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Awareness and Perceptions of Junior Doctors Regarding Thalassaemia

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Abstract

Background: Thalassaemia remains a major public health concern in Bangladesh, where hereditary disorders are increasingly recognized as contributors to long-term morbidity. Junior doctors play a critical role in early identification, counselling and implementation of preventive strategies. This study aimed to evaluate the level of knowledge and attitude of junior doctors toward thalassaemia and compare findings between interns and medical officers. ***Methods:*** A hospital-based cross-sectional descriptive study was conducted among 110 junior doctors (interns and medical officers) in Gonoshasthaya Samaj Vittik Medical College, Savar, Dhaka, Bangladesh, from April to June 2019. Data were collected using a pre-designed, self-administered questionnaire comprising demographic variables, 20 knowledge items and 9 attitude items. Knowledge scores were categorized as good, average, or poor. Attitude scores were classified as positive or negative. Data were analyzed using SPSS. ***Results:*** Participants were predominantly aged 22–26 years (76.4%), female (63%) and interns (72.7%). Good knowledge was observed in 34.5%, while 34.5% had average and 30.9% had poor knowledge. Positive attitudes were noted in 81.8% of respondents. Interns demonstrated significantly better understanding of consanguinity (p=0.014), prevention (p=0.011) and routine investigations (p=0.008). All participants were willing to donate blood and 80% were willing to donate bone marrow. Knowledge and attitude showed a positive, though statistically insignificant, association. ***Conclusion:*** Despite favorable attitudes toward prevention, substantial knowledge gaps persist among junior doctors. Strengthened training in genetics and thalassaemia management is necessary.

Keywords: Thalassaemia, knowledge, attitude, prevention, Bangladesh.

INTRODUCTION

Thalassaemia represents one of the most prevalent hereditary haemoglobin disorders worldwide, with a particularly heavy burden across low- and middle-income countries situated within the so-called "thalassaemia belt," stretching through South Asia, the Middle East and the Mediterranean region [1–4]. Each year, an estimated 60,000–70,000 children are born with severe thalassaemia syndromes, the majority of whom reside in resource-constrained settings where prevention and long-term management remain major public health challenges [1,5,6]. Bangladesh occupies a central location within this belt and has made substantial gains in reducing preventable childhood mortality through improvements in infectious disease control, nutrition and maternal–child health programs [6–8]. However, these epidemiological shifts have inadvertently highlighted a relative neglect of genetic disorders, including haemoglobinopathies, which are now emerging as significant contributors to chronic disease burden.

Current estimates suggest that approximately 3% of the Bangladeshi population carries β-thalassaemia and another 4% carries Hb E [9]. More recent national assessments indicate even higher carrier frequencies, with Hb-E prevalence reaching 6.1% in general

populations and exceeding 40% among tribal groups [10]. Hospital-based studies further document substantial proportions of Hb-E trait and disease among patients attending tertiary centers. These data underscore an impending rise in thalassaemia-related morbidity and resource demands, mirroring trends observed in comparable developing countries [11-13].

Management of thalassaemia major continues to rely primarily on regular lifelong blood transfusion and iron chelation therapy. While haematopoietic stem cell transplantation offers a potential cure, its high cost, need for fully matched donors and sophisticated supportive care infrastructure render it inaccessible for most families in Bangladesh [14–16]. Individuals living with transfusion-dependent thalassaemia often face additional psychological, economic and social challenges, including stigmatization and caregiver burden, further amplifying the disease's long-term impact [17,18]. In such contexts, prevention—achieved through public education, carrier screening, premarital counselling and prenatal diagnostic services—remains the most sustainable strategy for reducing new cases [19–21].

Physicians play a pivotal role in effective thalassaemia prevention programs. Evidence from countries such as Italy, Cyprus, Turkey and Iran demonstrate that physician communication significantly enhances public knowledge, uptake of screening and reproductive risk awareness [22–24]. However, the Bangladeshi health system is characterized by acute physician shortages, particularly in rural areas, alongside short consultation durations and limited opportunities for counselling [25,26]. Given these systemic constraints, the knowledge, attitude and counselling capacity of junior doctors—who form the backbone of frontline service delivery—becomes critically important. Although studies from various regions have examined thalassaemia knowledge among medical undergraduates and trainees, their findings are inconsistent and may not reflect the preparedness of junior physicians within Bangladesh [23,27].

Understanding the awareness and perceptions of junior doctors is essential not only for strengthening community-level genetic counselling but also for informing medical curricula, continuing professional education and national prevention strategies. In this setting, junior doctors frequently manage antenatal, paediatric, adolescent and general patient populations, placing them in a uniquely influential position for early risk identification and preventive guidance.

