Development and Validation of a Menstruation-Related Activity Restriction Questionnaire among Adolescent Girls in Urban Resettlement Colonies of Delhi

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Abstract

Introduction: Menstruation, a physiological phenomenon, till date is associated with myths, taboos, and malpractices. These interfere with the emotional, physical, and mental health of adolescent girls. This study attempts to draft a validated questionnaire to measure menstruation-related activity restriction. Objective: The objective was to study activities restricted during menstruation among adolescent girls residing in urban resettlement colonies of Delhi and to develop and validate a questionnaire for menstruation-related activity restriction. Materials and Methods: A community-based cross-sectional study was conducted among adolescent girls residing in urban resettlement colonies of Delhi during 2019. A multistage random sampling technique was used to select 1100 girls across four districts of Delhi. A 15-item questionnaire was developed by an expert committee and validated with principal component analysis (PCA). Results: In total, 1100 adolescent girls were included in the study whose mean age was 15.8 (±2.1) years. School/college/work was missed due to menstruation in 60% of the adolescent girls, 66% were not comfortable during menstruation, and 92% were restricted from entering religious places. In exploratory factor analysis using PCA, 6 principal components were identified which had eigenvalues more than 1. Conclusion: Religious restrictions during menstruation (94%) were highly prevalent among adolescent girls, followed by restriction of routine activity (69%) and work/academically related activity (60%). Construct validity has identified a six-factor structure for the menstruation-related activity restriction questionnaire. This was identified as a valid and internally consistent tool to assess activities restricted during menstruation among Indian adolescent girls.

Keywords: Activity restriction, factor analysis, menstrual hygiene, menstruation, questionnaire validation

INTRODUCTION

Menstruation is a normal physiological phenomenon in women beginning from adolescence until menopause. However, effective menstrual hygiene management (MHM) is a concern in millions of girls and women globally, especially in developing countries.[1] It is well-established that lack of valid information, poor accessibility, affordability of safe absorbent material and water sanitation, and hygiene-related issues worsens MHM outcomes, which particularly increased the incidence of reproductive tract infections.[2] Girls and young women practicing poor MHM can withdraw from school and work, hindering their academic outcomes and occupational productivity.[3] Furthermore, several culturally ingrained myths and taboos promote the notion of menstruation as a time of physical and ritualistic impurity in women.[4] Ethnographers have documented several physical, social, and religious restrictions associated with MHM among girls in India that preclude them from participating actively in routine household activities and foster social isolation.[4]

The totality of these regressive worldviews contributes to normalization of menstruation-related restrictions.[3] Moreover, menstruation-related shame and embarrassment adversely impact MHM in young women who prefer to reuse clothes as absorbent material without completely drying in the sun.

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and avoid personal hygiene measures such as bathing and washing their hair. Health and hygiene of the women is sacrificed due to these restrictions which leads to reproductive health issues like reproductive tract infections, pelvic inflammatory diseases. Moderate levels of physical activity during menstruation decrease the menstrual pain. This benefit is lost because of the restriction of physical activity during menstruation. Restrictions also affect the academic performances of young girls and compromise the occupation in varying degrees in working women leading to productivity loss.

It is important for public health researchers to evaluate activity restriction during menstruation in adolescent girls for their appropriate management through health promotion interventions. However, there exists a paucity of studies from India that have developed validated questionnaires for evaluation of activity restriction across physical, social, religious, hygiene, and cultural domains. The present study was, therefore, conducted to assess the restriction of activities during menstruation among adolescent girls residing in urban resettlement colonies of Delhi, India, and to develop and validate a questionnaire for the assessment of menstruation-related activity restriction (MRAR).

**Materials and Methods**

**Study design and setting**

A community-based cross-sectional study was conducted in randomly selected urban resettlement colonies of Delhi. An urban resettlement colony represents a relocated urban slum population, which is densely populated and often lacks adequacy in sanitation and health facilities, with a significant proportion of the residents belonging to lower-middle socioeconomic classes.

**Study period and population**

This study was conducted for 11 months from March 2019 to February 2020 among adolescent girls (11–19 years) residing in the selected resettlement colonies in urban areas of Delhi. Both school-going and dropout adolescent girls were included. Any adolescent who was seriously ill or not willing to participate in the study was excluded.

