## Original Article

# Cultural Validation of the Turkish Version of Evidence-Based Practice Questionnaire

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**Abstract**

**Aim:** The study aims to investigate the psychometric properties of the Turkish version of Evidence-Based Practice Questionnaire.

**Methods:** This study has a methodological design. The study sample comprised 123 nurses from a university hospital in Manisa.  The original version of the Evidence-Based Practice (EBP) Questionnaire adapted into Turkish, was tested for internal consistency, content validity and construct validity.

**Results:** Internal consistencies exist for the Turkish version of the Evidence-Based Practice (EBP) Questionnaire. Cronbach alpha value was 0.93 for the practice of EBP subscale, 0.80 for the attitude towards EBP subscale and 0.94 for the knowledge / skills associated with EBP subscale. Test-retest correlation coefficients for the practice, attitude, and knowledge/skill subscales were calculated as 0.96, 0.94 and 0.97 respectively. In order to obtain additional evidence for the validity of the three-factor structure of the EBPQ determined by the Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) was conducted on its 24-item structure. The CFA results obtained in this present study support that the three-factor structure obtained in this scale has an acceptable model in terms of the fit criteria.

**Conclusion:** This scale may have value in discrimination between implementation of EBP among nurses with different education levels.

**Key words:** Evidence-Based Practice Questionnaire, attitude, knowledge, skill, nursing, validity and reliability

## Introduction

Internationally, evidence-based practice (EBP) has been a priority for many years (Stokke et al., 2014). Many organizations such as the World Health Organization and the European Commission stress that health and social services should be based on the best research evidence (World Health Organisation, 2011).  On the other hand, a literature review has revealed that the gap between practice and research in nursing still persists (Heydari & Zeydi, 2014). Recent studies have highlighted that nurses use EBP to a limited extent (Eizenberg, 2011; Berland  & Gundersen,

2012; Bostrom et al. 2013). The nurses face considerable challenge as both individual and organizational towards EBP (Copur, Kuru & Seyman, 2015). Organizational barriers comprise lack of staff experienced in EBP, supportive leadership and lack of resources (Solomons & Spross, 2010). The many barriers towards EBP are not surprising considering that EBP is a process that is far from straightforward and does not follow a prescribed, logical and linear path, but is both challenging and complex (Stokke et al. 2014). Despite these barriers, nurses generally held positive attitudes and beliefs towards EBP and they

recognize the importance of EBP for quality of care – this is independent of workplace, role, or nationality (Melnyk, 2008; Thorsteinsson, 2013). Previous studies show that nurses' attitudes and beliefs are associated with the extent to which EBP is implemented (Estabrooks et al. 2003; Bostrom et al. 2013; Melnyk et al. 2010). Subsequently, attitudes and beliefs can potentially predict future behaviour (Stokke et al. 2014).

Evidence-based nursing is the nurses' decision-making process through utilizing their clinical expertise, patients' preferences and the best available evidence in a healthcare environment where sources can be obtained (Brown & Burlington, 2014). Activities related to evidence-based nursing have increased rapidly since the late 1990s. As to Turkey, articles evaluating evidence-based nursing conceptually, providing examples of the use of evidence-based strategies in nursing and emphasizing the obstacles related to the implementation of evidence-based nursing have been published since the beginning of the 2000s (Yurumezoglu & Kocaman, 2008; Ozturk et al. 2010; Temel & Ardahan, 2011). Of the nurses participating in a study conducted in Turkey, 68.9% stated that they performed evidence-based practices sometimes whereas 12.8% stated that they always performed them (Ozdemir & Akdemir, 2009). On the other hand, although 76% of the nurses in Ozsoy and Ardahan's (2008) study considered that practices should be based on research, it was observed that the first four sources of information they made use of were experience, intuition, discussion and observation. These results suggest that although nurses in Turkey display positive attitudes towards the use of research, they do not incorporate these attitudes into their nursing activities and decisions. However, Article 6 of the Nursing Regulations published in Turkey on March 08, 2010 defines nurses' responsibility as "Nurses are supposed to plan, implement, evaluate and supervise nursing care based on the evidence" (http://www.saglik.gov.tr/TR/dosya/1-46937/h/hemsirelikkanunu.doc., 2010). On the other hand, that the nurses' responsibility to perform activities based on evidence is clearly defined in the regulation does not necessarily mean that this is always put into practice. Relevant studies indicate that implementation of evidence-based practices is a very complex, slow process (Parahoo & McCaughan, 2001; Melnyk et al. 2008; Polit & Beck, 2008). Therefore, nurse managers and researchers have the responsibility to facilitate this process. In order to develop strategies to facilitate the process, nurses' feelings and thoughts about, and attitudes and behaviors towards evidence-based practices should be taken into consideration.

