



Determinants of Physical and Mental Health: A Cross-Sectional Study among Rural Adolescent Girls in Bangladesh

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ABSTRACT

Purpose: This study aimed to explore the determinants of physical and mental health changes & problems among rural adolescent girls in Bangladesh. **Methods:** The study was conducted with 400 participants (adolescent girls) by using convenient sampling technique where Chi-squared tests were used to measure the relationships between physical & mental health determinants of adolescent girls and socio-demographic indicators (age & family income). **Findings:** This study explored menstruation (72%), breast growing (14%), changes in vocal chores (6%), increasing hair in different parts of body (4%) and changes in size of sexual organs (2%) are the major physical health changes of adolescents. They also acquired some mental health changes e.g., attraction to opposite sex (76%), repeated changes in mood (43%), conscious about dress up (24%), feeling shyness (22%), feeling overly sensitive (8%), conflicting thoughts (13%) and feeling uncertain (11%) etc. In this transition period, adolescent girls also face some physical & mental health problems. Physical weakness (14.2%), headache (82.8), vomiting (0.8%) and depression (54.2%), anxiety (5.5%), mental retired/stress (20.2%), mental distortion/sadness (9%) & fear (9.3%) are the common physical & mental health problems they experienced at this time. **Originality:** This study reveals the major physical and mental health determinants of adolescent girls with their physical & mental health vulnerabilities. As the most vulnerable group, rural adolescent girls (poor family income) suffer more vulnerability (physical & mental health problems) during their adolescent period.

Keywords: Adolescent Girls, Physical Health, Mental Health, Menstruation, Depression, Rural Community, Bangladesh.

INTRODUCTION

Adolescence is the time when a person transitions from childhood to maturity. The WHO defines adolescents as anyone between the ages of 10 and 19 (World Health Organization, 2021; MoHFW, 2017). According to Bangladesh's most recent census, adolescents make up more than one-fifth of the whole population (BBS, 2022). Between puberty and the onset of legal maturity, there is a transitional stage of physical, mental and developmental problems (Forte *et al.*, 2020). Around the world, there are more than 1.2 billion adolescents or nearly one in every six people. Every person goes through physiological, mental and social changes during adolescence (Mridha *et al.*, 2021). Adolescence is a phase of vulnerability because of these changes, which happen concurrently and quickly. As a result, adolescents might experience both physical and mental health issues (Sivagurunathan, 2015).

Puberty-related bodily changes mark the start of adolescence. These changes include an increase in height, the growth of pubic and armpit hair, and changes to the skin (e.g., pimples). Male voices get deeper as their facial hair develops (Lang *et al.*, 2022). Girls in their adolescence begin menstruating and develop breasts. These pubertal changes are caused by hormones, especially a surge in male androgen and female estrogen (Steinberg & Lerner, 2009). The release of sex hormones from the gonads-the ovaries and testicles-begins with the onset of puberty which is brought on by changes in the adolescent's brain. Usually, this occurs between the ages of 10 and 11 for females and between the ages of 11 and 12 for boys (Stangor, 2012). Puberty for girls is a series of events. Each girl is unique; her progression throughout these changes may vary (Health Encyclopedia, n.d.). The earliest adolescent's alteration in girls is the appearance of breast buds. The breast and nipple grow slightly elevated, creating these little bumps under the nipple (Reena, 2015). Only in a tiny region surrounding the genitals does the first pubic hair development result in long, silky hair. Then, as it spreads, this hair gets darker and coarser (Raising Children Network, 2017). The girl's physical appearance also begins to change. The hips may also widen in addition to growing taller and weighing more. It's also possible for the fat in the hips, thighs, and stomachs to increase. Girls also start menstruating or getting periods during adolescent's period (Lally & Valentine, n.d; Marván *et al.*, 2001).

