Design and psychometric properties of a questionnaire for assessing sexual and reproductive health needs of married adolescent women: an exploratory sequential mixed methods study

Ashraf Ghiasi\textsuperscript{a}, Afsaneh Keramat\textsuperscript{b}, Farid Zayeri\textsuperscript{c}, Maryam Farjamfar\textsuperscript{d}, Katayon Vakilian\textsuperscript{e} and Leila Bagheri\textsuperscript{f}

\textsuperscript{a}Department of Midwifery, School of Nursing and Midwifery, Birjand University of Medical Sciences, Birjand, Iran; \textsuperscript{b}School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran; \textsuperscript{c}Proteomics Research Center and Department of Biostatistics, Faculty of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran; \textsuperscript{d}Clinical Research Development Unit, Imam Hossein Hospital, Shahroud University of Medical Science, Shahroud, Iran; \textsuperscript{e}Medical School, Arak University of Medical Sciences, Arak, Iran; \textsuperscript{f}Department of Midwifery, Faculty of Nursing and Midwifery, Islamic Azad University, Larestan Branch, Larestan, Iran

ABSTRACT
To date, there is no valid and reliable instrument to specifically evaluate married adolescent women’s sexual and reproductive health (SRH) needs. Hence, the aim of this study was to develop and evaluate the psychometric properties of a questionnaire for assessing married adolescent women (MAW)’s SRH needs. The current exploratory sequential mixed method study was performed in two phases. In the first phase, a preliminary questionnaire was developed based on in-depth interviews with 34 MAW and four key informants as well as a comprehensive literature review. In the second phase, validity of the questionnaire was assessed using face, content, and construct validity and reliability of the questionnaire was assessed using internal consistency and test–retest reliability. Based on qualitative content analysis and literature review, 137 items were extracted. After several modifications of the generated items, a 108-item questionnaire was prepared for the psychometric process. After checking face and content validity, 85 items remained in the study. In the exploratory factor analysis, 11 items were removed and the remaining 74 items were categorised into nine factors. Cronbach’s alpha coefficient and the intraclass correlation coefficient were found to be 0.878 and 0.99 for the whole scale, respectively.

IMPACT STATEMENT

- \textbf{What is already known on this subject?} Sexual and reproductive health (SRH) needs of married adolescent women (MAW) are different from those of married adult women or unmarried, sexually active adolescents. However, there are to date no valid and reliable instruments to specifically evaluate the SRH needs of this group of women.
- \textbf{What do the results of this study add?} The final version of questionnaire consists of 74 items in nine domains including need to improve MAW’s sexual quality of life, promote MAW’s SRH self-care, improve MAW’s SRH self-efficacy, increase MAW’s SRH knowledge, increase husband’s involvement in MAW’s SRH, improve the performance of health care providers, strengthen the family support to married adolescent women, improve family involvement in SRH education of MAW, and provide specific premarital counselling to MAW.
- \textbf{What are the implications of these findings for clinical practice and/or future research?} The 74-item questionnaire has acceptable validity and reliability. Therefore, it can be used by researchers and policymakers as an appropriate instrument for assessing MAW’s SRH needs.

Introduction
Despite widespread efforts to end child marriage, about one in three girls in the developing countries marry before age 18 and one in nine marry before the age of 15 (UNICEF 2012, UNFPA 2012). If current levels of child marriages hold, the total number of women married in childhood will grow from more than 700 million today to nearly 1.2 billion by 2050 (Brides 2016). Child marriage is associated with suboptimal reproductive health (Doskoch 2013). Married adolescent women (MAW) start childbearing earlier, give shorter birth intervals, and report having more unwanted pregnancies than their peers who marry later (Raj et al. 2009). They are also more likely to have limited access to, and use of, contraception, and other maternal healthcare services compared to adult peers (Maharjan et al. 2019). These factors put them at higher risk of pregnancy complications, which are the leading cause of death among adolescent girls in developing countries (Syachareun et al. 2018). MAW have also higher risk of HIV infection and other sexually transmitted infections, and are more likely to experience intimate partner violence, than unmarried, sexually active girls or women who marry later.
Further, babies born to adolescent mothers are at higher risk of preterm birth, low birth weight, stillbirth and neonatal mortality (Gilbert et al. 2004; Mohsin et al. 2006). Yet, despite their large numbers, increased risk of pregnancy complications, and many unmet needs, little is known about the sexual and reproductive health (SRH) needs of MAW. Awareness of SRH needs of MAW is critical for developing interventions to reduce the negative health consequences of child marriage. Evidence suggests that the SRH needs of MAW are different from those of married adult women or unmarried, sexually active adolescents (Santhya and Jejeebhoy 2003). However, to the best of our knowledge, there are to date no valid and reliable instruments to specifically evaluate MAW’s SRH needs. Hence, the purpose of this study was to design and evaluate the psychometric properties of a questionnaire for assessing SRH needs of MAW in Iran.

