



Research article

Evaluating the effectiveness of utilization of health communication interventions on sexual and reproductive health of the Rohingya women living in Cox's Bazar refugee camp

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HIGHLIGHTS

- Different myths and perceptions of taboo regarding sexual and reproductive health (SRH) are common.
- These orthodox values impose some restrictions.
- Utilization of health communication interventions (HCIs) differentiated SRH among the Rohingya women.
- Utilization of HCIs appeared as the stronger predictor than socioeconomic characteristics.
- Interpersonal communication with a healthcare provider and understandability of the messages are the strongest predictors.

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ABSTRACT

Objectives: This study aimed to examine the effectiveness of NGOs' health communication interventions (HCIs) regarding sexual and reproductive health (SRH) among the Rohingya women living in the refugee camps in Cox's Bazar, Bangladesh.

Methods: A camp-based cross-sectional questionnaire survey was conducted from November 10, 2019, to January 10, 2020, among 415 Rohingya married women of reproductive age (above 18–49 years) living in the refugee camp in Cox's Bazar, Bangladesh. The study participants were selected using a convenient sampling. The independent-sample t-test and hierarchical regression analysis were performed using IBM SPSS version 24.0.

Results: Different myths and perceptions of taboo are common among the Rohingya women regarding SRH which imposes some restrictions on them. Of the Rohingya women, 79.8 percent ever had a consultation with non-government organizations' (NGOs) appointed health care providers (doctors/nurses) regarding SRH issues, while only 68.4 percent of them had a door visit by the NGO workers in this regard. Moreover, 62.7 percent participated in NGO's SRH communication program, whereas three-fourths understood the SRH messages appropriately. However, the study findings reported significant differences ($p \leq .001$) in the mean scores of all items related to participants' SRH status for the difference in the utilization level of health communication interventions. Regression analysis shows that the Rohingya women's utilization of NGOs' health communication interventions appeared as stronger predictors than socioeconomic variables for better SRH status. At the same time, β values indicate that the Rohingya women's interpersonal communication with a health care provider and understanding the messages of communication activities are reported as the strongest predictors of outcome variables.

Conclusion: Health communication interventions significantly influence positive changes in women's SRH. Accordingly, this study recommends strengthening communication interventions using behavioral change theories and strategic communication approaches as it is difficult to change their socioeconomic status in existing settings.

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1. Introduction

As many as 750,000 Rohingya, who have been forcibly displaced as refugees in Myanmar's Rakhine state, have entered Cox's Bazar, Bangladesh due to the onset of violence and massive human rights violations since October 2016 [1, 2]. Women and girls made up almost two-thirds of the newly arriving [2, 3]. The pervasive attack, including the use of sexual violence and rape among the Rohingya women and girls [2] as part of Myanmar military' ethnic cleansing [4] mission between October 2016 and August 2017, has heightened the necessity of sexual and reproductive health (SRH) utilities [5, 6]. Pregnancies have resulted from many of these sexual assaults [2, 5]. The scenario has been worsened as post-rape services in Bangladeshi refugee camps, such as emergency contraception, safe abortion, and counseling services, is still insufficient [3, 6], while 47 percent of the population has a dearth of primary healthcare services for victims of sexual abuse and other forms of SRH care [5]. The situation has deteriorated as SRH services are loaded by an inadequate number of female physicians and a lack of gender-segregated services [7]. In Bangladesh, furthermore, the Rohingya displaced women and teenagers are still under the threat of sexual harassment, such as child abuse, early marriage, prostitution and trafficking, as well as increasing security threats due to overcrowding and the absence of privacy in the camps [8]. In addition, some Rohingya families have forced teenage girls to marry in the hope of providing more food security, whereas other refugee adolescent girls are becoming the victims of human trafficking by smugglers to the neighboring countries [9, 10].

Reports indicated that a substantial portion of the Rohingya people lack knowledge about reproductive and maternal health (MH), have a negative attitude towards SRH and family planning (FP), and are reluctant to use contraceptives. Different local and international NGOs are working through communication interventions to enhance the status of SRH. Communication in the health sector has become essential in addressing multifaceted health issues globally over the last few decades. It is widely used to inform the intended audiences about beneficial health facts, form favorable attitudes, and practice recommended behaviors. Subsequently, health communication is now "an evolving and increasingly prominent field" in health sectors [11, p. 3] and can contribute to almost all facets of disease prevention and health promotion [12]. Accordingly, apart from various health services, local and international NGOs and the government are working to address the SRH issues for the Rohingyas through communication campaigns, counseling, and awareness programs [13].

Although most of the studies emphasized the SRH and FP knowledge, perceptions and needs, and the prevalence of contraceptive use among the Rohingya people [14, 15, 16, 17, 18], very few scholarly works explored the utilization of and accessibility to SRH-related services and amenities; consequently, little is known regarding whether such interventions had any effect on the use of contraceptives among the refugee women. However, evidence indicated that the sociocultural conditions among Rohingya in the refugee camps and Bangladeshi host populations, as well as a lack of legal status and persistent movement restrictions, hinder the provision of reproductive health services [19]. Health-related home deliveries were once common among the Rohingya in Myanmar, and they are still common in the camps, although reproductive health care is frequently accessible but unavailable to Rohingya adolescents and youth [17]. Nonetheless, higher involvement in different programs outside of their homes and increased access to reproductive healthcare facilities could greatly increase the use of contraceptives among Rohingya women, resulting in fewer unintended pregnancies [16]. In addition, previous studies reported that increasing awareness of their SRH rights might also assist in ameliorating the situation [16, 20]. Although SRH-care services and awareness programs involve different communication activities on a large scale, it is evident that no study is available to date investigating the effect of the utilization of health communication interventions on

SRH of the Rohingya refugee women comprehensively. This study is an attempt to address this gap.

Therefore, the overall purpose of this study is to evaluate the effectiveness of the utilization of health communication interventions of international and local NGOs on the SRH status of Rohingya women. The importance of the present study lies in providing information and evidence that NGOs can use to augment their ongoing health communication activities, pointing out the significance of communication interventions and developing more effective communication strategies for improving the sexual and reproductive health of the Rohingya refugee women.

2. Materials and methods

2.1. Design, settings and characteristics

This study used the quantitative research approach designed with a camp-based cross-sectional sample survey which was carried out at Rohingya refugee Camp-4 (located at Lombashiya, Modhurchora in the Kutupalong Mega area) in Cox's Bazar, a district in Chittagong division of Bangladesh, which is the country's largest administrative division geographically. We chose this camp as the study location because it is one of the largest, with 24 international and national organizations assisting the Rohingya community.

