Menstrual knowledge and practices of Pakistani girls: A multicenter, cross-sectional study

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ABSTRACT

Information regarding the menstrual knowledge and practices of Pakistani girls is sparse. Therefore, we aimed to evaluate the knowledge and practices of Pakistani girls regarding menstruation. This cross-sectional study was conducted among four categories of university female students of medical, pharmacy, nursing, and arts & humanities during a period of 5 months (November 2016–March 2017). The data were acquired using a self-administered questionnaire from 3 medical institutes, 2 pharmacy institutes, 3 nursing institutes and 2 arts & humanities institutes at Lahore, Pakistan. The mean age of participants (N = 1777) was 20.38 ± 2.39 years. Overall 39.5%, 76.1% and 29.3% respondents’ provided correct answers to the questions concerning menstrual cycle length, duration of menstrual bleeding and source of bleeding, respectively. Regarding the understanding of menstruation, around 27% understood it as monthly bleeding happening with every woman, whereas 18% stated that it was a sign of adulthood. However, a small proportion believed that it was removal of dirt from the body. Regarding the practices-related to menstruation, there were some malpractices regarding diet and dietary intake (avoiding certain foods, eating less, and less fluid intake). However, the hygienic practices were found to be satisfactory. In conclusion, Pakistani university girls have some misconceptions, misperceptions and malpractices related to menstruation. Our findings draw attention to conduct awareness programs in order to eradicate these misconceptions, myths and malpractices.

1. Introduction

Menstruation is a natural phenomenon that is defined as “periodic discharge of blood from the uterus through vagina, occurring more or less at regular monthly intervals throughout the active reproductive life of a female (Critchley, 1986)”. There are several types of menstrual disorders (amenorrhea, premenstrual syndrome, dysmenorrhea, oligomenorrhea, polymenorrhea, menorrhagia etc.) but the most prevalent among young females are dysmenorrhea and premenstrual syndrome (PMS) (Rafique and Al-Sheikh, 2018; Amu and Bamidele, 2014; Karout et al., 2012; Anandha Lakshmi et al., 2011; Houston et al., 2006; Singh et al., 2008). Aforementioned menstrual disorders had a negative impact on the quality of life as it resulted in class absenteeism, social restrictions and limited academic, sports and daily activities (Unsal et al., 2010). An increased risk of menstrual disorders has been associated with obesity, smoking, coffee consumption, menstrual bleeding >7 days and a positive family history of dysmenorrhea and PMS (Bae et al., 2018; Unsal et al., 2010). Psychological stress is also known to be independently associated with premenstrual symptoms and the experience of irregular menstrual cycles among college students (Rafique and Al-Sheikh, 2018; Yamamoto et al., 2009). An earlier study from Karachi, Pakistan, revealed that there were misconceptions and unhygienic practices of menstruation among school-going girls requiring action by healthcare professionals (Ali and Rizvi, 2010). However, to our knowledge, menstrual knowledge and practices of Pakistani university going girls have not been assessed. Therefore, we aimed to evaluate the menstrual knowledge and practices of Pakistani university girls.
2. Subjects and methods

2.1. Study population and settings

A cross-sectional study design was used and the study was conducted in the second largest metropolitan city of Pakistan (Lahore, the capital city of Punjab Province) among four groups of university-going girls (medical, pharmacy, nursing, and arts & humanities students) during a period of 5 months (November 2016–March 2017). The data of medical students were gathered from Fatimah Jinnah Medical College, Ameer-Ud-Din Medical College and Services Institute of Medical Sciences. The data of female pharmacy students were gathered from Punjab University College of Pharmacy, University of the Punjab and Faculty of Pharmacy, The University of Lahore. The data of nursing students were collected from Schools of Nursing at Lahore General Hospital, The University of Lahore and Mayo Hospital. The data of female arts and humanities students were gathered from University Oriental College, University of the Punjab and University of the Education, Lahore, Pakistan. Investigators approached the university students at the aforementioned settings during university timing and briefed them about the purpose of this study. Those who consented to participate were administered the study instrument and data were collected. If needed, assistance was provided by the investigators.

