

# Examining the Psychometric Properties of the Adolescent Students' Basic Psychological Needs at School Scale for the Azerbaijani Sample

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Received: November 28, 2023

Accepted: March 1, 2024

Online Published: March 27, 2024

doi:10.11114/jets.v12i2.6545

URL: <https://doi.org/10.11114/jets.v12i2.6545>

## Abstract

The purpose of this study is to adapt the "The Adolescent Students' Basic Psychological Needs at School Scale (ASBPNSS)," which was developed to assess satisfaction with basic psychological needs at school, into Azerbaijani and evaluate its psychometric properties. Among the students involved in the study, 255 (50.5%) were female, and 250 (49.5%) were male. The average age of the participants was 14.65 (SD = 1.15), with an age range of 12-17. Exploratory and confirmatory factor analyses were conducted to assess the construct validity of the scale. The results of the exploratory factor analysis for the items of ASBPNSS revealed three factors: autonomy, relatedness, and competence. Confirmatory factor analysis supported this structure. The three factors collectively explained the overall structure with a total variance of 58.061%. Criterion-related validity was also examined for validity purposes. Internal consistency was assessed for the reliability of the scale, yielding an internal consistency coefficient of .82. The results indicate that the scale is a psychometrically sound measurement tool for assessing the extent to which adolescent students' basic psychological needs are met at school.

**Keywords:** adolescent students, basic psychological needs

## 1. Introduction

In recent years, the satisfaction of basic psychological needs has been recognized as a crucial aspect of individual well-being. Self-determination theory (SDT; Deci & Ryan, 2000) identifies three fundamental psychological needs for optimal psychological development and well-being: autonomy (feeling in control of one's actions), relatedness (feeling connected to important people), and competence (effectively interacting with the environment and developing one's abilities). These needs are considered essential because they provide distinct "psychological nutrients" that sustain well-being and contribute independently to healthy psychological growth (Ryan, 1995). Numerous studies, grounded in SDT and other perspectives, have supported the role of these needs in psychological health and well-being (Carver & Scheier, 2000; Deci & Ryan, 2000; Kernis, 2000; Reis et al., 2000). These needs are believed to be universal across individuals and cultures, affecting various aspects of life (Deci & Ryan, 2000; Eccles and Roeser, 2011). Meeting these needs promotes motivation and success, while their neglect increases the risk of psychological issues and health problems (Ryan & Deci, 2000; Sheldon and Bettencourt, 2002).

As close relationships, autonomy, and identity become core developmental issues during adolescence (Steinberg, 2007), the basic psychological needs associated with these issues also play a vital role in adolescents' well-being (Gilman & Huebner, 2006). Research shows that meeting psychological needs during adolescence has an important role in psychological well-being and positive development (Gilman & Huebner, 2003; Park, 2004; Proctor et al., 2009). Most research on psychological needs in adolescence focuses on the role of family factors in adolescent adjustment. However, since adolescents spend most of their time at school during adolescence, environments outside the family, such as school, become increasingly important for positive development (Eccles & Gootman, 2002; Eccles and Roeser, 2009).

School satisfaction, a crucial aspect of school-related subjective well-being, has been a subject of scholarly interest (Baker et al., 2003; Huebner et al., 2004). Connell and Wellborn (1991) argued that students' evaluations of their school experiences are indicators of the extent to which their school experiences fulfill fundamental psychological needs, including the needs for competence, autonomy, and relationships. Research has underscored the significance of factors such as student involvement in decision-making (Epstein, 1981), supportive behaviors from teachers and peers (Tian et

al., 2013), and a sense of academic competence and social acceptance (Tian & Liu, 2007) in relation to school satisfaction and overall well-being.

In terms of showing the importance of school experiences in the lives of adolescents, studies based on "Self-Determination Theory" have revealed that the academic autonomy provided to adolescents at school and the attachments established at school have an impact on students' academic motivation and academic achievement (Black & Deci, 2000; Deci & Ryan, 1985; Fortier, Vallerand, & Guay, 1995; Niemiec & Ryan, 2009; Ryan & Deci, 2000; Ryan & Powelson, 1991; Wentzel, Barry, & Caldwell, 2004). In particular, the need for relatedness is associated with school attachment and achievement (Furrer & Skinner, 2003; Martin & Dowson, 2009), while the need for autonomy and competence is associated with intrinsic motivation (Niemiec & Ryan, 2009; Ryan & Deci, 2009).