Methods

This sequential, exploratory mixed methods research had two phases: descriptions of these are provided as follows.

Phase 1: item generation and questionnaire development

A qualitative content analysis was designed to determine the concept and dimensions of the MAW’s SRH needs. The research was conducted from November 2017 to June 2018 in Mashhad city (healthcare centres) and Shahrood County (a maternity teaching hospital and urban/rural healthcare centres), Iran. Data were collected using semi-structured, in-depth interviews with 34 MAW and four healthcare providers. In the interviews, MAW were asked the following questions: ‘What does sexual and reproductive health mean to you?’; ‘What are the sexual and reproductive health needs of MAW?’; ‘What are the barriers and challenges faced by MAW in accessing and utilising reproductive health services?’; ‘What major challenges did you face, and how did you handle them?’.

Healthcare providers were asked the following interview questions: ‘What are the sexual and reproductive health needs of MAW?’; ‘What are the barriers and challenges faced by MAW in accessing and utilising reproductive health services?’ Each interview lasted between 30 and 80 min. All interviews were audio-recorded and later transcribed verbatim for analysis. MAXQDA software (Version 10) was used to facilitate data management. Some data of interviews with MAW are published in another article (Ghiasi et al. 2020).

Then, the following databases were searched for relevant papers: Web of Science, PubMed, Scopus and Science Direct. Google Scholar was also searched for any pertinent studies that may not have been found in the database search.

Extracted codes from the interviews and a review of the literature led to an initial questionnaire with 137 items. After several modifications of the generated items, a 108-item questionnaire was prepared for the next stage.

Phase 2: psychometric properties of the questionnaire

In this phase, the validity (face, content and construct validity) and reliability (internal consistency and test–retest reliability) of the designed questionnaire were assessed. Details are as follows.

Face validity

Qualitative and quantitative methods were used to determine face validity. In the qualitative method, 10 MAW were recruited using convenience sampling to determine complexity, relevancy and ambiguity of each item. Then, the items were revised according to their comments.

For quantitative face validity assessment, the same adolescent women rated the importance of each item on a five-point Likert scale. Then, the impact score for each item was calculated using the following formula: \( \frac{\text{frequency} \times \text{importance}}{\text{importance}} \). Frequency reflects the percentage of raters who scored a score of 4 or 5, and importance reflects the mean score for the importance of each item. Items with an impact score of greater than or equal to 1.5 (which corresponds to a mean frequency of 50% and a mean importance of 3 on the five-point Likert scale) were considered appropriate (Lacasse et al. 2002).

Content validity

Content validity was also assessed using qualitative and quantitative methods. For analysing qualitative content validity, 10 experts in the fields of midwifery and reproductive health were invited to read MAWSRHN and comment on the grammar, wording, item allocation and scaling of the questionnaire. Then, items were amended based on their comments.

Quantitative content validity assessment was done by calculating the content validity ratio (CVR) and content validity index (CVI).

