

Psychometric properties of the World Health Organization Quality of life instrument, short form: Validity in the Vietnamese healthcare context

Trung Quang Vo^{1*}, Bao Tran Thuy Tran¹, Ngan Thuy Nguyen¹, Tram ThiHuyen Nguyen², Thuy Phan Chung Tran³

¹Department of Economic and Administrative Pharmacy, Faculty of Pharmacy, Pham Ngoc Thach University of Medicine, Ho Chi Minh City 700000, Vietnam.

² Department of Pharmacy, Ear-Nose-Throat Hospital in Ho Chi Minh city, Ho Chi Minh City 700000, Vietnam.

³ Department of Administration, Ear-Nose-Throat Hospital in Ho Chi Minh city, Ho Chi Minh City 700000, Vietnam.

ABSTRACT

Context: The World Health Organization (WHO) Quality of Life Group developed a self-report 26-item questionnaire called the WHO Quality of Life Instrument, Short Form (WHOQOL-BREF). This instrument has been translated into different languages, and its validity and reliability have been confirmed in many countries. This research determined and analyzed the psychometric properties of the Vietnamese version of the WHOQOL-BREF.

Objectives: This study was aimed at evaluating the validity and reliability of the Vietnamese WHOQOL-BREF as an instrument for ascertaining QOL among Vietnamese medical students.

Methods: A cross-sectional design was adopted in the assessment of the instrument, which involved 1,357 medical undergraduates from different regions of Vietnam. The QOL of the students were measured using the questionnaire. Cronbach's alpha testing and exploratory factor analysis were conducted to determine the reliability and validity of the scale.

Results: The internal consistency and construct validity of the Vietnamese WHOQOL-BREF indicated that the instrument had acceptable reliability and validity. The Cronbach's alpha values of the questionnaire's different domains were deemed satisfactory (>0.6), with scores of 0.67 to 0.81 for

each domain and 0.88 for the entire scale. The factor loadings reflected the discriminant validity of the WHOQOL-BREF with respect to all domains.

Conclusion: The Vietnamese version of the WHOQOL-BREF is a reliable and valid tool for evaluating the QOL of medical students in Vietnam.

Keywords: healthcare, quality of life, reliability, validity, Vietnam, WHOQOL-BREF.

Correspondence:

Trung Quang Vo (PhD.)

Department of Economic and Administrative Pharmacy (EAP), Faculty of Pharmacy, Pham Ngoc Thach University of Medicine, Ho Chi Minh City 700000, Vietnam.

Email: trungvq@pnt.edu.vn; voquangtrungdk@gmail.com

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INTRODUCTION

Many studies have shown that quality of life (QOL) is influenced by various factors, including physical and psychological health, and QOL, in turn, can affect the academic capabilities of medical students. Undergraduates studying under a medical training program may experience numerous health problems, such as anxiety, fatigue, or depression, owing to stress stemming from the pressure to obtain excellent grades, work responsibilities, financial issues, and curricular burdens[1],[2]. Medical students may also suffer from serious consequences caused by extended study hours coupled with strong demands from the health sector.

QOL was defined by the World Health Organization (WHO) as an overarching term that covers the quality of different life aspects, such as overall health, occupation, housing, culture, knowledge standard, and marital status[3]. In other words, the concept represents human health indicators that encompass physical, emotional, social, and environmental facets [4], serving as a measure meant to subjectively evaluate both positive and negative features of life. To develop such measure, the QOL working group of the WHO created a comprehensive assessment questionnaire called the WHO Quality of Life Instrument-100(WHOQOL-100) [3, 5, 6], which was later refashioned to generate a short version known as the WHOQOL-BREF[7]. The effectiveness of the short form in measuring QOL in different cultures has been confirmed[8].

QOL is evaluated using many other tools, such as the Euro QOL five-dimension questionnaire[9], the short-form WHOQOL instrument for people with HIV[10], the 36-item Short Form Health Survey [11], the AIDS Health Assessment Questionnaire [12], the Medical Outcomes Study HIV Health Survey [13], and the Functional Assessment of HIV Infection[14]. However, the WHOQOL-BREF was regarded in this research as the optimal tool for evaluating the QOL of medical students for three main reasons. First, it was developed with consideration for differences between countries and cultures[15], thereby minimizing debate as to its applicability in various contexts. Second, in the WHOQOL-BREF, contextual factors that are normally disregarded as relating to health are considerably valued, with the instrument containing items that take into consideration numerous physical, psychological, social, and environmental aspects of well-being [16, 17]. Not only does the questionnaire capture many subjective features of QOL[18], but it also addresses personal opinions regarding self-health[18]. Finally, the WHOQOL-BREF has been proven to exhibit better relevance and sensitivity than those displayed by the general form of the questionnaire.