2.2. Sampling formula and sample size

The study population consisted of all Rohingya married women of reproductive age (above 18–49 years) living in Cox's Bazar camps during the study period. Participants in the sample were chosen using a convenient sampling approach as selecting the appropriate sampling approach was difficult given the humanitarian context and inadequate funds. A previous study also faced this methodological challenge due to the structure of the camps [20]. A total of 415 Rohingya women were included as the study participants using a single population proportion formula.

2.3. Data collection tools and procedures

The data collection for analysis began on November 10, 2019, and ended on January 10, 2020. A pretested, organized, and facilitator-administered questionnaire was used to collect data. Ten female facilitators were hired based on prior data collection expertise to guide and administer the survey. The data collection process in the camp was also accompanied by ten Rohingya women who were regarded as community members in the survey area. They helped the research team reach the houses of the respondents in the block, establishing a rapport with the participants and requesting the refugee women to cooperate and participate in the study. Despite the drawbacks caused by the camp's design, confidentiality and privacy were upheld throughout the data collection process. The community members were not present during information gathering through the survey that took place in a quiet room of the house of the respective refugee women situated in a particular block of the camp. All of the Rohingya women hired have prior experience helping their community. Engaging community members in conducting research is also suggested by Ahmed et al. [20]. The facilitators had a good understanding of the Rakhine/Arakanese language. They were able to clarify the questions to the interviewee because they were fluent in the Rohingya dialect.

2.4. Reliability and validity of the items

The questionnaire's items were derived from a study of similar literature. Five experts assessed the questionnaire's content validity with experience in the same field to determine the questionnaire items' relevance to the study's objectives. Separately, the experts looked over the questionnaire. The names of the reviewers were not known to each other.

Following the advice of experts, several modifications were made to the questionnaire. Cronbach's Alpha (α) values for SRH awareness, perception and behavior scales indicate high internal consistency reliability. Alpha (α) value is good among the awareness-related ten items ($\alpha = .85$) and is strong among the perception-related ten items ($\alpha = .91$) and among the behavior-related ten items ($\alpha = .90$). Among 40 Rohingya women, a pilot study was conducted to assess the understandability as well as the completeness and accuracy of the information provided for the study. They were left out of the final survey. The questionnaire was then updated, and a few questions were either modified or removed.

2.5. Measurement of the dependent variables

All the response options regarding SRH-related items involved a five-point Likert's scale (for the awareness section: definitely true, probably true, not sure, definitely false, and probably false; for the perception section: strongly agree, agree, neutral, disagree, and strongly disagree; for the behavior section: always, often, sometimes, rare, and never). For each section, the score of each positive statement ranged from 1 to 5, while the score was reversed for negative statements. The total score of each section of SRH awareness, perception, and behavior for any individual participants was obtained from the total of scores of 10 statements. For the ten items of each section of awareness, perception, and behavior, the maximum attainable score was '50', and the minimum score was '10'. However, five scales of each section were recoded into three categories because of the low frequency and percentage distribution at the endpoint of the scale.

2.6. Statistical analyses

The collected data were processed using Statistical Package for the Social Sciences (SPSS) version 24.0. An independent-sample t-test was used to examine the mean difference of each item of respondents' SRH awareness, perceptions, and behaviors-related items by the utilization of health communication interventions. The variables with a $p < .05$ in bivariate analyses (independent-samples t-test and Pearson correlations) were included in linear regression models. The multicollinearity was checked. In hierarchical regression, model 1 assessed the determinants of better SRH health awareness, perceptions, and behaviors concerning sociodemographic variables. Model 2 explored the effects of sociodemographic variables and respondents' access to maternal healthcare-related factors, while model 3 (the final model) examined the respondents' sociodemographic, access to maternal healthcare, and utilization of health communication interventions-related factors. In model summary, ANOVA values ($p < .001$) of each model for overall SRH awareness, perceptions, and behaviors report that our hierarchical regression model performed well and would be a good predictor of the main outcome variables. R^2 of each model was changed considerably, and F changes were also statistically significant ($p < .001$). Variables with p -value $< .05$ in the regression analysis were taken as significant predictors.

2.7. Ethical approval and consent to participate

The study was reviewed and approved by the Faculty of the Social Sciences of the University of Chittagong. The study received ethical approval from the Ethical Review Board of the University of Chittagong (reference number: CU SOC-21-0002). Each participant gave their informed written consent to participate by signing or thumb-stamping a consent document.

3. Results

3.1. Descriptive characteristics of the participants

Table 1 shows that the mean age of the participants was 25.52 (SD \pm 6.32) years. As regards the educational status of the Rohingya women,

Table 1. Background characteristics of the participants.

Characteristics (N = 415)	Categories	Number	Percentage
Region of residence in Myanmar	Mongdu	124	29.9
	Racidong	71	17.1
	Buthidong	182	43.9
	Others	38	9.2
Age (Mean 25.52 years, SD \pm 6.32)	18–20	99	23.9
	21–24	109	26.3
	25–30	141	34.0
	Above 30	66	15.9
Educational status	No education	218	52.5
	Primary incomplete	111	26.7
	Primary	33	8.0
	Lower secondary	34	8.2
	Secondary	19	4.6
Occupational status	Housewife	327	78.8
	Professional	88	21.2
Amount of land in Myanmar 5.24 (\pm 6.22) acres			
Number of children (3.96 \pm 2.58)	1–2	143	34.5
	3–4	115	27.7
	5–6	88	21.2
	Above 6	69	16.6

more than half (218, 52.5%) had no formal education. Besides, 111 (26.7%) had below the primary level of education and most of the participants (327, 78.8%) were homemakers. The respondents' mean amount of land in Myanmar was 5.24 (\pm 6.22) acres. The mean number of children of the study participants was almost 4 (3.96, SD \pm 2.58).

3.2. Utilization of health communication interventions

Figure 1 depicts the utilization of different health communication interventions provided by the NGOs in the camp through interpersonal, organizational, and print media channels. Of the Rohingya women, 331 (79.8) ever had a consultation with a health care provider (doctor/nurse) regarding SRH issues, while only 284 (68.4%) of them had a door visit by the health worker in this regard. Besides, 260 (62.7%) participated in NGO's SRH communication program, whereas 216 (52%) saw posters and billboards. In addition, 315 (75.9%) understood the messages of the communication program adequately.