In terms of public health, mental health is the current problem. In low- and middle-income countries (LMICs), such as Bangladesh, the issue is still not given the attention it deserves, although steadily becoming recognized as a public health concern on a global scale. The new

Mental Health Act in Bangladesh was recently approved in 2018 and it contains a few flaws (Ahn & Jun, 2007; Anjum *et al.*, 2019). Depression, anxiety, frustration, anger, emotional disorders, risk-taking behavior, psychosis and suicide or self-harm are the most typical mental health changes among teenagers in Bangladesh. For a very long period in Bangladesh, the concept of mental health was disregarded. This was brought on by the social setting or the stigma associated with mental illness. Researchers estimate that between 16% and 18% of adolescent's in Bangladesh experience distinct changes and issues related to their mental health. Despite the fact, it is currently uncommon, providing for the mental health service of adolescents (Humaira, 2023; Patton *et al.*, 2016). The World Health Organization's Mental Health Action Plan (2013–2030) establishes prevention and promotion of mental health as a worldwide goal. Reduce premature mortality from non-communicable illnesses by one-third via prevention and treatment and promote mental health and wellbeing are two objectives of the Sustainable Development Goals (SDGs), according to SDG 3.4 (Bennett *et al.*, 2018). The intensity of adolescent's mental suffering has largely gone overlooked by the World Health Organization (WHO), which has solely concentrated on the death rates from suicide among adults (World Health Organization, 2021). Mental health is impacted by many different things. Adolescent's mental health may be increasingly negatively impacted by risk factors as they become older. Experiencing difficulty, feeling pressure to fit in with other kids and discovering one's own identity are all things that can cause stress during adolescence (Das *et al.*, 2016; Polanczyk *et al.*, 2015; Saxena *et al.*, 2014).

There is an inadequacy in existing literature specifically addressing the major physical and mental health changes of the adolescent's girls. During adolescent's period, most of the time girls in rural areas suffer more when they experience physical and mental health changes in their body. The research focuses on the major physical health changes (menstruation, Breast growing & changes in size of sexual organs etc.) & problems (physical weakness, headache, and decreasing body weight) as well as mental health changes (attraction to opposite sex, repeated changes in mood and feeling shyness etc.) & problems (depression, anxiety, mental retired/stress, mental distortion/sadness) to provide a holistic overview of the adolescent's physical and mental health. So this research will be a lighthouse towards the gray area from where the policy makers may have paradigm-shift-thought to impose effective strategies on adolescent's health for upgrading existing health policies to ensure a good, friendly & favorable environment for their better growth and development.

METHODOLOGY

Study Design, Population and Area

This cross-sectional survey was conducted among adolescent girls (9-17 years) in four purposively selected upazilas (Kaliganj, Chaugachha, Shyamnagar, Kalia) from four districts (Jhenaidah, Jessore, Satkhira, Narail) of Bangladesh.

Sample Size and Sampling Technique

The sample size of the study has been calculated by using formulae as follows:

$$n = Z^2 pq / d^2 = (1.96)^2 (.5) (.5) / (.05)^2 = 384$$

Where,

- n = Desired sample size
- z = Standard normal deviate (1.96 at 95% level of confidence)
- p = Prevalence of physical & mental health (50% unknown prevalence)
- q = $1-p$
- d = Degree of accuracy required (5%)

From purposively selected four upazilas, 100 respondents (adolescent girls) were selected from each upazilas by convenient sampling. Thus, 400 respondents (adolescent girls) from four selected upazilas were chosen to make up the research population by taking 50% unknown prevalence and adding 5% non-respondent error.

Data Collection Tools/Questionnaire

Face-to-face interviews were used in the research to collect solely quantitative data. Because Bengali is a native language of Bangladeshis, a printed version of the interview procedure in Bengali was given to them to complete. The protocol included a number of preset statements concerning the prevalence of physical & mental health determinants of the adolescent girls, along with yes, no, and comment alternatives that were to be followed. Age, education and family income were among the socio-demographic data gathered. A total of 30 questions were added to evaluate the prevalence of physical & mental health determinants of the adolescent girls.

