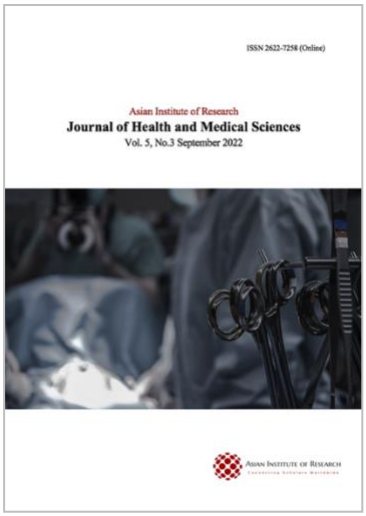

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Assessment of Reproductive Health Status and Quality of Life of Female Adolescents Living in the Slums of Dhaka, Bangladesh During COVID-19 Pandemic Situation: A Mixed-Method Study

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Abstract
Background: The COVID-19 pandemic has exacerbated the challenges of vulnerable adolescents who had reproductive health problems even before the COVID-19 pandemic. Methodology: We investigated this vulnerability through cross-sectional studies with a mixed-method approach. on female adolescents aged 15-19 years, residing in the Bauniabadh and the Ta block Jhil Par slums together with service providers. The quantitative method included a household survey of adolescents (n=144) through a semi-structured pre-tested questionnaire. The qualitative method included interviews with service providers (n=10) and with adolescents (n=9). Result: The study revealed changes in length, duration and flow of menstruation, substandard menstrual hygiene practices and impediments to the uptake of reproductive health (RH) information by adolescents during the pandemic. Married pregnant adolescents are inclined in taking their antenatal checkups (ANC) only during the last trimester and preferred delivery at home during the pandemic. There was also an increase in marriage among these adolescents and service providers had difficulty providing door-to-door RH services. Most of our female adolescents were married off during the pandemic, they lost connection with their friends and this made them feel lonely and secluded. They did not receive the support of their friends as before the pandemic. Conclusion: The study will enable the adolescent health expert to focus on the sexual and reproductive health (SRH) of vulnerable adolescents living in impoverished conditions during the COVID-19 pandemic.

Keywords: COVID-19, adolescents, slum, reproductive health, vulnerable, Bangladesh

1. Introduction

When compared to other age groups, adolescents had a lower incidence of hospitalization and death from COVID-19. However, the disease had an impact on their reproductive health, sexual health and quality of life. Menstrual health, menstrual hygiene management, family planning, and obstetric care are some of the aspects of reproductive health (RH) for adolescents. Evidence from prior large-scale disruptions, like natural catastrophes and recessions, suggests that the current pandemic would have substantial and long-term consequences for adolescents (Lindberg et al., 2020).

Adolescents make up 1.2 billion people, or nearly one-fifth of the world's population (UNICEF, 2021). Bangladesh has 36 million adolescents, accounting for 22% of the population (UNICEF, 2021). A high number of Bangladeshi migrants end up in slums in the cities. More than 5,000 slums in Dhaka city are home to an estimated four million inhabitants (UNICEF, 2021).

Adolescence is considered a vulnerable period because during this phase physical and social changes occur quickly and simultaneously (National strategy for adolescent health, 2017-18). As a result, an adolescent may experience physical and social issues such as menstrual problems, and issues in dealing with menstrual hygiene, and as for married adolescents matters of contraceptives and conception, all these situations invariably affect their Quality of life (Nasreen, Alam, and Edhborg, 2016).

Studies conducted previously in the slums of Dhaka found that the mean marriage age in slums was 13.6 years. Because the living conditions of adolescents and their families in the slums were unsafe, they were married off early. During pregnancy or if they had menstrual problems, adolescent girls did not usually visit facilities. Girls in their adolescence did not foster good menstrual hygiene (Nasreen et al.,2016). Social distancing and other parameters containing COVID made it difficult for adolescent women to get the health treatment, social services, and community support they needed to avoid child marriage and pregnancy. Adolescent girls are more likely to drop out of school and never return if schools remain closed. Job losses and rising economic uncertainty may push families to marry their daughters to alleviate financial strains (UNICEF, 2021).

During the pandemic, due to disruption in logistic services and countrywide lockdown adolescents found it difficult to avail contraceptives of their choice or plan a pregnancy. (Riley et al., 2020). There was also a rise in unwanted pregnancies and those adolescents did not get proper follow-up (Mambo et al., 2020).

Social interactions are critical in adolescents' growth to adulthood. Children and adolescents are especially sensitive to perceiving COVID-19-related restrictions on social contacts as a burden. Usual ways of communicating and seeking social support were greatly disturbed in the COVID-19 context. Face-to-face interactions were usually limited to members of the core network, such as family members. This had a significant impact on the social relationship domain of quality of life of adolescents who were no longer in school (Long et al., 2021).

Studies during the pandemic have shown that adolescents' relationships with friends deteriorated as a result of the restricted situation. The rate of children and adolescents experiencing the low health-related quality of life was notably higher during the pandemic (Deutscher, 2020).

Although there are studies worldwide on adolescent RH during the COVID-19 pandemic, RH of female adolescents in slums during the pandemic and perception of these adolescents and service providers on RH during the COVID-19 pandemic especially in low-resource settlements of Dhaka have been less studied. This paper's results expect to draw the attention of the adolescent health experts to emphasize the SRH of adolescents who live in peril

2. Methods and materials

2.1. Study Site and sample

The cross-sectional study employing a mixed-method approach was conducted in the slums of Pallabi thana of Mirpur, Dhaka. There are 107 slums under Dhaka North City Corporation (DNCC), from which Bauniabadh and 'Ta' block Jhil Par was selected purposively to match our participants and sample size. Bauniabadh slum is located in Pallabi Thana of Dhaka district, ward number 5, DNCC zone 2. It has approximately 2500 households. The slum is divided into 5 blocks A.B, C, D and E. On the other hand, 'Ta' Block Jhil par is located in Pallabi Thana of Dhaka district, ward number 6, DNCC zone 2. It has around 900 households. These two slums are approximately two kilometers apart from each other. We selected a mixed-method study design from this study, linking common themes across the survey and semi-structured interviews.