To determine CVR, the same 10 experts were asked to score each item on a three-point Likert scale: 1 = not essential; 2 = useful, but not essential; and 3 = essential. The CVR for each item was calculated using the following formula: \( \text{CVR} = \frac{n_e}{n_e + (N/2)} \). In this formula, \( n_e \) is the total number of experts and \( N \) is the number of experts that rated the item as essential. According to Lawshe’s table, items with a CVR greater than or equal to 0.62 were retained (Lawshe 1975). For calculating CVI, the same 10 experts were asked to rate each item based on relevance, clarity and simplicity on a four-point Likert scale (rating from 1 [not relevant/not clear/not simple] to 4 [highly relevant/highly clear/highly simple]) (Davis 1992). The CVI was calculated for individual items (I-CVI) and the overall scale (S-CVI). The I-CVI was calculated as the proportion of experts who rated the item as 3 or 4 (Polit et al. 2007). The S-CVI was calculated as the average value of all the I-CVI values (Polit et al. 2007). Content validity indexes were considered to be acceptable when I-CVI and S-CVI were at least 0.78 and 0.90, respectively (Fleiss et al. 1981; Polit et al. 2007). To counter the limitations of CVI, each I-CVI was adjusted for chance agreement by calculating the modified kappa statistic (\( \kappa^* \)). To compute the modified kappa statistics,
the probability of chance agreement was computed first: 
\[ P_c = \frac{(N/A)(N - A)}{N^2} \times 0.5^N, \]
where \( N \) denotes the number of experts and \( A \) denotes the number of experts who agree that the item is relevant. Then, the \( \kappa^* \) was calculated using the following formula: 
\[ \kappa^* = \frac{(I-CVI - P_c)/(1 - P_c)}{Polit et al. 2007}. \]

**Construct validity**

Construct validity was assessed via exploratory factor analysis (EFA). The required sample size for conducting EFA is 3–10 subjects per item (Munro 2005). Therefore, for 85-item questionnaire, a sample size of \( 85 \times 3 = 255 \) was estimated; however, in practice, 248 MAW participated in the study and completed the questionnaire. Census method was used to recruit subjects from urban/rural healthcare centres in Shahrood County and Miami County of Semnan province, northeast Iran (July to November 2020). The inclusion criteria were: having Iranian nationality; being 10–19 years old; being married; living in Shahrood County or Miami County; given birth to \( \geq 1 \) child or being pregnant with a gestational age of \( \geq 20 \) weeks; and willingness to participate in research. Married nulliparous adolescents (who had never been pregnant or had never carried a pregnancy beyond 20 weeks) were not included in the study. Kaiser–Meyer–Olkin (KMO) was used for checking sampling adequacy and Bartlett’s test of sphericity was used to examine the appropriateness of data for factor analysis. The KMO value should be greater than 0.5 and the result of Bartlett’s test of sphericity should be statistically significant with a \( p \) value less than .05 (Field 2003; Polit et al. 2007). Principal components analysis (PCA) with varimax rotation was conducted to extract the underlying factors (Ferguson and Cox 1993). Factor loadings greater than or equal to 0.3 were considered appropriate (Kline 2005). The number of factors was extracted based on eigenvalues greater than 1 and then see the scree plot. All statistical analyses were performed using SPSS software, version 22.0 (SPSS Inc., Chicago, IL).

**Internal consistency**

The internal consistency for each dimension and the entire scale was assessed using Cronbach’s alpha coefficient. Values equal to or greater than 0.7 were considered acceptable (Cronbach 1951).

**Test–retest reliability**

For test–retest reliability assessment, 20 MAW were asked to twice with a 2-week interval complete MAWRSRN. Then, the test–retest reliability of the questionnaire was determined by calculating intraclass correlation coefficients (ICCs), and its results were interpreted as follows: 0–0.20 as poor; 0.21–0.40 as fair; 0.41–0.60 as good; 0.61–0.80 as very good; and 0.81–1 as excellent (Munro 2005).

**Ethics**

The study protocol was approved by the Ethics Committee of Shahroud University of Medical Sciences with the ethical code: IR.SHMU.REC.1396.69. All subjects gave informed consent prior to participation in the study.

**Results**

**Phase 1: item generation and questionnaire development**

The results of the qualitative content analysis led to the extraction of the concept and dimensions of MAW’s SRH needs in four main categories, as follows: ‘improving the quality of educational institutions’, ‘husband’s involvement in MAW’s sexual and reproductive health’, ‘strengthening the foundations of MAW’s sexual and reproductive health’ and ‘need for social support’.

The preliminary questionnaire consisting of 137 items was developed according to the extracted codes from qualitative study (135 items) and a comprehensive literature review (two items). After careful review of the items by the research team, the number of items was reduced to 108. Seventy-nine of the items were rated on a five-point Likert scale ranging from 1 (strongly disagree, not at all, never) to 5 (strongly agree, very much, always), and 29 were placed on a three-point Likert scale (1 = correct, 0 = incorrect and I do not know). Eighteen items were negatively worded.

**Phase 2: psychometric properties of the questionnaire**

**Face validity**

In qualitative face validity, six items were modified and three were merged into each other based on MAW’s suggestions. Then, in quantitative face validity, eight items were deleted due to their impact score of less than 1.5.