Studies on evidence-based practices show that the production of evidence for the best practice alone is not adequate to make changes in practices (Stokke et al., 2014) One of the important causes of this problem which has complex dimensions is the practitioners' attitudes and perceptions (Estabrooks et al., 2007). In two systematic reviews investigating individual characteristics that influence the use of research, it is reported that the most important characteristic affecting the use of research is the "attitude displayed towards research" Estabrooks et al. 2003; Squires et al. 2011). Therefore, in order to develop effective evidence-based strategies, it is important to know nurses' attitudes towards relevant issues. Therefore, in order to develop strategies to accelerate the evidence-based nursing process, the first step to be taken is to know nurses' attitude towards the issue. In Turkey, there is no standard instrument that measures nurses' attitudes towards evidence-based practices. Therefore, this study was aimed at demonstrating the validity and reliability of the Turkish version of the Evidence-Based Practice Questionnaire (EBPQ) developed to assess nurses' knowledge/skills related to and attitudes towards EBP.

## Aim

This article is a report of the psychometric testing of the Turkish version of Evidence-Based Practice Questionnaire.

## Methods

***Evidence-Based Practice questionnaire (EBPQ):*** The questionnaire was developed by Upton and Upton in 2006 in order to assess nurses' knowledge and skills associated with, and attitudes towards evidence-based practices. It consists of 24 items. Responses to the items of the questionnaire are rated on a scale ranging from 1 to 7. The lowest and highest possible scores to be obtained from the scale are 24 and 168 respectively. The higher the total score obtained from the questionnaire is, the more positive are the attitudes displayed towards the evidence-based practice and its clinical efficacy. When the original form of the questionnaire was developed, its content validity was established by cooperating with specialist health professionals. Upon the completion of factor analysis conducted to find the structure-concept

validity of the scale, the following three subscales which account for the 61.77% of the total variance were obtained:

1- Practice of EBP: 6 items, Cronbach's alpha coefficient: 0.85 (score: 6-42).

2-Attitudes Towards EBP: 4 items, Cronbach's alpha coefficient: 0.79 (Score: 4-28).

3- Knowledge / Skills associated with EBP: 14 items, Cronbach's alpha coefficient: 0.91 (score: 14-98).

Cronbach alpha coefficient for the entire questionnaire was determined as 0.85. In conclusion, the scale was considered as an acceptable and applicable one in terms of validity and reliability (Upton & Upton, 2006).

**Translation**

In order to test the validity of Turkish version of the EBPQ, the language validity of the scale was tested first. To establish the language validity, the items were translated into Turkish by eight native speakers of Turkish with a good command of English. The final form of the items translated into Turkish was back-translated into English by two bilingual experts whose native language was Turkish. The experts were given detailed information on the topic before they back-translated the items. The back-translated items were compared with the items in the original scale in English. Of the items, those not compatible with the original ones were revised, and the items of the scale took their final form.

The scale was piloted in a group of nursing (n = 10). This procedure ensured that the Turkish version of the scale was linguistically appropriate ( Chang & Chau, 1999).

**Participants**

The participants were selected form 221 Registered Nurses working in a university hospital in Manisa and recruited between September and December 2014. Sample size is important in factor analysis. Opinions on how to calculate the sample size vary, and several guiding rules have been cited in the literature (Tezbasaran, 2008). MacCallum et al. (1999) suggested that a sample size should be 100 or greater. Preacher and MacCallum (2002) stated that the sample size should be three to tenfold of the total number of the items in a scale. On the other hand, some other researchers suggested that the sample size should be at least five times greater than the total number of the items (Erkus, 2012). In

this present study, the sample size was calculated by multiplying the number of the items by 5.