When students feel they can express themselves freely and find school activities meaningful to their values, they are likely to feel satisfied with their autonomy at school. The need for competence involves individuals' sense of effectiveness in their endeavors and interactions within their social environment (Baumeister & Leary, 1995). Students who believe in their ability to accomplish assigned tasks and succeed academically are likely to feel competent at school. Relatedness, later recognized as a crucial psychological aspect, pertains to the desire to establish close, trusting relationships and feel connected to others. Students who perceive supportive relationships with both teachers and peers are likely to feel a sense of relatedness satisfaction at school (Davidson, Guest, & Welsh, 2010; Furrer & Skinner, 2003). The findings indicate that when these three basic psychological needs are met at school, adolescents' school-related subjective well-being tends to increase.

The studies cited above reveal the importance of meeting the three basic psychological needs of autonomy, relatedness, and competence at school in terms of supporting students' academic success and positive development. However, these studies measured general psychological needs rather than environment-specific needs. Psychological needs in school settings may differ from psychological needs in other settings in terms of the ways and levels of meeting them. Based on this, Tian, Han, and Huebner (2014) proposed the concept of "Basic Psychological Needs of Adolescent Students at School" to measure basic psychological needs in more specialized areas such as school. According to them, a scale developed to measure psychological needs at school is important for studying basic psychological needs among students. Understanding the psychological needs of individuals will make important contributions to practitioners in organizing environments that allow students to develop their psychological health in the most appropriate way. In other words, identifying the fundamental psychological needs within the unique setting of adolescent education holds significant importance as it could reveal how schools and teachers meet students' essential needs, thereby impacting educational methods and policies.

Looking at the existing literature, there is no other scale besides the "Adolescent Students' Basic Psychological Needs at School Scale" developed by Tian et al. (2014) to measure psychological needs at school. Following the theory of Basic Psychological Needs, Tian et al. (2014) developed the Adolescent Students' Basic Psychological Needs at School Scale (ASBPNSS) to measure students' basic psychological needs in the school context. The scale is designed to measure the relative satisfaction of basic psychological needs such as autonomy, relatedness, and competence in the school context. Competence refers to the degree of success of adolescents in school life, the level of effectiveness in achieving desired results, and the degree to which they express their personal abilities (e.g., "I have been able to learn interesting new skills at school recently"). Autonomy refers to adolescents initiating and continuing their own actions by taking responsibility for these actions in the school environment (e.g., "I can decide for myself how to do things at school"). Relatedness refers to adolescents' levels of school attachment and their relationships with their teachers and peers (e.g., "Teachers and classmates are pretty friendly towards me at school") (Tian et al., 2014).

When examining the existing literature in Azerbaijan, there is no measurement tool developed or adapted for meeting psychological needs in schools. Furthermore, studies on meeting psychological needs at school are generally limited. Only one study conducted by Babayev and Nazlı in 2016 addresses this topic. However, this study revealed that the psychological needs of Azerbaijani adolescent students are not adequately met. In a study related to meeting the psychological needs of students studying at the higher education level, it was found that meeting the autonomy needs of students studying at the master's level increases their interest in the major they are studying (Asgarova & Tsang, 2022). It's evident that there is a lack of research on students' psychological needs in the school environment. Therefore, our research aims to contribute to identifying and improving the understanding of the psychological needs of adolescent students attending schools in Azerbaijan. By conducting this research, we aim to contribute to identifying the fundamental psychological needs of adolescent students in the school environment. As such, the main aim of this study is to adapt the "Adolescent Students' Basic Psychological Needs at School Scale (ASBPNSS)" developed by Tian et al. (2014) into Azerbaijani.

## 2. Method

### 2.1 Participants

A total of 504 students participated in the study, who were selected through appropriate sampling methods in Baku from the seventh, eighth, ninth, tenth, and eleventh grades. Of the participating students, 255 (50.5%) were male, and 250 (49.5%) were female students. The average age of the participants was 14.65 (SD = 1.15), with an age range of 12 to 17 years. When examining the distribution of students by grade level, it was observed that 6.7% (34 individuals) were in the 7th grade, 37.4% (189 individuals) were in the 8th grade, 32.6% (164 individuals) were in the 9th grade, 17% (186 individuals) were in the 10th grade, and 6.3% (11 individuals) were in the 11th grade.