This study therefore, aimed to evaluate the knowledge and attitudes of junior doctors regarding thalassaemia and to determine whether differences exist between interns and medical officers. By identifying gaps in understanding among early-career physicians, the findings may guide targeted educational interventions and strengthen thalassaemia prevention efforts within Bangladesh.

METHODOLOGY & MATERIALS

A hospital-based cross-sectional descriptive study was conducted at Gonoshasthaya Samaj Vittik Medical College and Hospital, Dhaka, Bangladesh. Data collection occurred over three months from April to June 2019. The study involved junior doctors actively working in the hospital during the study period, including interns and medical officers, who represent the primary early-career clinical workforce.

Sample Selection

A purposive convenience sampling strategy was implemented. A total of 110 structured questionnaires were distributed.

Inclusion Criteria

Junior doctors (interns and medical officers) who were present during the data collection period.
Provided written informed consent

Exclusion Criteria

Faculty members were excluded from the study

Data Collection Procedure

Data collection followed a structured process designed to ensure accuracy and consistency. After explaining the purpose and importance of the study, investigators approached eligible participants during their duty hours without interfering with clinical responsibilities. Written informed consent was obtained from each participant, emphasizing the voluntary nature of participation, confidentiality of responses and anonymity in data reporting.

A pre-designed, self-administered questionnaire was used as the primary data collection tool. The instrument was developed by the research team following an extensive literature review and included three sections. The first section documented demographic characteristics such as age, sex, professional designation and primary sources of information about thalassaemia. The second section assessed knowledge, consisting of 20 close-ended items covering etiology, inheritance patterns, diagnosis, treatment, prognosis, preventive strategies and transfusion-related considerations. Correct responses were scored as one, whereas incorrect or "don't know" responses were scored as zero. Knowledge levels were categorised as good (12–20), average (9–11), or poor (≤8). The third section evaluated attitudes using nine items related to premarital screening, reproductive choices, donation practices and ethical considerations; scoring followed the same pattern as the knowledge section.

Participants completed the questionnaire independently to reduce interviewer bias. To maintain

uniformity, instructions were clearly provided and investigators remained available to clarify queries without influencing responses. Completed questionnaires were collected immediately, reviewed for completeness, coded and stored securely. Only the research team had access to the data.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee before study initiation. Participation was fully voluntary, with written informed consent collected individually. Confidentiality and anonymity of responses were ensured.

Statistical Analysis

Data were entered and analyzed using standard statistical software (SPSS version 22). Descriptive statistics (frequency, percentage, mean and range) summarized demographic characteristics, knowledge scores and attitude scores. Chi-square tests evaluated associations between knowledge/attitude levels and respondent designation. Correlation analyses explored the relationship between knowledge and attitude scores. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 110 junior doctors participated in the study. Their ages ranged from 22 to 32 years, with 76.4% belonging to the 22–26-year age group. Females constituted 63% of the participants. Of all respondents, 72.7% were interns and 27.3% were medical officers. The MBBS program was the most common source of information on thalassaemia (80.9%), followed by MBBS plus media exposure (10.9%). The overall distribution of knowledge and attitude scores is presented in Table 1.

Table 1: Knowledge, Attitude and Practice Scores of Participants

Category	Score	n (%)
Knowledge (20 items)	Good	38 (34.5)
	Average	38 (34.5)
	Poor	34 (30.9)
Attitude (9 items)	Positive	90 (81.8)
	Negative	20 (18.2)
Total Participants		110 (100%)

Table 2: Item-wise Knowledge Responses Among Interns and Medical Officers

No.	Question	Response	Intern n (%)	MO n (%)	Total n (%)	p-value
1	Etiology of thalassaemia	Correct	80 (100)	29 (96.7)	109 (99.1)	0.101
		Incorrect	0	0	0	
		Do not know	0	1 (3.3)	1 (0.9)	
2	Role of consanguineous marriage	Correct	78 (97.5)	25 (83.3)	103 (93.6)	0.014
		Incorrect	0	2 (6.7)	2 (1.8)	
		Do not know	2 (2.5)	3 (10)	5 (4.5)	
3	Which sex is affected more	Correct	25 (31.2)	7 (23.3)	32 (29.1)	0.718
		Incorrect	43 (53.8)	18 (60)	61 (55.5)	
		Do not know	12 (15)	5 (16.7)	17 (15.5)	
4	Diagnostic tests	Correct	74 (92.5)	27 (90)	101 (91.8)	0.259
		Incorrect	6 (7.5)	2 (6.7)	8 (7.3)	
		Do not know	0	1 (3.3)	1 (0.9)	
5	Treatment options	Correct	55 (68.8)	21 (70)	76 (69.1)	0.055
		Incorrect	25 (31.2)	7 (23.3)	32 (29.1)	
		Do not know	0	2 (6.7)	2 (1.8)	
6	Do minor cases need treatment	Correct	36 (45)	13 (43.3)	49 (44.5)	0.424
		Incorrect	32 (40)	15 (50)	47 (42.7)	
		Do not know	12 (15)	2 (6.7)	14 (12.7)	
7	Definite treatment	Correct	67 (83.8)	26 (86.7)	93 (84.5)	0.624
		Incorrect	12 (15)	3 (10)	15 (13.6)	
		Do not know	1 (1.2)	1 (3.3)	2 (1.8)	
8	Most common type in Bangladesh	Correct	3 (3.8)	1 (3.3)	4 (3.6)	0.818
		Incorrect	65 (81.2)	23 (76.7)	88 (80)	
		Do not know	12 (15)	6 (20)	18 (16.4)	
9	Can occurrence be predicted	Correct	60 (75)	20 (66.7)	80 (72.7)	0.168
		Incorrect	10 (12.5)	2 (6.7)	12 (10.9)	

