ORIGINAL ARTICLE

Two decades and counting: The enduring legacy of the Attribution Questionnaire

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ABSTRACT

Background and aim*:* This study examines the psychometric properties of three versions of the Attribution Questionnaire (AQ) in an Italian context. The AQ is a widely used tool for assessing public stigma toward mental illness, a phenomenon that profoundly affects individuals, their quality of life, and healthcare policies. The three versions analyzed include the AQ-21 (2003), comprising six domains (Personal Responsibility, Fear, Pity, Anger, Helping, Coercion/Segregation); the AQ-26 (2008), reorganized into six factors (Fear/Dangerousness, Help/Interaction, Responsibility, Forced Treatment, Empathy, Negative Emotions); and the Italian AQ-27, an expanded version with nine domains.

Methods: A total of 233 participants, recruited via snowball sampling, completed the AQ-27-I. Confirmatory Factor Analysis and Structural Equation Modeling were used to evaluate the fit of the AQ models and to explore causal relationships between latent variables within the best-fitting model.

Results: All three AQ versions demonstrated acceptable psychometric properties, with the AQ-27 emerging as the most robust due to its more detailed structural configuration. Analysis of AQ-27-I identified two distinct models: the personal responsibility model and the dangerousness model. The former showed that attributing responsibility for mental distress to individuals is associated with anger and a paradoxical combination of desires

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to help and segregate those individuals. The latter confirmed that perceiving individuals with mental illness as dangerous leads to heightened fear and increased social avoidance.
Conclusions: The findings confirm the AQ-27's reliability in assessing public stigma and emphasize the importance of exploring interactions between its domains. A better understanding of stigma dynamics could enhance targeted interventions. (www.actabiomedica.it)

Key words: mental health stigma, Attribution Questionnaire, discrimination, public perception, structural equation modeling

Introduction

Stigma associated with mental health conditions can have profound and far-reaching consequences, impacting individuals' well-being, access to care, and overall quality of life. These consequences manifest across various domains, from social interactions to healthcare systems, and can exacerbate the challenges faced by those already grappling with mental health issues (1). One significant consequence of stigma is its detrimental effect on individuals' mental health outcomes. Research suggests that experiencing stigma can contribute to increased levels of stress, anxiety, depression, and diminished self-esteem among individuals with mental health conditions (2). The fear of being judged or discriminated against may prevent individuals from seeking help or disclosing their condition, leading to delays in accessing appropriate care and support (3). Moreover, stigma can perpetuate social isolation and undermine interpersonal relationships, as individuals may withdraw from social interactions to avoid potential discrimination or negative reactions from others. This isolation can further exacerbate feelings of loneliness and alienation, contributing to a cycle of distress and social marginalization (4). In addition to its impact on individuals' mental well-being, stigma also affects healthcare systems and policies. Discriminatory attitudes and beliefs about mental illness can influence resource allocation, treatment decisions, and the development of mental health policies. This can result in disparities in access to quality care and services for individuals with mental health conditions, perpetuating inequalities in health outcomes (5). Addressing stigma requires multifaceted strategies that must be both evidence-based and rigorously evaluated (6). Some interventions that initially yielded positive results can have unintended effects. For instance, education and awareness campaigns can be very useful in combating the stigma of mental health by improving attitudes and increasing knowledge about mental illnesses in young people (7). However, as Corrigan points out (2018), education can expose people to broader perspectives, highlighting a sense of difference from another group, which can contribute to the creation of stereotypes and prejudice. Contact-based interventions, where individuals interact with those with lived experience of mental illness, have shown promise in reducing stigma. Studies have found that contact interventions lead to improved attitudes and increased social acceptance of individuals with mental health challenges. Personal contact humanizes the experience of mental illness, challenging preconceived notions, reducing anxiety and fostering empathy and perspective-taking (6,8). Media plays a powerful role in shaping societal attitudes towards mental health. Positive portrayals of individuals with mental illnesses in media have been associated with reduced stigma. Conversely, sensationalized or stigmatizing depictions can reinforce negative stereotypes (9–11). Thus, promoting accurate and empathetic representations of mental health in media is essential for combatting stigma. Evaluation serves as a cornerstone in the development and refinement of anti-stigma interventions. By systematically assessing intervention outcomes, researchers can identify