### 2.2 Instruments

#### 2.2.1 Information form

The form included questions about age, gender, and grade level.

#### 2.2.2 Adolescent Students' Basic Psychological Needs at School Scale (ASBPNSS) (Tian et al., 2014)

The ASBPNSS is a self-report questionnaire consisting of three dimensions: autonomy, relatedness, and competence. It comprises 15 items that respondents rate on a six-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Higher scores within each dimension indicate greater levels of autonomy, relatedness, and competence. In the initial study, Cronbach's alpha coefficients were .85 for autonomy, .80 for relatedness, and .77 for competence. Confirmatory Factor Analysis (CFA) results from the original study showed the following:  $\chi^2 = 166.12$  (df = 87); CFI = .98; NNFI = .97; RMSEA = .054 with a 90% confidence interval of [.042, .067]; and SRMR = .048. The factor loadings ranged from .44 to .77, and the test-retest reliability coefficients were .73 for autonomy, .71 for relatedness, and .74 for competence.

#### 2.2.3 Translation Procedure

The ASBPNSS underwent a translation process into Azerbaijani language using the back-translation method. Initially, three experts proficient in both English and Azerbaijani languages translated the original English version of the scale into Azerbaijani. Subsequently, the Azerbaijani version was independently back-translated into English by two different experts. A careful assessment of the scale items' clarity and accuracy compared to the original version led to necessary revisions. The final Azerbaijani version of the instrument, incorporating these revisions, was then subjected to testing. Pilot implementation of the questionnaire, organized according to expert opinions, was carried out with a total of 20 students attending 8th and 9th classes. At the end of the pilot application, feedback was received from the students regarding the clarity of the materials, and the statements of the related substances were regulated.

#### 2.2.4 Satisfaction With Life Scale (SWLS)

The Satisfaction With Life Scale (SWLS) is a 5-item scale known as SWLS (Diener et al., 1985), designed to assess an individual's overall life satisfaction. Using a 7-point Likert scale (1-Strongly Disagree, 7-Strongly Agree), participants are asked to rate their agreement with five statements related to their quality of life. The scale's scores range from a minimum of 5 to a maximum of 35, with higher total scores indicating greater life satisfaction. In terms of scale validity and reliability, Diener et al. (1985) reported an internal consistency of 0.87 and a test-retest correlation of 0.82. Additionally, their study revealed a single-factor model that accounted for 66% of the total variance. An Azerbaijani version of the SWLS was developed by Osmanlı et al. (2021). The results indicated that the Azerbaijani version of SWLS demonstrated good internal consistency (Cronbach's  $\alpha = 0.81$ ), and confirmatory factor analysis supported a single-factor structure, explaining 57.35% of the total variance.

### 2.3 Analysis of the Data

#### 2.3.1 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to test the structural validity of the "Adolescent Students' Basic Psychological Needs at School Scale". Factor analysis is a statistical technique where specific variables are subjected to analysis to discover new factors conceptually (Çokluk, Şekercioğlu, and Büyükoztürk, 2014). Bartlett's tests were applied to examine the suitability of the data for factor analysis. A Kaiser Meyer-Olkin (KMO) value higher than .60 indicates the suitability of the data for factor analysis (Büyükoztürk, 2007). The findings are presented in Table 1.

Table 1. The result of KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.851
	X <sup>2</sup>	2088.290
Bartlett's Test of Sphericity	sd	105
	p.	.000

\*\*p<.001

According to the obtained results, it has been determined that the data is suitable for factor analysis (Kalaycı, 2006). An initial principal-axis factor analysis with the Oblique rotation method (Direct Oblimin; Delta = 0) was conducted on the data. This analysis revealed four factors with eigenvalues ranging from 4.558 to 1.016. However, the scree plot indicated that a three-factor solution with interpretable item content was the most appropriate solution (Figure 1).

