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# Psychometric properties of the Persian adaptation of quality of sexual function questionnaire

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**Abstract**
The quality of sexual relationships is one of the essential dimensions of quality of life. Quality of life tools and sexual satisfaction scales are usually quite distinct and do not allow for a comparison between the two genders. The quality of sexual function (QSF) scale measures the quality of sexual relationships and allows for the comparison of women with men. This study aimed to evaluate the reliability and validity of the Persian adaptation of the Quality of Sexual Function Scale. A total of 333 participants were recruited from the clinics of Rasoul Akram Hospital, Tehran, Iran. The scale was translated and adapted by the World Health Organization's (WHO) recommended method. We found a new construct by exploratory factor analysis. The Cronbach's alpha was 0.82 and the McDonald's omega was 0.89. The size of the correlation coefficient between QSF score and age, BMI, and the number of years of married life was trivial. The exploratory factor analysis revealed that the Persian version of QSF consisted of seven dimensions: physical well-being, sexual excitement, mental well-being, expression of sexual wish, desire, satisfaction, being unhappy with sexual life, and sexual dreams. The results of this study revealed that the Persian version of the QSF had appropriate validity and reliability for future studies. The new factorial structure can help to better evaluate the sexual function of patients.

**Keywords** Quality of life · Sexual function · Sexual satisfaction · Validation

## 1 Introduction

Sexual satisfaction is one of the most important aspects of an individual's life. Sexual intimacy is a significant part of romantic relationships and studies show that it can affect marital satisfaction and quality of life (Fischer et al., 2019; Peixoto et al. 2019). Quality of life is a very broad concept that has been declared the ultimate goal of health services to improve the general well-being of individuals (Mahmoudi et al. 2018; Rezaei et al. 2018). Quality of life and sex are important issues for both patients and healthy individuals.

Extended author information available on the last page of the article

Numerous tools have been designed to assess sexuality and quality of life, and each usually focuses on one of two separate concepts (Carrillo et al. 2022; Pastoor et al. 2018). While some quality-of-life tools have a subscale or multiple questions about sex (Cocks et al. 2007; Greimel et al. 2003; van Andel et al. 2008), there was not a scale to compare the quality of life between different groups, especially between the genders. Also, a wide range of sexual satisfaction scales have been developed, most of which examine sexual satisfaction in a range between dissatisfied and satisfied on a continuum (Mallory et al., 2019). Quality of Sexual Function is a tool designed to overcome these limitations. It can simultaneously examine sexual satisfaction and quality of life, with a low number of items and easy comprehensibility (Heinemann et al. 2005).

This scale can be used for both men and women and allows comparison between the genders (Heinemann et al. 2005) which is very valuable in evaluating interventions to increase sexual satisfaction in pairs. In a 2014 study by Lee et al., the Korean version of a Quality of Sexual Function scale was assessed. The tool was translated into Korean and completed by 220 women at the Korean National Cancer Center. Cronbach's alpha of the Korean version of the questionnaire was 0.83 (Lee et al., 2014). In 2011, Pereira et al. translated the Quality of Sexual Function into Portuguese utilizing a Brazilian sample. The results of their study indicated that the translated tool can be used to compare the quality of sexual relationships between the two genders and people with different levels of education (Pereira et al. 2011).

The questionnaire provides a suitable tool for assessing the quality of care provided to patients. It can be used to screen people with sexual problems. It can also provide a tool for researchers in this field. There is not enough evidence regarding the psychometric properties of QSF. Moreover, cultural differences can affect the factorial structure of scales. It is necessary to study the structure of new scales worldwide. Therefore, the present study was conducted to translate and psychometrically evaluate the Persian adaptation of the Quality of Sexual Function Scale.

## 2 Method

### 2.1 Design

This was methodological research that was conducted in two stages. The instrument of the present study was the Quality of sexual function scale. This tool has 40 items, 32 of which are related to the quality of life and sexual life. The answers to the items were scored from 0 to 5 on a 6-point Likert scale, where 0 is no partner and 1 = No, 2 = Rarely, little, 3 = Moderately, sometimes, 4 = Often, and 5 = Very often, always. and the sum of the scores indicated the quality of the sexual function. First, the Quality of the Sexual Function scale was translated and then the instrument was psychometrically evaluated. The tool was translated based on the tool translation and adaptation process recommended by the WHO (World Health Organization 2019).