2.2. Data collection Tools

2.2.1. Quantitative survey questions

Pre-tested semi-structured Bangla questionnaire for data collection. At first, variables were identified according to the specific objectives. Then questionnaires and appropriate scales of measurement for each variable were identified.

This Questionnaire included socio-demographic questions for which questionnaires from Bangladesh Demography and Health Survey 2017 and 2018 were used. To assess the reproductive health and the access to reproductive health services, modified and adapted questionnaire derived from "Questionnaire for an interview with young people by John Cleland," A.H; Owen, J. E and MacGarvey, E.J (1995)", and Bangladesh Adolescent health and well-being survey 2019-2020 was used. To measure adolescents' social relationship domain of Quality of Life, the Bangla WHOQOL-BREF scale was used which is available on the WHO website. The WHOQOL-BREF is a 26-item instrument consisting of four domains. The social relationship domain of quality of life of the WHOQOL-BREF has 3 items, namely personal relationships, sex life and support from friends. It is scored from 1 to 5 on a response scale, which is stipulated as a five-point ordinal scale.

2.2.2. Qualitative guidelines

The qualitative portion included the in-depth interview and key informant interview guidelines. These guidelines were developed upon analysis of the quantitative part, where gaps were found as well as taking guidance from qualitative experts. The In-depth Interview guideline four code plans were there which were perception of menstrual health and menstrual hygiene management, perception of obstetric health, perception of the source of information about reproductive health and perception of social relationship domain of quality of life. The Key-Informant Interview guidelines had one code plan which was a perception of giving reproductive health services to adolescents during the COVID-19 pandemic situation

2.3. Data collection procedure

After receiving permission from IRB, and BSMMU, we took permission from the Chief Health Officer (CHO) of Dhaka North City Corporation (DNCC). The written permission of the CHO of DNCC along with the clearance of IRB, and BSMMU were submitted to the Assistant Health officer at DNCC, Mirpur Zone-2. Then a DNCC volunteer was recruited to access the slum. The DNCC volunteer introduced us to the gatekeeper of both the slums. Verbal permission from slum leader/gatekeeper of both the slums for conducting the study was taken. Along with gatekeeper of the slum and DNCC volunteer the households of the slum were reached.

Respondents comprised a simple random sampling of girls recruited from both slums after making a framework from a household listing. For the Bauniabadh slum, which is composed of 5 blocks for convenience of our study we chose blocks A, B, D, and E were chosen. Each block has several lines (roads) with families in it. Each line had about 8-10 households which were selected based on the inclusion criteria and then numbered. A framework was constructed from that household listing. A total of 160 households were listed from Baunibadh. A simple random sampling by lottery method was performed on that household list.

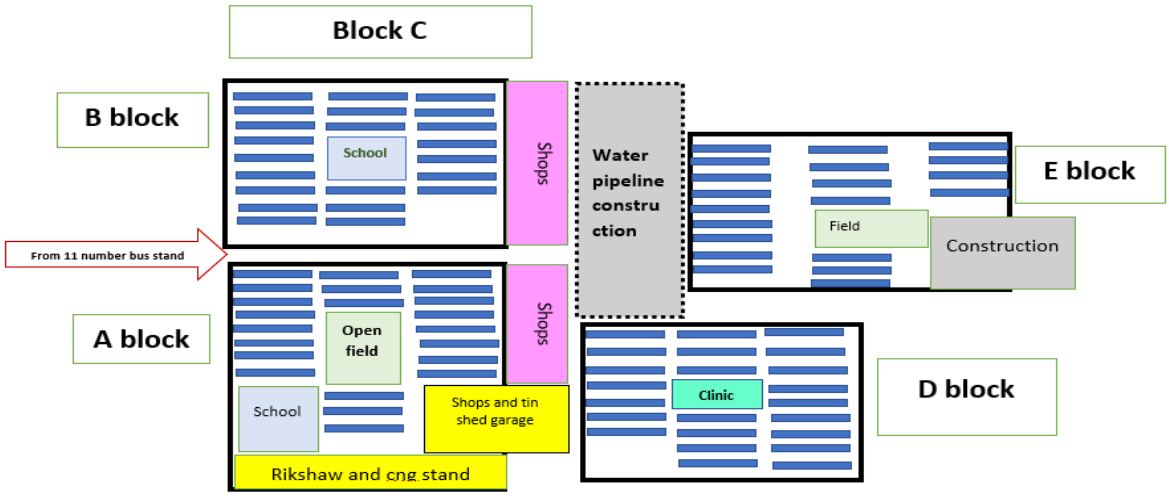

Figure 1: Framework of Bauniabad for simple random sampling

Unlike Baunibadh, 'Ta' block Jhil par slum was not differentiated into any lines or blocks. However, the areas were divided into three wings, which were connected by wooden bridges. There were several tin shed units in the slum. Each unit was one household and was selected based on the inclusion criteria and then numbered. A framework was constructed from that household listing. A total of 108 household listing was made from 'Ta' block Jhil Par. A simple random sampling by lottery method was performed on that household list.