Statistical Analysis

For the purpose of assuring the accuracy and validity of the data, the interview-collected information was reviewed, cleared up, processed, and codified. Statistical significance was set at $p < 0.05$. Every p-value that is given is two-tailed. The study's primary characteristics of the data were described through frequencies and percentages using the most recent version of the Statistical Package for Social Sciences (SPSS version 25.0) and MS Excel. The prevalence of physical & mental health determinants of the adolescent girls were depicted using descriptive statistics (frequency, percentages and means) and inferential analysis (i.e., chi-square tests), which measured associations between independent (age & family income) and dependent variables (physical & mental determinants).

RESULTS

Table 1: *Socio-economic Background of the Respondents*

Variables	Frequency (N=400)	Percent
Age		
9-11 Years	191	47.8
12-14 Years	169	42.2
15-17 Years	40	10.0
Education Level		
Primary	168	42.0
Secondary	148	37.0
Higher Secondary	84	21.0
Family Income		
5000-10000 Tk	364	91.0
11000-15000 Tk	20	5.0
15000 Tk+	16	4.0

Table 1 elucidates the socio-economic background of the respondents where total respondents are distinguished by three age groups 9-11 years (47.8%), 12-14 years (42.2%), 15-17 years (10%). In recognizing their education level, 42% are studying in primary, 37% secondary and 21% higher secondary level. It also shows that most of the respondent's (91%) family income 5000-10000TK where only 5% and 4% respondent's family income 11,000-15000TK and 15000TK+ respectively.

Table 2: *Physical and Mental Health Determinants of the Adolescents*

Variable	Frequency (N=400)	Percent
Major Physical Health Changes		
Increasing height	8	2.0
Increasing hair in different parts of body	16	4.0
Changes in size of sexual organs	8	2.0
Menstruation	288	72.0
Breast growing	56	14.0
Changes in vocal chores	24	6.0
Physical Health Problems		
Physical weakness	57	14.2
Headache	331	82.8
Decreasing body weight	9	2.2
Vomiting	3	0.8
Major Mental Health Changes*		
Attraction to opposite sex	304	76.0
Repeated changes in mood	172	43.0
Intention to be independent	16	4.0
Conscious about dress up	96	24.0
Depression and mental conflict	16	4.0
Feeling shyness	88	22.0
Dependency on friends/Peer pressure	20	5.0
Feeling overly sensitive	32	8.0
Conflicting thoughts	52	13.0
Feeling uncertain	44	11.0
Mental Health Problems		
Depression	217	54.2
Anxiety	22	5.5
Mental retired	81	20.2
Mental distortion/sadness	36	9.0
Fear	37	9.3

Distrust	7	1.8
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**Multiple responses counted*

Table 2 shows the respondent's (adolescent girls) major physical health changes & problems and mental health changes & problems during their adolescent's period. Most of the respondents (72%) noticed menstruation, breast growing (14%), and changes in vocal chores (6%), increasing hair in different parts of body (4%) and changes in size of sexual organs (2%) as their physical health changes. Participant's noticed physical weakness (14.2%), headache (82.8), decreasing body weight (2.2%) and vomiting (0.8%) as their major health problems. They noticed attraction to opposite sex (76%), repeated changes in mood (43%), conscious about dress up (24%), feeling shyness (22%), feeling overly sensitive (8%), conflicting thoughts (13%) and feeling uncertain (11%) as major mental health changes during their adolescents period. Along with these, depression (54.2%), anxiety (5.5%), mental retired (20.2%, mental distortion/sadness (9%) and fear (9.3%) are the major mental health problems they experienced.