Many previous studies highlighted the need to assess the validity and reliability of questionnaires[19][7]. One of the instruments requiring validation is the Quality of Nursing Work Life in China, which is a regional scale that was expanded through translation into international instruments with consideration for the cultural, political, and social

characteristics of a given country[20]. Another scale is the Chinese version of the WHOQOL-HIV, which was developed by a research team from Sun Yat-sen University and China Academy of Chinese Medical Sciences [21]. Other WHO questionnaires that have been translated into different languages also need valuation in terms of validation and reliability[22]. The same requirement holds true for the WHOQOL-BREF, which has been translated into many languages and whose validity and reliability have been verified in different countries [23, 24]. These efforts were expanded by the present study, which was aimed at assessing the psychometric properties of the Vietnamese WHOQOL-BREF by using the instrument to determine the QOL of a large sample of medical students. Particular focus was directed toward confirming the validity and reliability of the Vietnamese version using statistical tests.

MATERIALS AND METHODS

Study design

From March to April 2019, we administered a cross-sectional survey to 1,357 medical students from different universities located in north, central, and South Vietnam. The students were of varying year levels majoring in 10 areas of medical study: medical, pharmacy, dentistry, and traditional medical, public healthcare, nursing, medical engineering, and nutrition, preventive medical, and ophthalmic refraction. The inclusion criteria were studying in healthcare universities, having the ability to read and write in Vietnamese and knowing how to fill out questionnaire.

Sampling method

Before being distributed, the survey was re-checked by an experienced instructor to verify its accuracy and authenticity. The survey form was created in March 2019 and extensively shared over a social media platform until April 2019 when data were sufficiently collected, but forms were face-to-face administered to the medical students from southern universities, especially those located in Ho Chi Minh City as a result of the authors' hometown and the convenience for surveying. The participants' personal information, such as names, phone numbers, and email addresses, were excluded from the survey. The respondents were given a set of learning materials as gifts after they completed the questionnaires. All the participants in the direct survey were instructed to complete the questionnaires independently, but some explanations were provided to those who did not fully understand a question. The respondents were informed of their right to withdraw participation in the survey.

Instrument

The WHO Quality of Life Group, with the help of 15 international field centers, developed the WHOQOL-BREF, a self-report questionnaire comprising 26 questions, each representing a facet of QOL [19, [25]. These questions are intended to assess four aspects of QOL, namely, physical aspects (seven questions), psychological features (six questions), social relationships (three questions), and environmental dimensions (eight questions) [26]. Two extra questions are designed to determine general health and QOL

[25]. Each of the questions are accompanied by a scale ranging from 1 (*poor*) to 5 (*good*), with the higher scales corresponding to better QOL[27], except for the scales of items 3, 4, and 26, which were reversed in accordance with WHOQOL-BREF guidelines[28]. The final score for each of the four aspects was calculated by multiplying the mean score of all the answers provided for a given aspect by four [25]. In the case of missing values, the appropriate mean score of the aspect for which a missing value was detected was used in the calculations, as suggested in the WHOQOL-BREF guidelines [28].

Procedures

Beaton's guidelines were used as basis for the translation of the instrument [29]. Two Vietnamese bilingual translators, both of whom have a medical background, translated the original WHOQOL-BREF from English to Vietnamese. The initial Vietnamese version went through discussions to address inconsistencies. After being approved by experts, the Vietnamese WHOQOL-BREF was back translated by another bilingual expert. The result was then compared with the original English questionnaire to ensure the precision of the translation. The official Vietnamese questionnaire was produced after some final modifications.