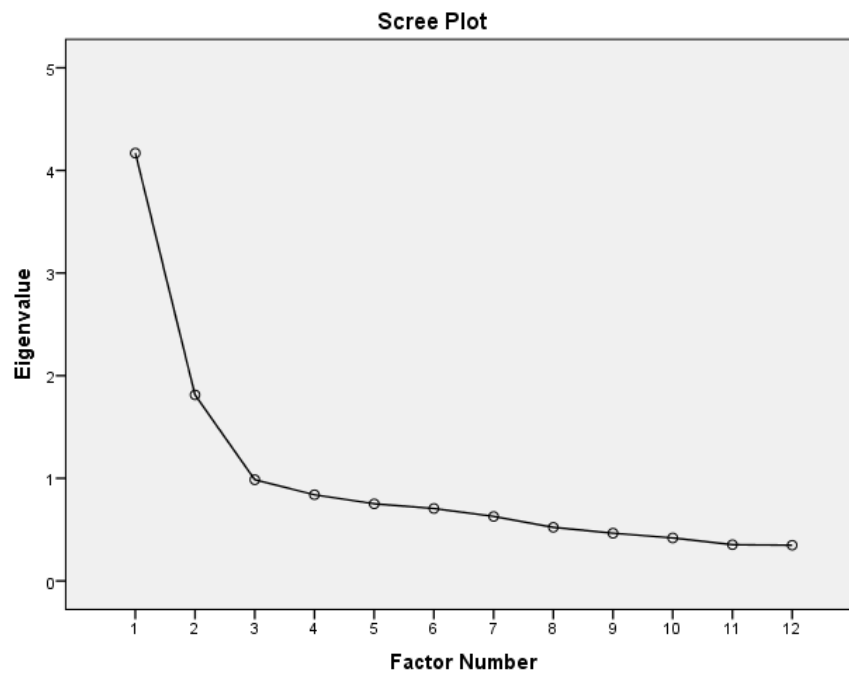


Figure 1. Scree plot

As a result of the analysis, it was decided to exclude Item 13 and Item 10, which are located in different factors and have factor loadings differing by less than 0.10. Additionally, Item 15, which is the only item under a different factor, was also excluded from the analysis.

Table 2. Pattern Matrix

	Factor			
	1	2	3	4
Item 1	-.117	.649	-.012	-.049
Item 2	.139	.464	-.025	-.242
Item 3	.016	.425	.120	-.009
Item 4	.060	.858	-.066	.175
Item 5	.120	.373	.056	-.045
Item 6	.794	.127	-.074	.015
Item 7	.600	.061	.118	.027
Item 8	.683	-.068	.168	.039
Item 9	.759	.019	.020	.020
Item 10	-.154	.063	-.009	.128
Item 11	.087	.035	.726	.185
Item 12	.051	-.019	.668	-.039
Item 13	.258	.147	.184	-.256
Item 14	-.018	.107	.460	-.337
Item 15	.009	-.034	.015	.412

After removing items 10, 13, and 15 from the Adolescent Students' Basic Psychological Needs at School Scale, another Exploratory Factor Analysis was conducted. According to the analysis results, a factor structure with eigenvalues of 4.168 (34.737%), 1.813 (15.106%), and 0.986 (8.217%) was obtained. The three factors collectively explain the overall structure with a total variance of 58.061%. The factor loadings of the items according to the factor structure are shown in Table 3.

Table 3. Factor loadings of the items

	Factor		
	relatedness	autonomy	competence
Item 6	.810		
Item 9	.730		
Item 8	.699		
Item 7	.621		
Item 4		.801	
Item 1		.683	
Item 2		.492	
Item 3		.434	
Item 5		.390	
Item 12			.832
Item 11			.611
Item 14			.409

Based on the factor structure obtained from the Exploratory Factor Analysis, the values of the items range from .39 to .83. The analysis revealed that the Relatedness dimension of the scale consists of 4 items, the Autonomy dimension consists of 5 items, and the Competence dimension consists of 3 items.

The factor structure obtained through the Exploratory Factor Analysis of the scale has been tested with Confirmatory Factor Analysis (CFA). Confirmatory Factor Analysis (CFA) examined the fit indices of the three-dimensional model, and the chi-square value ( $\chi^2/df$ ) was found to be 1.93. The ( $\chi^2/df$ ) ratio must be less than 3 (Kline, 2011); the root mean square error of approximation (RMSEA) values were 0.061 (0.043; 0.079). According to these values, a chi-square value below 5 relative to degrees of freedom indicates a good fit (Çokluk, Şekercioğlu, & Büyüköztürk, 2014; Tabachnick and Fidell, 2007). Additionally, RMSEA values of  $\leq 0.05$  indicate excellent fit, while values of  $\leq 0.08$  indicate that models have good fit. These values suggest that the scale demonstrates a satisfactory level of fit. When

other fit indices were examined, SRMR= 0.065, GFI= 0.94, CFI= 0.96, and AGFI= 0.91 were found. These results further indicate that the model has adequate fit (Schermelleh-Engel and Moosbrugger, 2003; Çokluk et al., 2014). The analysis results are presented in Figure 2.