**Sample size calculation and sampling technique**

With expected prevalence of satisfactory frequency of change of sanitary pads from a study as 12.7%, 20% relative precision, and 5% alpha error, the sample size was calculated to be 681 using OpenEpi, version 3 (Andrew G. Dean and Kevin M. Sullivan, Atlanta, GA, USA). Considering the effect of clustering, a design effect of 1.5 was used to inflate the sample size to 1022 with a design effect of 1.5. The sample size was then rounded to 1100 to further increase power.

Multistage sampling technique was used for selection of the study areas and participants. Out of 11 districts in Delhi, four districts were randomly selected which were East, North East, South, and North West districts. Probability proportional to size sampling was used to select the urban resettlement colonies. The urban resettlement colonies selected were Gokalpuri in North East, Sarai Kale Khan in South, Mangolpuri in North West, and Kalyanpuri in East district. A total of 234 adolescents from Gokalpuri, 288 from Sarai Kale Khan, 398 from Mangolpuri, and 180 from Kalyanpuri were selected. A systematic random sampling method was used to select the adolescents from each colony.

**Development of questionnaire**

A committee consisting of experts from community medicine, public health specialist, and teachers was set up to identify various dimensions for developing the questionnaire for measurement of restriction of activities during menstruation in adolescent girls. The questionnaire was interviewer administered and consisted of mostly close-ended and a few open-ended questions.

Fifteen items were constructed considering all the dimensions related to activity restriction in simple and short sentences to promote comprehension. The items were reviewed by another expert committee for content validation, and necessary changes were made as per the expert recommendations.

After revision, the questionnaires were translated to the local language Hindi in a linguistically valid manner through a back and forth translation process. Back translation was done by another language expert efficient in both English and Hindi. Then, both English versions of the questionnaires were compared for the change in meaning due to translation. Revision was done to address the discrepancies identified in the back translation. After development and content validation, pretesting was done among twenty adolescents from the study area and assessed for relevance and understanding of the items following which the questionnaire was used for data collection in the study participants.

**Study procedure**

After obtaining informed and written consent from eligible adolescents, data were collected using a pretested semi-structured interview schedule. Details such as sociodemographic details, menstrual hygiene practices, and activities restricted during menstruation were collected. Age of the adolescents was categorized as early (10–14 years) and late adolescents (15–19 years) based on the United Nations Children’s Fund classification. Socioeconomic status of the study participants was classified based on the Modified BG Prasad Scale 2019 based on the per capita income of the family.

**Operational definitions**

Household activity included preparing food, cleaning home, washing clothes, taking care of siblings, lifting heavy weights, and fetching water.

Outdoor activities included playing outdoor games, going to market, fetching water from outside, and going for shopping.

Social functions included social gatherings such as family functions, marriages, birthday parties, and get together with friends.
Missed school/work included not going to school or workplace at least for 1 day in the past 1 year because of reasons attributed to menstruation-related issues as reported by the participant.

Religious practices included going to temple, handling religious books/things, doing puja, and entering puja room in the house.

**Statistical analysis**

Data were entered in MS Excel and analyzed using STATA statistical software version 14 (StataCorp LLC, Lakeway Drive College Station, Texas, USA).\(^{[15]}\) Continuous variables were summarized as mean with standard deviation (SD) or median with interquartile range (IQR) based on the distribution of data. Categorical variables were summarized as frequencies and proportions. Kaiser-Meyer-Olkin (KMO) index was used to measure the sampling adequacy. Bartlett’s test of sphericity was used to test the correlation between the items of the questionnaire, and the suitability of the data for structure detection was checked. A correlation matrix was generated to check the suitability of data for factor analysis, and eigenvalues were calculated. A scree plot was used to confirm the choice of components. Exploratory factor analysis using principal component analysis (PCA) with varimax orthogonal rotation and Kaiser normalization was done for the menstruation-related activity restriction questionnaire (MRARQ).