2.2. Sample size

The sample size for this study was computed by Sample Size Calculator (Raosoft®), available at http://www.raosoft.com/samplesize.html. The margin of error was kept at 5%, confidence level of 95% and response distribution was assumed 50%. A minimum sample of 378 female students was required in each group. To avoid biases, we took extra samples from each group, and the maximum required sample size was 1800. A convenient sampling method was employed and all the university students were approached directly by the researchers within the university timings (8 a.m–4 p.m). Researchers explained the objectives and nature of this study and subjects who consented were administered the study instruments.

2.3. Ethical considerations

The study protocol was reviewed and approved by the Human Research Ethics Committee, Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan (HEC/PUCP/1935). Moreover, written requests, along with required documents, were submitted to the relevant authorities at all the other aforementioned institutes and verbal approvals were received. A written informed consent was obtained from every student prior to their recruitment in the study.

### Table 1. Demographic data of the study population (N = 1777).

| Variable                              | Overall (N = 1777) | Medical students (N = 594) | Pharmacy students (N = 393) | Nursing students (N = 388) | Arts & humanities (N = 304) |
|---------------------------------------|--------------------|---------------------------|----------------------------|---------------------------|-----------------------------|
| Age (years)                           | 20.38 ± 2.39       | 19.08 ± 1.12              | 20.11 ± 1.99               | 20.30 ± 2.21              | 22.05 ± 2.87               |
| **Body mass index**                   |                    |                           |                            |                           |                             |
| Underweight                          | 424 (23.9)         | 100 (22.3)                | 118 (27.1)                 | 120 (26.7)                | 86 (19.5)                   |
| Normal                                | 1137 (64.0)        | 301 (67)                  | 264 (60.6)                 | 289 (64.2)                | 283 (64)                    |
| Overweight                           | 182 (10.2)         | 40 (8.9)                  | 46 (10.6)                  | 36 (8)                    | 60 (13.6)                   |
| Obese                                 | 34 (1.9)           | 8 (1.8)                   | 8 (1.8)                    | 5 (1.1)                   | 13 (2.9)                    |
| **Year of education**                 |                    |                           |                            |                           |                             |
| 1st                                   | 686 (38.6)         | 261 (58.1)                | 181 (42.8)                 | 155 (36.8)                | 89 (48.0)                   |
| 2nd                                   | 353 (19.9)         | 132 (29.4)                | 73 (17.7)                  | 135 (32.1)                | 13 (12.3)                   |
| 3rd                                   | 170 (9.6)          | 44 (9.8)                  | 57 (13.8)                  | 66 (15.7)                 | 3 (2.8)                     |
| 4th                                   | 117 (6.6)          | 10 (2.2)                  | 41 (9.9)                   | 65 (15.4)                 | 1 (0.9)                     |
| 5th                                   | 63 (3.5)           | 2 (0.4)                   | 61 (14.8)                  | –                         | –                           |
| **Stratum**                           |                    |                           |                            |                           |                             |
| Rural                                 | 245 (13.8)         | 66 (14.7)                 | 28 (6.4)                   | 70 (15.6)                 | 81 (18.3)                   |
| Urban                                 | 1532 (86.2)        | 383 (85.3)                | 408 (93.6)                 | 380 (84.4)                | 361 (81.7)                  |
| **Hosteller**                         |                    |                           |                            |                           |                             |
| Yes                                   | 725 (40.8)         | 282 (62.8)                | 113 (25.9)                 | 227 (50.4)                | 103 (23.3)                  |
| No                                    | 1052 (59.2)        | 167 (37.2)                | 323 (74.1)                 | 223 (49.6)                | 339 (76.7)                  |
| **Economic class**                    |                    |                           |                            |                           |                             |
| Lower                                 | 409 (22.0)         | 32 (7.1)                  | 43 (9.9)                   | 194 (43.1)                | 140 (31.7)                  |
| Middle                                | 832 (46.8)         | 185 (41.2)                | 216 (49.5)                 | 217 (48.2)                | 214 (48.4)                  |
| Upper                                 | 536 (30.2)         | 232 (51.7)                | 177 (40.6)                 | 39 (8.7)                  | 88 (19.9)                   |
| **Father's Occupation**               |                    |                           |                            |                           |                             |
| Self employed                         | 630 (35.5)         | 133 (29.6)                | 166 (38.1)                 | 173 (38.4)                | 158 (35.7)                  |
| Govt. servant                         | 467 (26.3)         | 166 (37)                  | 107 (24.5)                 | 103 (22.9)                | 91 (20.6)                   |
| Private employee                      | 348 (19.6)         | 75 (16.7)                 | 98 (22.5)                  | 83 (18.4)                 | 92 (20.8)                   |
| Unemployed                            | 51 (2.9)           | 9 (2.0)                   | 6 (1.4)                    | 15 (3.3)                  | 21 (4.8)                    |
| Father not alive                      | 130 (7.3)          | 18 (4.0)                  | 22 (5)                     | 46 (10.2)                 | 44 (10.0)                   |
| Retired                               | 151 (8.5)          | 48 (10.7)                 | 37 (8.5)                   | 30 (6.7)                  | 36 (8.1)                    |
| **Mother's Occupation**               |                    |                           |                            |                           |                             |
| House wife                            | 1449 (81.5)        | 324 (72.2)                | 358 (82.1)                 | 383 (85.1)                | 384 (86.9)                  |
| Working woman                         | 328 (18.5)         | 125 (27.8)                | 78 (17.9)                  | 67 (14.9)                 | 58 (13.1)                   |
| **Health Care Professional in family**|                    |                           |                            |                           |                             |
| Yes                                   | 684 (38.5)         | 180 (40.1)                | 175 (40.1)                 | 201 (44.7)                | 128 (29.0)                  |
| No                                    | 1093 (61.5)        | 269 (59.9)                | 261 (59.9)                 | 249 (55.3)                | 314 (71.0)                  |
2.4. Outcome measures

