Knowledge and Awareness Regarding Premarital Screening of \(\beta\)-thalassemia among Undergraduate Students in Bangladesh

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Abstract

**Introduction:** Thalassemia is the most common congenital single gene disorder in Bangladesh. Considering the nature of the disease inherited from parents, thalassemia can effectively be prevented by premarital blood screening before marriage. The aim of the study was to assess the level of knowledge and awareness regarding premarital screening of \(\beta\)-thalassemia among undergraduate students.

**Materials and Methods:** This cross-sectional study was conducted among conveniently selected 156 undergraduate students of 2 universities at Dhaka University and American International University-Bangladesh (AIUB) from January to December 2019. Data were collected by pretested semi-structured questionnaire through face to face interview. Data was analyzed using SPSS software version 23.

**Results:** It was found that about 49.5%, 43.6% and 7.1% of respondents had poor, average and good knowledge about premarital screening of \(\beta\)-thalassemia respectively where there was statistical significance between the level of knowledge and the parental consanguinity and the family history of thalassemia (p-value<.05). On the other hand, 66.7%, 32.1% and 1.3% had poor, average and good awareness in this regards respectively. The level of awareness was significantly associated with the parental consanguinity, family history of thalassemia, monthly income and family type (p-value<.05).

**Conclusion:** This study showed knowledge and awareness levels among undergraduate students regarding premarital screening of \(\beta\)-thalassemia were insufficient. The thalassemia prevention can be enhanced by a well-organized educational program focusing on thalassemia and early screening in young adults.

**Keywords:** Thalassemia, gene disorder, premarital blood screening
INTRODUCTION

Thalassemia is a hereditary disorder that involves the decreased and defective production of hemoglobin and it is not infectious; it only transmits genetically from parents to their children (1). It is accounted that 80-90 million people are $\beta$-thalassemia carriers globally (2), and the rates are higher in the Mediterranean, Middle East, Central Asia and the Indian subcontinent and North America (3). In Bangladesh, approximately 7% of the populations are the carrier of $\beta$-thalassemia (4). Unlike; a report states that the carrier status of thalassemia trait is about 10% in Bangladeshi nationals (5).

The rapidly growing numbers of children diagnosed as thalassemia in Bangladesh clearly indicate that thalassemia is an emerging health burden of the country (6). Though, thalassemia is a severe and incurable disease, it is only manageable when it is prevented (6). Effective prevention can minimize the affected births approximately to 95% (7). Premarital screening has been proved as an effective approach for preventing the incidence of thalassemia in many developed and developing countries so far (8, 9). Implementing and designing an educational intervention about a specific topic for a specific population requires understanding the depth and attitudes of their knowledge. Such as medical undergraduate students possess good knowledge and positive attitude towards thalassemia (10) where non-medical student exposure to medical knowledge particularly thalassemia is quite limited, as a result, their knowledge and awareness is not high (11). Earlier authors found that premarital screening, knowledge and awareness about thalassemia are associated with the socio-demographic profile of the participants such as age, gender, marital and residence status, education, occupation, family income, parental consanguinity, family type and family history of thalassemia (12, 13).

This study sought to identify the level of awareness and knowledge regarding pre-marital screening of thalassemia among undergraduate students; thus the relevant authorities could get an insight of the intervention program in this regard.

MATERIALS AND METHODS:

This descriptive cross-sectional study was conducted to assess the level of knowledge and awareness regarding premarital screening of $\beta$-thalassemia among conveniently selected 156 undergraduate students at the selective universities in Dhaka which was lasted for almost 1 year (From January to December, 2019). Two universities such as Dhaka University and American International University-Bangladesh (AIUB) were conveniently selected as the study place. Sample size of the study was set by using a standard and validated equation (14). All the undergraduate students regardless of their age, gender, religion, marital status, living area, and the studying subject were included in this study. A semi-structured questionnaire containing 31 items was used to collect the data.

Prior to implementing the main questionnaire, necessary approval and consent was taken from the authority of National Institute of Preventive and Social Medicine (NIPSOM), Bangladesh, Dhaka University, American International University-Bangladesh and the participants. Descriptive statistics were calculated for all of the variables, including continuous and categorical variables and presented through the table. In order to find out the significant association between the variables, inferential analysis was applied by using SPSS version 23. A p-value of <0.05 were considered as significant.