Table 3: Association between Physical & Mental Health and Age of the Respondents

Variable	9-11 Year	12-14 Year	15-17 Year	P
Major Physical Health Changes				
Increasing height	2 (1.1)	6 (2.7)	0 (0.0)	<0.001
Increasing hair in different parts of body	6 (3.4)	13 (5.9)	2 (100.0)	
Changes in size of sexual organs	5 (2.8)	12 (5.4)	0 (0.0)	
Menstruation	130 (73.4)	160 (72.4)	0 (0.0)	
Breast growing	26 (14.7)	29 (13.1)	0 (0.0)	
Changes in vocal chores	8 (4.5)	1 (0.5)	0 (0.0)	
Physical Health Problems				
Physical weakness	22 (11.5)	8 (4.7)	27 (67.5)	<0.001
Headache	166 (86.9)	160 (94.7)	5 (12.5)	
Decreasing body weight	2 (1.0)	0 (0.0)	7 (17.5)	
Vomiting	1 (0.5)	1 (0.6)	1 (2.5)	
Major Mental Health Changes				
Attraction to opposite sex	39 (9.6)	41 (11.4)	9 (11.7)	0.379
Repeated changes in mood	21 (5.2)	20 (5.6)	2 (2.6)	
Intention to be independent	10 (2.5)	8 (2.2)	1 (1.3)	

Conscious about dress up	12 (3.0)	18 (5.0)	1 (1.3)	
Depression and mental conflict	87 (21.5)	74 (20.6)	12 (15.6)	
Feeling shyness	5 (1.2)	9 (2.5)	2 (2.6)	
Dependency on friends/Peer pressure	44 (10.9)	40 (11.1)	12 (15.6)	
Feeling overly sensitive	5 (1.2)	9 (2.5)	3 (3.9)	
Conflicting thoughts	152 (37.5)	120 (33.3)	34 (44.2)	
Feeling uncertain	30 (7.4)	21 (5.8)	1 (1.3)	
Mental Health Problems				
Depression	209 (56.9)	7 (36.8)	1 (7.1)	<0.001
Anxiety	18 (4.9)	1 (5.3)	3 (21.4)	
Mental retired/stress	75 (20.4)	3 (15.8)	3 (21.4)	
Mental distortion/sadness	33 (9.0)	2 (10.5)	1 (7.1)	
Fear	26 (7.1)	6 (31.6)	5 (35.7)	
Distrust	6 (1.6)	0 (0.0)	1 (7.1)	

Table 3 shows the chi-square results that a statistically significant association was found between age classifications and major physical health changes (menstruation, breast growing and changes in vocal chores) of the respondents ($p < 0.001$), physical health problems (physical weakness & headache) experienced by the respondents ($p < 0.001$) and mental health problems (depression, mental retired/stress) of the respondents ($p < 0.001$). Besides, statistically non-significant association were found in respondent's age classifications with major mental health changes (conflicting thoughts, depression and mental conflict, attraction to opposite sex, dependency on friends/peer pressure) of the respondents ($p = 0.379$).

Table 4: Association between Physical & Mental Health and Family Income

Variable	5000-10000 Tk	11000-15000 Tk	15000 Tk+	P
Major Physical Health Changes				
Increasing height	103 (53.9)	88 (52.1)	26 (65.0)	0.51
Increasing hair in different parts of body	9 (4.7)	11 (6.5)	2 (5.0)	
Changes in size of sexual organs	35 (18.3)	41 (24.3)	5 (12.5)	
Menstruation	19 (9.9)	12 (7.1)	5 (12.5)	
Breast growing	22 (11.5)	13 (7.7)	2 (5.0)	