**Content validity**

In qualitative assessment of content validity, 26 items were modified and two were merged into each other based on experts’ recommendations. In the quantitative assessment of content validity, 12 items with a CVR of less than 0.62 were deleted. All remaining 85 items had an excellent content validity (I-CVI ≥ 0.78, \( \kappa^* \geq 0.74 \)). The average scale content validity (S-CVI/Ave) was 0.94.

**Construct validity**

For EFA, 248 MAW completed the 85-item questionnaire. The KMO index (0.716) and Bartlett’s test of sphericity (\( \chi^2 = 4803.455, \text{df} = 2145, p < .001 \)) indicated that the sampling was adequate for EFA. The results of the PCA with varimax rotation indicated an initial 30-factor solution with eigenvalues greater than 1 that accounted for 69.06% of the total variance. However, due to the large number of factors and the uninterpretable results, the scree plot was used to determine the number of factors (9). The scree plot showed that the major variance was related to the first nine factors...
Factor analysis with nine constant factors was repeated with varimax rotation. The nine factors explained 34.71% of the observed variance.

As shown in Table 1, 11 items that were not loaded on any of the factors were excluded from the questionnaire, whereby the questionnaire was reduced to 74 questions. Subsequently, each factor was named according to its items. Factor 1: need to improve MAW’s sexual quality of life (13 items); factor 2: need to promote MAW’s SRH self-care (eight items); factor 3: need to improve MAW’s SRH self-efficacy (six items); factor 4: need to increase MAW’s SRH knowledge (18 items); factor 5: need to increase husband’s involvement in MAW’s SRH (nine items); factor 6: need to improve the performance of health care providers (six items); factor 7: need to strengthen the family support to MAW (eight items); factor 8: need to improve family involvement in SRH education of MAW (three items); and factor 9: need to provide specific premarital counselling to MAW (three items).

Internal consistency
Cronbach’s alpha coefficient for the entire instrument was .878 and ranged from .704 to .809 for its sub-scales, all of which reflect acceptable internal consistency. Therefore, no items of the scale were omitted in this phase. The results are shown in Table 2.

Test–retest reliability
The ICC was .99 for the entire instrument and ranged from .97 to 1 for its subscales, lending support for the stability of the questionnaire. The results are shown in Table 2.

Scoring
The final questionnaire consists of 74 items divided into nine separate domains. The score of items related to the domain of ‘need to increase MAW’s SRH knowledge’ has a two-point Likert scale (1 = correct, 0 = incorrect and I do not know). The items of other eight domains are rated on a five-point Likert scale ranging from 1 (strongly disagree, not at all, never) to 5 (strongly agree, very much, always). Nine negatively worded items in the questionnaire are reverse scored, including three items in factors 1 and 9, two items in factor 5 and one item in factor 6.

To convert raw scores into standard scores, the following conversion formula was used:

\[
\text{linear transformed formula} = \left( \frac{\text{actual raw score} - \text{lowest possible raw score}}{\text{possible raw score range}} \right) \times 100
\]

where ‘actual raw score’ is the values achieved through summation, ‘lowest possible raw score’ is the lowest possible value that could occur through summation and ‘possible raw score range’ is the difference between the maximum possible raw score and the lowest possible raw score.
Table 1. The results obtained from exploratory factor analysis using varimax rotation.