No.	Question	Response	Intern n (%)	MO n (%)	Total n (%)	p-value
		Do not know	10 (12.5)	8 (26.7)	18 (16.4)	
10	How can occurrence be predicted	Correct	28 (35)	8 (26.7)	36 (32.7)	0.505
		Incorrect	14 (17.5)	4 (13.3)	18 (16.4)	
		Do not know	38 (47.5)	18 (60)	56 (50.9)	
11	Prevention	Correct	53 (66.2)	12 (40)	65 (59.1)	0.011
		Incorrect	22 (27.5)	11 (36.7)	33 (30)	
		Do not know	5 (6.2)	7 (23.3)	12 (10.9)	
12	Duration of transfusion	Correct	32 (40)	10 (33.3)	42 (38.2)	0.164
		Incorrect	23 (28.8)	5 (16.7)	28 (25.5)	
		Do not know	25 (31.2)	15 (50)	40 (36.4)	
13	Need for optional vaccine	Correct	36 (45)	11 (36.7)	47 (42.7)	0.293
		Incorrect	30 (37.5)	16 (53.3)	46 (41.8)	
		Do not know	14 (17.5)	3 (10)	17 (15.5)	
14	Need for routine investigations	Correct	67 (83.8)	17 (56.7)	84 (76.4)	0.008
		Incorrect	8 (10)	10 (33.3)	18 (16.4)	
		Do not know	5 (6.2)	3 (10)	8 (7.3)	
15	Life expectancy: major	Correct	21 (26.2)	7 (23.3)	28 (25.5)	0.124
		Incorrect	27 (33.8)	5 (16.7)	32 (29.1)	
		Do not know	32 (40)	18 (60)	50 (45.5)	
16	Life expectancy: minor	Correct	21 (26.2)	8 (26.7)	29 (26.4)	0.248
		Incorrect	19 (23.8)	3 (10)	22 (20)	
		Do not know	40 (50)	19 (63.3)	59 (53.6)	
17	Can minor become major	Correct	26 (32.5)	13 (43.3)	39 (35.5)	0.326
		Incorrect	37 (46.2)	14 (46.7)	51 (46.4)	
		Do not know	17 (21.2)	3 (10)	20 (18.2)	
18	Carrier × normal → thalassaemic child	Correct	20 (25)	12 (40)	32 (29.1)	0.287
		Incorrect	55 (68.8)	16 (53.3)	71 (64.5)	
		Do not know	5 (6.2)	2 (6.7)	7 (6.4)	
19	Affected child if both parents' carriers	Correct	27 (38.8)	3 (10)	30 (27.3)	0.036
		Incorrect	37 (46.2)	17 (56.7)	54 (49.1)	
		Do not know	16 (20)	10 (33.3)	26 (23.6)	
20	Affected child if one parent carrier	Correct	14 (17.5)	5 (16.7)	19 (17.3)	0.223
		Incorrect	47 (58.8)	13 (43.3)	60 (54.5)	
		Do not know	19 (23.8)	12 (40)	38 (28.2)	

Table 3: Attitude-based Responses Among Interns and Medical Officers

Attitude Item	Intern n (%)	MO n (%)	Total n (%)	p-value
Like to marry a carrier	20 (25)	9 (30)	29 (26.4)	0.391
Want premarital screening	77 (96.2)	28 (93.3)	105 (95.5)	0.742
Want to donate blood	80 (100)	30 (100)	110 (100)	–
Want to donate bone marrow	64 (80)	24 (80)	88 (80)	0.342
Both carriers should not marry	58 (72.5)	22 (73.3)	80 (72.7)	0.064
Both carriers should not have children	38 (47.5)	11 (36.7)	49 (44.5)	0.26
Premarital screening necessary for general people	79 (98.8)	27 (90)	106 (96.4)	0.029
Termination needed if PND positive	36 (45)	13 (43.3)	49 (44.5)	0.727
Legislation for premarital screening	72 (90)	22 (73.3)	94 (85.5)	0.074