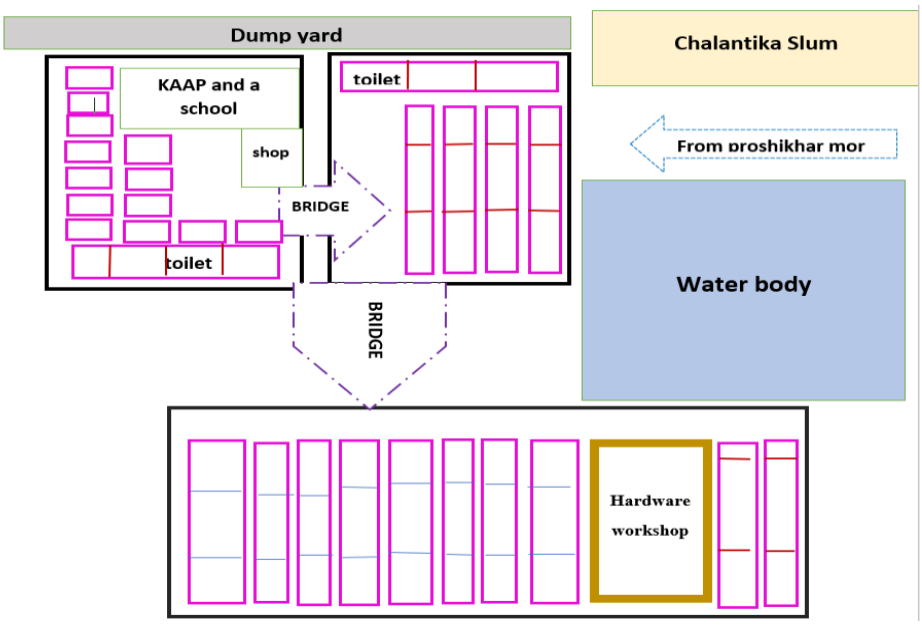

Figure 2: Framework of the 'Ta' block Jhil Par slum for random sampling

From the above two frameworks, a total of 144 female adolescents both married and unmarried were enrolled in the quantitative study. The selection criteria for the respondents were age between 15 and 19 years, willingness to participate in the study, informed written consent of the parent/guardian, and consent of minors. Adolescents under 18 years of age without a parent or legal guardian who could provide informed consent were excluded from the study.

The questionnaire consisted of the following sections: the sociodemographic segment for which questions from BDHS 2017-2018 were used; the reproductive health and access to reproductive health services, modified and adapted questionnaire derived from the 'Questionnaire for an interview with young people by John Cleland' and

Bangladesh Adolescent Health and well-being survey 2019-2020 was used. To measure adolescents' social relationship domain of Quality of Life, the Bangla WHOQOL-BREF scale was used.

2.4. Statistical Analysis

Data were collected through face-to-face interviews in a private setting without parents or guardians being present. The completed questionnaires were entered into a database in SPSS version 23. Descriptive statistics and bivariate statistics were replaced. Associations were analyzed using the Chi-square and Fisher exact test. The significance p-value of the associations was analyzed.

2.5. Qualitative Analysis

Nine girls from the slum through in-depth interview guidelines and ten service providers were purposively selected for the key informant interviews that provide services to slum people. The interviews were carried out in Bangla. In-depth interviews were performed in a private environment and key informant interviews were done in the respective workplace of the service providers' workplaces. During the interview, notes were taken and interviews were recorded with voice recorders and then transcribed. Data were manually coded. All the transcripts were reviewed and themes were generated based on the analysis plan. Thematic analysis was used for this research (Barun and Clarke, 2006). Data validity was ensured by triangulation, which was again verified by comparing the data from the In-depth Interview (IDI) and Key Informant Interview (KII).

3. Results

3.1. Sociodemographic characteristics of the participants

One hundred forty-four girls participated in the study, and nine girls participated in in-depth interviews. The average age of participants was 16.9 years (SD +- 1.40). The majority of girls were unmarried (63.9 percent), and 36.1 percent were married. Around 73% of the adolescents were married in the last two years and 27% were married for more than 2 years. Approximately 52 percent of girls currently study during the pandemic and about 48 percent do not currently attend school. Approximately 26 percent of the respondent's fathers never attended school and about 28 percent of these young girls' fathers had studied till primary school. Most of the fathers (51 percent) were employed at different locations and about 33 percent were self-employed. Of the mothers of these young girls, 37 percent had never attended school and 41 percent had studied until primary school. The majority of mothers (69%) were housewives and about 12% were both garment workers and housewives.

3.2. Menstrual history of the respondents

We evaluated the menstrual history of the participants before and during the COVID-19 pandemic.

Length: Adolescents with normal menstrual cycles between 24 and 38 days were 83 percent before the pandemic, which decreased to 71 percent during the pandemic. About 5% of adolescents reported that they had a shorter cycle 23 days before the outbreak, this number grew during the pandemic, with 12 percent of adolescents complaining that they are now experiencing shorter cycles. Approximately 6 percent of girls reported having had a longer cycle than 38 days before the COVID-19 pandemic, this percentage has increased considerably, and today about 14% of girls say their menstrual cycle has been 38 days or longer since the pandemic.

Duration: Those with shorter menstrual periods of less than 5 days also increased by 23% before and 40% during the pandemic. Before the pandemic, 60% of adolescents reported menstruation lasted between 5 and 7 days, a reduction of 50% during the pandemic.

Flow: The majority of adolescents (28%) complained of a high flow during the pandemic compared to the previous pandemic (19%).

Problem: Among the teenagers surveyed, thirty-two percent said they had some form or the other of menstrual problems since the pandemic., whereas only 11% complained of having menstrual problems before the pandemic. Treatment and barriers: Of those who had menstrual problems during the pandemic, only about 35% of them sought some sort of treatment, and 38% of them faced barriers while receiving treatment.