Statistical analysis

Standard psychometric methods were used to determine the normality, validity, and reliability of the questionnaire [26]. The Statistical Package for the Social Sciences (version 22.0) was used to analyze the sociodemographic information of the respondents as well as calculate the mean, standard deviation (SD), skewness, and kurtosis of the responses. We specifically checked floor and ceiling effects, determining whether more than 15% of the participants provided the lowest or highest score possible[30]. Cronbach's alpha testing was performed to evaluate the internal consistency of the instrument, with 0.6 regarded as an acceptable value given its conventional consideration as such[31]. Kaiser-Meyer-Olin (KMO) test was used to determine a valid factor solution[32]. Exploratory factor analysis (EFA) with a valid factor loading of 0.4 or above was conducted to ascertain the questionnaire's construct validity[33], [34].

Ethical considerations

This study was approved by the committee of Pham Ngoc Thach University of Medicine. The purpose of the research was explained to all the participants during the survey.

RESULTS

Demographic characteristics

The demographic characteristics of the sample are shown in Table 1. Among the respondents, 471 were males (34.7%), and 886 were females (65.3%). The majority were single (96.9%) and undergraduate students (96.3), among whom 21% (n = 285), 37% (n = 502), 14% (n = 190), 15.5% (n = 211), 9.9% (n = 134), and 2.6% (n = 35) were in their first to sixth years, respectively. Of the 1,357 participants, 651 (48%) had health problems, and most lived in southern Vietnam, rarely engaging in physical exercises. The participants also seldom used stimulants or sleeping pills.

Descriptive statistics

Table 2 illustrates the descriptive statistics corresponding to each item in the questionnaire. For all the items, the coefficients of skewness and kurtosis ranged from -1.0 to 1.0, which are acceptable values. The floor and ceiling effects indicated that the proportion of participants presenting the highest or lowest possible score did not exceed 15%, except with respect to social support, to which 19.53% of the sample assigned the best or worst score. Overall, the QOL of the participants was positive, as reflected by the mean score of the items.

Internal consistency

The Cronbach's alpha coefficients of the domains covered in the Vietnamese WHOQOL-BREF were 0.60 to 0.85, with the highest being that of the environmental domain (0.81), and the lowest being the value generated for the physical health domain (0.67) (Table 3). The total correlation coefficient of all the items exceeded 0.3, which is an acceptable value. This does not apply to two items for which coding was reversed (i.e., medication dependency and negative feelings).

Validity

In the EFA (Table 4), the principal axis method of factor extraction and orthogonal factor rotation (varimax) were used. Bartlett's test of sphericity yielded a value of 10398.549 (df = 276, $p < 0.001$), indicating that the correlation matrix of the sample was not a single identity and was sufficiently significant to be considered in factor analysis. The Kaiser-Meyer-Olkin (KMO) test produced a value of 0.908 (between 0.5 and 1.0), suggesting that the sample size was sufficient to achieve stable factor solutions.

In the factor analysis, five major factors accounted for 53.18% of the rotated variance. Four original domain names were maintained in correspondence with four parallel principal factors (psychological, environmental, physical, and social), but some of the items belonging to certain factorial domains were reorganized (as given in Table4). Seven items loaded onto the first factor (physical health) explained 12.25% of the variations in rotated variance. Loadings on the second factor (psychological issues) accounted for 12.74% of such variances. The third factor (social relationship), to which no modification was applied, represented 8.88% of the variances in the variance. Five items (information, recreation, safety, physical environment, and financial resources) from the original environmental domain were retained in the Vietnamese WHOQOL-BREF. A new factor (morbidity) was created on the basis of the factor loadings. The two final factors (physical and social domains) accounted for 12.59% and 6.73% of the variances in rotated variance. Because of the factor loadings, four items were cross-loaded on different determinants. Specifically, "positive feelings" was cross-loaded on the physical and psychological domains, and "energy" was cross-loaded on the physical and environmental domains. "Body image" and "concentration" were cross-loaded onto the psychological and environmental domains.

DISCUSSION

Our results showed that the WHOQOL-BREF is a suitable questionnaire for measuring the QOL of the

Vietnamese population, with the score distribution pointing to the good psychometric properties of the instrument. We obtained permission from the WHO to translate and validate the WHOQOL-BREF for use in the Vietnamese context [35]. The translation processes were implemented competently to ensure the reliability and validity of the final version. The skewness and kurtosis coefficients derived in this work ranged from (-1) to (+1), indicating that the variables examined were normally distributed [36]. This result is similar to that of research conducted among Taiwanese patients and aging Portuguese patients with HIV [37][38]. In regard to floor and ceiling effects, these can occur only when 15% or more of participants assign the lowest or highest score to an item [39].