3.3. Participants' SRH status by health communication interventions

Table 2 illustrates that 279 (67.2%) participants knew that the STI carrier may unknowingly spread the virus to their companion. In addition, 280 (67.5%) participants accurately knew whether a three-year delay between conception and birth can minimize the risk of adverse maternal health. Regarding the item, 'if any woman is a mother before 18 years is immature to take care of baby', 319 (76.9%) of the Rohingya women answered correctly. Furthermore, 242 (58.3%) participants are well-informed regarding the copious benefits of using contraceptives.

Table 3 displays that the majority (81.7%) of the participants correctly agreed whether a girl should know the SRH and Sexually transmitted diseases (STDs) before marriage. Besides, 363 (87.5) participants thought that SRH and FP matters should be discussed openly with husbands. Regarding different myths of menstruation, 126 (30.4%) had the opinion that a woman should not go into the kitchen during the period, while 176 (42.4%) thought that a woman should not touch anyone during menstruation. Moreover, more than two-thirds of the participants thought that a woman should not brush her hair during the menstrual period, whereas more than one-fourth of the participants

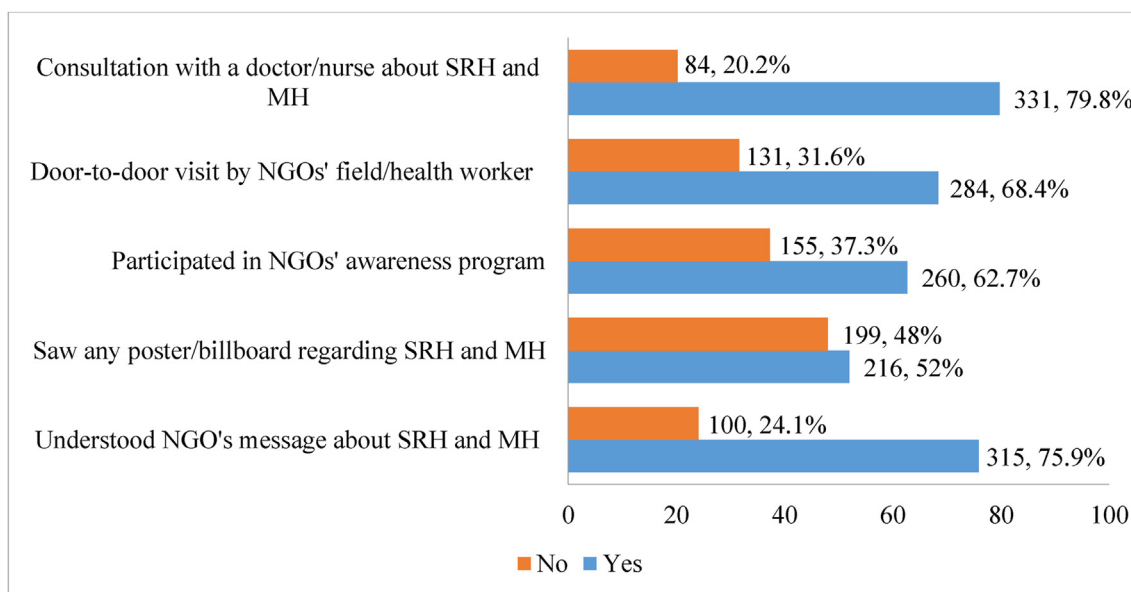


Figure 1. Utilization of health communication interventions of the participants.

Table 2. Participants' sexual and reproductive health awareness by the utilization level of health communication interventions.

Items	Descriptive Statistics				Independent-samples t-test			
	False n (%)	Don't know n (%)	True n (%)	M (SD)	High Utilization of HCIs	Low Utilization of HCIs	t	p
1. Excessive, little and irregular menstruation is a problem	4 (1.0)	21 (5.1)	390 (94.0)	4.73 (±0.61)	4.89 (±0.37)	4.50 (±0.78)	6.11	<.001
2. Uncleanliness during menstruation causes different diseases	32 (7.7)	6 (1.4)	377 (90.8)	4.53 (±0.91)	4.70 (±0.75)	4.31 (±1.05)	4.15	<.001
3. Teenage pregnancy might be harmful to mother and child	46 (11.1)	22 (5.3)	347 (83.6)	4.27 (±1.11)	4.67 (±0.62)	3.73 (±1.37)	8.45	<.001
4. A pregnant woman should have four antenatal visits with a doctor	68 (16.4)	3 (0.7)	344 (82.9)	4.32 (±1.37)	4.82 (±0.74)	3.63 (±1.71)	8.63	<.001
5. During delivery a female relative is enough	301 (72.5)	1 (0.2)	113 (27.2)	3.96 (±1.56)	4.80 (±0.72)	2.81 (±1.68)	14.71	<.001
6. A mother can perform heavy housework after 1–2 days of delivery	404 (97.3)	3 (0.7)	8 (1.9)	4.77 (±0.59)	4.84 (±0.54)	4.68 (±0.65)	2.61	.009
7. The STI carrier may unknowingly spread the virus to their companion.	16 (3.9)	120 (28.9)	279 (67.2)	3.99 (±0.96)	4.29 (±.87)	3.57 (±.91)	8.19	<.001
8. A three-year delay between conception and birth can minimize the risk of adverse maternal health	109 (26.3)	26 (6.3)	280 (67.5)	3.72 (±1.46)	4.38 (±0.96)	2.82 (±1.55)	11.71	<.001
9. If any woman be a mother before 18 years is immature to take care of baby	56 (13.5)	40 (9.6)	319 (76.9)	3.97 (±1.12)	4.33 (±0.81)	3.48 (±1.30)	7.62	<.001
10. There are many benefits of taking contraceptive	11 (2.7)	162 (39.0)	242 (58.3)	3.73 (±0.82)	3.90 (±0.78)	3.51 (±0.82)	4.87	<.001

believed that a woman should not see herself in the mirror during the menstrual cycle. Furthermore, more than half of the participants expressed that one should conceal if s/he is affected by any STD.

Table 4 demonstrates that of the participants, 140 (33.7%) listened attentively if they got any message regarding SRH and MH, while 106 (25.5%) reported that they informed others if they knew anything new about SRH and MH. Conversely, about one-fourth of the participants attempted to conceal the issues related to SRH and STDs. Of the participants, 247 (59.5%) use sanitary pads during menstruation, and more than one-fifth feel ashamed to discuss SRH issues with their husbands. Besides, about two-thirds of the participants use contraceptives, and only 11.8 percent want to continue contraceptive use despite their husbands' disapproval.