Menstrual knowledge and practices were assessed by a 37 item self-administered questionnaire that was designed by previous researches (Ali and Rizvi, 2010; Houston et al., 2006). We measured weight with an electronic weighing scale (model MS-100; Certeza, USA) and height to the nearest millimeter with a portable measuring tape.

2.5. Statistical analysis

Frequency and percentages were calculated for categorical variables whereas mean ± standard deviation (SD) for continuous variables. P-values were obtained by ANOVA (continuous variables) and Chi-Square test (categorical variables) to determine the significance of the results and a p-value < 0.05 was considered statistically significant. The data were analyzed using SPSS version 22.0 (SPSS Inc., Chicago, IL) for Windows.

3. Results

A total 1800 questionnaires were distributed and 1777 fully completed questionnaires were received, with a response rate of 98.7% (nursing students 99.8%, pharmacy students 96.9%, medical students 99.6% and arts & humanities students 98.2%).

Table 2. Menstruation knowledge of the study population among different participant categories.

| Variable                           | Overall   | Medical students | Pharmacy students | Nursing students | Arts & humanities | p-value |
|------------------------------------|-----------|------------------|-------------------|-----------------|-------------------|---------|
| Menstrual cycle length (days)      |           |                  |                   |                 |                   |         |
| 5-10                               | 788 (44.3)| 155 (34.5)       | 234 (53.7)        | 216 (48)        | 183 (41.4)        | <0.001  |
| 10-12                              | 71 (4.0)  | 6 (1.3)          | 8 (1.8)           | 33 (7.3)        | 24 (5.4)          |         |
| 21-40                              | 702 (39.5)| 267 (59.5)       | 159 (36.5)        | 153 (34)        | 123 (27.8)        |         |
| Don’t know                         | 216 (12.2)| 21 (4.7)         | 35 (8)            | 48 (10.7)       | 112 (25.3)        |         |
| Menstrual bleeding duration (days) |           |                  |                   |                 |                   |         |
| 1-2                                | 163 (9.2) | 14 (3.1)         | 29 (6.7)          | 45 (10)         | 75 (17)           | <0.001  |
| 2-8                                | 1352 (76.1)| 405 (90.2)     | 370 (84.9)        | 334 (74.2)      | 243 (55)          |         |
| 8-12                               | 126 (7.1) | 5 (1.1)          | 25 (5.7)          | 53 (11.8)       | 23 (5.2)          |         |
| Don’t know                         | 136 (7.7) | 5 (1.1)          | 12 (2.8)          | 18 (4)          | 101 (22.9)        |         |
| Understanding of menstruation      |           |                  |                   |                 |                   |         |
| 1. Monthly bleeding                | 474 (26.7)| 110 (24.5)       | 113 (25.9)        | 117 (26.0)      | 134 (30.3)        | <0.001  |
| 2. Dirty bleeding                  | 81 (4.6)  | 12 (2.7)         | 7 (1.6)           | 11 (2.4)        | 51 (11.5)         |         |
| 3. Good for marriage               | 68 (3.8)  | 13 (2.9)         | 14 (3.2)          | 17 (3.8)        | 24 (5.4)          |         |
| 4. Sign of adulthood               | 319 (18.0)| 67 (14.9)        | 78 (17.9)         | 103 (22.9)      | 71 (16.1)         |         |
| 5. Happens with every female       | 380 (21.4)| 100 (22.3)       | 99 (22.7)         | 84 (18.7)       | 97 (21.9)         |         |
| 6. 1 & 4                           | 60 (3.4)  | 17 (3.8)         | 19 (4.4)          | 19 (4.4)        | 5 (1.1)           |         |