**Ethical Consideration**

During the planning stage of the study, written approval was obtained from the Ethics Committee of Ege University Faculty of Nursing. In addition, written permission from the relevant institutions (2014-113) where the study to be conducted and the verbal consents from the participants were obtained. In order to administer the questionnaire, necessary permission was obtained from the author of the questionnaire through e-mail.

**Data Analysis**

*Reliability testing*

To test the reliability of the data, Cronbach's alpha coefficient, the test-retest correlation coefficient and the item-total score correlation were calculated. For test–retest purposes, the scale was administered to 30 nurses at a two-week interval. Test–retest measurement was assessed using Pearson's correlations and a Wilcoxon's signed-rank test with a two-week interval.

*Validity testing*

To establish the language validity, content validity, known-group validity, Pearson Product Moment Correlation Coefficient used to determine the relationship between the total score obtained from the scale and nurses' education levels was calculated.  In order to determine the construct validity, the Exploratory Factor Analysis (EFA) based on the principal component analysis method was performed. Then, to determine whether the current construct was a valid one, the Confirmatory Factor Analysis (CFA) was implemented. The Statistical Package for the Social Sciences (SPSS) 16.0 and LISREL 8.54 were used to analyze the data. The statistical significance level was set at 0.05. Descriptive statistics were used to analyze the distributions of responses on the questionnaire items and subscales.

**Results**

**Study group**

Of the participating nurses, 123 returned the questionnaires. The response rate was 56% (123/221). The majority of the participants were female (n = 114, 92.6%) with a mean age of 32.92 ± 9:38 and were all employed full-time. Of the participants, 40.7% had the bachelor's degree, 35.8% had been working as a nurse for 1-5 years, 15.4% participated in a scientific research project

as a researcher, and 22.8% regularly kept up with publication on scientific research.

**Reliability**

In the reliability analysis, Cronbach's alpha coefficient, the test-retest analysis and item-total correlations were calculated. Cronbach's alpha value of the EBPQ was 0.94 for the entire questionnaire, which indicated that the level of the internal consistency coefficient of the questionnaire was high. Cronbach alpha value was 0.93 for the practice of EBP subscale, 0.80 for the attitude towards EBP subscale and 0.94 for the knowledge / skills associated with EBP subscale. This shows that the three subscales of the scale were reliable. The item-total correlation coefficients ranged between 0.32 and 0.84 and were considered statistically significant (p<0.000). The results of the item-total analysis and internal consistency coefficients of the scale are given in Table 1.

According to the Wilcoxon's signed-rank test, there was no difference between test and retest values of the total, the practice, attitude, and knowledge/skill subscales scores (t=-1.583, p > 0.05). Test-retest correlations performed at a two-week interval were considered quite high for the entire questionnaire (r = 0.98, p= .001). Test-retest correlation coefficients for the practice, attitude, and knowledge/skill subscales were calculated as 0.96, 0.94 and 0.97 respectively (Table 2).

**Validity**

The Turkish version of the scale whose language validity was established was then evaluated in terms of content validity by 10 academics who were knowledgeable about the topic using the Content Validity Index (CVI). After the academics' evaluation, the form which took its final form was pilot tested with 10 nurses who were not in the sample but had characteristics similar to those of the participants. No items were removed from the questionnaire after the academics' evaluation and pilot-testing process.

For the assessment of the construct validity of the scale, exploratory factor analysis was conducted. Sampling adequacy (0.931) calculated with the Kaiser-Meyer-Olkin (KMO) coefficient was applied to EBPQ and the results of Barletta test ($x^2$ = 3.580, p = 0.000) were considered to be highly significant. In this context, to examine the factor structure of the scale, the Principal Component Analysis and varimax rotation method were applied. In this present study, to attain the most appropriate construct and the accurate number of factors during the prediction of factor analysis, the criteria applied were as follows: the eigenvalue ≥ 1, factor loading at least 0.40, the variance exploratory rate ≥ 0.40. At the end of the exploratory factor analysis conducted with the varimax rotation, it was found that the items of the scale were grouped under three major factors with an Eigenvalue >1, and that factor loadings of all the items varied between 0.32 and 0.87. However, the distribution of the eigenvalues graph analysis revealed that there were three main breaking points, and the sharpest break occurred after the first factor. Therefore, the EBPQ was determined to have a one-dimensional and multi-factorial structure. It was observed that the three-factor structure with Eigenvalues of 14.08, 2.96 and 2.07 accounted for 75.4% of the total variance. Besides, at the end of the factor analysis, the statement "My workload is too great to keep up-to-date with all of the new evidence" included in the attitude towards evidence-based practice subscale in the original scale was included in the evidence-based practice subscale in the present study with its 0.42 factor loading. However, after considering the theoretical structure, the researchers decided to include it in the attitude towards evidence-based practice subscale as in the original scale (Table 3).