Findings (Tables 2, 3, and 4) from the independent-sample t-tests depict that there were statistically significant differences ($p < .01$) in the

mean scores of all items related to respondents' SRH awareness, perceptions, and behaviors for the difference in utilization of health communication interventions. Figures 2, 3, and 4 also depict that the study participants utilized more health communication interventions, had better SRH awareness, showed a more positive attitude towards these issues, and practiced more hygiene behaviors.

3.4. Predictors of participants' better SRH status

The hierarchical multiple regression as shown in Table 5 reveal that the predictors of respondents' regular SRH awareness are: the amount of land owned in Myanmar ($\beta = .09, p = .005$), the current number of children ($\beta = -.17, p < .001$), having a reliable source of SRH knowledge ($\beta = .09, p = .007$), access to SRH and MH care ($\beta = .18, p < .001$), ever had a consultation a doctor/nurse on SRH ($\beta = .23, p < .001$), ever had a door visit by

Table 3. Participants' sexual and reproductive health perceptions by the utilization level of health communication interventions.

Items	Descriptive Statistics				Independent-samples t-test			
	Disagree n (%)	Neutral n (%)	Agree n (%)	M (SD)	High Utilization of HCIs	Low Utilization of HCIs	t	p
1. A girl should know the SRH and STDs before marriage	15 (3.6)	61 (14.7)	339 (81.7)	4.38 (±0.92)	4.68 (±0.61)	3.95 (±1.10)	7.95	<.001
2. SRH and FP matters should be discussed openly with the husband	38 (9.2)	14 (3.4)	363 (87.5)	4.36 (±1.09)	4.78 (±0.50)	3.78 (±1.38)	9.19	<.001
3. A woman should not go into the kitchen during the menstrual period	281 (67.7)	8 (1.9)	126 (30.4)	3.71 (±1.52)	3.93 (±1.36)	3.42 (±1.69)	3.25	.001
4. A woman should not touch anyone during the period	231 (55.7)	8 (1.9)	176 (42.4)	3.27 (±1.56)	3.52 (±1.39)	2.93 (±1.70)	3.77	.001
5. A woman should not brush her hair during the menstrual period	259 (62.4)	14 (3.4)	142 (34.2)	3.48 (±1.51)	3.83 (±1.28)	3.01 (±1.67)	5.45	<.001
6. A woman should not see herself in the mirror	276 (66.5)	30 (7.2)	109 (26.3)	3.67 (±1.52)	4.08 (±1.20)	3.12 (±1.72)	6.33	<.001
7. One should conceal if s/he is affected by any STDs	169 (40.7)	15 (3.6)	231 (55.7)	2.89 (±1.51)	3.26 (±1.45)	2.39 (±1.46)	6.01	<.001
8. A woman should not take a baby before 20 years old	138 (33.3)	49 (11.8)	228 (54.9)	3.27 (±1.35)	3.64 (±1.20)	2.75 (±1.39)	6.81	<.001
9. A father of a newborn baby should be informed regarding FP	49 (11.8)	32 (7.7)	334 (80.5)	4.06 (±1.05)	4.40 (±0.79)	3.58 (±1.18)	7.97	<.001
10. A couple should discuss and plan about the timing of taking baby	73 (17.6)	46 (11.1)	296 (71.3)	3.88 (±1.21)	4.34 (±0.89)	3.26 (±1.31)	9.46	<.001

Table 4. Participants' sexual and reproductive health behaviors by the utilization level of health communication interventions.

Items	Descriptive Statistics				Independent-samples t-test			
	Never/rarely n (%)	Sometimes n (%)	Often/always n (%)	M (SD)	High Utilization of HCIs	Low Utilization of HCIs	t	p
1. I want to know more new information regarding SRH	82 (19.8)	63 (15.2)	270 (65.1)	3.78 (±1.50)	4.40 (±1.05)	2.92 (±1.58)	10.77	<.001
2. I listen attentively if I get any message regarding SRH	147 (35.4)	128 (30.8)	140 (33.7)	2.87 (±1.34)	3.33 (±1.21)	2.23 (±1.24)	9.08	<.001
3. I inform others if I know anything new about SRH	149 (35.9)	160 (38.6)	106 (25.5)	2.75 (±1.20)	3.22 (±1.03)	2.10 (±1.11)	10.50	<.001
4. I try to conceal the issues related to SRH and STDs	131 (31.6)	184 (44.3)	100 (24.1)	3.10 (±1.19)	3.35 (±0.99)	2.75 (±1.36)	4.98	<.001
5. I use sanitary pad during menstruation	87 (21.0)	81 (19.5)	247 (59.5)	3.62 (±1.45)	4.32 (±0.98)	2.67 (±1.46)	12.96	<.001
6. I discuss regarding SRH with relatives and neighbors	137 (33.0)	190 (45.8)	88 (21.2)	2.80 (±1.12)	3.23 (±1.03)	2.21 (±0.96)	10.20	<.001
7. I feel ashamed to discuss SRH with my husband	268 (64.6)	58 (14.0)	89 (21.4)	3.84 (±1.41)	4.32 (±0.98)	3.18 (±1.63)	8.24	<.001
8. I use contraceptive	115 (27.2)	27 (6.5)	273 (65.8)	3.44 (±1.60)	4.14 (±1.04)	2.49 (±1.73)	11.17	<.001
9. I left contraceptive use after side effects of taking it	228 (54.9)	98 (23.6)	89 (21.4)	3.57 (±1.55)	4.03 (±1.14)	2.95 (±1.81)	6.96	<.001
10. I want to continue contraceptive use despite my husband's disapproval	263 (63.4)	103 (24.8)	49 (11.8)	2.13 (±1.23)	2.29 (±0.96)	1.91 (±1.49)	2.97	.003

any NGO worker on SRH ($\beta = .20, p < .001$), participated in the SRH awareness program ($\beta = .10, p = .010$), and whether respondents understood the message of SRH ($\beta = .21, p < .001$). These factors contributed significantly to the regression model ($F = 72.90, df = 4/404, p < .001$) and accounted for 64% variations in the outcome variable.