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3 | RESULTS:

The socio-demographic status of participants can be noticed in Table 1. There were 156 participants in the study. The mean age of the participants was 21.53 ± 1.183 years. The male participants was 83 (53.2%) and female participants’ 73 (46.8%). 143 (91.7%) were unmarried and 13 (8.3%) respondents were married. Most of the respondents 124 (79.5%) were from urban area while only 32 (20.5%) respondents were from rural area. About 147 (95%) had no history of parental consanguinity and in case of family history of thalassemia, only 7 (4.5%) respondents had positive family history. It was observed that 138 (88.5%) of respondents were belonging to Islam religion. However, among the participants, 133 (85%) were from nuclear family.

Table 2 shows the status of participants’ knowledge about the premartial screening of β-thalassemia. It is observed that 50.6%, 60.3%, 16.0%, 46.2%, 69.9%, and 43.6% respondents had positive knowledge that the thalassemia is a hereditary and blood disorder, and it is due to blood deficiency, consanguineous marriage and thalassemia trait couple, and it can be detected by blood test.

Participants’ awareness regarding the premartial screening of β-thalassemia can be found in Table 3. About 51.3% of respondents received information about β-thalassemia from the mass media. Approximately 7.7% thought that thalassemia is an anemic disease. Almost 78.8% of interviewees’ believed that premartial screening can raise awareness about healthy and sound marriages.
4 | DISCUSSION:

This cross-sectional study was conducted to find out the level of knowledge and awareness about the \( \beta \)-thalassemia among purposively selected 156 undergraduate students in Bangladesh. A semi-structured questionnaire containing 31 items was used for extracting data from the undergraduate students of Dhaka University and American International University Bangladesh.

The present study showed that about 49.4% respondents had poor knowledge about premarital screening of \( \beta \)-thalassemia which is far better than a study conducted in Saudi Arabia (15). In contrast, a very similar percentage of respondents to the current study (43.6%) and a study conducted among nursing students (46.5%) in Egypt (16) illustrated that they contain an average score of knowledge in this field.
TABLE 3: Information related to the awareness regarding premarital screening of $\beta$-thalassemia(n=156)

| Source                  | No Frequency | No Percentage | Yes Frequency | Yes Percentage |
|-------------------------|--------------|---------------|---------------|---------------|
| Mass-media              | 76           | 48.7          | 80            | 51.3          |
| Relatives               | 136          | 87.2          | 20            | 12.8          |
| Friends/family          | 100          | 64.1          | 56            | 35.9          |
| Health-care providers   | 87           | 55.8          | 69            | 44.2          |

| Question                                                                 | Frequency | Percentage |
|-------------------------------------------------------------------------|-----------|------------|
| Individual who have thalassemia are anemic?                             | 144       | 92.3       |
| Want to marry a thalassemia patient/carrier?                           | 149       | 95.5       |
| Thalassemia can sometimes be treated with blood transfusion?           | 139       | 89.1       |
| Premarital screening raises awareness about healthy and sound marriages? | 33        | 21.2       |
| Marriage between healthy person and a carrier lead to minor thalassemia child? | 114       | 73.1       |

TABLE 4: Level of knowledge and awareness regarding premarital screening of $\beta$-thalassemia(n=156)

| Level  | Knowledge Scoring range | Frequency (f) | Percentage (%) | Awareness Scoring range | Frequency (f) | Percentage (%) |
|--------|--------------------------|---------------|----------------|--------------------------|---------------|----------------|
| Poor   | 0-7                      | 77            | 49.4           | 0-1                      | 104           | (66.7%)        |
| Average| 8-11                     | 68            | 43.6           | 2-3                      | 50            | (32.1%)        |
| Good   | 12-16                    | 11            | 7.1            | 4-5                      | 2             | (1.3%)         |

In terms of good knowledge regarding premarital screening of $\beta$-thalassemia, only 7.1% of students had presented this type of level in this research which is little bit lower (12.17%) compared to a research carried out in Iran among university students (17). Unlike these, previous studies have shown that large amounts of medical students have a good knowledge of $\beta$-thalassemia (18, 19). Since those studies’ participants were from the medical colleges, therefore, it is understandable for this type of difference compared to the present research finding. Therefore, depth studies about thalassemia among non-medical students are required to carry out in Bangladesh.