### 2.2 Study sample and settings

We recruited a total of 333 adult participants using a convenience sampling technique. Study samples were individuals attending outpatient clinics of Rasoul Akram Hospital, Teh-

ran, Iran for a routine check-up. Inclusion criteria were age over 18 years, having a health document in the clinic, regular attendance for routine check-ups, being married or being in a committed relationship, and consent to participate in the study. Exclusion criteria were having a severe physical illness, suffering from a chronic physical or mental health disease, having a sexually transmitted disease, and reporting a lack of libido or having impotence.

### 2.3 Translation

In the first step, the scale was translated into Persian by the main project partner who was part of the health team and was familiar with the terminology of the scale. The translator was relatively fluent in English, but his mother language was Persian. The focus was on conceptual translation. Attempts were made to translate the tool into a simple and acceptable format for use in the widest possible range of audiences. For this reason, to translate each term, we tried to look for the best word in Persian by considering the meaning of the word. The translator tried to translate the questions into as few words as possible. Professional vocabulary was avoided. In the next step, a focus group was formed. In this working group, words and phrases were examined and suggestions for correction were provided. The group included the main translator, specialists in the field of sex and psychology (3 people), and specialists in the field of translation and instrument development (2 people). The product of this step was a completely translated scale. The third step was to translate the scale into the original language (Back translation). This was done by an independent person who was unfamiliar with the translated tool. In the back translation, the emphasis was more on conceptual translation than linguistic translation. Disagreements were discussed with key project members and changed according to their comments.

A pre-test was conducted to evaluate the translated version. The pre-test was performed on 20 patients referred to the clinic of Hazrat Rasoul Hospital, Tehran, Iran. After completing the scale, respondents were asked to share their comments about the questions. In this regard, respondents were asked to rephrase all questions and show words or phrases with unclear meanings. If there was an alternative term, they were asked to choose the one they understand best. Interviews were conducted with respondents by the main researcher.

The next step was the psychometric evaluation of translated scale. The main purpose of the step was to determine the psychometric properties of the translated questionnaire. This step included determining the validity of the instrument. We used the face and content validity methods along with Exploratory factor analysis.

### 2.4 Face and content validity

We used the qualitative method to establish face validity. In the qualitative step, we gave the scale to 10 participants from the sampling population (5 men and 5 women aged 35 to 65) and asked them to comment on the appropriateness of the appearance, degree of clarity or ambiguity of the selected words, and the rationale for the sequence of the items. Their viewpoints were included in the scale. We used the qualitative method of content validity. In this step, we asked 10 experts in the fields of measurement, psychology, quality of life, and sexology about grammar, use of appropriate words, and item allocation.

### 2.5 Exploratory factor analysis (EFA)

The **exploratory factor analysis** was performed with the principal axial factor method and varimax rotation. Kaiser-Meyer-Olkin (KMO) and Bartlett tests were calculated to assess the quality of the responses and the quality of the samples. We considered the KMO index greater than 0.7 as an acceptable value. Furthermore, 95% confidence intervals (CIs) were estimated for each eigenvalue based on CI 95 width (z: 1.96). We used Horn's parallel analysis approach to determine the number of latent factors and items with communalities < 0.2 that were excluded from EFA [43]. The number of extracted factors were determined based on three approaches: (a) Exploratory Graph Analysis (EGA), (b) parallel analysis, and (c) parallel analysis scree plot [44]. Items with factor loading values of 0.3 or greater were considered appropriate.

### 2.6 Reliability

We determined the reliability of the scale using two methods test-retest and calculation of internal consistency. In the test-retest method, 20 patients who were randomly selected from the sampling population and were able to complete and return the instrument on two occasions within two weeks period were invited. They completed the scale in two stages with an interval of two weeks. The correlation between the two measurements was evaluated using the Pearson correlation test ($r = 0.86$). The Cronbach's alpha was 0.82 and the McDonald's omega was 0.89.

### 2.7 Statistical analysis

SPSS software version 16 was used for statistical analysis. The normal distribution of the quality-of-life score and its dimensions were examined using the Kolmogorov-Smirnov test and their distribution was normal ($p > 0.05$). Independent t-test, one-way analysis of variance (ANOVA), Tukey's post-hoc tests, and Pearson correlation were used to analyze the data. CFA was conducted using AMOS version 16. McDonald's Omega coefficient was computed using package *psych* in R version 4.1.