Table 5 also report that the predictors of respondents' regular SRH perceptions are: Rachidong as the area of residence in Myanmar ($\beta = .10, p = .005$), the amount of land owned in Myanmar ($\beta = .09, p = .009$), the current number of children ($\beta = -.12, p = .001$), having a reliable source of SRH knowledge ($\beta = .21, p < .001$), ever had a consultation with a doctor/nurse on SRH ($\beta = .18, p < .001$), ever had a door visit by an NGO worker ($\beta = .12, p = .023$), and whether respondents understood the message of SRH ($\beta = .38, p < .001$). These determinants contributed

significantly to the regression model ($F = 48.04, df = 4/404, p < .001$) and accounted for 54% variations in the outcome variable.

Table 5, furthermore, depicts that the four predictors of respondents' regular SRH behaviors are: Rachidong as the area of residence in Myanmar ($\beta = .08, p = .014$), the amount of land owned in Myanmar ($\beta = .11, p < .001$), the current number of children ($\beta = -.14, p < .001$), having a reliable source of SRH knowledge ($\beta = .16, p < .001$), access to SRH and MH care ($\beta = .16, p < .001$), ever had a consultation with a doctor/nurse on SRH ($\beta = .24, p < .001$), ever had a door visit by a field worker on SRH ($\beta = .19, p < .001$), and whether respondents understood the message of SRH ($\beta = .24, p < .001$). These predictors contributed significantly to the regression model ($F = 76.73, df = 4/404, p < .001$) and accounted for 66% variations in the outcome variable.

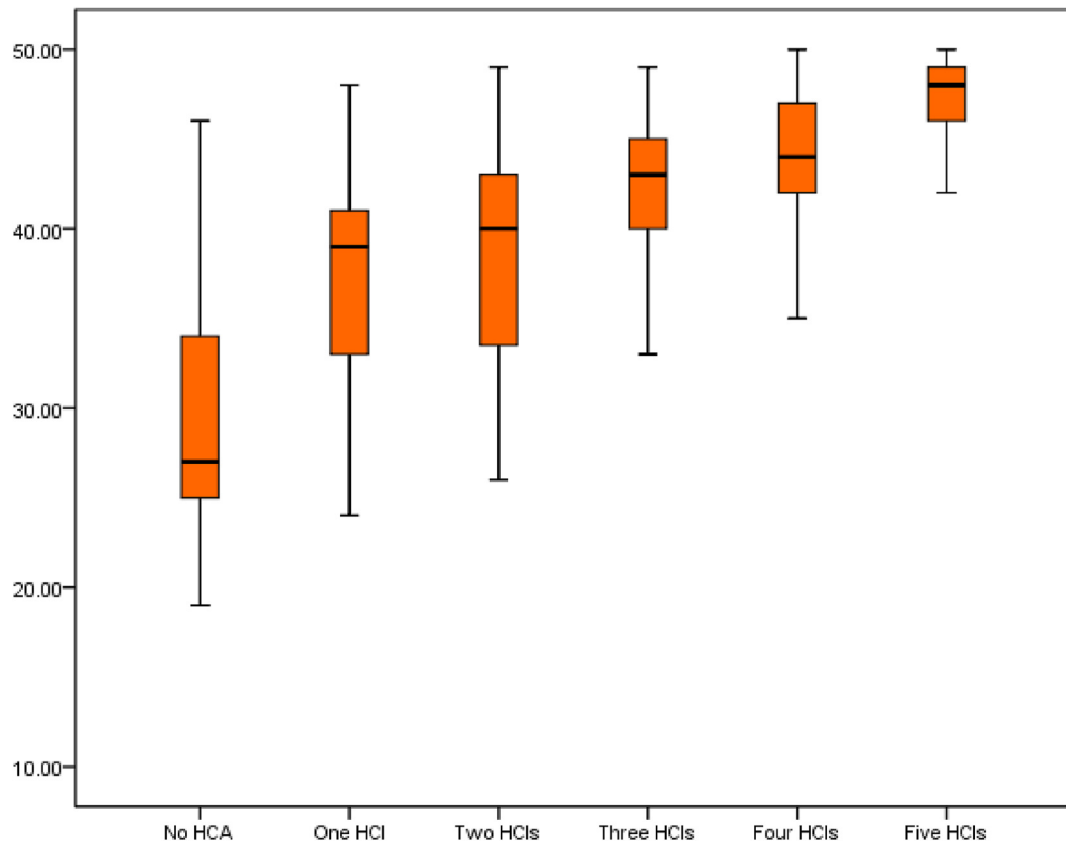


Figure 2. SRH awareness of the study participants by utilization of health communication interventions (HCIs).