In order to obtain additional evidence for the validity of the three-factor structure of the EBPQ determined by the Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) was conducted on its 24-item structure. Data-model fit indices [goodness of fit index (GFI) = 0.93, adjusted goodness of fit index (AGFI) =0.91, root mean square error of approximation (RMSEA) =0.048, standardized root mean square (SRMR) =0.051, comparative fit index (CFI) =0.94] obtained from factors analysis were considered to be at an acceptable level (Table 4).

In this present study, to determine the construct validity of the scale, the discriminant validity analysis (known-groups comparison) was performed. The results of the statistical analysis between the nurses' education level and the total scores obtained from the scale are shown in Table 5. The results revealed a statistically significant difference between the mean scores  the nurses obtained from the attitude towards, and knowledge and skills associated with EBP subscales in terms of their education levels (p <0.05, Table 5) .

**Table 1  Item–Total Score Correlation and Alpha Value of EBPQ (n=123)**

| Items | Item-Total Correlations | | Cronbach α Value* |
|---|---|---|---|
| | r | p | |
| 1 | .73 | <0.001 | .94 |
| 2 | .68 | <0.001 | .94 |
| 3 | .48 | <0.001 | .95 |
| 4 | .65 | <0.001 | .95 |
| 5 | .69 | <0.001 | .94 |
| 6 | .68 | <0.001 | .94 |
| 7 | .61 | <0.001 | .95 |
| 8 | .43 | <0.001 | .95 |
| 9 | .51 | <0.001 | .94 |
| 10 | .39 | <0.001 | .95 |
| 11 | .70 | <0.001 | .94 |
| 12 | .32 | <0.001 | .96 |
| 13 | .73 | <0.001 | .94 |
| 14 | .75 | <0.001 | .94 |
| 15 | .72 | <0.001 | .94 |
| 16 | .75 | <0.001 | .94 |
| 17 | .80 | <0.001 | .94 |
| 18 | .81 | <0.001 | .94 |
| 19 | .80 | <0.001 | .94 |
| 20 | .82 | <0.001 | .94 |
| 21 | .84 | <0.001 | .94 |
| 22 | .76 | <0.001 | .94 |
| 23 | .81 | <0.001 | .95 |
| 24 | .76 | <0.001 | .95 |
| **Cronbach α: .94** | | | **Total** |

\* Internal consistency when the item is excluded.

**Table 2: Intraclass correlation coefficients (ICC) and confidence intervals (95% CI)**

| Subscales | Number of items | ICC* | IC 95%** |
|---|---|---|---|
| Evidence-Based Practice | 6 | .96 | .85 - .92 |
| Attitudes toward EBP | 4 | .94 | .78 - .91 |
| Knowledge and skills associated to EBP | 14 | .97 | .81 - .93 |
| Total EBPQ | 24 | .98 | .86 - .94 |