## 3 Results

At the end of the sampling, 333 people completed the research questionnaire. Of these, 193 were women (58%), 330 were in a committed sexual relationship (99.1%) and 331 had sex within the last month (99.4%). For 12.9% (43 people) participants, sex was insignificant, 54.4% (181 people) noted that sex was important and 32.7% (109 people) noted that sex was very important. The minimum age of participants in the study was 22 and the maximum was 74 years with a mean and standard deviation of $45.11 \pm 48.28$ years. The average number of years of cohabitation was $18.97 \pm 12.93$ years.

CFA demonstrated that the original structure provided an improper fit in the present sample (AGFI = 0.74, GFI = 0.77, CFI = 0.71). However, CMIN/df (3.19) and RMSEA (0.08) demonstrated a moderate fit.

The KMO test value (0.85) demonstrated that correlation was adequate to develop suitable factors with the Bartlett test of Sphericity $\chi 2$ (66) = 3923.95 ($p < 0.0001$). EFA suggested an eight-factor solution of QSF in the Iranian population basis on eigenvalues of more than 1. Some experimental rotations were executed to determine the most appropriate factors. Based on the eigenvalues and the percentage of explained variance (57.00) a 7 factors solution was selected. Question 13 "Sometimes I have got problems with urination" was omitted because it does not have a loading value above 0.3 in any factor. CFA demonstrated that the revised structure provided a better fit in the present sample (AGFI = 0.82, GFI = 0.85, CFI = 0.85). Also, CMIN/df (2.37) and RMSEA (0.06) demonstrated a good fit.

According to the results of the Table 1, the structures of the translated version were different from the original one. Most of the questions in factor one had loading values above 0.4 in the new EFA. Only question 13 was not included in factor one or any factor. While questions 9, 10, 1, and 8 had loading values above 0.4 in factor one they had higher loadings in a new factor. We named factor one based on its question "Physical Well-being" (Eigenvalue = 6.57, % of Variance = 20.55). The second factor was named "Sexual Excitement" (Eigenvalue = 4.19, % of Variance = 13.10). The third factor was named "Mental Well-being" (Eigenvalue = 2.16, % of Variance = 6.75). we named the fourth factor "Expression of Sexual wish") (Eigenvalue = 1.64, % of Variance = 5.14). The fifth factor was named "Desire and Satisfaction" (Eigenvalue = 1.41, % of Variance = 4.41). The sixth factor was named "Being Unhappy with Sexual Life" (Eigenvalue = 1.16, % of Variance = 3.64). Finally, the seventh factor was named "Sexual Dreams" (Eigenvalue = 1.08, % of Variance = 3.38).

There was a positive and significant correlation between the total score and all dimensions of the scale (Table 2).

There was a significant difference between men and women in the dimensions of the quality of the sexual function scale and the total score (Table 2). Men had higher scores in the total score and dimensions except for the Being Unhappy with Sexual Life dimension. The score of quality of sexual life and its dimensions sex and its dimensions were significantly higher in people for whom sex was more important (Table 3). Although there was a statistically significant and negative relationship between the quality of sexual function and age ($r = -0.170$, $p = 0.002$), the amount of correlation was trivial and negligible. There was no statistically significant relationship between the quality of sexual function and BMI and years of life with a sexual partner ($p > 0.05$). The comparison of the dimensions of quality of sexual function between those for whom sex is of little importance, moderate importance, and high importance is given in Table 4.

To ensure the validity and reliability of two factors that each had less than three items, we conducted additional analyses. Firstly, we evaluated the factor loadings of the two items in each factor. In both factors, both items had strong loadings on the factor (above 0.5), indicating that the factor was a good representation of the construct. Additionally, the two items had similar loadings, with factor 6 having loadings of 0.621 and 0.527, and factor 7 having loadings of 0.670 and 0.516, which suggests that the factors were reliable. The face validity of both factors also supported the notion that the two items were measuring the same construct, and both factors appeared conceptually coherent.