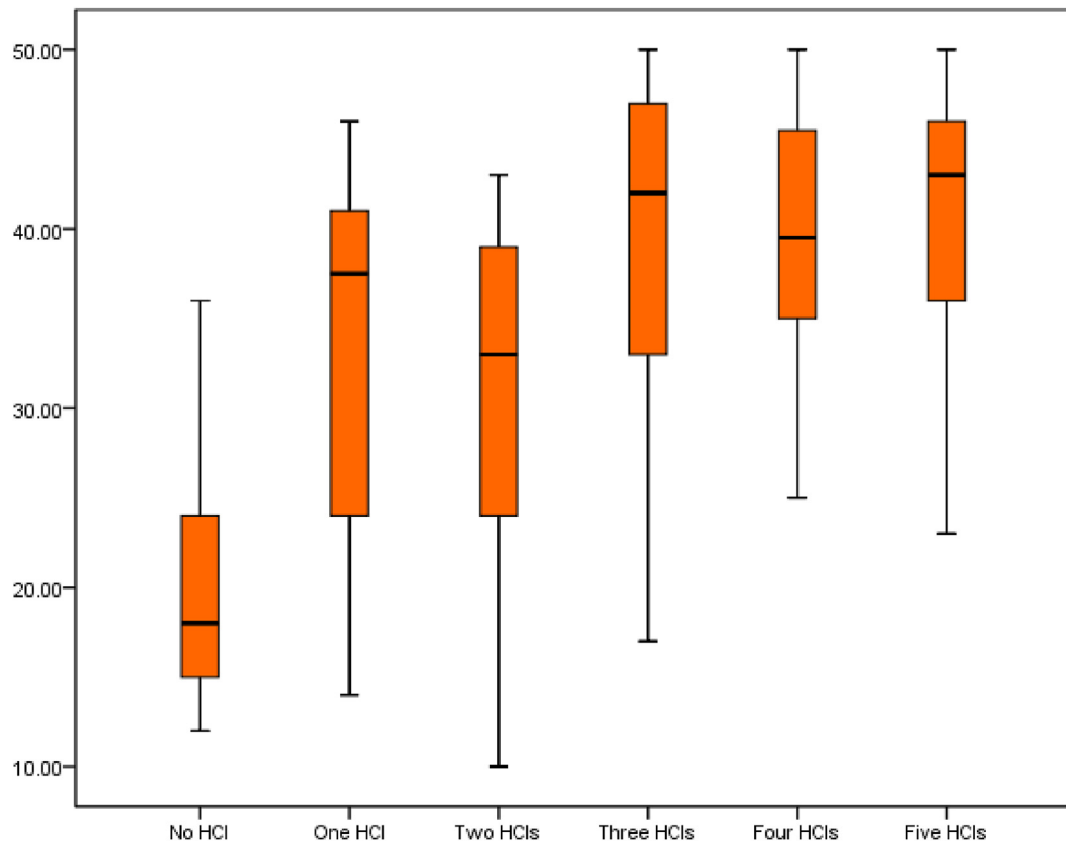


Figure 3. SRH perceptions of the study participants by utilization of health communication interventions (HCIs).

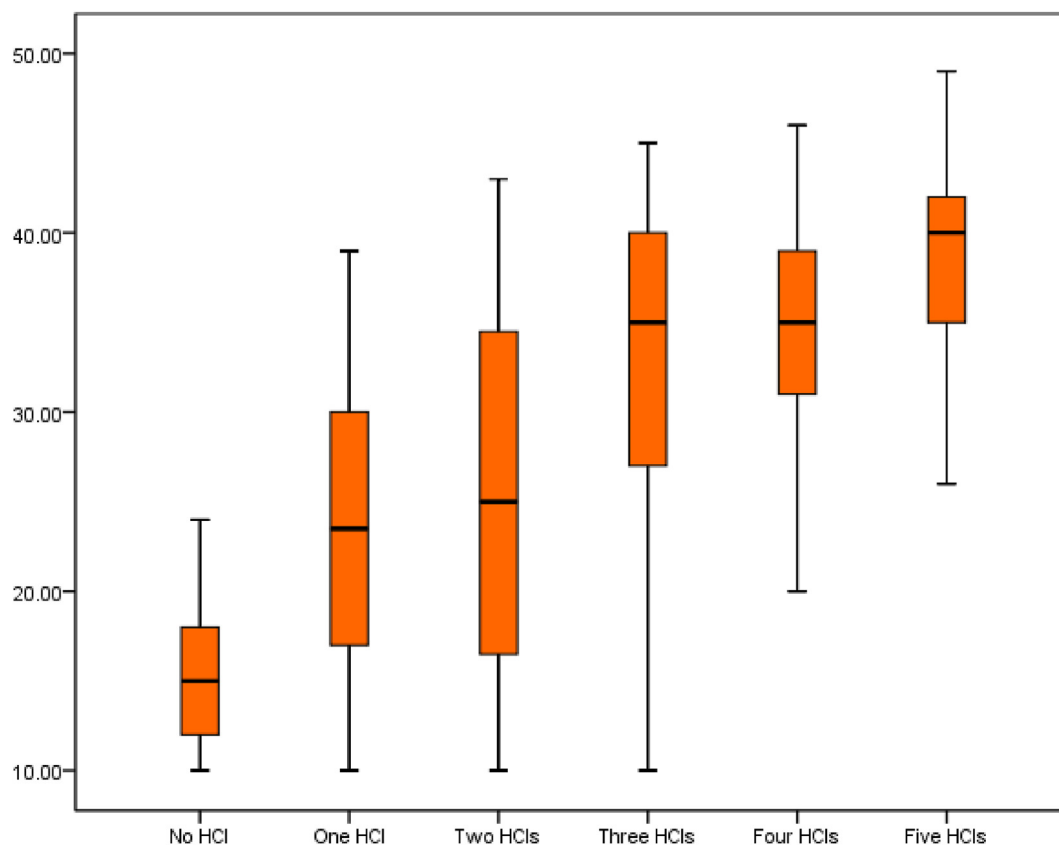


Figure 4. SRH behaviors of the study participants by utilization of health communication interventions (HCIs).

4. Discussion

The study showed that not all Rohingya women in the study area utilized most of the communication interventions conducted by NGOs despite the availability of programs in the camp. Perceptions of taboo, conservative attitudes and orthodox values of the family and society are the impediments to participating in NGO-run health communication interventions relating to sexual and reproductive health for a cohort of the Rohingya women in the study area. Although there were posters and billboards on sexual and reproductive health in the camp, the Rohingya women ignored them as they were indifferent regarding this issue. Furthermore, women from all families of refugee camps are not allowed to go out of the house and to talk to health workers due to religious prohibitions and husbands' disapproval. Our study findings are similar to previous studies [17, 19], which reported that even though healthcare services are available in the camps, service utilization for maternal and sexual reproductive health is low owing to a long-standing practice of restricting girls' and women's movements outside of the house. Literature suggested that increased autonomy among refugee women related to their sexual and reproductive health and greater involvement in different activities outside their homes could lead to a considerable upsurge in contraceptive use [16].

Our findings depicted that a quarter of Rohingya women do not understand the language used in health communication interventions. Even though there is an affinity for the languages between the Rohingya community living in the refugee camps and the people of Cox's Bazar and Chittagong, there is also a variance. In addition, many doctors working in refugee camps came from outside the Chittagong division and could not speak fluently like the Rohingya people; therefore, a quarter of the Rohingya women did not comprehend the language used in communication activities. Consequently, in most cases, besides Bengali staff, the Rohingya volunteers are also recruited to communicate effectively with their community. Our result is similar to others reporting that Bangladeshi

health workers from Chittagong and Cox's Bazar district can speak a language analogous to the Rohingya language, while communication between officials and staff hiring from outside the districts and refugee people is difficult [14].

According to our study findings, the Rohingya people believe in this type of dogmatic axioms because of religious prejudices, thinking too early to learn, the perception of being an embarrassment, and being afraid of marriage delaying, etc. In fact, among the Rohingya community, sociocultural norms, religious doctrine, and orthodox beliefs make reproductive health a taboo subject, depicting that many Rohingya women believe too much discussion about sexual and reproductive health would be a religious offense. Consequently, the Rohingya people are unwilling to address openly and remain unaware of SRH issues. Our findings are in agreement with other studies [14, 16].