Type of barriers.: Five out of six adolescents said the barriers were due to financial constraints and two out of six teenage girls stated fear of contracting coronavirus and difficulty in getting doctor's appointments. The menstrual history has been described in Table 2.

The quantitative findings were confirmed by individual interviews. Adolescents described their days of menstruation as a period of suffering and discomfort. Some adolescents even mentioned that their intensity of the pain had increased since the pandemic, while others said their periods had become irregular since the pandemic.

'Last year for 2-3 months I did not have periods, then I got a regular period for 2 months, then it stopped for 2 months at the beginning of this year' (Adolescent, 18 years, married).

"*I have very irregular menses for 2 years, I don't even understand when I will have periods*" (Adolescent, 16 years, unmarried).

Service providers who give reproductive health services to adolescents in slums said that they had noticed the influx of women and adolescents with menstrual problems since the pandemic.

"I noticed many women and also few adolescents are now coming with leukorrhea and irregular cycle in my chamber" (Doctor, 48 years)

3.3. Menstrual Hygiene Management

We compared and contrasted the menstrual hygiene practices of adolescents before and at the time of the COVID-19 pandemic. Although the majority of the girls used both sanitary napkins and cloths invariably during their menstruation, the usage of cloths increased during the pandemic. Before the pandemic, 31% of adolescent girls were using cloth which rose to 37% since the pandemic. Analysis revealed that there was no change in the location of these menstrual clothes drying, as most of them dried in the dark house, (83%) before and during the pandemic. However, around 69% of these teenage girls said to have changed their menstrual cloth or sanitary napkin less than 4 to 6 times a day before the pandemic, this number increased to 79% since the pandemic. There was a slight change in the disposal of the sanitary napkin in the garbage bin prior to and during covid (69% compared to 67%). However, the number of girls disposing of sanitary pads in toilets before the pandemic was 16%, and since the pandemic, it has increased to about 20%. Approximately 31% of individuals said they faced barriers in buying sanitary napkins during the pandemic, of which 87% were contributed due to a hike in the cost of sanitary napkins and around 35% because of the desired sanitary napkin not being available. Menstrual hygiene practices are described in Table 1

Table 1: Menstrual hygiene practice of adolescents (N=144)

Variables		Before the pandemic	During the pandemic
		n (%)	n (%)
Sanitary products used during menstruation			
Sanitary Napkin	Yes	114 (79.2)	118 (81.9)
	No	26 (18.1)	26 (18.1)
	Did not have periods before the pandemic	4 (2.8)	-
Cloth	Yes	45 (31.3)	53 (36.8)
	No	95 (66.0)	91 (63.2)
	Did not have periods before the pandemic	4 (2.8)	-

Cotton	Yes	3 (2.1)	3 (2.1)
	No	137 (95.1)	141 (95.1)
	Did not have periods before the pandemic	4 (2.8)	-

The place from where the sanitary product was brought		
Variables	(n=114)	(n=118)
Pharmacy	85 (74.6)	93 (78.8)
Shop	20 (17.5)	17 (14.4)
Does not know	4 (3.5)	8 (6.8)
NGO worker	5 (4.4)	0 (0.0)
Place where the sanitary pad is disposed		
Dustbin	79 (69.3)	79 (66.9)
Drain	17 (14.9)	16 (13.6)
Toilet	18 (15.8)	23 (19.5)
The menstrual cloth was cleaned by	(n=45)	(n=53)
Only water	13 (28.9)	15 (28.3)
Water and body soap	16 (35.6)	20 (37.7)
Water and detergent	13 (28.9)	13 (24.5)
Throw away	3 (6.7)	5 (9.4)
Place where menstrual cloth is dried during the pandemic	(n=44)	(n=48)
Sunlight	7 (16.7)	8 (16.7)
Inside house	35 (83.3)	40 (83.3)
Number of times sanitary pad /cloth /cotton was changed (n=144)		
Less than 4-6 times	99 (68.8)	113 (78.5)
More than 4-6 times	41 (28.4)	31 (21.5)
Did not have periods before the pandemic	4 (2.8)	-
Barriers faced in acquiring sanitary pads during pandemic (n=118)		
Yes	37 (31.4)	
No	63 (53.4)	
Does not know	18 (15.2)	
Types of barriers faced (n=37)		
The increased price the of the pad	Yes 32 (86.5)	
	No 5 (13.5)	
Unavailability of the desired sanitary napkin	Yes 13 (35.1)	
	No 24 (64.9)	
Fear of contracting coronavirus	Yes 11 (29.7)	
	No 26 (70.3)	

These quantitative findings were confirmed by in-depth interviews with adolescents. The young girls complained that during the pandemic they mostly used cloth rather than sanitary napkins because most of their parents had lost their jobs. Housing and food were their primary concerns for survival in a pandemic rather than good menstrual hygiene practices.

*"*We *did not have food at home and you are asking why did I not use the pad! I could use cloth during a pandemic and it did the same work"* (17 years, unmarried).

'Since I got married in 2020, I use cloth, my husband cannot afford to buy a pad' (18 years, married).

Adolescents in the slums who were still in education disposed of the pads in the dustbin rather than individuals who were not studying at present. Also, parents who studied until primary school or more, their daughters disposed of sanitary napkins in the garbage bin rather than the daughters of parents who had never gone to school. It was

found statistically significant when associations were analyzed using the chi-square test. The results are presented in Table 2.