**Table 1** Exploratory factor analysis of the questionnaire

| No | Item | Questionnaire dimensions | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3 | During rest I have palpitation | 0.605 | | | | | | |
| 2 | I have had chest pain | 0.603 | | | | | | |
| 12 | I experienced muscle weakness | 0.586 | | | | | | |
| 7 | I had sleeping problems such as insomnia | 0.561 | | | | | | |
| 6 | I had dizziness | 0.523 | | | | | | |
| 5 | I had severe sweating without any reason | 0.511 | | | | | | |
| 11 | My memory and concentration has been impaired | 0.505 | | 0.366 | | | | |
| 4 | I experienced myalgia and arthralgia including lumbar region and extremities | 0.493 | | | | | | |
| 16 | Did you experience any pain during intercourse? | 0.394 | | | | | | |
| 30 | Are you happy with sexual excitement? | | 0.843 | | | | | |
| 29 | Do you experience sexual excitement before or during sex? | | 0.755 | | | | | |
| 32 | Do you achieve sexual satisfaction? | | 0.731 | | | | | |
| 31 | Is sufficient moisture produced during sex? | | 0.614 | | | | | |
| 27 | Do your sex organs respond to stimulation as always? | | 0.471 | | | | | |
| 9 | I was depressed (sad, tendency to crying, and a low mood) | | | 0.759 | | | | |
| 10 | I was physically exhausted | | | 0.718 | | | | |
| 1 | Both physically and mentally I feel less well | | | 0.564 | | | | |
| 8 | I have been irritable and aggressive | | | 0.556 | | | | |
| 20 | Does your partner show less interest for sex? | | | | 0.612 | | | |
| 28 | Are you the one who shows desire for sex first? | | | | 0.609 | | | |
| 19 | Does your partner have more desire for sex? | | | | 0.539 | | | |
| 25 | Do you tend to have more sexual self-satisfaction? | | | | 0.385 | | | |
| 17 | Has your partner experienced pain during intercourse? | | | | 0.367 | | | |
| 18 | Did you like to have sex more frequently? | | | | | 0.643 | | |
| 22 | Has your desire for masturbation or sex increased? | | | | | 0.598 | | |
| 21 | Has your desire diminished for sexual relationship? | | 0.329 | | | | | |
| 26 | I refuse sexual intercourse as I have no interest in it | | | | | 0.393 | | |
| 14 | Are you unhappy with your sexual life? | | | | | | 0.621 | |
| 15 | Is your spouse unsatisfied with your sexual relationship? | | | | | | 0.527 | |
| 24 | Does your partner have sexual dreams about you? | | | | | | | 0.670 |
| 23 | Majority of times, I have sexual dreams | | | | | | | 0.516 |

**Table 2** The correlation between the quality of sexual function scale scores and its dimensions

| | | Physical well-being | Sexual excitement | Mental well-being | Expression of Sexual wish | Desire and satisfaction | Being unhappy with sexual life | Sexual dreams |
|---|---|---|---|---|---|---|---|---|
| Sexual excitement | r | 0.251 | | | | | | |
| | p | 0.000 | | | | | | |
| Mental Well-being | r | 0.647 | 0.156 | | | | | |
| | p | 0.000 | 0.004 | | | | | |
| Expression of Sexual wish | r | 0.302 | 0.451 | 0.230 | | | | |
| | p | 0.000 | 0.000 | 0.000 | | | | |
| Desire and Satisfaction | r | 0.194 | 0.115 | 0.263 | 0.212 | | | |
| | p | 0.000 | 0.036 | 0.000 | 0.000 | | | |
| Being unhappy with sexual life | r | 0.302 | 0.333 | 0.317 | 0.258 | 0.348 | | |
| | p | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | |
| Sexual dreams | r | 0.091 | −0.119 | 0.114 | 0.101 | 0.310 | 0.103 | |
| | p | 0.097 | 0.031 | 0.037 | 0.067 | 0.000 | 0.060 | |
| QSF | r | 0.821 | 0.564 | 0.755 | 0.548 | 0.466 | 0.562 | 0.238 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