Table 4: Correlation of Knowledge and Attitude Scores

Knowledge Level	Attitude	Intern n (%)	MO n (%)	Total n (%)	p-value
Good	Positive	24 (88.9)	10 (90)	34 (89.5)	0.854
	Negative	3 (11.1)	1 (9.1)	4 (10.5)	
Average	Positive	24 (80)	6 (75)	30 (78.9)	0.758
	Negative	6 (20)	2 (25)	8 (21.1)	
Poor	Positive	18 (78.3)	8 (72.7)	26 (76.5)	0.722
	Negative	5 (21.7)	3 (27.3)	8 (23.5)	

DISCUSSION

The present study explored the awareness and attitudes of junior doctors toward thalassaemia, an increasingly significant public health concern in Bangladesh. Despite the country's position within the thalassaemia belt and the growing recognition of hereditary blood disorders, the findings revealed notable gaps in essential knowledge among early-career physicians. Only 34.5% of participants demonstrated good knowledge, which is unexpectedly low for a medically trained cohort in a high-prevalence region. Comparable observations have been reported among Bangladeshi college students and young populations in Pakistan and Thailand, where suboptimal knowledge levels were also documented [23,28]. However, the results diverge from studies conducted among junior doctors and medical students in India, Malaysia and Pakistan, in which participants displayed stronger foundational understanding [21,28,29]. This discrepancy may underscore differences in curriculum focus, clinical exposure, or the continuity of medical education.

Although most respondents correctly identified thalassaemia as an inherited disorder, misconceptions persisted regarding its inheritance pattern. A substantial proportion (71%) incorrectly believed that marriage between a normal individual and a carrier could result in a child with thalassaemia major. Additionally, only 29.1% correctly recognized that both sexes are equally affected by the condition. Similar gaps in genetic understanding have been reported in earlier studies from Bangladesh and Malaysia, suggesting that fundamental genetic principles remain insufficiently emphasized among young clinicians [21,30]. The significantly higher proportion of interns responding correctly to questions about consanguinity, prevention and necessary investigations suggests that more recent training may provide an advantage, while medical officers may face knowledge erosion without structured continuing education.

The majority of participants correctly identified diagnostic tests required for detecting thalassaemia, consistent with findings reported by Chatterjee et al. [29]. However, the understanding of treatment remained incomplete. Although 84.1% were aware that bone marrow transplantation is the definitive treatment, only 38.2% correctly recognized the lifelong transfusion requirement in the absence of curative therapy. Comparable deficits in treatment-related knowledge have been previously documented among medical students in Malaysia and other developing countries [28]. Furthermore, respondents demonstrated limited understanding of genetic risk probabilities: only 27.3% and 17.3% correctly identified the chances of an affected child among carrier–carrier and carrier–normal couples, respectively, highlighting a persistent need for enhanced education in genetic counselling.

The study also revealed poor awareness of the most common thalassaemia types prevalent in Bangladesh, as well as inadequate knowledge regarding prediction, prevention and life expectancy. These findings are concerning, given the essential role junior doctors play in early identification and community-level counselling. Interestingly, demographic characteristics such as age, gender and designation showed no influence on overall knowledge level, aligning with earlier research reporting similar patterns [21].

Despite these knowledge gaps, the overall attitude of junior doctors was encouraging. Positive attitudes were observed in 81.8% of participants, which aligns with findings from studies in India and suggests a strong willingness to engage in preventive efforts [19,29]. A positive association, although statistically insignificant, was also observed between higher knowledge scores and favorable attitudes, echoing trends noted by Chatterjee *et al.*, [29]. Notably, all participants expressed willingness to donate blood and 80% were willing to donate bone marrow, demonstrating a commendable level of altruism. Support for premarital screening was high and the majority endorsed the need for relevant legislation, reflecting attitudes consistent with populations surveyed in regional studies [29,31]. These positive attitudes may serve as a valuable foundation for national prevention programs, provided that gaps in knowledge are addressed through targeted educational interventions.

Collectively, these findings highlight the need for strengthened training in genetics, counselling and thalassaemia management within both undergraduate and postgraduate medical curricula. Improved awareness among junior doctors is essential not only for effective clinical management but also for shaping public perceptions and guiding informed reproductive decisions.

Limitations of the study

This study was conducted in a single institution with a relatively small sample of junior doctors, which may restrict the generalizability of the findings.

CONCLUSION

The study identified important gaps in knowledge about thalassaemia among junior doctors despite their largely positive attitudes toward prevention and patient support. Strengthening genetics and thalassaemia-focused training within medical education, alongside structured continuing professional development, may enhance physicians' capacity to contribute effectively to national thalassaemia prevention efforts.

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Conflicts of interest

There are no conflicts of interest.

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