| 7. 1 & 5                           | 124 (7.0) | 46 (10.2)        | 31 (7.1)          | 31 (6.9)        | 16 (3.6)          |         |
| 8. 4 & 5                           | 229 (12.9)| 69 (15.4)        | 72 (16.5)         | 14 (10.7)       | 40 (9.0)          |         |
| 9. 1, 2, 3, 4 & 5                  | 42 (2.4)  | 15 (3.3)         | 3 (0.7)           | 20 (4.4)        | 4 (0.9)           |         |
| Source of bleeding                  |           |                  |                   |                 |                   |         |
| Uterus                             | 521 (29.3)| 186 (41.4)       | 105 (24.1)        | 91 (20.2)       | 139 (31.4)        | <0.001  |
| Vagina                             | 1118 (62.9)| 253 (56.3)     | 315 (72.2)        | 341 (75.8)      | 209 (47.3)        |         |
| Stomach                            | 12 (0.7)  | 1 (0.2)          | 2 (0.5)           | 2 (0.4)         | 7 (1.6)           |         |
| Any part of abdomen                | 83 (4.7)  | 3 (0.7)          | 5 (1.1)           | 12 (2.7)        | 63 (14.3)         |         |
| Urinary tract                      | 43 (2.4)  | 6 (1.3)          | 9 (2.1)           | 4 (0.9)         | 24 (5.4)          |         |
| Knowledge given about menstruation before menarche | 1636 (92.1) | 398 (88.6)     | 380 (87.2)        | 428 (95.2)      | 430 (97.3)        | <0.001  |
| Yes                                | 141 (7.9) | 51 (11.4)        | 56 (12.8)         | 22 (4.9)        | 12 (2.7)          |         |
| No                                 |           |                  |                   |                 |                   |         |
| Source of knowledge of menstruation before menarche | 864 (48.6) | 188 (41.9)     | 220 (50.5)        | 228 (50.7)      | 228 (51.6)        |         |
| Mother                             | 324 (18.2)| 67 (14.9)        | 61 (14.0)         | 111 (24.7)      | 85 (19.2)         |         |
| Elder sister                       | 81 (4.6)  | 10 (2.2)         | 11 (2.5)          | 30 (6.7)        | 30 (6.8)          |         |
| Aunt                               | 313 (17.6)| 106 (23.6)       | 79 (18.1)         | 51 (11.3)       | 77 (17.4)         |         |
| Friend                             | 141 (7.9) | 51 (11.4)        | 56 (12.8)         | 22 (4.9)        | 12 (2.7)          |         |
| None                               | 54 (3.0)  | 27 (6.0)         | 9 (2.1)           | 8 (1.8)         | 10 (2.3)          |         |
| Information given about menstruation before menarche | 426 (24.0) | 69 (15.4)       | 102 (23.4)        | 132 (29.3)      | 123 (27.8)        |         |
| 1. Physical changes                | 226 (12.7)| 75 (16.7)        | 53 (12.2)         | 44 (9.8)        | 54 (12.2)         |         |
| 2. Social & religious restrictions | 50 (2.8)  | 10 (2.2)         | 6 (1.4)           | 23 (5.1)        | 11 (2.5)          |         |
| 3. Bathing practices               | 151 (8.5) | 46 (10.2)        | 37 (8.5)          | 39 (8.7)        | 29 (6.6)          |         |
| 4. Use of material for absorption  | 80 (4.5)  | 12 (2.7)         | 15 (3.4)          | 10 (2.2)        | 43 (9.7)          |         |
| 5. Blood is dirty                  | 266 (15.0)| 90 (20.0)        | 78 (17.9)         | 56 (12.4)       | 42 (9.5)          |         |
| 7. All of the above                | 26 (1.5)  | 7 (1.6)          | 10 (2.3)          | 8 (1.8)         | 1 (0.2)           |         |
| 8. None                            | 552 (31.1)| 140 (31.2)       | 135 (31.0)        | 138 (30.8)      | 139 (31.4)        |         |
3.1. Demographic characteristics