r: Person's correlation coefficient, p: two-sided p-value resulted from z-test

**Table 3** Comparison of the quality of sex and its dimensions between men and women

| | Gender | | | | |
|---|---|---|---|---|---|
| | Men | | Women | | t-test |
| | Mean | SD | Mean | SD | |
| Physical Well-being | 18.32 | 6.24 | 15.79 | 5.16 | t (330) = 3.91, p = 0.001 |
| Sexual excitement | 12.80 | 4.67 | 10.08 | 2.80 | t (330) = 6.12, p = 0.001 |
| Mental Well-being | 10.05 | 4.50 | 8.88 | 3.74 | t (330) = 2.49, p = 0.013 |
| Expression of Sexual wish | 10.32 | 1.81 | 9.15 | 1.71 | t (330) = 5.93, p = 0.001 |
| Desire and Satisfaction | 8.13 | 2.26 | 8.84 | 1.92 | t (330) = -2.99, p = 0.003 |
| Being Unhappy with Sexual Life | 3.58 | 1.91 | 3.68 | 1.85 | t (330) = -0.45, p = 0.648 |
| Sexual dreams | 3.88 | 1.81 | 4.25 | 1.64 | t (330) = -1.91, p = 0.056 |
| QSF | 67.09 | 15.08 | 60.68 | 11.21 | t (330) = 4.24, p = 0.001 |

SD: standard deviation, t: t statistic of independent t-test, p: p-value

## 4 Discussion

This study aimed to adapt and psychometrically evaluate the quality of the sexual function scale. Based on the results of the present study, the adapted scale had a good face, content, and construct validity and reliability. The factorial structure proposed by our study has a good theoretical basis. The construct validity of the original scale was not tested after the main study. We believe our results need more confirmation by confirmatory factor analysis. The results showed that the quality of sexual function decreases with age. Also, the more important sexual function was to people, the higher the quality of their sexual function score.

**Table 4** Comparison of the quality of sex and its dimensions in the studied units by the importance of sex

| | Importance | | | | | | p* |
|---|---|---|---|---|---|---|---|
| | Low Importance | | Important | | Very Important | | |
| | Mean | SD | Mean | SD | Mean | SD | |
| Physical Well-being | 19.23 $^{A}$ | 6.20 | 16.69$^{B}$ | 5.47 | 17.44$^{AB}$ | 6.44 | 0.037 |
| Sexual excitement | 16.91 $^{A}$ | 5.05 | 11.49$^{B}$ | 3.44 | 9.86 $^{C}$ | 3.26 | 0.001 |
| Mental Well-being | 11.49 $^{A}$ | 4.71 | 9.07$^{B}$ | 3.95 | 9.62$^{B}$ | 4.31 | 0.003 |
| Expression of Sexual wish | 11.26 $^{A}$ | 1.94 | 9.69$^{B}$ | 1.76 | 9.49$^{B}$ | 1.73 | 0.001 |
| Desire and Satisfaction | 9.02 $^{A}$ | 2.06 | 7.91$^{B}$ | 1.97 | 9.06 A | 2.26 | 0.001 |
| Being unhappy with sexual life | 5.16 $^{A}$ | 2.03 | 3.30$^{B}$ | 1.61 | 3.54$^{B}$ | 1.96 | 0.001 |
| Sexual dreams | 3.88$^{AB}$ | 1.69 | 3.82 $^{A}$ | 1.65 | 4.46$^{B}$ | 1.86 | 0.008 |
| QSF | 76.95 $^{A}$ | 14.88 | 61.97$^{B}$ | 12.74 | 63.48$^{B}$ | 12.93 | 0.001 |

SD: standard deviation

*: One-way ANOVA

For each dimension, mean values with at least a common letter in superscript were not statistically different (Tukey's post-hoc test).

There has been a lot of focus on sexual function and quality of life in recent years, but usually separate scales have been designed for sexual satisfaction between men and women. In addition, tools that measure the quality of life alongside sexual satisfaction are also separated (Derogates et al. 2001; Derogatis 1997; Fugl-Meyer et al. 1997; Reynolds et al., 1988). Therapeutic interventions should be able to assess the change in sexual satisfaction and quality of life on both sides of the relationship, and different scales do not allow the comparison of changes in couples. The present tool in combination thus allows comparisons to be made between couples and determine who has benefited the most from the interventions. It also allows the simultaneous examination of the quality of life and satisfaction with sexual function. The results of a systematic review showed that many tools have been designed to assess sexual function, but many of them are not able to examine sexual function regardless of the sexual function of the sexual partner and the gender of the sexual partner (Giraldi et al. 2011). A variety of disorders can affect the sexual function of couples, and the present tool, in addition to the quality of one's sexual function, can also measure a person's opinion of his/her partner's sexual function, and at the same time, if the tool is used for a sexual partner, the correlation between the two can be evaluated (Heinemann et al. 2005; Lee et al., 2014; Pereira et al. 2011).