Table 1. Cronbach's alpha values of the questionnaire items and domains

Code	Domain	Cronbach's alpha	Total correlation
Domain 1.		0.67	
Physical health			
Q2	Mobility	0.63	0.43
Q5	Sleep	0.60	0.48
Q6	Daily activities	0.63	0.41
Q7	Work capacity	0.63	0.41
Q15*	Pain and discomfort	0.66	0.30
Q16*	Medication dependency	0.69	0.19
Q18	Energy	0.61	0.47
Domain 2. Psychological health		0.70	
Q4	Positive feelings	0.63	0.52
Q8	Self-esteem	0.62	0.55
Q17	Spirituality	0.63	0.50
Q19	Body image	0.65	0.46
Q24	Concentration	0.66	0.44
Q26*	Negative feelings	0.75	0.18
Domain 3. Social relationship		0.73	
Q9	Personal relation	0.62	0.59
Q10	Sexual activity	0.66	0.55
Q11	Social support	0.67	0.54
Domain 4. Environment		0.81	
Q12	Home environment	0.79	0.51
Q13	Health and social care	0.78	0.53
Q14	Transport	0.79	0.47
Q20	Information	0.78	0.54
Q21	Recreation	0.79	0.50
Q22	Safety	0.77	0.60
Q23	Physical environment	0.78	0.53
Q25	Financial resources	0.79	0.47

Table 2. Demographic characteristics of the participants (n=1,357)

Characteristic	N	%	Characteristic	N	%
Gender			Region		
Male	471	34.7	The Northern	40	2.9
Female	886	65.3	The Central	170	12.5
Marital status			The Southern	1147	84.5
Single	1315	96.9	Relatives' careers		
Married	42	3.1	Healthcare	655	48.3
Education level (year)			Others	702	51.7
First	285	21.0	Employment status		
Second	502	37.0	Employed	401	29.6
Third	190	14.0	Unemployed	956	70.4
Fourth	211	15.5	Physical exercises frequency (time(s) per week)		
Fifth	134	9.9	None	518	38.2
Sixth	35	2.6	1-2	455	33.5
Health status			3-4	208	15.3
Had problems	651	48.0	>4	176	13.0
Healthy	706	52.0	Internet usage (hour(s) per day)		
Academic level			<2	184	13.6
Postgraduate	20	1.5	2-4	671	49.4
Undergraduate	1307	96.3	>4-8	384	28.3
College	28	2.1	>8	118	8.7
Vocational training	2	0.1	Sleep amount (hour(s) per day)		
Stimulant usage			<3	13	1.0
Never	865	83.7	>3-5	147	10.8
Current	184	13.6	>5-8	1017	74.9
In the past	308	22.7	>8	180	13.3
Sleeping pills usage			Accommodation		
Never	1227	90.4	Relatives' house	511	37.7
Rarely	89	6.6	Motel	672	49.5
Sometimes	35	2.6	Dormitory	174	12.8
Often	6	0.4	Monthly expense (USD)^(a)		
Social activities participation			<131	658	48.5
Never	55	4.1	131-218	529	39
Rarely	384	28.3	>218-306	114	8.4
Sometimes	784	57.8	>306-437	32	2.4
Often	134	9.9	>437-655	15	1.1
Majors			>655	9	0.7
Medical	581	42.8			
Pharmacy	415	30.6			
Others ^(b)	361	26.6			

Notes:

^(a) 1 USD = 22,893 VND (Source: Vietnamese Ministry of Finance-exchange rate for foreign currencies in March 2019, number: 1007/TB-KBNN)

^(b) Others: Dentistry, traditional medical, public healthcare, nursing, medical engineering, nutrition, preventive medical, ophthalmic refraction.