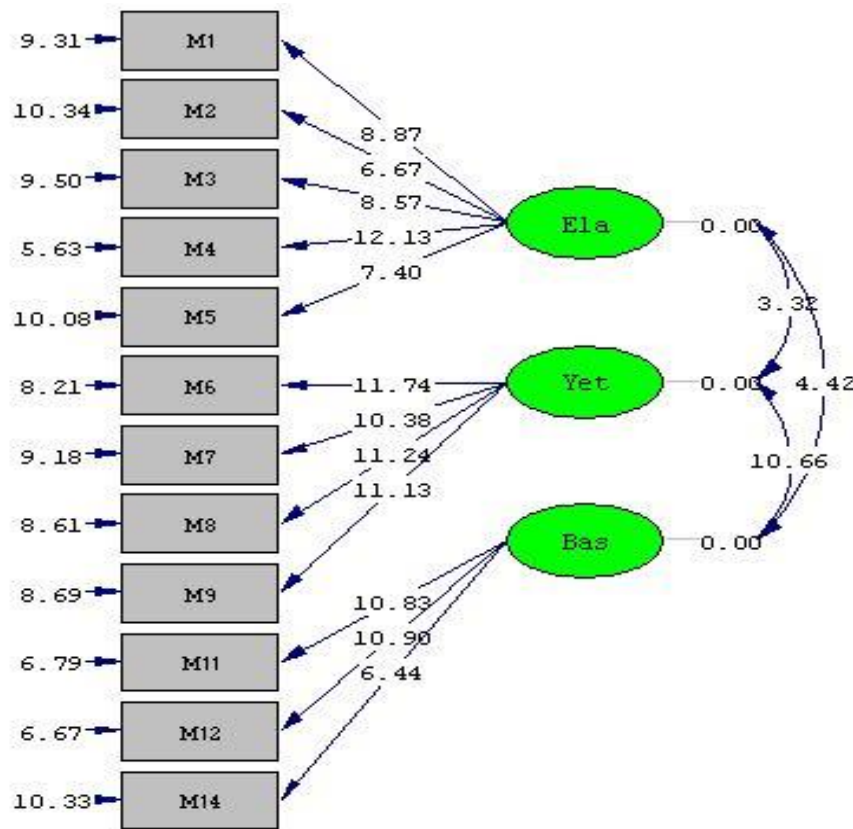


Figure 2. The results of confirmatory factor analyses (Ela= autonomy, Yet= relatedness, Bas= competence)

Chi-Square=98.78, df=51, P-value=0.000 07, RMSEA=0.061  
 (Percent Confidence Interval for RMSEA = (0.043; 0.079))

In the adaptation study, the "Satisfaction with Life Scale" was used for criterion-related validity. The positive and moderate relationships found between the need for autonomy, relatedness, and competence at school and the scores on the life satisfaction scale provide evidence supporting the criterion-related validity of the ASBPNSS. The relationship between the factors and total score of the scale and the score of the "life satisfaction scale" is presented in Table 4:

Table 4. Relationship between the factors and total score of the scale and the score of the life satisfaction scale

	autonomy	relatedness	competence	total score
life satisfaction	.29**	.39**	.37**	.45**

p<.01

A Pearson correlation analysis was conducted to examine the associations between the dimensions of autonomy, relatedness, and competence, revealing moderate positive correlations between all dimensions, which closely aligns with the results of the original study. In the reliability analysis, the internal consistency coefficient (Cronbach's Alpha) was calculated as  $\alpha = .71$  for the autonomy subscale,  $\alpha = .83$  for the relatedness subscale, and  $\alpha = .69$  for the competence subscale. The reliability coefficient for the overall scale was found to be  $\alpha = .82$ .