Table 2: Association between the education of the adolescents and their parents with disposal of the sanitary napkin of adolescents (N=144)

Place where sanitary products are disposed of during pandemic	Respondent studying at present				P-value
	n(%)				
	Yes		No		
Dustbin	49 (62.0)		30 (38.0)		0.02
Drain	6 (37.5)		10 (62.5)		
Toilet	63 (53.4)		55 (46.6)		
Disposal of the sanitary pads during a pandemic	Education of the respondent's father *				
	n(%)				
	Never been to school	Studied till primary	Studied till secondary	Do not know	
Dustbin	17 (21.5)	24 (30.4)	21 (26.6)	17 (21.5)	0.02
Drain	7 (43.8)	2 (12.5)	0 (0.0)	7 (43.8)	
Toilet	10 (43.5)	5 (21.7)	4 (17.4)	4 (17.4)	
Education of the respondent's mother*					
	n(%)				
Disposal of the sanitary pad during a pandemic	Never been to school	Studied till primary	Studied till secondary	Do not know	
Dustbin	28 (35.4)	39 (49.4)	5 (6.3)	7 (8.9)	0.03
Drain	11 (68.8)	3 (18.8)	2 (12.5)	0 (0.0)	
Toilet	12 (52.2)	6 (26.1)	1 (4.3)	4 (17.4)	

*Fisher Exact Test

3.4. Family Planning and Obstetric History of married adolescents

During the survey, we found that 38% of young girls had already delivered during the pandemic and around 19% had miscarried a child during the pandemic. Among the adolescents who were pregnant, the majority (64%) of them said it was their planned pregnancy and around 73% of them received ANC. However, seven out of eight of them stated that they had received this ANC at home from an NGO worker. The majority (45%) of the adolescents were delivered at home during the pandemic. Some girls (55%) who delivered during the pandemic said they faced barriers during their delivery. Financial constraints and not receiving neonatal care after delivery constituted 45% of each of these barriers and approximately 36% were contributed due to trained health care professionals not being available for delivery during the pandemic. Ten out of the 52 married adolescents who miscarried during the pandemic, around 40% of them sought treatment, and 50% of them said they faced barriers while receiving these treatments. The obstetric conditions during a pandemic are described in Table 3.

Table 3: Obstetric History of married adolescents (N=52)

Variable (n=52)		n(%)
Obstetric State	Pregnant at present	11 (21.2)
	Delivered in pandemic	20 (38.4)
	Miscarriage during pandemic	10 (19.2)
	Did not deliver/was not pregnant/did not have a miscarriage during a pandemic	11 (21.2)
Adolescents who are pregnant (n=11)		
Planned Pregnancy	Yes	7 (63.6)
	No	4 (36.4)
ANC received	Yes	8 (72.7)
	No	3 (36.4)
Adolescents who delivered during pandemic (n=20)		
Place of delivery of child during a pandemic	Home	9 (45.0)
	Government Hospital	6 (30.0)
	Private Hospital	1 (5.0)
	NGO Clinic	4 (20.0)
Barriers faced	Yes	11 (55.0)
	No	9 (45.0)
Types of barriers (n=11)		
Financial Constraints	Yes	5 (45.5)
	No	6 (54.5)
Fear of coronavirus	Yes	3 (27.3)
	No	8 (72.7)
The doctor was not available for delivery	Yes	4 (36.4)
	No	7 (63.6)
Was unaware of the place of delivery	Yes	2 (18.2)
	No	9 (81.8)
Health care provider could not come for home delivery	Yes	4 (36.4)
	No	7 (63.6)
Could not receive neonatal care after delivery	Yes	5 (45.5)
	No	6(54.5)
Adolescents who miscarried during the pandemic (n=10)		
Treatment sought after miscarriage	Yes	4 (40.0)
	No	6 (60.0)
Barriers faced whilst receiving treatment	Yes	2 (50.0)
	No	2 (50.0)

During a qualitative interview with the married girls, they said that all of them were married during the pandemic. most of these married adolescents whether they are pregnant, taking contraception or had delivered a child, none of their reproductive health decisions was taken by themselves. All married adolescents got married as early as 14 to 15 years. They remained silent when asked why they were not involved in their reproductive health decisions. The decisions were mainly taken by their mother, mother-in-law or husband. They dropped out of school after marriage and none of them did any job which would provide for them financially, all these situations made them more vulnerable. The pregnant adolescents knew that they were pregnant not by any blood test performed in the hospital, but by the signs and symptoms they developed and later when they discussed with their family members.

"*My uncle is a doctor* (He is not a doctor, he works in a pharmacy in the village - this information was retrieved when speaking to her after the interview), *I discussed with him all my symptoms, and he gave me medicine to stop vomiting,"* (17 years).

None of our female adolescents who were pregnant had their antenatal check-ups done.
"*My mother said that I can go for checkup in the latter half of pregnancy, now since I am having no issues, I can continue like this"* (16 years).

"*My husband said there is no need of ANC at 5th month. If needed we can go in* 7th *month and ultrasound is not good for my child in the womb"* (19 years).

One of our respondents delivered a child during the pandemic. The delivery was done at home under the supervision of a slum RH service provider.

"I was scared to deliver this child in hospital during a pandemic and so my mother called a health provider and she did my delivery" (18 years).

3.5. Source of Information on the reproductive health of female adolescents

More than half (51%) of the adolescents said they received RH information primarily from their mothers. Many participants (57.1%) stated they had no source of reproductive health information and around 34% did not want any kind of reproductive health information.

During qualitative in-depth interviews majority of respondents considered their mother to be their critical source of RH information. Starting from knowing about menstruation to using a menstrual cloth or sanitary pads or how and where to dispose of them- all this information was given by the mother. Female relatives such as paternal aunts and sisters played a critical role after the mother. Some said that NGOs held adolescent health meetings before the pandemic that greatly served them with reproductive health knowledge and also subjects such as *Sharirik Shikkha* (subject of pubertal growth and changes) in school books also imparted information on RH.