| Items                                                                 | Factor loading |
|----------------------------------------------------------------------|----------------|
| My husband prepared me both mentally and emotionally for the first time sex. | 0.324 0.315    |
| In our sexual relationship, my husband does not do anything that bothers me or if I ask him, he won't repeat it again. | 0.559          |
| My husband pays attention to my sexual needs.                         | 0.654          |
| My husband spends enough time on foreplay before intercourse.         | 0.483          |
| I enjoy having sex with my husband.                                   | 0.684          |
| My husband kisses or hugs me after sex.                               | 0.496          |
| I can openly express my love and feelings for my husband during sex.  | 0.657          |
| My husband forces me to have sex with him when I don't want to.       | 0.462 0.352    |
| I have no interest to have sex.                                      | 0.628          |
| Because of the fear of the consequences of saying no to my husband, despite not having desire, I am forced to have sex with him. | 0.579          |
| I can initiate sex with my husband.                                  | 0.396          |
| I talk openly to my husband about my sexual needs and expectations.  | 0.465          |
| I don't criticise my husband's sexual behaviour when he is tired, angry, upset or sexually aroused. | 0.387          |
| As soon as I know I am pregnant, make first prenatal appointment with a doctor or midwife. | 0.511          |
| I eat a varied diet during pregnancy based on a range of foods from the five food groups (fruits, vegetables, grains, protein foods and dairy). | 0.352 0.336    |
| For appropriate weight gain during pregnancy, I follow the healthcare providers' advice. | 0.357          |
| If I suspect that I have a vaginal infection, see a doctor as soon as possible. | 0.358          |
| If I have a sexual problem, I will try to solve it.                  | 0.402          |
| I take vitamin and mineral supplements (especially iron, folic acid and calcium) during pregnancy and up to 3 months after delivery. | 0.446          |
| If I have a vaginal infection, I will complete the entire course of treatment. | 0.419          |
| During pregnancy, I brush and floss my teeth regularly, even if nausea and vomiting or bleeding gums occur. | 0.429          |
| I can persuade my husband to pay attention to my ideas about timing and number of births. | 0.537          |
| I can persuade my husband to involve in family planning.             | 0.575          |
| If I decide to use a method of contraception, I am able to get it.    | 0.340          |
| During pregnancy if I feel that I can no longer control my anger when I argue with my husband, I will postpone the discussion to another time. | 0.486          |
| When I encounter a stressful situation during pregnancy (such as facing financial difficulties, arguing with husband, Concern about foetal health), I can manage it. | 0.333          |
| I feel comfortable talking about my sexual and reproductive health concerns with healthcare professionals. | 0.348          |
| Pregnancy is possible after even only one unprotected sex.           | 0.478          |
| A woman is most likely to become pregnant in the middle of her menstrual cycle (usually about 14 days before the start of the next period). | 0.439          |
| Pregnancy can happen if semen is spilled outside the vagina (such as in intercrural sex, or anal sex). | 0.314          |
| A woman can get pregnant if she has unprotected sex during her menstrual cycle. | 0.380          |
| The correct way to take the oral contraceptive (COC) tablet is to take one every day (regardless of whether you have sex or not) for 21 days, then stop for seven days. | 0.463          |
| Emergency contraception should not be used as an ongoing birth control method. | 0.430          |
| The condom should be unrolled onto an erect (hard) penis before any penetration occurs. | 0.341          |
| Birth control pills do not cause infertility.                        | 0.518          |
| The mini-pill is a good choice for breastfeeding mothers because it does not reduce the milk supply. | 0.314          |
| IUD expulsion isn't common.                                          |                |
| Preconception care should begin at least 3 months before a woman becomes pregnant. |                |