**Ethical considerations**

The study was conducted after getting an ethical clearance certificate from the Institutional Ethical Committee of Maulana Azad Medical College. Data were collected after getting informed written consent from the study participants. After collecting the details, the adolescents were given health education regarding the healthy MHM and government schemes related to the menstrual hygiene.

**Results**

A total of 1100 adolescent girls were enrolled whose mean (±SD) age was 15.8 (±2.1) years, with 332 (70%) participants in the late adolescent stage and 768 (30%) in the early adolescent stage. The median (IQR) age was 13 (13–14) early adolescents and 17 (16–18) among late adolescents. Most participants were Hindu by religion (84%), unmarried (98%), and belonging to nuclear family (86%), whereas only 3% were involved in any part-time or full-time job.

The median (IQR) per capita income of the study participants was 2000 (1250–3000). According to the Modified BG Prasad 2019 Scale, 207 (19%) belonged to class 5, 373 (34%) belonged to class 4, 232 (21%) belonged to class 3, 152 (14%) belonged to class 2, and 36 (3%) belonged to class 1.

The activities restricted during menstruation are depicted in Table 1. Among the participants, 69% missed routine activity, 32% missed household activities, 22% had restriction of outdoor activities, and 28% were restrained from attending social gatherings. School/college/work was reported missed due to menstruation in 60% of the adolescent girls and 66% reported discomfort during menstruation. Avoidance of religious activities like handling of religious books during menstruation was reported by 92% of the participants. Personal hygiene practices were also restricted during menstruation, including bathing (12%) and washing of hair (45%).

**Kaiser-Meyer-Olkin index and Bartlett tests**

The estimated KMO value for the 15-item MRARQ questionnaire was 0.659. It indicates that the sampling was adequate to do...

| Characteristics                                      | Categories | Frequency (%) |
|-------------------------------------------------------|------------|---------------|
| Missed routine activity                               | Yes        | 758 (69)      |
| Missed household activity*                            | Yes        | 349 (32)      |
|                                                       | NA*        | 112 (10)      |
| Restriction of outdoor activities                     | Yes        | 242 (22)      |
|                                                       | NA*        | 35 (3)        |
| Restriction from attending social functions/gatherings| Yes        | 304 (28)      |
|                                                       | NA*        | 13 (1)        |
| Missed school/college/work due to menstruation        | Yes        | 659 (60)      |
| Less confident/comfortable during menses              | Yes        | 724 (66)      |
| Enter religious places during menstruation             | Yes        | 85 (8)        |
| Enter kitchen/cook food during menstruation           | Yes        | 917 (83)      |
| Take bath during menstruation                         | Yes        | 968 (88)      |
| Wash hair during menstruation                         | Yes        | 603 (55)      |
| Sleep on the same beds during menstruation            | Yes        | 865 (79)      |
| Touch pickle during menstruation                      | Yes        | 225 (20)      |
| Touch religious books during menstruation             | Yes        | 68 (6)        |
| Restriction for a girl in eating certain food during menstruation | Yes        | 538 (49)    |
| Restriction from sexual intercourse                   | Yes        | 22 (2)        |
|                                                       | NA*        | 1077 (98)     |

*NA includes girls who do not do the activities irrespective of the menstruation. NA: Not applicable # Household activity included preparing food, cleaning home, washing clothes, taking care of siblings, lifting heavy weights and fetching water.
the factor analysis. The Bartlett’s test $P$ value was <0.001, indicating that there was a significant correlation to conduct the factor analysis. The correlation matrix revealed that all variables had at least one correlation coefficient >0.3.

**Principal component analysis**

In exploratory factor analysis using PCA, 6 principal components were identified which had eigenvalues more than 1 which is also depicted in the scree plot [Figure 1 and Table 2]. Items 2, 1, and 3 loaded on factor 1 (work restrictions), items 13, 7, and 12 loaded on factor 2 (religious restrictions), items 11, 8, and 4 loaded on factor 3 (social restrictions), items 9 and 10 loaded on factor 4 (personal hygiene), items 5 and 6 loaded on component 5 (comfort), and question 15 loaded on component 6 (sexual activity). Question 14 did not load on any factor and was omitted.