There are also some myths about menstruation among the Rohingya people. These myths about menstruation are imposed by traditional views and cultural beliefs that restrict adolescent girls and adult women. Because of these restrictions, women are prohibited from going outside, entering the kitchen, contacting any guy, brushing their hair, or looking in the mirror. Even a cohort of respondents said they should adhere to these malpractices, believing that disobeying these limitations will destroy their property and have an adversary effect on men. Copious eke of myths and prohibitions relating to menstruation are also common in Bangladesh and other countries with similar cultural attributes [21, 22, 23, 24, 25].

The study found that Rohingya women became involved in more communication interventions; more awareness, positive attitudes, and safe behavior are prevalent among them. Bangladeshi and foreign skilled and experienced officers work as health communication specialists who formulate communication strategies and plan communication programs. Usually, the NGOs employ Bangladeshi doctors, foreign doctors, midwives, and nurses as health care providers after equipping them with adequate training regarding language and cultural issues. Volunteer

Table 5. Linear regression showing the Predictors of a Better Awareness, Perceptions and Behaviors of SRH among the Participants.

Variables	SRH Awareness		SRH Perceptions		SRH Behaviors	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Region of residence in Myanmar ^a	0.01	.872	0.10	.005	0.08	.014
Educational status ^b	-0.01	.666	-0.02	.572	-0.00	.949
Amount of land owned in Myanmar ^c	0.09	.005	0.09	.009	0.11	<.001
Current number of children ^c	-0.17	<.001	-0.12	.001	-0.14	<.001
Reliable source of SRH knowledge ^d	0.09	.007	0.21	<.001	0.16	<.001
Access to SRH and MH care ^e	0.18	<.001	0.05	.217	0.16	<.001
Consultation with a doctor/nurse on SRH ^e	0.23	<.001	0.18	<.001	0.24	<.001
Door visit by an NGO worker on SRH ^e	0.20	<.001	0.12	.023	0.19	<.001
Participated in SRH communication program ^e	0.10	.010	-0.05	.222	0.02	.549
Whether respondents understood the message of SRH ^e	0.21	<.001	0.38	<.001	0.24	<.001
Model summary and ANOVA	$R^2 =$ 64%, $F =$ 72.90	<.001	$R^2 =$ 53%, $F =$ 48.04	<.001	$R^2 =$ 65%, $F =$ 76.73	<.001

^a 1 = Mongdu/Racidong, 2 = Buthidong.

^b 1 = No education, 2 = Have education.

^c Continuous variable.

^d 1 = Others, 2 = Physician/nurse.

^e 1 = No, 1 = Yes.

doctors who are proficient in Rakhine/Arakanese language are prioritized in hiring in the camps. Moreover, the Bengali and Rohingyas were recruited as field workers based on their educational qualifications and language skills to communicate effectively with the women in the camps. To bring positive changes in SRH care of Rohingya women, various group-based meetings are held in blocks, and awareness is created through the door-to-door interpersonal visit by NGOs' health workers. Religious conservatism is maintained during a camp visit. *Imam* (Muslim religious leader) and *Majhi* (local Rohingya leaders), who are considered as opinion leaders and influential persons of the Rohingya community, are employed to address the hard-core resisters who are adherent of existing dogmatic myths and orthodox beliefs and also oppose to adopt with recommended attitudes and behaviors. Opinion leaders such as an Imam and an elderly person who have already acquiesced to the messages of health communication interventions abet the NGOs to bring changes among the austere Rohingya women. The health communication message was often disseminated in the mosque with the cooperation of the religious leaders. Especially female workers were employed to address sexual and reproductive health issues among Rohingya women, as the topics are perceived as highly taboo. Besides, NGO health workers go from block to block in collaboration with *Majhi* and *Imam*. Our depiction is supported by a previous study [14].

β values show that the Rohingya women's interpersonal communication with the health care provider and understanding of the messages of communication activities are reported as the strongest predictors of outcome variables. We noticed the SRH status of the Rohingya women was better, who received medical consultation and advice from the healthcare providers. Health professionals have been able to communicate with them and familiarize them with SRH more favorably. The Rohingya women are given numerous health messages for pregnancy, maternity, child health, and general health by the doctors and nurses working at clinics and healthcare facilities. This study also observed that

the refugee women whose primary source of SRH-related information were doctors and nurses and who had more access to reproductive and maternal health care were more likely to have better SRH outcomes.

Apart from communication-related predictors, some socioeconomic factors, for example, the living area in Myanmar and the amount of land there, appeared as influencing variables of better SRH outcome. In particular, the perception and behavior of the women from Rachidong area are better than those of the women from Maungdaw and Buthidong areas. Rachidong has a better transportation system, giving its residents more options for commuting to the city for a job. In addition, women with fewer children were found to have better SRH-related outcomes in our study. This cohort is more conscious and progressive than others as they engage and remain focused actively in various awareness programs. Consequently, they become the primary and early receivers of SRH services.

This study has several limitations. First, the study data were collected following the convenient sampling method that might question the wholeness of the study. Second, social desirability could have influenced the participant's data, affecting the outcome's validity. Third, this study could not provide a more accurate interpretation and in-depth insight into the matter in absence of the qualitative data. Finally, the challenges were exacerbated by the distances between separate blocks where data collection was taking place at the same time. Due to a shortage of funds, the study data was only obtained from one camp. As a result, concerns may be posed as to whether the various camps, in terms of facility and NGOs' access, could cast doubt on the study's assertion of the wholeness of the Rohingya women, even though study participants from various backgrounds were included as study samples.

5. Conclusion

The Rohingya women's utilization of NGOs' health communication interventions appeared to be stronger predictors of better SRH, than socioeconomic variables, while refugee women's interpersonal communication with health care providers and understanding of the message of communication activities contributed significantly. This study recommends strengthening communication interventions using behavioral change theories and strategic communication approaches, as it is difficult to change their socioeconomic status in existing settings. It also suggests that the Rohingya women be trained and prepared on important SRH-related issues through a behavior change communication program to refute their dogmatic perceptions, myths, and misconceptions; and those religious leaders be enticed and active in the program planning and implementation.

Declarations

Author contribution statement

Muhammad Zakaria, MPH; Tania Nachrin, MSS; Md. Abul Kalam Azad, MA: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no competing interests.

Additional information

No additional information is available for this paper.