(continued)
| Items                                                                                                                                                                                                 | Factor loading |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Early pregnancies among adolescents have major health consequences for adolescent mothers and their babies.                                                                                             | 0.482          |
| Because I’m a teenager, I should pay more attention to my diet during pregnancy than other pregnant women.                                                                                             |                |
| Fever and chills, severe headache, vision problems; such as blurring or seeing flashing lights, and severe nausea-vomiting are some warning signs of possible pregnancy complications.                             | 0.338          |
| Periodontal infection such as tooth decay and gum disease is linked to an increased risk of premature birth and low birth weight.                                                                     | 0.378          |
| In a normal and healthy pregnancy, orgasm doesn’t increase the risk of miscarriage or preterm labour.                                                                                                 | 0.712          |
| Having sex during pregnancy is generally safe and won’t hurt the foetus.                                                                                                                               | 0.586          |
| Genital herpes and genital warts are both transmitted through sexual contact.                                                                                                                            | 0.603          |
| Apart from HIV/AIDS, there are many other diseases that can be transmitted through sexual contact.                                                                                                       | 0.583          |
| Condoms are most effective at protecting against sexually transmitted diseases like HIV/AIDS.                                                                                                           | 0.379          |
| Sexually transmitted diseases can be passed from a mother to her baby and can cause miscarriage or stillbirth.                                                                                           |                |
| Genital ulcers are usually caused by sexually transmitted diseases.                                                                                                                                     | 0.409          |
| It is not possible to know if someone has HIV/AIDS by looking at him or her.                                                                                                                             |                |
| HIV/AIDS cannot be transmitted through kissing, hugging, sharing toilets, towels or dishes.                                                                                                             | 0.367          |
| My husband and I decide together which form of birth control to use.                                                                                                                                    | 0.447          |
| My husband pays attention to his sexual hygiene.                                                                                                                                                         | 0.335          |
| My husband cooperates with me during treatment of genital infection (e.g. he stops having sexual intercourse, or uses a condom from the beginning of sex, and takes medication if necessary).               | 0.535          |
| My husband is emotionally abusive towards me while I am pregnant.                                                                                                                                     | 0.301          |
| My husband is physically abusive towards me while I am pregnant.                                                                                                                                       | 0.437          |
| My husband accompanies me to prenatal care (including appointments, screening tests and ultrasound scans) and the delivery process.                                                                     | 0.391          |
| My husband and I decide together how many children to have, and when to have them.                                                                                                                                 | 0.316          |
| My husband understands my mood swings during pregnancy.                                                                                                                                                  | 0.532          |
| My husband helps me with household chores during pregnancy.                                                                                                                                              | 0.376          |
| My husband helps me take care of the newborn baby.                                                                                                                                                       | 0.378          |
| I am satisfied with the way the health care providers communicate with me.                                                                                                                                  | 0.566          |
| I have received information about nutrition during pregnancy, sex during pregnancy, oral health care during pregnancy, childbirth preparation classes, how to take iron supplement, benefits of taking iron and multivitamins during pregnancy from health care providers. | 0.678          |
| Because I became pregnant as a teenager, I receive special attention from health care providers during, and after pregnancy.                                                                           | 0.458          |
| Healthcare providers provide me all the information I need (pregnancy nutrition, sex in pregnancy, pregnancy risk symptoms, how to use contraception …) without having to wait for a question from me.            | 0.735          |
| Health care providers provide me the required health information in a simple and understandable language.                                                                                                 | 0.423          |
| Because I became pregnant before the age of 19 years, health care providers blame me.                                                                                                                   | 0.389          |
| In internal (vaginal) examinations during labour or during normal delivery, Midwives -obstetricians treat me with respect.                                                                             |                |
| My family tries to keep me calm and stress free during pregnancy.                                                                                                                                      | 0.385          |
| My husband’s family tries to keep me calm and stress free during pregnancy.                                                                                                                                | 0.538          |
| I need financial assistance for pregnancy-related health care costs.                                                                                                                                     |                |
| My family will financially support me for costs associated with pregnancy (e.g. for purchasing foods, routine antenatal tests, ultrasound screening or frequent hospitalisations), if needed. | 0.548          |

(continued)
For example, in the five-point Likert scale, each item had scores of 1–5, so to calculate the percentage score of subscale 1, the maximum score is 65 and the minimum score is 13 because it has 13 items and to calculate the percentage score of subscale 2, the maximum score is 40 and the minimum score is 8 because it has eight items.

But, after considering the weight of items, each subscale of questionnaire is scored on a scale of 0–100, with higher scores indicating fewer unmet need.

The total score of the questionnaire is computed using calculating the average of the total modified scores of the questionnaire. Higher scores in the entire questionnaire represent fewer unmet need for SRH.

Discussion

The aim of this exploratory sequential mixed methods study was to develop and evaluate the psychometric properties of a questionnaire for assessing MAW’s SRH needs, called the MAWSRHN. To our knowledge, the MAWSRHN is the first psychometrically tested scale available for assessing MAW’s SRH needs. The initial questionnaire was developed based on in-depth interviews with MAW and key informants as well as a comprehensive literature review. Results from the psychometric assessment indicated that the scale has an acceptable validity and reliability. The results of face validity showed that the words and phrases used in the MAWSRHN are easy to understand by the target population. Moreover, the content validity of the instrument was confirmed by a panel of experts. The construct validity of the questionnaire was performed using EFA. Cronbach’s alpha of the questionnaire was 0.878; indicating acceptable internal consistency and test–retest reliability of the questionnaire was excellent, with an ICC of 0.99. After completing the validity and reliability stages, the final version of questionnaire consists of 74 items in nine domains including need to improve MAW’s sexual quality of life, promote MAW’s SRH self-care, improve MAW’s SRH self-efficacy, increase MAW’s SRH knowledge, increase husband’s involvement in MAW’s SRH, improve the performance of health care providers, strengthen the family support to MAW, improve family involvement in SRH education of MAW, and provide specific premarital counselling to MAW.

