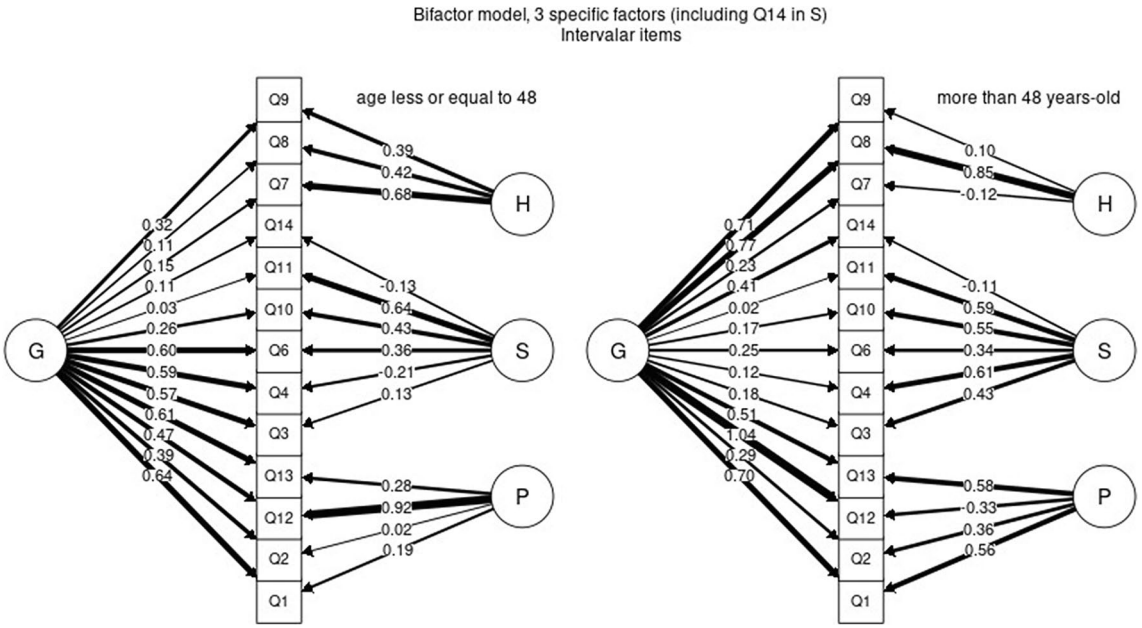

Fig. 2 The best validation models for women at the cut-off age of 48 years: bifactor model including a general factor (G) with three factors, namely personal (P), social (S), and healthcare (H). The Q14 was included in the social factor (S). Items grouped by the secondary factors were qualitatively related below and in Table 3. Healthcare (H): Q7: pain reduction, Q8: improved obesity complication, such as diabetes, Q9: reduced medication need. Social (S): Q3: improved in intimacy and partnership, Q4: reduction in clothing size, Q6: improved social life (e.g., culture, meeting friends), Q10: increased employment chance, Q11: better work performance, Q14: increased life expectancy. Personal (P): Q1: improved mental health, Q2: improved physical activity, Q12: weight loss, Q13: improved self-esteem

Table 3 Items grouped by the secondary factors

Intrinsic expectations Personal factor (P)	Extrinsic expectations Social factor (S)	Intrinsic expectations Healthcare expectations (H)
• Q1 — Improved mental health • Q2 — Improved physical activity • Q7 —Pain reduction • Q8 —Improved obesity complication, such as diabetes • Q9 — Reduced medication need • Q12 — Weight loss • Q13 — Improved self-esteem	• Q3 — Improved in intimacy and partnership • Q4 — Reduction in clothing size • Q6 — Improved social life (e.g., culture, meeting friends)	• Q7 — Pain reduction • Q8 — Improved comorbidities such as diabetes • Q9 — Reduced medication need

were health improvement (H), social performance (S), and personal reasons (P).

Discussion

We translated, culturally adapted, and validated the EOAQ-EST questionnaire into Brazilian Portuguese. Throughout this process, we ensured clarity of technical terms and comprehensibility of questionnaire items. The translated instrument showed stability in the test–retest phase of the study. The final version was easy to apply and short in duration (mean 16 min), suggesting its potential as a pre-surgical tool to assess patients' motivations for seeking MBS and their expectations for surgical outcomes.

CFA indicated that the bifactor model provided the best fit for the EOAQ-EST scale, which is particularly valid for Brazilian female patients seeking surgery. The novel approach of testing the age invariance of the scale functioning at the cutoff of 48 years for female participants also suggested that the underlying construct remained unchanged in women of different ages, considering weight gain and menopause [19, 20].

The final model's item contribution analysis excluded Q5 but retained Q14. Question 5, "improved fertility," may not apply to postmenopausal women seeking MBS. Question 14, "increased life expectancy," is a motivation nearly everyone shares, regardless of their health status.

Many studies highlighted the critical need for a validated tool to assess motivations for undergoing bariatric surgery [3–10]. Physiological, emotional, cognitive, and personal factors motivate and influence patients' decisions, as shown by Cohn et al. [24]. Studies have emphasized the importance of actions to avoid frustration with the results of MBS due to unrealistic weight loss expectations and dissatisfaction with body image after metabolic and bariatric surgery [25, 26]. Patients often anticipate that MBS will transform their bodies and lives without the need for supplementary mental health care, lifestyle modifications, regular physical activity, or dietary adjustments [27, 28]. Therefore, given the knowledge gap regarding expectations of surgery, interventions and guidelines are recommended. The use of the EOAQ-EST can assist healthcare professionals in knowing patients' expectations regarding bariatric surgery, understanding the motivations that led to the decision, clarifying the patient's life in a real context, and realigning the expectations.

Weight loss trajectories after bariatric surgery vary widely between individuals. Despite comprehensive preoperative assessment of each candidate, long-term weight loss outcomes are heterogeneous regarding changes over time and differences between procedures and individuals [29]. The SOPHIA study has developed a machine learning-based model for predicting individual 5-year results, achieving a mean difference between predicted and observed BMI of -0.3 kg/m^2 (*SD* 4·7) [30]. Such predictive models could be integrated into clinical practice and patient expectations questionnaires to enhance preoperative counseling and decision-making in MBS**.**

Our study has several limitations, such as the lack of psychometric analysis in the original study. Secondly, the limited number of male participants precluded any analysis specific to this population, thereby failing to address their expectations, such as concerns about male infertility related to obesity. Thirdly, in the field of obesity surgery research, there was no universally accepted standard for comparing "expectations" and "motivations." Fourthly, this study was conducted at a single center and, therefore, may limit the generalizability of our findings to the broader population with obesity who seek MBS. Despite these limitations, our study's strengths include being the first to translate and validate the EOAQ-EST questionnaire from English to Brazilian Portuguese with methodological rigor. It has also provided valuable insights into factors influencing patients' motivation for MBS and highlights the need for further research.

Conclusions

The EOAQ-EST questionnaire was easy to administer, reliable and stable over time, and age invariant when applied to a sample of Brazilian MBS candidates. The factorial validity of the Brazilian-Portuguese version of this instrument was determined by confirmatory factor

analysis. We recommend using the EOAQ-EST regularly during the preoperative period of patients evaluated by the multidisciplinary team. We also suggest conducting large multicentric and longitudinal studies in inclusive populations of MBS candidates.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11695-024-07460-6.

Data Availability The data supporting this study's findings are available on request from the corresponding author.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional and/or National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare no competing interests.

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