Changes in vocal chores	3 (1.6)	4 (2.4)	0 (0.0)	
Physical Health Problems				
Physical weakness	65 (36.7)	0 (0.0)	54 (24.4)	<0.001
Headache	60 (33.9)	1 (50.0)	54 (24.4)	
Decreasing body weight	46 (26.0)	1 (50.0)	62 (28.1)	
Vomiting	6 (3.4)	0 (0.0)	51 (23.1)	
Major Mental Health Changes				
Attraction to opposite sex	86 (11.0)	3 (9.1)	0 (0.0)	0.817
Repeated changes in mood	38 (4.9)	2 (6.1)	3 (11.5)	
Intention to be independent	19 (2.4)	0 (0.0)	0 (0.0)	
Conscious about dress up	30 (3.8)	1 (3.0)	0 (0.0)	
Depression and mental conflict	161 (20.6)	6 (18.2)	6 (23.1)	
Feeling shyness	15 (1.9)	0 (0.0)	1 (3.8)	
Dependency on friends/Peer pressure	87 (11.1)	5 (15.2)	4 (15.4)	
Feeling overly sensitive	16 (2.0)	0 (0.0)	1 (3.8)	
Conflicting thoughts	281 (35.9)	15 (45.5)	10 (38.5)	
Feeling uncertain	50 (6.4)	1 (3.0)	1 (3.8)	
Major Mental Health Problems				
Depression	419 (55.8)	22 (25.6)	3 (60.0)	<0.001
Anxiety	36 (4.8)	8 (9.3)	0 (0.0)	
Mental retired/stress	142 (18.9)	33 (38.4)	2 (40.0)	
Mental distortion/sadness	74 (9.9)	14 (16.3)	0 (0.0)	
Fear	63 (8.4)	9 (10.5)	0 (0.0)	
Distrust	17 (2.3)	0 (0.0)	0 (0.0)	

Table 4 represents a statistically significant relationship was found between family income and physical health problems (physical weakness, headache & decreasing body weight) & mental health problems (depression, mental retired/stress, mental distortion and fear) of the respondents ($p < 0.001$). Along with these, non-significant relationship were found in respondent's family income classifications with major physical health changes (increasing height, breast growing, menstruation & changes in size of sexual organs) ($p = 0.51$) and mental health changes (conflicting thoughts, depression & mental conflict, attraction to opposite sex and feeling uncertain) of the respondents ($p = 0.817$).

DISCUSSION

This study has been conducted to explore the major determinants of adolescent girl's physical and mental health focusing physical health and mental health changes & problems. This study result shows that during adolescent's period girls experience some common and major physical health changes. In where, menstruation (72%), breast growing (14%), changes in vocal chores (6%), increasing hair in different parts of body (4%) and changes in size of sexual organs (2%) are the major physical health changes. Previous studies show that girls detect menstruation and numerous menstrual difficulties while they are adolescents (65%) (P et al., 2016). Another research investigated at girls who had dysmenorrhea (67.2%) and premenstrual syndrome symptoms (63.1%) (World Health Organization, 2021). Menarche is the first menstrual cycle, which normally occurs at roughly 12 or 13 years of age and considered significant milestone in puberty for girls (Anderson *et al.*, 2003).

Besides this, physical weakness (14.2%), headache (82.8), decreasing body weight (2.2%) and vomiting (0.8%) are their common physical health problems they experienced during their adolescents period. The findings are contradictory to other previous studies that showed in India, about 47% of girls between the ages of 11 and 19 are underweight, while another survey found that 40% of females are underweight (Jahagirdar *et al.*, 2012). Girls' top three physical issues were headaches (33.1%), menstruation issues (25.4%) and weakness (10.8%) (Chowdhury, 2016). Along with physical health changes, adolescent girls experience some mental health changes among them. Attraction to opposite sex (76%), repeated changes in mood (43%), conscious about dress up (24%), feeling shyness (22%), feeling overly sensitive (8%), conflicting thoughts (13%) and feeling uncertain (11%) are the major mental health changes they have noticed among them during their adolescents period. These findings well evidenced by other studies that showed adolescents' sex attraction to guys is fairly prevalent (80%) (Mollah, 2014). And shy feelings (75%), as well as sensitive thoughts (28%), are extremely typical during their adolescent period (Sarker *et al.*, 2018).