Our results showed a seven-dimensions factor structure for the scale. Their names are Physical Well-being, Sexual excitement, Mental Well-being, Expression of Sexual wish, Desire, and Satisfaction, Being unhappy with sexual life, and Sexual dreams. Physical Well-being has 9 items and is the biggest factor. Physical Well-being is an important factor in sexual life. It Is also a very important part of health and quality of life and sexual function can be affected greatly by it (Amin et al. 2022; Epifanio et al. 2023; Rai 2021). Sexual excitement is the second big factor with 6 questions. Sexual excitement is an important part of sexual relationships and in most of the scales, it is one of the main factors (Clayton and Harsh 2016; Jeng et al. 2020). Mental Well-being has 4 items. While mental health is a big part of health, we separated mental health from physical well-being. The results of previous studies showed that mental health contributes significantly to sexual function (Effati-Daryani et al. 2021; Khajehei et al. 2015). Expression of sexual wish is a new factor that

we found in our study. We found that the expression of sexual wish is related to confidence and the sense of feeling loved (Martínez-Martínez et al. 2017). The desire and Satisfaction dimension has 3 items. Having sexual desire and sexual satisfaction are two important parts of the quality of sexual function (Hidalgo and Dewitte 2021; Palacios et al. 2019; Simon et al. 2022). We have two dimensions with only two questions. While mathematically it is corrected to have only two questions in a factor, the current literature advise against it and each dimension should have at least three questions. However, conceptually these four items did not belong to any other factors and also, they could not summarize in one factor. The first one is being unhappy with sexual life and second one is Sexual dreams. The results of previous studies showed that being unhappy and unsatisfied with sex is very important for sexual function (Lee et al. 2012; Nordenström 2011). We found having mutual sexual dreams can help both partners to have a better sexual relationship which has been shown in previous studies(Heinemann et al. 2005; Wang et al. 2022).

## 5 Conclusion

The results of the present study showed that the Persian version of the Quality of Sexual Function scale is a tool with appropriate validity and reliability for use in epidemiological studies. Also, it is suitable for studies that consider the impact of interventions on quality of life and sexual function at the same time. It can facilitate the study of sexual function quality and the advancement of knowledge and practice amongst Persian population groups, an area in which there is a dearth of knowledge at present.

## 6 Limitations

One of the limitations of the present study was that it only examined the quality of the sexual function of one of the sexual partners. In future studies, the quality of the sexual function of both sexual partners can be examined and the relationship between a person's perception of their sexual function and the sexual partner's satisfaction with his/her performance can be examined. Another suggestion is to use the tools used in the present study along with the quality of life and sexual function questionnaires for men and women to evaluate the divergent and convergent validity of the Persian version of this questionnaire. We recommend using the Quality of life Short form (SF36), and Arizona Sexual Experience Scale (ASEX), the International Index of Erectile Dysfunction (IIEF), the Change in Sexual Functioning Questionnaire20 (CSFQ), the Derogatis Interview for Sexual Functioning (DISF), the Female Sexual Function Index (FSFI), and the Golombok-Rust Inventory of Sexual Satisfaction (GRISS) (Grover and Shouan 2020). Another limitation of the present study is the presence of two factors with less than three items. To address this, we recommend conducting a replication study to assess whether the factor structure holds up in a different sample. Consistent emergence of the identified factors across multiple samples would provide additional evidence for the validity and reliability of these factors.

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**Authors' contributions** Study concept and design, experimental work, and wrote the manuscripts: (H.R., M.E.A) A critical review of the manuscript and study concept: (Y.R., C.B. F.A.N.). Analysis and interpretation of data: (H.R., M.A. and M.V). Acquisition of data and drafted and finalized the manuscript: (M.A., Y.R.). All authors have read and approved the manuscript.

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**Data availability** All data generated or analyzed during this study are included in this published article.

## Declarations

**Competing interests** All the authors declare that they have no competing interests.

**Ethical considerations** The present study is the result of a research project with ethical approval with the code IR.IUMS.REC 1395.95-03-121-29334.

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