Compared to other similar studies, Shahhoseini et al. (2012) designed an instrument for understanding health needs of female adolescents in an exploratory mixed-methods study. They conducted eight focus group discussions with 67 female adolescents and 11 in-depth interviews with key informants as well as a literature review. This questionnaire consists of five domains and 65 items (Shahhoseini et al. 2012). Although Shahhoseini et al. (2012) scale has been validated in Iran, its purpose and target population is totally different from our scale. Their scale assesses health needs of single adolescent girls but our scale assesses SRH needs of MAW.

In study by Khani et al. (2015), to design the Persian version of a questionnaire for assessing the SRH needs of Iranian women, the SRH Needs Assessment Questionnaire, which was designed by New Dimension Consulting (NEDICO)
for the International Organization for Migration and the United Nations Population Fund was translated and adapted to the Persian language. Khani et al. questionnaire consists of 12 different sections (114 items) (Khani et al. 2015). Rezaie-Chamani et al. (2019) conducted an exploratory mixed-methods study to investigate the reproductive health needs of women of reproductive age (15–49 years). Literature review in addition to 24 in-depth interviews with women of reproductive age and five key informants led to a questionnaire with 19 items in two domains (Rezaie-Chamani et al. 2019). Like our scale, Khani et al. (2015) and Rezaie-Chamani et al. (2019) scales were developed for Iranian context. However, our study designed exclusively for assessing SRH needs of MAW. Moreover, Khani et al. scale is a translated version of an original questionnaire but majority of items in our scale are generated based on semi-structured interviews with target population in Iran.

Some limitations of this study should be mentioned. First, subjects were recruited from two counties in the northeast Iran, which may limit generalisability of our findings to other regions. Another limitation is the sample size, which was the minimum required for factor analysis and not relatively large. The other limitation is the long length of the questionnaire, which might have led to participants’ boredom and could have influenced the accuracy of the participants when completing the questionnaire. A further limitation of the current work is lack of comparable valid and reliable instruments in the literature. In addition, the possibility of response bias is an inherent problem with any self-report measure. Our research also has some strengths. The questionnaire is developed based on the experiences of target group and a comprehensive literature review. Selection of MAW from urban–rural areas is other strength. Another strength of this study is utilising a mixed methods sequential explanatory research design. Moreover, the psychometric properties of the questionnaire were assessed through analyses of its face, content, construct validity, internal consistency and stability.

Conclusions

The MAWSRHN scale fills a gap in the literature, given the lack of SRH needs assessment tools for. This valid and reliable instrument can be used by researchers, and policymakers to assess MAW’s SRH needs before and after design and develop specific interventions for improving SRH status of this group of women. However, further modifications and psychometric testing of this new instrument should be performed before using it in other cultural contexts.

Acknowledgements

We also would like to thank all of the study’s participants for their participation.

Disclosure statement

There are no conflicts of interest.

Funding

This study was supported by Shahroud University of Medical Sciences as a PhD thesis. We hereby acknowledge the Research Deputy for Grant No. 9664.

ORCID

Ashraf Ghiasi http://orcid.org/0000-0002-4918-3210

References

Brides GN. 2016. The role of parliamentarians in ending child marriage: a toolkit. Ghana: Girls Not Brides.

Bruce J. 2007. Child marriage in the context of the HIV epidemic. New York: Population council.

Cronbach LJ. 1951. Coefficient alpha and the internal structure of tests. Psychometrika 16:297–334.

Davis LL. 1992. Instrument review: getting the most from a panel of experts. Applied Nursing Research 5:194–197.

Doskoch P. 2013. Child marriage associated with suboptimal reproductive health. International Perspectives on Sexual and Reproductive Health 39:105–106.

Ferguson E, Cox T. 1993. Exploratory factor analysis: a users’ guide. International Journal of Selection and Assessment 1:84–94.

Field A. 2000. Discovering statistics using SPSS for windows: advanced techniques for the beginner. London: Sage Publications.

Fleiss J, Levin B, Paik M. 1981. Statistical methods for rates and proportions. New York: John Wiley & Sons. p. 870.

Ghiasi A, Keramat A, Farjamfar M, Vakilian K. 2020. Perceived barriers to accessing pregnancy-related health information among married adolescent women: a qualitative study in Iran. Journal of Pediatric and Adolescent Gynecology 33:58–63.