Like young, adults, or older persons adolescents (girls) also suffer for some mental health challenges. Depression (54.2%), anxiety (5.5%), mental retired/stress (20.2%, mental distortion/sadness (9%) and fear (9.3%) are the major mental health problems they experienced. These findings are well documented by other studies which explored while anxiety disorders are anticipated to impact 4.6% of children and adolescents between the ages of 10 to 14 and 4.6% of those between the ages of 15 to 19. Depression is anticipated to

affect 1.1% of adolescents between the ages of 10 to 14 and 2.8% of those between the ages of 15 to 19. Sudden and unexpected mood changes are some of the signs of both sadness and anxiety (World Health Organization, 2021). Adolescents (girls) are dealing with anxiety, loneliness and depressive issues (prevalence of depression 18.4%, mild depression 37.1%, and moderate to severe depression 23.7%) (Uddin & Jewel, 2016). During their adolescence, girls experience anxiety (5.8%) and mental stress difficulties (2.2%) (P et al., 2016). The reporting systems for pediatric mental diseases have been discovered to be inadequate with the prevalence rate of child and adolescent psychiatric problems in the population being determined to be 6.46% and in schools to be 23.33% (Sivagurunathan, 2015; Malhotra & Patra, 2014; Mohanraj & Subbaiah, 2010). Adolescent girls reported feeling sad (45.3%) and aggressive (40.5%) as their two most prevalent depression symptoms, according to the research (Ria *et al.*, 2022). Although the prevalence of depression (54.3%) was nearly unchanged from the previous Bangladeshi study, the present study's sample of adolescent girls showed lower levels of anxiety and stress (64.8% and 59.0% respectively) (Mamun *et al.*, 2019; Alim *et al.*, 2017).

This study also shows that major physical health changes (menstruation, breast growing and changes in vocal chores), physical health problems (physical weakness & headache) and mental health problems (depression, mental retired) of the respondents are greatly impacted by the age classifications ($p < 0.001$). This is in line with different studies that depicted the age distinctions have an effect on the health factors that affect adolescents. Every year or half of the year, there are changes in physical health and different concerns. Every age group, 9–11, 12–14, and 15–17 years, experiences slightly or significantly distinct physical health changes and issues (Muzzey & Hensel, 2016). Adolescent girls physical health problems (physical weakness, headache & decreasing body weight) & mental health problems (depression, mental retired, mental distortion and fear) are influenced by their family income ($p < 0.001$). So, physical & mental health problems differ based on the family income classification. There is some existing literature that supports this finding. Girls from low-income families (LIFs) experience more hardship than girls from higher-income families (HIFs). Rural girls experience more problems with their physical and mental health due to a lack of education, inadequate medical care, and starvation (Srivastava, 2017).

Limitations

There are a few limitations to this research. The girls' histories and physical and mental health status were the main sources of the data; as a result, misclassification bias may occasionally be present. Due to the fact that face-to-face interviews were the primary method of data collection, recall bias and low response rates may be present. It's also possible that measurement bias results from the human mistake. The study is furthermore prone to all the drawbacks associated with cross-sectional research. However, this study has brought to light some significant concerns among adolescent girls in a region of Bangladesh and will further the mounting evidence that action is required to address the situation.

Conclusion

In the process of life circle, adolescent's is the most pivotal transition period. The foundation of human being physical and mental health is formed and developed during this period where it is very crucial for girls. Menstruation, breast growing, changes in vocal chores, increasing hair in different parts of body and changes in size of sexual organs are the adolescent's major physical health changes. During adolescent's period, they also acquired some mental health changes e.g., attraction to opposite sex, repeated changes in mood, conscious about dress up, feeling shyness, feeling overly sensitive, conflicting thoughts and feeling uncertain etc. In this transition period, adolescent girls also face some physical & mental health problems. Physical weakness, headache, decreasing body weight and vomiting, depression, anxiety, mental retired, mental distortion and fear are the common physical & mental health problems they experienced at that time. So at the adolescents' period, parents, family members and others should ensure sound physical & mental health for their overall growth and development by securing a good, friendly & favorable environment.

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Conflict of Interest

No conflict of interest to declare.

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