### 3. Discussion

The study underscores the critical importance of addressing students' fundamental psychological needs, particularly while they are in educational institutions such as schools where they spend the majority of their time. Tian et al. (2014)

advocate for the use of a more precise scale to measure the extent to which these needs are met in school environments. Given the absence of studies on this topic in Azerbaijani literature, the authors conducted an adaptation study to bridge this gap.

The results of the present study provide strong support for the validity and reliability of the ASBPNSS in Azerbaijani adolescents. The Exploratory Factor Analysis (EFA) results confirmed the consistency of the original three-factor structure in the Azerbaijani version of the ASBPNSS. However, as part of the analysis, Item 13 and Item 10 were eliminated due to their placement in distinct factors with factor loadings differing by less than 0.10. Additionally, Item 15, which was the sole item under a different factor, was also excluded. Notably, similar findings were reported in adaptation studies by Özdemir et al. (2015), Özen & Demir (2018), and Inman et al. (2023), where items 10 and 15 exhibited low factor loadings.

Moreover, in the original development of the ASBPNSS, two items with factor loadings below .30 were excluded to achieve the theoretically proposed three-factor solution (Tian et al., 2014). Hence, the decision to remove items 10, 13, and 15 was consistent with prior practices. Subsequently, a second Exploratory Factor Analysis (EFA) was conducted with the 12-item version, confirming the original three-factor structure with all items loading appropriately within their respective factors.

Further validation of the 12-item solution was conducted through Confirmatory Factor Analysis (CFA), which demonstrated good fit indices for the three-factor solution of the Azerbaijani version of the ASBPNSS. These results closely mirrored those reported for the original ASBPNSS by Tian et al. (2014), affirming the stability and consistency of the factor structure.

There are several limitations that should be considered regarding the current study. Firstly, the participants in this study were limited to students from schools in Baku. To enhance the generalizability of the results, future research should include students from various regions across Azerbaijan. Expanding the study to different regions can contribute to the validity and reliability of the Azerbaijani version of the ASBPNSS. Additionally, it's important to note that the data for this study was collected from government schools. Conducting research in different types of schools, such as private or specialized institutions, may offer valuable insights into the basic psychological needs of students in various school settings in Azerbaijan.

Furthermore, it's essential to acknowledge that items 10, 13, and 15 were excluded from the analysis due to their low factor loadings. Therefore, it would be beneficial to continue investigating the scale's validity and reliability in future studies, perhaps by refining or replacing these items to improve the scale's psychometric properties.

Overall, this study utilized both exploratory and confirmatory factor analyses, providing robust evidence for the validity and reliability of the 12-item ASBPNSS. These findings suggest that the 12-item version demonstrates better internal consistency and factor structure than the original 15-item version when used among Azerbaijani adolescents. The results indicate that the Azerbaijani version of the ASBPNSS can be a valuable tool for assessing the satisfaction of basic psychological needs among adolescent students within the school context.

Moreover, the validated Azerbaijani version of ASBPNSS can benefit cross-cultural researchers studying how cultural factors impact students' basic needs satisfaction in school and its influence on academic achievement and overall positive functioning. Additionally, by confirming the three-factor structure, this study supports the theoretical idea of Basic Psychological Needs Theory (BPNT) that basic needs are universal across different cultural backgrounds.

### **Acknowledgments**

There were people who supported the study until its conclusion. We would especially like to thank our family and friends for their moral support. Tian and his colleagues, who developed the original scale, supported our study by providing immediate feedback for the adaptation study. We thank them for this. School administrators offered their support as much as they could during the data collection process. We would like to express our endless gratitude to the students who spent their valuable time filling out the forms during the data collection process.

### **Authors contributions**

Dr. Maarif Mammadov was responsible for designing the study, obtaining scale permission, preparing the data collection form, following the translation processes, data collection process, and revising the statistical analysis, especially factor analysis, in the method section of the article. MSc Anar Babayev was responsible for the scale translation processes, data collection process, descriptive analysis of the data, writing and revising the method and results section. Mirsadig Mukhtarov was responsible for entering the data into the statistical program and writing the introduction part.

### **Funding**

The research was conducted with the authors' own financial resources.

**Competing interests**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Informed consent**

Obtained.

**Ethics approval**

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

**Provenance and peer review**

Not commissioned; externally double-blind peer reviewed.

**Data availability statement**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

**Data sharing statement**

No additional data are available.

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