what works, for whom, and under what circumstances (12,13). This iterative process enables the optimization of interventions, ultimately enhancing their impact on stigma reduction (14,15). Selecting appropriate evaluation tools is essential for generating reliable and valid data. Quantitative measures, such as standardized surveys and scales, offer valuable insights into changes in knowledge, attitudes, and behavior towards mental illness; qualitative methods, including interviews and focus groups, provide a nuanced understanding of participants' experiences and perceptions, complementing quantitative findings (3,16). Building upon the insightful work by Johnson-Kwochka et al. (2021) (17), which aimed to examine the factor structure of the Attribution Questionnaire and relationships between constructs in the Attribution Model, and recognizing the fundamental role of validated psychometric tools in assessing the effectiveness of stigma reduction strategies, we deemed it crucial to conduct a thorough investigation into the relevance and applicability of the AQ-27 within the Italian context. The aims of this study are as follows: 1) to determine which of the three Attribution Questionnaire previous versions (2003, 2008 and 2012) currently exhibit greater psychometric robustness among the Italian population, and 2) to define possible causal paths between the latent variables of the model with the best fit utilizing the domains present in the AQ-27. This involves exploring the relationships between these latent variables and understanding how they interact and influence each other within the framework provided by the AQ-27, thereby contributing to a deeper understanding of the underlying constructs measured by the instrument.

Materials and Methods

Participants

This is a cross sectional-study. The participants were recruited using the snowball sampling strategy: the questionnaire was initially distributed to all contacts of the authors via social networks (LinkedIn and Instagram), with the request for them to complete it and send the link to their own contacts. Considering that a sample of at least 200 people is necessary to implement a Confirmatory Factor Analysis (18,19), it was decided to keep the questionnaire active until 250 people completed it, hypothesizing that a maximum of 20% would provide incomplete data. This approach ensured that the minimum required number was reached. Prior to performing the confirmatory factor analysis (CFA), we assessed the adequacy of the data using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. These preliminary tests are widely recommended as they provide evidence that the correlation matrix is factorable and that the data are suitable for factor analysis (20,21). A KMO value above 0.60 and a statistically significant Bartlett's test ($p < 0.05$) are generally considered acceptable indicators of sampling adequacy (22). Only two inclusion criteria were established: being aged 18 years or older and speaking fluent Italian. If respondents did not meet both criteria, they were invited to exit the survey. All participants voluntarily signed online informed consent form prior to their inclusion in the study, indicating their understanding of the research procedures and their agreement to participate.

Data collection and measures

Study data were collected and managed using REDCap electronic data capture tools hosted at University of Modena and Reggio Emilia. REDCap is a secure, web-based software platform designed to support data capture for research studies, providing an intuitive interface for validated data capture; audit trails for tracking data manipulation and export procedures; automated export procedures for seamless data downloads to common statistical packages; and procedures for data integration and interoperability with external sources (23). The online questionnaire was structured as follows: a socio-demographic data collection sheet including age, sex assigned at birth, gender identity, place of residence, and educational qualification, along with the Italian Version of Attribution Questionnaire 27 (AQ-27-I) (24–26), which includes items present in all three versions of the Attribution Questionnaire, thus allowing for scoring across all three versions. For each version of the AQ described, the corresponding items in the Italian version will be indicated in parentheses, and items