*ICC - Intraclass correlation coefficients;   **CI - Confidence interval of 95%*

## Table 3 The Results of EBPQ Principal Component Analysis

| Factors | Factor Load | Eigenvalue | Percentage of Variance Explained |
|---|---|---|---|
| **Factor 1- Evidence-Based Practice (total score:6-42)** | | | |
| How often have you formulated a clearly answerable question as the beginning of the process towards filling this gap? | .77 | | |
| How often have you tracked down the relevant evidence once you have formulated the question? | .72 | | |
| How often have you critically appraised, against set criteria, any literature you have discovered? | .73 | | |
| How often have you integrated the evidence you have found with your expertise? | .75 | 14.08 | 41.85% |
| How often have you evaluated the outcomes of your practice? | .80 | | |
| How often have you shared this information with colleagues? | .82 | | |
| Cronbach α = .93 | | | |
| **Factor 2- Attitudes toward EBP (total score:4-28)** | | | |
| My workload is too great for me to keep up-to-date with all the new evidence | .42 | | |
| I resent having my clinical practice questioned | .77 | | |
| Evidence-based practice is a waste of time | .80 | 2.96 | 21.73% |
| I stick to tried and trusted methods rather than changing to anything new | .81 | | |
| Cronbach α = .80 | | | |
| **Factor 3- Knowledge and skills associated to EBP (total score:14-98)** | | | |
| Research skills | .75 | | |
| Technology skills | .32 | | |
| Monitoring and reviewing of practice skills | .79 | | |
| Converting your information needs into a research question | .73 | | |
| Awareness of major information types and sources | .83 | | |
| Ability to identify gaps in your professional practice | .84 | | |
| Knowledge of how to retrieve evidence | .82 | | |
| Ability to analyse critically evidence against set standards | .83 | 2.07 | 11.93% |
| Ability to determine how valid (close to the truth) the material is | .84 | | |
| Ability to determine how useful (clinically applicable) the material is | .86 | | |
| Ability to apply information to individual cases | .87 | | |
| Sharing of ideas and information with colleagues | .85 | | |
| Dissemination of new ideas about care to colleagues | .81 | | |
| Ability to review your own practice | .79 | | |
| Cronbach α = .94 | | | |

## Table 4 The goodness of fit indices for the three factors model

| The goodness of fit indices | |
|---|---|
| $x^2$/df* (301.89.27/146) | 1.96 |
| GFI | 0.93 |
| AGFI | 0.91 |
| CFI | 0.94 |
| SRMR | 0.051 |
| RMSEA | 0.048 |

*$p$=.00  df: degree of freedom, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI),
Comparative Fit Index (CFI), Standardized Root-mean-Square Residual (SRMR),
Root Mean Square Error of Approximation (RMSEA).*

**Table 5 Comparison of Nurses' Score Averages Obtained From the EBPQ in Terms of their Education Levels**

| | Evidence-Based Practice | Attitudes toward EBP | Knowledge and skills associated to EBP | Total EBPQ |
|---|---|---|---|---|
| | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| **Education Level** | | | | |
| Highschool | 13.34±6.40 | 12.03±4.07 | 41.62±16.99 | 68.00 ± 21.97 |
| Associate degree | 12.73±5.60 | 15.10±5.48 | 40.68±13.84 | 67.52 ± 19.65 |
| Baccalaureate degree | 20.98±7.69 | 19.58±5.19 | 69.96±16.51 | 101.01± 23.48 |
| Master's degree | 21.03±8.54 | 23.66±2.42 | 74.83±15.43 | 129.35 ± 25.29 |
| | *KW=65.114 p=0.33>0.05 | *KW=10.114 p=0.02<0.05 | *KW=7.344 p=0.03<0.05 | *KW=10.912 p=0.02<0.05 |

*\*Kruskall Wallis Test*

## Discussion

The study results indicated that the psychometric properties of the Turkish version of the EBPQ were adequate. This study also contributed to the adaption of the EBPQ into Turkish culture in line with international protocols. The language translation used for the assessment of evidence-based practice used by the nurses was previously tested; thus, translation or any other content was not modified. In addition, internal consistency determined in other studies was sufficient in terms of item correlations (Upton & Upton, 2006).

In the literature, the correlation coefficient for the item analysis is recommended to be above 0.25 (Clark & Watson, 1995; Tezbasaran, 2008). The breaking point in this present study for the level of item-total correlation was 0.30, as in the original study (Upton & Upton, 2006). Therefore, it was decided that all the items of the scale were reliable. When the scale's reliability results were assessed as a whole and compared with those of the original study, in addition to lower values, significantly high internal consistency values were found. Some studies suggest that Cronbach's alpha coefficient should be at least 0.70 (Buyukozturk, 2014). In terms of reliability, Cronbach alpha coefficient for the EBPQ was at an acceptable level. The homogeneity of the EBPQ was considered adequate in terms of item correlation (Clark & Watson, 1995).