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References

- [1] M. Safi, UN Chief and Rights Groups Raise Concerns over Rohingya deal, *The Guardian*, 2018. <https://www.theguardian.com/world/2018/jan/17/un-chief-and-rights-groups-raise-concerns-over-myanmar-rohingya-deal>.
- [2] UN Women, Gender Brief on Rohingya Refugee Crisis Response in Bangladesh, 2018. <http://www2.unwomen.org/media/field%20office%20eseasia/docs/publications/2017/10/gender-advocacy-paper-for-rohingyarefugee-crisis-response-in-bangladesh-r10.pdf?la=en&vs=2521>.
- [3] Inter-Agency Working Group (IAWG), Women and Girls Critically Underserved in Rohingya Refugee Response, 2018. <https://reliefweb.int/sites/reliefweb.int/files/resources/IAWG%20Statement%20on%20Rohingya%20Humanitarian%20Response.pdf>.
- [4] N. Uddin, Ethnic cleansing of the Rohingya people, in: *The Palgrave Handbook of Ethnicity*, Palgrave Macmillan, Singapore, 2019.
- [5] United Nations Security Council (UNSC), Report of the Secretary General on Conflict-Related Sexual Violence, para. 55, U.N. Doc. S/2018/250, 2018.
- [6] Human Rights Watch (HRW), All of My Body Was Pain: Sexual Violence Against, 2017. https://www.hrw.org/sites/default/files/report_pdf/burma1117_web_1.pdf.
- [7] I. Toma, M. Chowdhury, M. Laiju, N. Gora, N. Padamada, Rohingya Refugee Response Gender Analysis: Recognizing and Responding to Gender Inequalities, 2018.
- [8] United Nations Population Fund (UNFPA), As Rohingya Refugee Crisis Escalates, Women Emerge as Front-Line Responders, 2017. <https://www.unfpa.org/news/rohingya-refugee-crisis-escalates-women-emerge-front-lineresponders>.
- [9] A. Taylor, Child marriage in the Rohingya camps in Bangladesh, *Atlantic* (2017).
- [10] R. Srivastava, Lured with a Happily-Ever-After Dream, Rohingya Girls Sold in India, *Reuters*, 2018. <https://www.reuters.com/article/us-india-trafficking-rohingya/lured-with-a-happily-everafter-dream-rohingya-girls-sold-in-india-idUSKBN1FB1LD>.
- [11] R. Schiavo, *Health Communication: from Theory to Practice*, John Wiley & Sons, 2013.
- [12] R.K. Thomas, *Health Communication*, Springer Science & Business Media, 2006.
- [13] P. Palma, Family planning: too important, yet ignored: Rohingya Mothers, Children in Danger for Lack of Services, in: *Daily Star*. Dhaka, 2017. <https://www.thedailystar.net/frontpage/family-planning-too-important-yet-ignored-1485694>.
- [14] Women's Refugee Commission (WRC), A Clear Case for Need and Demand: Accessing Contraceptive Services for Rohingya Women and Girls in Cox's Bazar, 2019. <https://www.womensrefugeecommission.org/wp-content/uploads/2020/04/Contraceptive-Service-Delivery-in-the-Refugee-Camps-of-Cox-s-Bazar-Bangladesh-05-2019.pdf>.
- [15] M. Tanabe, A. Myers, P. Bhandari, N. Cornier, S. Doraiswamy, S. Krause, Family planning in refugee settings: findings and actions from a multi-country study, *Conflict Health* 11 (1) (2017) 9.
- [16] M.N. Khan, M.M. Islam, M.M. Rahman, M.M. Rahman, Access to female contraceptives by Rohingya refugees, Bangladesh, *Bull. World Health Organ.* 99 (3) (2021) 201.
- [17] S. Ainul, I. Ehsan, E. Haque, S. Amin, U. Rob, A.J. Melnikas, J. Falcione, Marriage and Sexual and Reproductive Health of Rohingya Adolescents and Youth in Bangladesh: a Qualitative Study, *Population Council*, Dhaka, 2018. https://knowledgecommons.popcouncil.org/cgi/viewcontent.cgi?article=1467&context=departments_sbsr-pgy.
- [18] M.A.K. Chowdhury, S. Billah, F. Karim, A.N.S. Khan, S. Islam, S.E. Arifeen, Report on Demographic Profiling and Needs Assessment of Maternal and Child Health (MCH) Care for the Rohingya Refugee Population in Cox's Bazar, Maternal and Child Health Division, Icddr, Bangladesh. Dhaka, 2018. <http://dspace.icddr.org/jspui/bitstream/123456789/9067/2/Special%20Report%20153.pdf>.
- [19] P.K. Parmar, R.O. Jin, M. Walsh, J. Scott, Mortality in Rohingya refugee camps in Bangladesh: historical, social, and political context, *Sex. Reprod. Health Matters* 27 (2) (2019) 39–49.
- [20] R. Ahmed, B. Aktar, N. Farnaz, P. Ray, A. Awal, R. Hassan, S.B. Shafique, M.T. Hasan, Z. Quayyum, M.B. Jafarovna, L.H. Kobeissi, Challenges and strategies in conducting sexual and reproductive health research among Rohingya refugees in Cox's Bazar, Bangladesh, *Conflict Health* 14 (1) (2020) 1–8.
- [21] S. Dube, K. Sharma, Knowledge, attitude and practice regarding reproductive health among urban and rural girls: a comparative study, *Stud. Ethno-Med.* 6 (2) (2012) 85–94.
- [22] S.M. Gaferi, M.F. Al-Harbi, S.M. Yakout, A.T. Soliman, Knowledge, attitude and practice related to reproductive health among female adolescents, *J. Nurs. Educ. Pract.* 8 (8) (2018) 53–65.
- [23] O. Ivanova, M. Rai, W. Mlahagwa, J. Tumuhairwe, A. Bakuli, V.N. Nyakato, E. Kemigisha, A cross-sectional mixed-methods study of sexual and reproductive health knowledge, experiences and access to services among refugee adolescent girls in the Nakivale refugee settlement, Uganda, *Reprod. Health* 16 (1) (2019 Dec) 1.
- [24] A. Kumar, K. Srivastava, Cultural and social practices regarding menstruation among adolescent girls, *Soc. Work. Publ. Health* 26 (6) (2011) 594–604.
- [25] M. Zakaria, F. Karim, S. Mazumder, F. Cheng, J. Xu, Knowledge on, attitude towards, and practice of sexual and reproductive health among older adolescent girls in Bangladesh: an institution-based cross-sectional study, *Int. J. Environ. Res. Publ. Health* 17 (21) (2020) 7720.