7, 8, 16, 20, 21, and 26 should be considered reverse scored. The first version of Attribution Questionnaire developed in 2003 (25) comprised 21 items divided into 6 domains: Personal Responsibility Beliefs (10, 11, 23), Pity (9, 22, 27), Anger (1, 4, 12), Fear (13, 18, 19, 24), Helping (7, 16, 21, 26) an Coercion-Segregation (6, 15, 17, 25). The development of this model enabled verification that, in line with attribution theory, causal attributions influence beliefs regarding individuals' responsibility for their condition. These beliefs, in turn, trigger affective reactions, ultimately resulting in rejecting responses such as avoidance, coercion, segregation, and withholding help. The Attribution Questionnaire version proposed by Brown (2008) comprises 26 items divided into 6 domains: Fear/Dangerousness (2, 3, 6, 13, 18, 19, 24), Help/Interact (7, 8, 16, 20 21, 26), Responsibility (10, 11, 23), Forcing treatment (14, 15, 17, 25), Empathy (9, 22, 27) and Negative emotions (1, 4, 12). Four of these factor scales (Fear/Dangerousness, Help/Interact, Forcing Treatment, and Negative Emotions) had acceptable internal consistency, test-retest reliability, and convergent validity with other stigma measures. The Attribution Questionnaire-27, validated in Italian, consists of 27 items divided into 9 domains. It has undergone validation in Italian, both in the general population (26) and various subpopulations such as medicine and surgery students, and high school students (28,29). Additionally, it has been validated in several other languages including Turkish, Swedish, and Spanish (30–32). Study participants were tasked with reading vignettes depicting Harry, a 30-year-old single man with schizophrenia, and then rating their level of agreement with statements on a Likert scale ranging from 1 ("not at all") to 9 ("very much"). The questionnaire comprises 9 domains, each evaluating a common stereotype about individuals with mental illness: Personal Responsibility (10, 11, 23), Pity (9, 22, 27), Help (8, 20, 21), Anger (1, 4, 12), Coercion (5, 14, 25), Segregation (6, 15, 17), Dangerousness (2, 13, 18), Fear (3, 19, 24) and Avoidance (7, 16, 26). A higher score indicates a higher level of public stigma. The AQ-27-I has shown acceptable internal consistency, with Cronbach's alpha coefficient exceeding the values required by the literature for reliability to be considered sufficient.

Statistical analysis

The qualitative variables were described using absolute frequency and percentage. Confirmatory Factor Analysis (CFA) was used to assess the validity of the three measurement models by testing whether the observed data supports the proposed theoretical structure. Structural equation modelling (33) was used to explore possible causal paths between the latent variables of the model with the best fit. Common fit indices were used to evaluate how well the model fits the observed data: Comparative Fit Index (CFI; values of 0.90 or greater suggest good model fit), Tucker-Lewis Index (TLI; values of 0.90 or greater), Root Mean Square Error of Approximation (RMSEA; values below 0.08), and Root Mean Square Residual (RMSR; values of 0.08 or less). Additionally, we examined the Akaike Information Criterion (AIC) (34) and Bayesian Information Criterion (BIC) (35) to compare the non-nested models; for both criteria, smaller values indicate a better model fit. Standardized regression weights (β) are reported for all paths.

Ethical compliance and data privacy

In accordance with the Regional Council Resolution of June 19, 2023, No. 1029 "Adoption of the Regulation of Territorial Ethics Committees (CET) of the Emilia-Romagna Region, pursuant to Article 3, Paragraph 8, of the Ministerial Decree of January 30, 2023", approval from the Ethical Committee of the Area Vasta Emilia Nord this was not required for study. No personal or sensitive information was collected, and all questionnaires were administered in a completely anonymous manner. None of the questionnaires were diagnostic; their sole purpose was to gather opinions or considerations regarding mental health. The research was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki and other relevant ethical guidelines.

Results

Two hundred and fifty people filled out the online questionnaire; missing or invalid responses were

identified for 17 respondents, who were subsequently removed from the dataset.

The sample is therefore comprised of 233 people: 32.2% (N=75) identified as male, while 66.5% identified as female (N=155); only three people did not identify themselves within these two categories (1.3%). The most represented age group is between 26 and 33 years (48.9%) while 10 people are over 65 years old (4.3%). The respondents' residential locations are distributed as follows: 39.9% (93) reside in northern Italy, 25.3% (59) in central Italy, and 34.8% (81) in southern Italy. The most frequent qualification is a degree (N=100; 42.92%). Comprehensive socio-demographic details are available in Table 1.

Table 2 illustrates the fit indices of the various models examined. The model proposed by Corrigan and colleagues in 2003 (25) achieved satisfactory values for the CFI (0.90) and SRMR (0.08), while those for the TLI (0.83) and RMSEA (0.10) fall below commonly accepted thresholds (typically TLI ≥0.90; RMSEA ≤0.08), indicating suboptimal model fit. The model presented by Brown (2008) exhibits all indices lower than the reference values found in the literature. The Attribution Questionnaire 27 (Italian version), validated by Pingani and colleagues (26), was divided into two sub-models focusing on personal responsibility and dangerousness, respectively. Both sub-models yielded acceptable CFI values (0.89 and 0.97), with the dangerousness model also achieving a TLI index of 0.95. The AIC and BIC values for these two models are lower than those of the previously proposed models, suggesting improved relative fit; however, these comparisons should be interpreted with caution, as the models differ in both factor structure and number of items. To verify the suitability of the data for confirmatory factor analysis, we conducted the

Table 1. Socio-demographic characteristics of the sample (N = 233).