It has been observed that almost 50.6% and 60.3% of this study respondents’ knew the genetic nature and the blood disorder of thalassemia respectively whereas a study by Qadir and Rizvi (20) in Pakistan revealed that 92.1% of respondents knew that thalassemia is a familial disease. The present study found that less than 50% of respondent knew about the role of cousin marriage towards the causation of thalassemia (21) while a study stated that consanguineous marriages increases the chances of having children with thalassemia (21). In contrast, nearly
### Table 5: Association among the level of knowledge and awareness with the socio-demographic profile of participants

| Variables               | Subgroups | Level of knowledge | Statistics | Level of awareness | Statistics |
|-------------------------|-----------|--------------------|------------|--------------------|------------|
|                         |           | Poor knowledge f (%) | Average knowledge f (%) | Good knowledge f (%) | Poor awareness f (%) | Average awareness f (%) | Good awareness f (%) | p       |
| Age group (in years)    | 18-21     | 29 (37.7)          | 28 (41.2)  | 4 (36.4)           | 41 (39.4) | 19 (30.0) | 1 (50.0) | .894    |
|                         | 22-25     | 48 (62.3)          | 40 (58.8)  | 7 (63.6)           | 63 (60.6) | 31 (62.0) | 1 (50.0) | .697    |
| Gender                  | Male      | 39 (50.6)          | 37 (54.4)  | 10 (63.6)          | 51 (49.0) | 30 (60.0) | 2 (100.0) | .182    |
|                         | Female    | 38 (49.4)          | 31 (45.7)  | 4 (36.4)           | 54 (51.0) | 20 (40.0) | 0 (0.0)  | .937    |
| Marital Status          | Unmarried | 74 (96.1)          | 59 (86.8)  | 10 (90.9)          | 97 (93.3) | 44 (88.0) | 2 (100.0) | .112    |
|                         | Married   | 3 (3.9)            | 9 (13.2)   | 1 (9.1)            | 7 (6.7)   | 6 (12.0) | 0 (0.0)  | .317    |
| Residence               | Rural     | 12 (15.6)          | 17 (25.0)  | 3 (27.3)           | 17 (16.3) | 15 (30.0) | 0 (0.0)  | .112    |
|                         | Urban     | 65 (84.4)          | 51 (75.0)  | 8 (72.7)           | 87 (83.7) | 35 (70.0) | 2 (100.0) | .317    |
| Family Income (monthly) | 10000-25000 | 14 (18.2)  | 25 (36.8)  | 4 (36.4)           | 23 (22.1) | 20 (40.0) | 0 (0.0)  | .997    |
|                         | 25001-40000 | 20 (26.0)  | 17 (25.0)  | 3 (27.3)           | 24 (23.1) | 16 (32.0) | 0 (0.0)  | .991    |
|                         | 40001-55000 | 13 (16.9)  | 10 (14.7)  | 2 (18.2)           | 16 (15.4) | 8 (16.0) | 1 (50.0) | .991    |
|                         | 55001-70000 | 9 (11.7)   | 5 (7.4)   | 0 (0.0)            | 10 (9.6)  | 4 (8.0)  | 0 (0.0)  | .991    |
|                         | 70001-85000 | 1 (1.3)    | 3 (4.4)   | 0 (0.0)            | 3 (2.9)   | 1 (2.0)  | 0 (0.0)  | .991    |
|                         | 85001-10000 | 20 (26.0)  | 8 (11.8)  | 2 (18.2)           | 28 (26.9) | 1 (2.0)  | 1 (50.0) | .991    |
| Parental consanguinity  | No        | 98 (94.2)         | 49 (98.0)  | 0 (0.0)            | 98 (94.2) | 49 (98.0) | 0 (0.0)  | .002    |
|                         | Yes       | 6 (5.8)           | 1 (2.0)   | 2 (100.0)          | 6 (5.8)   | 1 (2.0)  | 2 (100.0) | .002    |
| Family history of Thalassemia | No        | 100 (96.2)     | 49 (98.0)  | 0 (0.0)            | 100 (96.2) | 49 (98.0) | 0 (0.0)  | .002    |
|                         | Yes       | 4 (3.8)           | 1 (2.0)   | 2 (100.0)          | 4 (3.8)   | 1 (2.0)  | 2 (100.0) | .002    |
| Religion                | Muslim    | 94 (90.4)         | 42 (84.0)  | 2 (100.0)          | 94 (90.4) | 42 (84.0) | 2 (100.0) | .935    |
|                         | Hindu     | 7 (6.7)           | 8 (16.0)  | 0 (0.0)            | 7 (6.7)   | 8 (16.0) | 0 (0.0)  | .557    |
|                         | Christian | 2 (1.9)           | 0 (0.0)   | 0 (0.0)            | 2 (1.9)   | 0 (0.0)  | 0 (0.0)  | .557    |
|                         | Buddhist  | 1 (1.0)           | 0 (0.0)   | 0 (0.0)            | 1 (1.0)   | 0 (0.0)  | 0 (0.0)  | .557    |
| Family type             | Nuclear   | 95 (91.3)         | 36 (72.0)  | 2 (100.0)          | 104 (100) | 50 (100) | 2 (100.0) | .007    |
|                         | Joint     | 9 (8.7)           | 14 (28.0)  | 0 (0.0)            | 95 (91.3) | 36 (72.0) | 2 (100.0) | .007    |
| Total                   | 104 (100) | 50 (100)          | 2 (100)   |                   | 104 (100) | 50 (100) | 2 (100.0) | .007    |
three quarter of the students had correct knowledge about the chance of having thalassemic child in both carrier parents which is little bit less than a study conducted among the Doctors in West Bengal, India (18). However, well over three quarter of the students of the current study was knowledgeable about the preventive measure of thalassemia. This study showed that most of the students did not have proper knowledge about the consequence of this disease. Hence, the concerned authorities are requested to revise the non-medical undergraduate programs’ curriculum.