Table 3. Descriptive statistics of the questionnaire items

Code	Domain	Mean±SD	Skewness	Kurtosis	Floor (%)	Ceiling (%)
Q1	General QOL	3.22±0.69	0.24	0.85	0.81	3.91
Q3	General health	2.92±0.82	0.21	-0.41	1.62	2.28
Domain 1. Physical health						
Q2	Mobility	3.29±0.68	0.18	0.83	0.81	4.05
Q5	Sleep	3.07±0.94	0.02	-0.47	3.61	5.90
Q6	Daily activities	3.58±0.78	0.02	-0.22	0.37	11.94
Q7	Work capacity	2.82±0.86	0.18	-0.17	4.64	2.65
Q15*	Pain and discomfort	3.11±0.80	-0.26	0.36	3.24	2.73
Q16*	Medication dependency	3.47±0.85	-0.34	0.10	1.62	8.92
Q18	Energy	3.23±0.77	0.18	0.50	1.25	5.75
Domain 2. Psychological health						
Q4	Positive feelings	3.28±0.84	-0.12	-0.21	1.33	5.67
Q8	Self-esteem	3.00±0.86	0.13	0.07	3.17	4.57
Q17	Spirituality	3.35±0.90	0.11	-0.27	1.40	11.64
Q19	Body image	2.75±0.98	0.02	-0.25	11.50	3.76
Q24	Concentration	2.98±0.88	-0.13	0.02	5.38	3.46
Q26*	Negative feelings	3.18±1.07	-0.40	-0.56	8.25	7.44
Domain 3. Social relationship						
Q9	Personal relation	3.24±1.09	-0.31	-0.4	8.25	12.16
Q10	Sexual activity	2.92±1.17	-0.02	-0.55	15.84	11.35
Q11	Social support	3.32±1.28	-0.48	-0.73	14.81	19.53
Domain 4. Environment						
Q12	Home environment	3.48±0.80	0.06	0.13	0.96	10.39
Q13	Health and social care	3.22±0.79	-0.01	0.31	1.69	5.01
Q14	Transport	3.27±0.88	-0.09	0.12	2.73	8.03
Q20	Information	3.14±0.81	0.10	0.10	1.55	4.79
Q21	Recreation	3.00±0.87	0.07	-0.04	3.39	4.20
Q22	Safety	3.03±0.84	-0.15	0.32	4.35	3.46
Q23	Physical environment	2.93±0.87	-0.13	0.31	6.26	3.46
Q25	Financial resources	3.05±0.89	-0.003	0.35	4.86	5.97

Notes: SD: Standard deviation

* Indicates negatively framed questions that were reversed coded

Table 4. Rotated component matrix of the questionnaire

		Physical health	Psychological health	Social relationship	Environment	Morbi-dity
Q2	Mobility	0.50				
Q4	Positive feelings	0.61	0.45			
Q5	Sleep	0.52				
Q6	Daily activities	0.67				
Q12	Home environment	0.68				
Q13	Health and social care	0.58				
Q14	Transport	0.59				
Q7	Work capacity		0.76			
Q8	Self-esteem		0.74			
Q17	Spirituality		0.51			
Q18	Energy	0.45			0.42	
Q19	Body image		0.55		0.41	
Q24	Concentration		0.55		0.45	
Q9	Personal relation			0.73		
Q10	Sexual activity			0.76		
Q11	Social support			0.78		
Q20	Information				0.58	
Q21	Recreation				0.55	
Q22	Safety				0.72	
Q23	Physical environment				0.71	
Q25	Financial resources				0.49	
Q15*	Pain and discomfort					0.75
Q16*	Medication dependency					0.73
Q26*	Negative feelings					0.58

Our analysis indicated that no such effects arose with respect to almost all the WHOQOL-BREF items, except for social support, for which a ceiling effect was observed. This finding suggests that the emergence of ceiling effects depends on population distribution. The internal consistency of all the items and domains was satisfactory, with Cronbach's alpha scores ranging from 0.67 to 0.81. The domains and items showed strong correlations, making our evaluation consistent with that conducted in a previous survey in Iran on 115 drug addicts, in which the Cronbach's alpha coefficients of six WHOQOL-100 domains ranged from 0.78 to 0.84 [40]. Significant differences in the reliability of the items under the social relationship domain were found. The Cronbach's alpha coefficient of this domain reached 0.73, confirming consistency among the questions. However, WHO studies carried out in 16 countries derived a Cronbach's alpha coefficient <0.7 [7]. This difference can be attributed to the restriction in the number of questions (three questions) or the cultures specific to various countries;

the participants were unwilling to disclose information about their sex lives due to privacy matters [41]. The greater Cronbach's alpha coefficient in our work reflects the security of the responses.