Demographic characteristics of the respondents’ are given in Table 1. The mean age of the study cohort was 20.38 ± 2.39 years and there was predominance of Muslim undergraduates from urban areas. Majority of the participants had a normal body mass index (64.0%) followed by underweight (23.9%). Moreover, around 39% reported that they had a health professional in their family.

3.2. Menstruation knowledge

Menstrual knowledge of the study population is shown in Table 2. Self-reported menarche age was 12–14 years (69.2%) followed by 15–16 years (22.4%). In majority of the respondents, the feelings/reaction at first menarche was a mixture of anxiety, pain, feeling bad, shy or crying. Around 40% of the respondents’ provided the correct answers to the question concerning menstrual cycle length, with significantly higher
Regarding the normal menstrual bleeding duration, still it was $5$ days (Table 2). Although 76.1% of our participants gave correct response with menstrual bleeding duration as 44.3% selected the option of 5. A small proportion (4.6%) believed that it was the removal of dirt from the body and this response was frequent in females having arts and humanities education (11.5%) than other participant categories (medical 2.7%; pharmacy 1.6%; nursing students 2.4%). Majority of the respondents had incorrect responses about the source of bleeding (vagina, 62.9%; stomach, 0.7%; any part of abdomen, 4.7%; urinary tract, 2.4%). Menstrual knowledge prior menarche was predominantly acquired from the mothers followed by elder sisters and friends.

3.3. Menstrual practices

Menstrual practices of the study population are shown in Table 3. Regarding the dietary modification during menstruation, majority of the study participants reported to avoid eating “too cold foods” (50.3%) whereas around 12% stated that they avoid eating “too hot foods”. Almost 56% of the respondents reported of eating same amount of food during menstruation. Surprisingly, 34% and 38% of the respondents reported to consume less food and reduced fluid intake during menstruation, respectively. Almost 78% of the respondents used sanitary pads for absorbing the blood and among them the highest percentage was that of medical students. Among the participants that reported using absorbent items other than sanitary pads, majority discarded the absorbing materials (Table 3). The absorbent material/item that was not discarded was usually washed and dried in sunlight (54.1%). Moreover, the washed clothes were stored in the clean and covered place so that these could be used again. Around 39% of the respondents reported to avoid bathing during menstruation, with no significant difference among participant categories ($p = 0.069$).

3.4. Impact of menstruation on absenteeism and daily activities

In the present study, approximately 58% of the participants reported no absenteeism from the institute due to menstruation, with significantly higher proportion (72.8%) that of medical students as compared to others. Regarding the daily/routine activities during menstruation, 31.7% reported no impact on routine activities, whereas 13.6, 34.5 and 20.3% reported seldom, sometimes and always missing routine activities, respectively.