		N	%
Age	18-25	29	12.5
	26-33	114	48.9
	24-41	40	17.2
	42-49	15	6.4
	50-57	16	6.9
	58-65	9	3.9
	66-73	7	3
	>73	3	1.3
Sex assigned at birth	Male	75	32.2
	Female	158	67.8
Gender identity	Male	75	32.2
	Female	155	66.5
	Other	3	1.3
Place of residence	Northern Italy	93	39.9
	Center of Italy	59	25.3
	Southern Italy	81	34.8
Educational qualification	Primary school diploma	12	5.2
	Middle School graduation	24	10.3
	High school graduation	85	36.5
	Bachelor's or master's degree	100	42.9
	PhD	12	5.2

Table 2. Fit indices of the various models examined.

Model	Number of domains	Constructs	Number of AQ items	AIC	BIC	CFI	TLI	RMSEA	SRMR
Corrigan et al., 2003 (25)	6	Personal responsibility beliefs, Pity, Anger, Fear, Helping, Coercion-Segregation	21	643.95	839.93	0.90	0.83	0.10	0.08
Brown, 2008 (27)	6	Fear/Dangerousness, Help/Interact, Responsibility, Forcing treatment, Empathy, Negative emotions	26	918.83	1149.18	0.86	0.84	0.09	0.27
Current Italian version of AQ-27 (Pingani et al., 2012) (26)	6	Personal responsibility model: Personal responsibility, Pity, Help, Anger, Coercion, Segregation	18	442.69	618.04	0.89	0.81	0.10	0.08
	3	Dangerousness model: Dangerousness, Fear, Avoidance	9	111.52	113.43	0.97	0.95	0.09	0.13

Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The overall KMO value was 0.89, indicating a high level of sampling adequacy and supporting the factorability of the correlation matrix. Bartlett's test of sphericity was statistically significant ($p<0.001$), suggesting that the correlations between items were sufficiently large for factor analysis. These results confirmed the appropriateness of conducting the CFA.

We conducted structural equation analyses allowing all possible different prediction paths for each endogenous variable (domains of AQ-27-I) within the two submodels of AQ-27-I. The resulting models, illustrated in Figures 1 and 2 and summarized in Table 3, exhibit fit indices that fall within acceptable good threshold, in line with established benchmarks in the literature. Belief in the responsibility of individuals experiencing mental distress for their situation is positively associated with increased anger ($\beta=0.44$; $p<0.001$), which subsequently prompts a behavioral inclination toward perceiving the segregation of individuals with mental distress as necessary ($\beta=0.60$; $p<0.001$), while simultaneously feeling the need to provide help ($\beta=0.50$; $p<0.001$). The emotional response of pity towards individuals with mental distress is positively associated with an increase in the emotional state of anger ($\beta=0.20$; $p<0.001$) and segregationist behavior ($\beta=0.10$; $p<0.003$). The desire to help and offer assistance to individuals with mental distress is associated with an increased likelihood of segregating them or moving them into specialized facilities ($\beta=0.11$; $p<0.007$), which subsequently leads to greater inclination towards coercion, such as through enforced treatment ($\beta=0.45$; $p<0.001$) (Figure 1). The optimal model derived from the examination of the domains within the dangerousness model mirrors the original model (24), wherein perceiving individuals with mental challenges as threatening is linked to heightened fear ($\beta=1.02$; $p<0.001$), consequently prompting a desire to maintain distance from such individuals ($\beta=0.47$; $p<0.001$) (Figure 2).

Discussion

The primary aim of this study was to assess which version of the Attribution Questionnaire demonstrated stronger psychometric properties. A secondary objective was to explore the predictive paths between latent variables within the best-fitting model, using the AQ-27-I domains.