Gilbert W, Jandial D, Field N, Bigelow P, Danielsen B. 2004. Birth outcomes in teenage pregnancies. Journal of Maternal-Fetal & Neonatal Medicine 16:265–270.

Khani S, Moghaddam-Banaem L, Mohamadi E, Vedadhir AA, Hajizadeh E. 2015. Psychometric properties of the Persian version of the Sexual

Table 2. Cronbach’s alpha coefficient and ICC of the instrument and its subscales.

| Subscales                                         | Cronbach’s alpha | ICC  |
|--------------------------------------------------|------------------|------|
| Need to improve married adolescent women’s sexual quality of life | 0.809            | 0.99 |
| Need to promote married adolescent women’s SRH self-care        | 0.736            | 0.99 |
| Need to improve married adolescent women’s SRH self-efficacy    | 0.704            | 0.98 |
| Need to increase married adolescent women’s SRH knowledge       | 0.736            | 0.99 |
| Need to increase husband’s involvement in married adolescent woman’s SRH | 0.743            | 0.99 |
| Need to improve the performance of health care providers        | 0.720            | 0.98 |
| Need to strengthen the family support to married adolescent women | 0.772            | 0.99 |
| Need to improve family involvement in SRH education of married adolescent women | 0.766            | 1    |
| Need to provide specific premartial counselling to married adolescent women | 0.716            | 1    |
| Total                                                           | 0.878            | 0.99 |

*ICC: intraclass correlation coefficient.*
and Reproductive Health Needs Assessment Questionnaire. Eastern Mediterranean Health Journal = La Revue de Sante de la Mediterranee Orientale = al-Majallah al-Sihhiyah li-Sharq al-Mutawasit 21:29–38.

Kline RB. 2005. Principles and practice of structural equation modeling. 2nd ed. New York: Guilford.

Lacasse Y, Godbout C, Series F. 2002. Health-related quality of life in obstructive sleep apnoea. European Respiratory Journal 19:499–503.

Lawshe CH. 1975. A quantitative approach to content validity. Personnel Psychology 28:563–575.

Maharjan B, Rishal P, Svanemyr J. 2019. Factors influencing the use of reproductive health care services among married adolescent girls in Dang District, Nepal: a qualitative study. BMC Pregnancy and Childbirth 19:1–9.

Mohsin M, Bauman A, Jalaludin B. 2006. The influence of antenatal and maternal factors on stillbirths and neonatal deaths in New South Wales. Journal of Biosocial Science 38:643–657.

Munro BH. 2005. Statistical methods for health care research. Philadelphia: Lippincott Williams & Wilkins.

Polit DF, Beck CT, Owen SV. 2007. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Research in Nursing & Health 30:459–467.

Raj A, Saggurti N, Balaiah D, Silverman JG. 2009. Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: a cross-sectional, observational study. Lancet 373:1883–1889.

Rezaie-Chamani S, Rahnavardi M, Khalesi ZB. 2019. Women’s reproductive health needs assessment questionnaire: development and validation. International Journal of Adolescent Medicine and Health 14:33.

Santhya K, Jejeebhoy SJ. 2003. Sexual and reproductive health needs of married adolescent girls. Economic and Political Weekly 38:4370–4377.

Shahhoseini Z, Simbar M, Ramezankani A, Alavi Majd H. 2012. Developing and psychometric of female adolescent health need questionnaire. Journal of School of Public Health & Institute of Public Health Research 9:11–22.

Speizer IS, Pearson E. 2011. Association between early marriage and intimate partner violence in India: a focus on youth from Bihar and Rajasthan. Journal of Interpersonal Violence 26:1963–1981.

Sychareun V, Vongxay V, Houaboun S, Thammavongsa V, Phummavongsa P, Chaleunvong K, et al. 2018. Determinants of adolescent pregnancy and access to reproductive and sexual health services for married and unmarried adolescents in rural Lao PDR: a qualitative study. BMC Pregnancy and Childbirth 18:219.

UNFPA. Marrying too young: end child marriage [Internet]. New York (NY): United Nations Population Fund; 2012.

UNICEF. Progress for children: a report card on adolescents. New York: UNICEF; 2012.

Wynd CA, Schmidt B, Schaefer MA. 2003. Two quantitative approaches for estimating content validity. Western Journal of Nursing Research 25:508–518.