In the EFA, the items in the Vietnamese WHOQOL-BREF were reorganized into four domains, and an additional emerging dimension (morbidity) was established. This method has also been implemented in past research [35, 42-44]. Using factor analysis to reclassify items enables the generation of subsets that can be used to measure the same underlying factors. It also improves the reliability and construct validity of measures [45, 46]. In the present EFA, seven items were loaded onto a distinct domain from the initial one. Items 12, 13, and 14 in the original environmental domain were loaded onto the physical domain, and item 7 in the original physical domain was loaded on the psychological domain. Items 15 and 16 in the original physical domain and item 26 in the original psychological domain were loaded on the newly established morbidity dimension of the

Vietnamese WHOQOL-BREF. The cross-loadings on different domains were also reflected in the results.

An issue arose as to the syntax characterizing three items of the Vietnamese WHOQOL-BREF: pain and discomfort, medication, and negative feelings. Some of the negatively worded items in the original questionnaire are “physical pain prevents you from doing what you need to do” “need any medical treatment to function” and “negative feelings, such as blue mood, despair, anxiety, depression”. Double-negative wordings were used in the translation into Vietnamese to preserve as many of the identical semantic and syntactic forms of the original. However, the participants would not have readily understood such syntactic forms in Vietnamese, and their responses would have been affected by their own interpretation of the questions. Ultimately, these matters would have caused item sampling errors [34]. In addition, if subjects are inattentive to questions, random errors would be introduced, thus preventing a reflection of genuine answers [34]. These issues highlight the need to present questions face-to-face when using the Vietnamese WHOQOL-BREF to limit random errors. On this basis, then, QOL as represented in the questionnaire should be interpreted with caution.

The sociocultural background of Vietnamese citizens may explain the factor analysis results. Issues regarding physical impairment among the population may have been influenced by the improvement in the support provided by the Ministry of Education and universities on finances, accommodations, healthcare, and transport for students. Although the WHOQOL-BREF has a four-discriminant-factor solution (9), previous studies revealed multicollinearity effects and correlations among the questionnaire items. Research in Taiwan, for instance, uncovered correlations among 10 items [47], whereas a Norwegian WHOQOL-BREF study found multicollinearity effects from seven items [48], indicating an overlapping of content structures. In addition, the item “body image” was cross-loaded onto the physical and psychological domains in a study validating WHOQOL-BREF for type 2 diabetes mellitus patients in India [49].

The current work has several limitations that need to be addressed. First, almost all the participants were from universities in the south (84.5%), whereas only 12.5% and 2.9% were from universities in central and north Vietnam. Given these low rates, analyzing the characteristics of the students on the basis of region was not possible, thereby affecting the evaluation of the medical students' QOL. Generalizability is also diminished. Second, the survey was of a self-report design; thus, providing privacy responses might lead to the deviation in the scores of social responses. Indeed, because of Vietnamese culture, people are unwilling to share personal information, especially sexual matters, with social community. Third, this is the first study to develop and evaluate the psychometric properties of the WHOQOL-BREF involving healthcare students. Thus far, no other research provides support for our findings.

CONCLUSION

To the best of our knowledge, this study is the first to evaluate the QOL of healthcare students in Vietnam through the Vietnamese WHOQOL-BREF. The instrument was confirmed valid and reliable for inquiring into the QOL of people in other cross-cultural studies and those undergoing different interventions. Other further studies in the future should carry out the sampling method in a more balanced way (in order words, focusing on every region of the country instead of just on the south of Vietnam).

ABBREVIATIONS

QOL: quality of life, EFA: exploratory factor analysis, SD: standard deviation, WHO: World Health Organization.

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CONFLICT OF INTEREST

The authors declare that no conflicts of interest arose in this work.

AUTHOR CONTRIBUTIONS

Trung Quang Vo (TVQ), Bao Tran Thuy Tran (BTTT), Ngan Thuy Nguyen (NTN), Tram ThiHuyen Nguyen (TTHN), Thuy Phan Chung Tran (TPCT).

Conceptualization: TVQ, TTHN, TPCT; *Data curation:* TVQ, BTTT, NTN; *Formal analysis:* BTTT, NTN; *Funding acquisition:* TVQ; *Investigation:* BTTT, NTN; *Methodology:* TVQ, BTTT, NTN; *Project administration:* TVQ, TTHN, TPCT; *Software:* BTTT, NTN; *Supervision:* TVQ; *Validation:* TVQ; *Visualization:* BTTT, NTN; *Writing - original draft:* BTTT, NTN, TVQ; *Writing - review & editing:* TVQ, TTHN, TPCT.

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