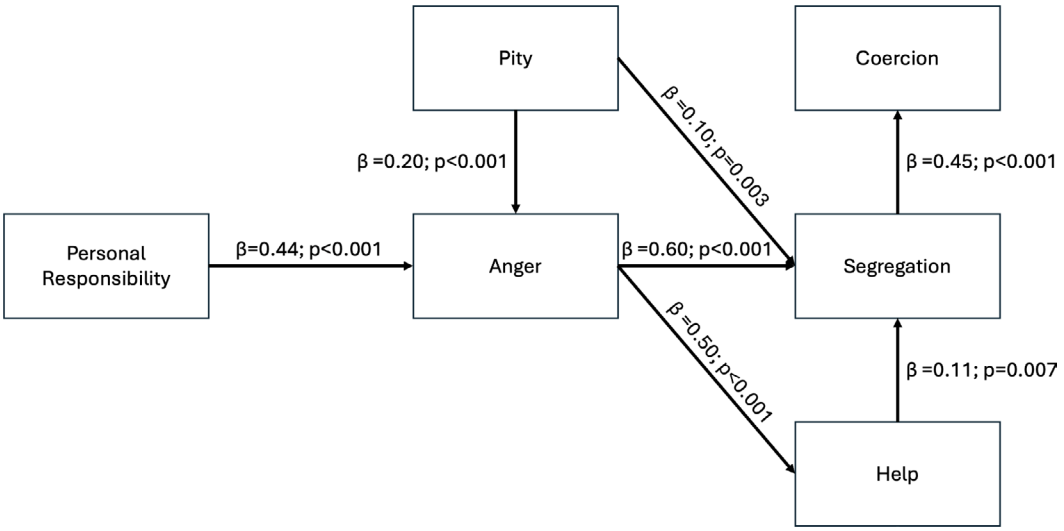

Figure 1. Best model identified using Responsibility Model endogenous variables.

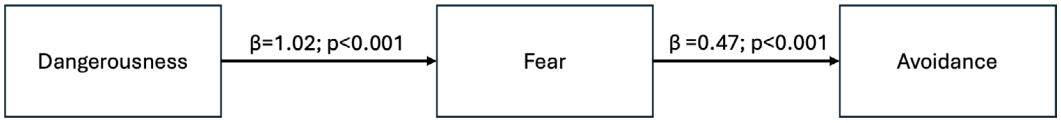

Figure 2. Best model identified using Dangerousness Model endogenous variables.

Table 3. Fit indices of the Responsibility and Dangerousness constructs obtained by allowing different prediction paths for each endogenous variable (domains of AQ-27-I).

Model	Number of domains	Constructs	Number of AQ items	AIC	BIC	CFI	TLI	RMSEA	SRMR
Personal Responsibility	6	Personal responsibility model: Personal responsibility, Pity, Help, Anger, Coercion, Segregation	18	310.03	330.73	0.96	0.93	0.08	0.05
Dangerousness	3	Dangerousness model: Dangerousness, Fear, Avoidance	9	467.05	477.40	0.97	0.92	0.24	0.04

Comparative psychometric performance

Confirmatory factor analysis (CFA) revealed minimal differences among the three versions of the AQ evaluated. Each questionnaire displayed a Comparative Fit Index (CFI) close to the accepted threshold, although the version by Brown (CFI = 0.86) fell slightly below the recommended cutoff of 0.90. Root Mean Square Error of Approximation (RMSEA) values ranged from 0.09 to 0.10 across models - slightly exceeding the commonly accepted limit of 0.08 – yet remained within a tolerable range. Standardized Root Mean Square Residual (SRMR) values supported the adequacy of fit for the Corrigan and Responsibility model of AQ-27-I, while for Brown's version and the Dangerousness model slightly exceeded the preferred threshold. Despite small variations in Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values, the AQ-27-I exhibited slightly greater psychometric robustness. This could be attributed to the structural design of AQ-27-I, which integrates two distinct theoretical models – Responsibility and Dangerousness – into a unified instrument. This dual-model configuration may enhance the overall resilience and reliability of the indices, compared to a hypothetical unified model encompassing all domains.