Adolescents who were in education spoke to a great extent about RH information than those who were not in education. Those who studied in school or college had multiple sources of RH information and had said about the necessities and importance of it, while those who were not in education, solely on their mother and did not discuss the importance of RH information.

'I learned all these from school, we have had some subjects that taught about physical changes that occur after puberty she added "*Even some NGO in Bauniabad gave us lessons on what to do during menstruation, I was in class 7 at that time, I used to go with my friend to this meeting'* (17 years, unmarried, studying at present).

Some adolescents were reluctant to receive any sort of RH information
"I do not know actually, I know there are meetings and seminars which say about all these in Bauniabad, but I have never been to them..... I did not want to about all this information, and that's why I did not go…. it's my body, I will know the changes" (17 years, married, out of school).

3.6. Social Relationship Domain of Quality of Life.

There are four domains of QoL. These are physical, psychological, social relationships and environmental. For our study, we chose to only explore the social relationship domain, as this domain had questions which enabled us to investigate the personal relationship, sexual life and support from friends of adolescents. Keeping in mind the social context of Bangladesh, the question relating to sexual life was restricted to married individuals. Significant associations were found between the social support that adolescents receive with them studying at present.

Table 4: Association between adolescent's support from friends and their studying at present

Variables	How satisfied are you with the support you get from friends?				
Studying at present	n (%)				P-value
	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	
Yes	5 (6.7)	26 (34.7)	26(34.7)	18 (24.0)	0.03
No	10 (14.5)	34 (49.3)	22(31.9)	3 (4.3)	

In our in-depth interview with adolescents, we found these young girls had several RH issues like those related to menstrual health and menstrual hygiene management. Social relationships were strained because, during the pandemic, adolescents could not get the desired response to their RH problems from their parents. Most of our female adolescents were married off during the pandemic, they lost connection with their friends and this made them feel lonely and secluded. They did not receive the support of their friends as before the pandemic.

"I wanted to take treatment; but my mother said it is financially difficult for us in corona…… I just wanted relief from clotted bleeding and pain but I cannot force my mother." (17 years, unmarried, out of school).

'My friend doesn't keep in touch with me... I am married now and pregnant, they are still in school... I feel bad…they have a different circle of friends now" (18 years, married, out of school).

4. Discussion

Our findings of different patterns of menstruation pandemic are comparable to a similar study conducted in Arizona on women aged 18 to 45 years where during the pandemic 35% had an increase in cycle length (Khan et al., 2021). Another study in Turkey during the pandemic found that 10.7% of women aged 18-24 years had longer or shorter menstrual cycles (Takmaz et al., 2021*)*. Our study revealed that around 12% of female adolescents were experiencing shorter menstrual cycles (less than 23 days) during the pandemic whereas before the pandemic only 5% encountered short cycles. Around 14% complained of a longer menstrual cycle (more than 38 days) during the pandemic, which only 6.3% said they experienced before the pandemic.

In our study, 21.5% of adolescent girls also reported a decrease in blood flow during menstruation, and 27.8 per cent of adolescents currently had a heavy flow. Similarly in their study of women of reproductive age during the Pandemic, *Phelan et al., 2020,* found that 18% of them had a heavy flow. Also comparable to our study *Li et al. in 2021 found that 25% of girls* had low blood flow during the pandemic.

The duration of menstruation of our respondents for less than 5 days was 39.6 % during the pandemic c. Similarly, a survey of women between the ages of 18 and 45 found that 50% of these women had menstruation for more than 7 days. (Ozimek et al., 2021).

During the quantitative analysis, we found that female adolescents complained they newly developed menstrual problems since the pandemic such as menorrhagia leukorrhea itching, burning in the vulval region and yellowish to greenish vaginal discharge. *Likewise, Malloy et al. 2021* in their online survey of reproductive-aged women found that 29% of women experienced severe dysmenorrhea and abnormal vaginal discharge during the pandemic. In our study, a total of 16 adolescents reported menstrual problems before COVID and during the pandemic, the number doubled (n=46). Before the Covid-19 half of the adolescents had taken services from government hospitals, but during Covid, more adolescents accessed services from pharmacy and homoeopathy treatment locally in the slum area. This reflects that adolescent could not go to the hospitals due to COVID protocols and hence sought to treatment in local areas. During the qualitative interview, we found that adolescents, especially unmarried female adolescents, rarely had treatment for menstrual problems.

In one of our IDI an unmarried adolescent S, 17 years said: *"we did not have food in the home and you are asking why did I not use a pad! I could use cloth during the pandemic". Around* 31.4% of our respondents said they faced barriers in acquiring sanitary pads during the pandemic. The increased price of sanitary pads contributed to 86.5% of this barrier. These findings are consistent with an online study conducted by Plan International from 11th May

2020 to 17th May 2020 with Water, Sanitation and Hygiene (WASH) and Sexual and Reproductive Health Rights (SRHR) professionals from 24 countries including Bangladesh. This study revealed that two-thirds of WASH professionals (58%) reported that menstrual hygiene products have become more expensive since the pandemic started.