In regards to the awareness of \( \beta \)-thalassemia, this study found about 66.7%, 32.1%, and 1.3% of participants had a poor, average, and a good level of score which is very similar with a study conducted by Ghafoor et al (22) in the case of the poor and average level of awareness. As opposed to, there is a very large difference between the current study and a previous study (22) on the percentage of participants who have a good level of awareness about thalassemia. Variety of social, familial, and educational attitudes among participants in the two studies may be responsible for revealing such results. Thus, it is recommended to conduct a similarly relevant study with participants with similar characteristics.

This study found that most of the participants were aware about the significance of pre-marital screening which is higher than a study of India (23). Respondents were somewhat confused about marriage with thalassemia carriers and the status of child thalassemia as a result of marriage. In addition, it was noticed that the present study’s maximum population were not aware about the proper treatment of thalassemia which is consistent to a prior study (20). Interestingly, more than 90% of the present study participants were against that the thalassemia individuals are anemic which upholds a study report carried out in Vietnam (24). Although earlier author have demonstrated lower initial hemoglobin levels in patients with coexisting anemia and thalassemia trait (25). Thus, further study between the relationship between thalassemia and anemia are recommended to conduct. However, a study found the electronic media as an effective way of health promotion (26) while this study’s half of the respondents also received information about thalassemia from the mass media. Therefore, authorities are requested to promote the prevention of thalassemia comprehensively using electronic and social media.

There was a statistical significance between the family history of thalassemia and the knowledge level of the participants in this study, which is supported by a previous study conducted in Jeddah (15). In the matter of association between the parental consanguinity of the respondents and knowledge level, the finding of this study was not similar to the Jeddah study (15) because the current research found a statistical significance in this regard. However, the current study did not find any relationship between the level of knowledge and respondents’ age, gender, marital status, residence, family income, religion and family type. Unlike, prior studies observed association between age, gender, marital and residence status, and family income precisely (13, 15). But, the present study found a strong association between the awareness level and the participants’ family income, parental consanguinity, family history, and the category of family type. Due to the rare literature on thalassemia awareness levels among students, the current study’s these findings has not been justified and supported; therefore, there is a need to conduct detailed and in-depth research in this regard.

5 | CONCLUSION:

This study accomplished its purposes by assessing the level of knowledge and awareness among undergraduate students, and found that about half of the participants had poor knowledge about thalassemia. Of these, a large proportion of students had inadequate awareness of this genetic disorder. In addition, possession of knowledge and awareness can be varied widely with the socio-demographic status of participants. Since premarital screening is one of the most important plans and strategies for preventing genetic disorders like thalassemia, therefore, concerned authorities should take a comprehensive preventive program from local to national level.

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