To improve the language validity, some changes are made in the scale and expert opinion is obtained. Then, content validity measurements are performed. Sampling adequacy was measured with the KMO coefficient. In order to apply the factor analysis within the scope of the validity study of a research, the KMO coefficient is used to determine the sampling adequacy. Furthermore, the results of Barlet test were found to be at a significantly high level. These results indicate that sample size was adequate and the data were appropriate to perform the factor analysis (Buyukozturk, 2014).

In order to monitor the potential impact of cultural differences, in addition to the Varimax rotation, multiple Eigenvalues were used to conduct the principal component analysis. In multi-factor scales, variance ratios between 40% and 60% are considered sufficient (Tezbasaran, 2008). When the results of the factor analysis were applied to the factor loading, factor loadings of the items of the scale varied between 0.32 and 0.87, and the three factors accounted for 75.4% of the total variance. Thus, when the Eigenvalues of the data group were considered, items were measured in three dimensions. These results support the idea that the scale used in this present study conducted in Turkey is not different from the original scale. The EBPQ was recently adapted to Portuguese (Rospendowiski, Alexandre & Cornelio, 2014). However, in that study, only the reliability analysis was carried out; factor analysis regarding the construct validity was not studied.

Regarding the evaluation of the psychometric properties of EBP, our study demonstrated high values for internal consistency as a whole, with greater accuracy for the domain of knowledge and skills (0.94), followed by the domain related to the application of EBP (0.93) and, finally, attitudes (0.80). The Cronbach's alpha score for the domain on attitudes is asssumed by its low number of items. Similar results were reported in

Rospendowiski et al's (2014) study and in the original study (Upton & Upton 2006).

The results of the construct-content validity analysis revealed that the factor structure of the Turkish version of the EBPQ was comprised of three subscales as is the original questionnaire, except that the item "My workload is too great to keep up-to-date with all of the new evidence" which was in the "attitudes towards evidence-based practice" subscale in the original scale was in the practice of EBP in the present study, because its factor loading was 0.42. However, after considering the theoretical structure, it was decided that including it in the attitude towards evidence-based practice subscale would be more appropriate, as in the original scale. In fact, when used in different countries, a scale is expected to have different factor structures due to institutional barriers and differences in educational programs, culture, nurses' knowledge, skills and attitudes. However, in this study, it corresponded to the construct determined by Upton and Upton (Upton & Upton, 2006).

In addition, in this present study, the fit of the model obtained through the exploratory factor analysis was tested with the confirmatory factor analysis. While the RMSEA and standardized RMS values lower than 0.80 in CFA indicate that the model is acceptable, AGFI and GFI values greater than 0.090 indicate acceptable fit indices (Capik, 2014). The CFA results obtained in this present study support that the three-factor structure obtained in this scale has an acceptable model in terms of the fit criteria.

One of the most commonly used methods to determine the validity of the construct validity of the scale is the discriminant validity (known-groups comparison). In this present study, to test the discriminant validity, how nurses' educational levels affect their EBPQ scores were investigated, because in the literature, it is reported that nurses with higher educational levels have higher levels of awareness of evidence-based practice (Koehn & Lehman, 2008). The results of the present study are consistent with those in the literature: the nurses' EBPQ scores varied by their education levels. The higher their education level was the higher their EBPQ scores were. In a study, it is reported that nurses with master and doctoral degrees achieve higher EBPQ scores (Dalheim et al. 2012). These results support the results of previous studies ( Egerod & Hansen, 2005; Koehn & Lehman, 2008)

and show that the scale has the discriminant validity.

## Study limitations

The study has several limitations. First limitation, it was conducted in a single hospital in Izmir, Turkey. Second, there was sampling bias due to the lack of random selection. Therefore, these findings cannot be generalised to other settings. In addition, the study assumed that the answers of the participants were valid, because of the impossibility of direct observation of the nurses towards EBP. These limitations should be taken into consideration in the future use of this scale. Furthermore, because it is the first study in Turkey using this instrument for the evaluation of EBP among nurses, expanded validity studies are needed on a larger sample involving the nurses who have different quality and characteristics.

## Conclusion

In conclusion, although this present study shows that the construct validity and reliability of the EBPQ scale is significant, it is considered that it would be beneficial to conduct future studies with larger samples and to investigate different models related to the factor structure of the measuring instrument by using different analysis methods. Moreover, this study should be repeated in different locations and different populations.

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