Studies have found significant associations between disposal practices and factors such as age, type of schooling, education of mother/father, social class, economic status, and occupation of parents (van Eijk et al., 2016). We have found a separate significant association ($p<0.05$) between the disposal of sanitary pads by adolescents and the education of both parents. Adolescents who disposed of the napkin in the dustbin, both their parents have been educated from primary to secondary levels whereas those who disposed in toilets or drain, their parents have never been to school. Equivalently a study in India showed that unsafe disposal practices, such as throwing absorbents into open spaces and burning (likely open burning, not incineration), were significantly higher in rural and slum settings (Elledge et al., 2018). Also, studies among schoolgirls in Ethiopia noted high rates of disposal in latrines at 69.3%. (Gultie, Hailu, and Workineh, 2014). In low-income communities, some adolescents disposed of their used clothes in drains and ditches, but others who were uncomfortable with disposing of menstrual clothing in the open threw them in toilets, perceiving this as a discrete disposal option (Elledge et al., 2018).

In our study, 52 out of 144 female respondents were married. The quantitative analysis showed amongst 21.2% were pregnant during the interview, 38.4% of them delivered during the pandemic and 19.2% of them had a miscarriage during the pregnancy. Obstetric services were interrupted during the pandemic. Among adolescents who had delivered during the pandemic, 72.7% received antenatal care (ANC). The majority (87.5%) of this ANC was given to them in the home by NGO workers and 12.5% of adolescents received ANC from pharmacies within the slum, of those who delivered during the pandemic (n=20), the Majority (45%) of them delivered at home. More than half of the respondents said that they faced barriers in delivering their children during the pandemic. The major problems they mentioned were lack of finance and service for newborns, among married adolescents, 10 adolescents had a miscarriage during the pandemic. Only 40% of adolescents who had a miscarriage sought treatment. This scenario is consistent with The Guttmacher Institute, New York, where they estimated a 10% decline in service coverage of essential pregnancy and newborn care in 132 low-and middle-income countries during a pandemic could lead to a huge number of additional women experiencing major obstetric complications without care, additional maternal deaths, additional newborns experiencing major complications without care and an additional newborn death. Similarly, a study amongst Ugandan youths by *Mambo et al., 2020* revealed that 8 out of 44 young women (15-24 years) who were pregnant could not get maternity care during the pandemic and 5 out of 24 (15-24 years) participants who had a miscarriage could not take treatment.

For proper menstrual hygiene management and safe and healthy RH, correct and specific information is necessary for female adolescents in slums who have become more vulnerable during Covid. In the quantitative part of the study, female adolescents said that they considered the mother as their primary source of information on RH, 51.4%. In our qualitative study, we found that unmarried adolescents and those in still education had multiple sources of information regarding RH as compared to married adolescents or those who have dropped out of school. Married and those who are out of school only relied on their mother for information on RH. Around 57.1% did not have any source of RH information during the pandemic. Likewise, a study published by Rutgers in 2020 revealed that 69% of adolescents in Kenya wanted information on menstrual hygiene during the pandemic and 26% wanted information on abortion, but neither of the groups could find any.

Our study also included the social relationship domain of quality of life, taking into account the context of slum and the involvement of vulnerable adolescents in a slum – IDI guidelines on sexual life were limited to married adolescents. These girls had some RH problems, for which their social relations were strained because they could not receive the desired response to seek treatment. Most parents lost their jobs during the pandemic and their main concern was to survive rather than to address the RH of their daughters, this impacted the personal relationships aspect of the social relationship of quality of life. Additionally, most of the female adolescents were married off during the pandemic, they lost connection with their friends and which made them feel lonely and secluded, this invariably affected their support from friends' aspect of the social relationship domain. We did not find much information regarding the sexual life aspect of the social relationship domain of quality of life of adolescents, may be because the discussion of sex life in communities such as slums may not be acceptable. A study was done by

Izutsu et al., 2006 with adolescents in urban slums of Dhaka found that the social relationship domain for girls in Bangladesh is culturally limited.

4.1 Limitations of the study

During the interviews, maximum safety protocols such as social distancing and wearing a mask could not be fully assured as the slum is an overpopulated area. During the daytime, it was difficult to get consent for adolescents who were below the age of 18 as in slums both the parents go out for work and hence for this, we lost a few of our participants. Maintaining privacy and confidentiality during interviews was challenging due to the infrastructure of the slum

5.Conclusion

This study conducted on female adolescents in slums of Dhaka namely Baunibadh and 'Ta' block Jhil par, revealed changes in length, duration and flow of menstruation, substandard menstrual hygiene practices and impediments to the uptake of reproductive health (RH) information by adolescents during the pandemic. Married pregnant adolescents were inclined in taking their antenatal checkups (ANC) only during the last trimester and preferred delivery at home during the pandemic. There was also an increase in marriage among these adolescents and service providers had difficulty providing door-to-door RH services. The personal relationship aspect of the social relationship domain of QoL was strained because during the pandemic the adolescents could not utilize the health services for their RH problems as their parents prioritized spending money on food, illness, clothing and shelter rather than spending it on their daughter's RH issues. The girls who dropped out of school during the pandemic lost connection with their friends and this made them feel lonely and secluded which invariably affected their support of friends aspect of social relationship domain of quality of life. Therefore, this study concludes that in adolescents who lived in slum areas, reproductive health and quality of life were invariably affected during the COVID-19 pandemic situation.

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Ethics approval
This study was conducted according to the Declaration of Helsinki and performed after getting ethical clearance from the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (Reference No. BSMMU/2021/8654).

Competing interests
The authors declare that there are no competing interests.

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Author Contributions
All of the authors have made significant contributions to this paper and have given their approval for its submission. The concept came from Hridi and FH; statistical analysis and qualitative analysis were handled by Hridi, FH, SSI and TS. data curation was handled by Hridi, FH, and SB; Data analysis and interpretation were carried out by Hridi, FH, TS, SB, NA and SSI. The revisions were given by FH, TS, SB, UH, BB, NA, MA, ZR and SSI. During the article's drafting or editing, each author contributed essential intellectual content and acknowledges responsibility for the entire project.