Pathways among stigma-related constructs

To pursue the second aim, we tested various models including all possible prediction paths between AQ-27-I domains. The optimal model reflects how attributing responsibility for mental illness often elicits anger (36). This emotional reaction can result in contradictory behavioral responses: a desire to provide support and simultaneously a tendency to segregate individuals into specialized facilities. Literature supports this duality. For instance, societal norms promoting help-giving (even to those deemed responsible) and pragmatic concern about well-being may explain why anger does not necessarily preclude prosocial responses. However, our findings indicate that pity is not associated with an increased willingness to help – contrary to prior studies suggesting that pity toward those not held responsible foster supportive attitudes (25). In our model, pity instead predicted greater anger and a higher tendency toward segregation. This aligns with work by Link et al. (1999) (37) and Maszak-Prato & Graham (2022) (38), who noted that pity may paradoxically lead to avoidance and institutionalization, especially in contexts of perceived risk (e.g., self-harm). Moreover, our model showed that the intention to support people with mental illness was associated with a greater inclination to segregate, which in turn predicted support for coercive measures such as involuntary treatment. This result resonates with the concept of "de-subjectivation" described by Verbeke et al. (2019) (39): coercion often emerges in contexts where individuals are seen unilaterally as patients, leading to fractured communication, power asymmetries, and a loss of personal agency.

The dangerousness model and public fear

The model derived from the "Dangerousness" dimension closely aligns with Corrigan's original framework and has shown cross-cultural applicability, including in Italian populations (25,28,29). Our findings reaffirm that perceptions of individuals with mental illness as dangerous trigger fear-based responses, most commonly manifested as avoidance. This is consistent with several meta-analyses and empirical studies (40,41) showing that perceived dangerousness is one of the strongest predictors of public stigma.

Limitations

This study has several limitations that should be considered when interpreting the results. First, the sample was exclusively Italian and recruited through non-probabilistic snowball sampling via the authors' personal and professional networks. This approach, while practical, may introduce self-selection bias and limit the generalizability of the findings to broader or more diverse populations.

Second, although the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity supported the adequacy of the data for factor analysis, these indicators alone do not guarantee that the proposed models in the CFA are optimally represented by the data. The less-than-ideal fit indices observed for some models—particularly regarding TLI and RMSEA—may in part reflect limitations in the sample, including

its size and composition. As noted in the literature, insufficient or unbalanced sample characteristics can reduce the power of confirmatory factor analysis and contribute to suboptimal model fit, even when preliminary assumptions appear to be satisfied (19). Third, we did not collect information on participants' personal experiences with psychological distress, which could have influenced their responses to the AQ-27-I. Such unmeasured factors may introduce uncontrolled variability and confounding effects related to self-stigma or social desirability. Finally, the cross-sectional nature of the study precludes causal inferences. The proposed models should therefore be interpreted primarily as theoretical frameworks, warranting further validation in longitudinal and more representative samples.

Conclusions

This research has affirmed the significance and utility of the AQ-27 as a reliable instrument for evaluating the phenomenon of public stigma. Nevertheless, it is crucial to acknowledge that the efficacy of this tool can be enhanced by considering the interactions among its various constituent domains. Examining the connections and interrelations between these domains could provide a more comprehensive insight into the intricate dynamics of stigma. Thus, we advocate for future research to delve deeper into how different facets of the AQ-27 correlate with and impact one another, aiming to deepen our comprehension of the stigma phenomenon and enhance the efficacy of focused interventions.

Ethic approval: In accordance with the Regional Council Resolution of June 19, 2023, No. 1029 "Adoption of the Regulation of Territorial Ethics Committees (CET) of the Emilia-Romagna Region, pursuant to Article 3, Paragraph 8, of the Ministerial Decree of January 30, 2023", approval from the Ethical Committee of the Area Vasta Emilia Nord was not required for this study. No personal or sensitive information was collected, and all questionnaires were administered in a completely anonymous manner. None of the questionnaires were diagnostic; their sole purpose was to gather opinions or considerations regarding mental health. The research was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki and other relevant ethical guidelines.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interests, patent/licensing, arrangement etc-) that might pose a conflict of interest in connection with the submitted article.

Authors contribution: In accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), all authors of this work have made significant contributions to the study. Specifically, M.M. and L.M. were responsible for the conceptualization of the study. M.M., G.M.G., and L.P. developed the methodology, while M.M. and L.P. performed the formal analysis. The investigation was conducted by M.M. The original draft was written by M.M., L.P., and M.M., with critical review and editing contributions from S.E.L., E.D.M., N.R., G.M.G., and L.P., G.M.G. provided supervision throughout the study. All authors contributed to drafting or critically revising the manuscript for important intellectual content, approved the final version for submission, and agreed to be accountable for all aspects of the work. They ensure that any concerns regarding accuracy or integrity are thoroughly addressed and resolved.

Declaration on the use of AI: None.

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