4. Discussion

This is the first study to evaluate menstrual knowledge and practices of Pakistani university girls. Similar to the findings of earlier studies involving Pakistani and Indian school girls (Ali and Rizvi, 2010; Kural et al., 2015), predominance of our study population also reported a menarche age of 12–14 years. Around 92% of the participants reported that they were well informed of menstruation before menarche and the source of knowledge was predominantly mothers which were consistent with the previously reported studies from India (Dasgupta and Sarkar, 2008; Khana et al., 2005). Around 60% of our study participants did not know the correct menstrual cycle length which was significantly higher (39%) than the findings of previous study conducted in adolescent females of the United States (Houston et al., 2006). However, higher proportion of incorrect response regarding menstrual cycle length might either be due to the predominance of teen girls belonging to 1$^{st}$ year of university education or study subjects confusing menstrual cycle days with menstrual bleeding duration as 44.3% selected the option of 5–10 days (Table 2). Although 76.1% of our participants gave correct response regarding the normal menstrual bleeding duration, still it was significantly lower than the findings of Houston et al. (2006) who reported that 95.7% of American girls knew the correct menstrual bleeding duration. This might be attributable to the fact that adolescents in many cultures, including Pakistan, are not provided comprehensive information on sexual and reproductive health, considering discussions on such issues a taboo. A wide majority of the respondents’ had misconception regarding the source of bleeding as almost 70% stated the source of bleeding was vagina instead of uterus. These findings indicate the need to improve the menstrual knowledge of Pakistani girls by providing comprehensive menstrual education in schools, colleges and universities, conducting awareness programs regarding menstrual abnormalities and/or adding these topics in the curriculum/syllabus of college/university education.

Contrary to the findings of earlier study (Ali and Rizvi, 2010), eating patterns were less affected by the menstruation which was due to the fact that our study cohort comprised of girls acquiring tertiary education. However, it was worrisome to see that 31% respondents’ reported of eating lesser than normal during menstruation and this may cause iron-deficiency anemia as adolescent girls, particularly in developing countries, are more at risk because of inadequate diet, loss of substantial amount of iron during menstruation, and early marriages (Chaturvedi et al., 2017; Panat et al., 2013; Dixit et al., 2011). The myths (beliefs that certain foods will make them sick in the present or have deleterious effect in future) that prevailed among our study participants were avoiding “too cold foods” or “too hot foods” and decreased fluid intake which was consistent with the study conducted in Pakistani (Ali and Rizvi, 2010) and Saudi Arabian school girls (Moawed, 2001). Regarding hygienic practices, it was encouraging to see the majority of the study participants managed menstruation hygienically by using sanitary pads which was better than the findings of previous studies (Dasgupta and Sarkar, 2008; Khana et al., 2005). Moreover, the absorbent that was not discarded was washed and dried in the sunlight (hygienic practice) in contrast to previously reported study in India (Khana et al., 2005). In contrast to the previous study from Pakistan (Ali and Rizvi, 2010), majority of our study population took bath during menstruation. These good hygienic practices can be attributed to the better educational and economic status of the participants. It was also encouraging to observe that majority of study participants reported no absenteeism and impact on routine activities which was contradictory to the findings of earlier studies reporting absenteeism as well as social and religious restrictions (Houston et al., 2006; Moawed, 2001; El-Shazly et al., 1990). Our study had some limitations. The study included only the institutions of one city of Pakistan and study sample was comprised of university-going girls. Therefore, our findings may not be representative of entire population of Pakistani girls. Moreover, we recruited study subjects using a convenience sampling method so we might have drawbacks such as non-generalizability and selection bias. Yet our study provided an insight of menstrual knowledge and practices in Pakistani female university students.

5. Conclusions

Pakistani university-going girls have somewhat satisfactory menstrual knowledge, and dietary and hygienic practices. There are some misconceptions and malpractices related to menstruation and our findings highlight the need to conduct awareness programs in order to eradicate these misconceptions and malpractices.

Declarations

Author contribution statement

H. Mansoor: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.
M. Salman: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.
N. Asif: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.
Z. Mustafa: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.
A. Nawaz: Contributed reagents, materials, analysis tools or data; Wrote the paper.
J. Molsin, B. Arif, A. Sheikh, N. Hira and A. Masood: Performed the experiments; Contributed reagents, materials, analysis tools or data.
N. Shehzadi and K. Hussain: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement
The authors declare no conflict of interest.

Additional information
No additional information is available for this paper.

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