References

Adolescent wellbeing and mental health. (n.d.). Retrieved May 28, 2022, from https://www.unicef.org/laos/media/4816/file/IMPACT%20OF%20COVID-19%20ON%20ADOLESCENT%20WELLBEING%20AND%20MENTAL%20HEALTH.pdf.

Ahmed, R., Yesmin, K., & Bangladesh, W. (2008). *Menstrual hygiene: Breaking the silence*. Retrieved March 13, 2022, from https://www.ircwash.org/sites/default/files/Ahmed-2008-Menstrual.pdf

Ainul, S., Hossain, M., Hossain, M., Bhuiyan, M., Hossain, S., Rob, U., & Bajracharya, A. (2020). Trends in maternal health services in Bangladesh before, during and after COVID-19 lockdowns: Evidence from national routine service data. *Reproductive Health*. https://doi.org/10.31899/rh14.1037

Braun, V., & Clarke, V. (2006). Using thematic Analysis in Psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Covid-19 update Flash. (2021) IEDCR. Retrieved August 13, 2021, from https://iedcr.gov.bd/covid-19/covid-19-update-flash

Deutscher. (2020). *Mental Health and Quality of Life in Children and Adolescents During the COVID-19 Pandemic (27.11.2020)*. Rzteblatt. https://doi.org/10.3238%2Farztebl.2020.0828

Elledge, M., Muralidharan, A., Parker, A., Ravndal, K., Siddiqui, M., Toolaram, A., & Woodward, K. (2018). Menstrual Hygiene Management and Waste Disposal in Low- and Middle-Income Countries—A Review of the Literature. *International Journal of Environmental Research and Public Health*, *15*(11), 2562. https://doi.org/10.3390/ijerph15112562

Gultie, T., Hailu, D., & Workineh, Y. (2014). Age of Menarche and Knowledge about Menstrual Hygiene Management among Adolescent School Girls in Amhara Province, Ethiopia: Implication to Health Care Workers & School Teachers. *PLoS ONE*, *9*(9), e108644. https://doi.org/10.1371/journal.pone.0108644

Li, G., Tang, D., Song, B., Wang, C., Qunshan, S., Xu, C., Geng, H., Wu, H., He, X., & Cao, Y. (2020). Impact of the COVID-19 Pandemic on Partner Relationships and Sexual and Reproductive Health: Cross-Sectional, Online Survey Study. *Journal of Medical Internet Research*, *22*(8), e20961. https://doi.org/10.2196/20961

Lindberg, L. D., Bell, D. L., & Kantor, L. M. (2020). The Sexual and Reproductive Health of Adolescents and Young Adults During the COVID-19 Pandemic. *Perspectives on Sexual and Reproductive Health*. https://doi.org/10.1363/psrh.12151Kamruzzaman, M., & Sakib, N. (2020). *Bangladesh imposes total lockdown over COVID-19*. Www.aa.com.tr. https://www.aa.com.tr/en/asia-pacific/bangladesh-imposes-total-lockdown-over-covid-19/1778272

Long, E., Patterson, S., Maxwell, K., Blake, C., Pérez, R. B., Lewis, R., McCann, M., Riddell, J., Skivington, K., Wilson-Lowe, R., & Mitchell, K. R. (2021). COVID-19 pandemic and its impact on social relationships and health. *J Epidemiol Community Health*, *76*(2). https://doi.org/10.1136/jech-2021-216690

Mambo, S. B., Sikakulya, F. K., Ssebuufu, R., Mulumba, Y., Wasswa, H., Thompson, K., Rusatira, J. C., Bhondoekhan, F., Kamyuka, L. K., Akib, S. O., Kirimuhuzya, C., Nakawesi, J., & Kyamanywa, P. (2020). *Sexual and Reproductive Health and Rights Challenges among Ugandan Youth during COVID-19 Pandemic lockdown: An online Cross-Sectional Study*. https://doi.org/10.21203/rs.3.rs-48529/v1

Nasreen, H. E., Alam, M. A., & Edhborg, M. (2016). Prevalence and Associated Factors of Depressive Symptoms Among Disadvantaged Adolescents: Results from a Population-Based Study in Bangladesh. *Journal of Child and Adolescent Psychiatric Nursing*, *29*(3), 135–144. https://doi.org/10.1111/jcap.12150

National Institute of Population Research and Training (NIPORT), & ICF. (2020*). Bangladesh Demographic and Health Survey 2017-2018*.

National Institute of Population Research and Training (NIPORT), International Centre for Diarrheal Disease Research, Bangladesh (icddr, b), & Data for Impact. (2021). *Bangladesh Adolescent Health and Wellbeing Survey 2019-20: Final Report.*

Periods in a Pandemic. (2020). Plan International. https://plan-international.org/publications/periods-in-a-pandemic

Riley, Sully, Ahmed, & Biddlecom. (2020). Estimates of the Potential Impact of the COVID-19 Pandemic on Sexual and Reproductive Health In Low- and Middle-Income Countries. *International Perspectives on Sexual and Reproductive Health*, *46*, 73. https://doi.org/10.1363/46e9020

van Eijk, A. M., Sivakami, M., Thakkar, M. B., Bauman, A., Laserson, K. F., Coates, S., & Phillips-Howard, P. A. (2016). Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. *BMJ Open*, *6*(3), e010290. https://doi.org/10.1136/bmjopen-2015-010290

World Health Organization (2012). *WHOQOL - measuring the quality of life| the world health organization*. [online] www.who.int. Available at: https://www.who.int/tools/whoqol

World Health Organization. (2021). *Violence Against Women*. Who. int; World Health Organization: WHO. https://www.who.int/news-room/fact-sheets/detail/violence-against-women