### DISCUSSION

Restriction of routine activities during menstruation is a conglomeration of traditional practices acquired over several centuries mediated by society, religion, and culture, with potential for positive, neutral, or negative influence on the health and well-being of women. The present study conducted among 1100 adolescent girls in Delhi observed nearly two in three participants complying with sociocultural restrictions and observing work-related restrictions during menstruation. The most common restrictions in the participants were in relation to religious activities, household activities, and personal hygiene.

In the present study, 60% of the participants reported missing school/academic work during menstruation, which is significantly higher compared to another Indian study which reported that only 24% of the adolescent girls missed school during their menstrual cycles.\[16\] Menstruation-related religious restriction among our study participants was very high (~90%). Another study conducted in the city of Mumbai reported that 97.6% of the women experienced religious restrictions during menstruation.\[17\] However, a meta-analysis of Indian studies reported the pooled prevalence of religious restriction events during menstruation in adolescent girls as 77% (95% confidence interval: 71%–83%).\[18\]

Our study has found that social restrictions were there in 28% of the study participants which was similar to other Indian studies.\[18\] A qualitative study done in Fiji, Papua New Guinea, and the Solomon Islands also reported the presence of similar menstruation-related restrictions.\[19\]

Validated questionnaires for menstruation-related activity restriction were not available even after extensive literature search. Various researches done in this field used questions developed by the investigators themselves. Construct validation was done through exploratory factor methods using PCA with varimax rotation after assessing the suitability of the data for analysis. The items of the questionnaire loaded on six factors, namely work restrictions, religious restrictions, social restrictions, personal hygiene, comfort, and sexual activity.

There are few strengths to our study. First, this is the first study to validate the questionnaire for menstruation-related activity restriction among adolescent girls. Second, a large representative sample was selected using a multistage probability sampling technique, ensuring good external validity of the data for analysis. The items of the questionnaire loaded on six factors, namely work restrictions, religious restrictions, social restrictions, personal hygiene, comfort, and sexual activity.

Table 2: Factor loadings from exploratory factor analysis (principal component analysis with varimax rotation with Kaiser normalization)

| Items in MRAR questionnaire | Factor loadings |
|-----------------------------|-----------------|
|                             | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 |
| Q2. Religious books         | 0.752    |          |          |          |          |          |
| Q1. Enter religious places  | 0.736    |          |          |          |          |          |
| Q3. Touch pickle            | 0.685    |          |          |          |          |          |
| Q13. Enter kitchen/cook     |          | 0.793    |          |          |          |          |
| Q7. Sleeping in the same bed| 0.681    |          |          |          |          |          |
| Q12. Social functions       |          | 0.300    |          |          |          |          |
| Q11. Taking bath            |          |          | 0.649    |          |          |          |
| Q8. Wash hair               |          |          | 0.640    |          |          |          |
| Q4. Household work          |          |          |          | −0.617   |          |          |
| Q9. Outdoor work            |          |          |          |          | 0.810    |          |
| Q10. Miss school/work       |          |          |          |          | 0.603    |          |
| Q5. Miss routine activity   |          |          |          |          | 0.768    |          |
| Q6. Less comfort            |          |          |          |          | 0.423    |          |
| Q15. Sexual intercourse     |          |          |          |          |          | 0.743    |
| Q14. Eating certain food    |          |          |          |          |          | −0.666   |

MRARQ: Menstruation - Related, Activity Restriction Questionnaire

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Garg, et al.: Menstruation-related activity restriction
Study limitations
Concurrent validity could not be assessed since another validated instrument for menstruation-related activity restriction was not available. We could not assess the test–retest reliability of the MRAR questionnaire. Finally, we did not assess the religiosity of the participants during the nonmenstrual period to assess the actual extent of religion-based behavior change in the menstrual period, and neither the effect of compliance with religious restrictions during menstruation on the participant’s self-esteem, which require further qualitative exploration.

Conclusion
Adolescent girls in India experience a variety of social, cultural, work, and religion-related restrictions during menstruation, much of which is potentially avoidable through behavior change and health promotion interventions. The MRARQ is a useful tool which can be used among adolescent girls from low-middle income groups in Northern India.

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Conflicts of interest
There are no conflicts of interest.

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