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A Survey on Knowledge, Awareness, and Perception of Genetic Testing for Hereditary Disorders among Undergraduate and Graduate Students of Bangladesh

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ABSTRACT

In general, genetic testing can help patients with hereditary disorders make crucial decisions related to prevention, treatment, and early detection. However, insufficient awareness about its significance is a contributing factor to the rising incidence of such disorders. To address this issue, the current study objects to investigate the level of knowledge, awareness and attitudes towards genetic testing among undergraduate and graduate students in Bangladesh. A total of 408 participants from different universities were surveyed, and the data was collected through a 38-question online survey that was divided into four sections. Among the participants, a large percentage of respondents were between 18 and 26 years old, with 59.8% holding a bachelor's degree and 78.9% came from science-related fields. Most respondents had heard of genetic testing and know that it could be used to diagnose inherited disease. A large portion of the respondents indicated their readiness to undergo genetic testing, showing a clear preference for these tests to be carried out exclusively in hospitals under the guidance of doctors. The consensus among most participants was that genetic testing holds significant importance and should be recommended for all newborns and expectant mothers. However, there were some concerns about potential negative implications but overall attitudes towards genetic testing were positive with variations based on age, education, and fields of study. This study necessitates the implementation of educational programs that eliminate any misconceptions and help educate the public to minimize misunderstandings about genetic testing. The findings of this research provide valuable information about the possible application of genetic testing for inherited conditions in Bangladesh.

Keywords: Knowledge, Awareness, Perceptions, Hereditary disorder, Hereditary of testing, and Genetic testing.

INTRODUCTION:

Genetic disorder is a condition caused by an abnormal variation in a person's DNA (Odelola *et al.,* 2013). These variations can occur in different forms, such as mutation in a single gene, change in the number of copies of a gene, or structural change in a chromosome

etc. (Ab Majid *et al.,* 2018). They can be caused by a variety of factors, including mutations, chromosomal abnormalities, or environmental exposure to the certain toxins (Maria Jackson & Leah Marks, 2018). Globally, more than 6,500 hereditary disorders have been discovered to date, and common genetic diseases are gradually becoming a serious health concern (McKusick, 2007; E. Samuels, 2010). For patients to receive the best care, these disorders must be diagnosed promptly and accurately (Black *et al.,* 2015; Baynam *et al.,* 2020). However, the diagnosis of hereditary illnesses can be difficult and is dependent on knowledge of the molecular causes of that specific disease (Burton & Gargus, 2021). Despite substantial progress in the post-genomic period in our understanding of many human diseases, the majority of the hereditary diseases remain unknown yet. This is basically due to the rarity and clinical heterogeneity of the majority of these disorders. Moreover, hundreds of genetic diseases from which the causes of the small numbers of these diseases are known and most of them are still unknown (Beaulieu *et al.,* 2014; McClellan & King, 2010; Oti & Brunner, 2007). Sometimes genetic disorders are inherited in next generation. Heredity is caused by the deoxyribonucleic acid (DNA) (O'Connor & Crystal, 2006) and in humans' cells typically have 46 chromosomes, which are arranged in 23 pairs. Each of the pairs consists of a chromosome from the paternal and a chromosome from the maternal line. There are genes on every chromosome. A gene or group of genes regulates traits.

However, the possibility of a defective gene being present in either parent and being passed on to the offspring can be known by using genetic testing. So, prior to getting married, it is important to know a couple's propensity for certain diseases that will be passed on to their unborn children (Odelola *et al.,* 2013). It has been found that a number of well-known disorders are linked to inherited gene mutations. There is a growing public health crisis in Bangladesh due to the prevalence of non-communicable diseases (NCDs) for example cardiovascular disease, cancer, diabetes, and chronic respiratory disease (Hiremath & Hiremath, 2012). Nearly 60% of deaths in Bangladesh are attributable to NCDs (Ahmed *et al.,* 2017). On the contrary, it is estimated that five to ten percent of cancers are caused by the hereditary factors (Lu *et al.,* 2014; Stanislaw *et al.,* 2016). Cancer such as colorectal cancer and breast cancer are included in this category. Hereditary diseases also include conditions that affect the blood, such as thalassemia, sickle cell anemia and hemophilia. Mutation in genes such as the hemoglobin C gene, are responsible for the development of hemophilia in next generation (Chin & Tham, 2020). People are concerned about the potential dangers associated with their genomic disorder and the suitability of genetic testing (McGowan *et al.,* 2013). The field of medical genetics focuses on using advances in genetics research and technology to address a wide range of healthcare issues (Thong *et al.,* 2018; Uddin *et al*., 2022; Mantere *et al.,* 2019).

The demand for genetic testing has increased in both clinical and direct-to-consumer settings as a result of technology advancements, decreased testing costs, and greater public awareness (Campion *et al.,* 2019). It can therefore be used to inspect for mutations or genetic variants that raise the risk of developing a wide range of diseases, to determine the effectiveness/dosage of therapeutic medications, and to identify how an individual would react to a certain food or allergen (Altaany *et al.,* 2019). Understanding the one's own or one's family's genomic risk may be affected by health literacy, which is influenced by cultural, societal, and personal variables (Parker *et al.,* 2003). Studies show that there is limited awareness about genetic testing, including newborn screening, among the general public in both developed and developing countries. The inclusion of genetics in medical curriculum at both the undergraduate and graduate levels have become an urgent matter in recent years. Knowledge of genetics and the ability to counsel individuals and families should be prerequisites for every subspecialty in the field of medical science (Kirklin, 2003). In Bangladesh, there is a necessity for additional research to explore the public perception of genetics as well as their attitudes toward genetic testing. For individuals, especially students, it is vital to have a rudimentary understanding of genetics in order to comprehend genetic testing and its possible benefits. Because the students' perceptions and knowledge of genetic testing can assist the broader public in gaining foundational knowledge, raising awareness, and addressing challen-

ges, misunderstandings, and information deficits in this field. However, the perspective of students in Bangladesh on genetic testing is still somewhat limited. Therefore, it is essential to conduct an evaluation of students' overall knowledge, awareness, & perspectives regarding genetic testing for hereditary disorders. This survey study required to address a research gap by examining Bangladeshi undergraduate & graduate students' knowledge, awareness & perceptions of genetic testing regarding hereditary disorders.

MATERIALS AND METHODS:

Study design

A cross-sectional study was carried out over the three-month period between December 2022 and February 2023. This population-based cross-sectional study looked at how undergraduate and graduate students in Bangladesh understood, felt about, and the perceived genetic testing for inherited disorders. The study was conducted using both qualitative and quantitative data. Participants have to be current students from various Bangladeshi universities. A total of 408 graduate and undergraduate students who participated in the study had backgrounds in life sciences as well as other subjects besides molecular life science and health science. They were citizens of the Bangladesh with a range of socioeconomic statuses and educational institutions, could speak in English, and were between the ages of the 18 and 50. To find out how undergrads studying molecular life sciences and health felt about genetic testing for hereditary disorders, a questionnaire was developed and updated online based on one from research by Hong-Wai Tham (Q article). Prior to the data collection, each and every participant was the properly informed of the study's objectives.

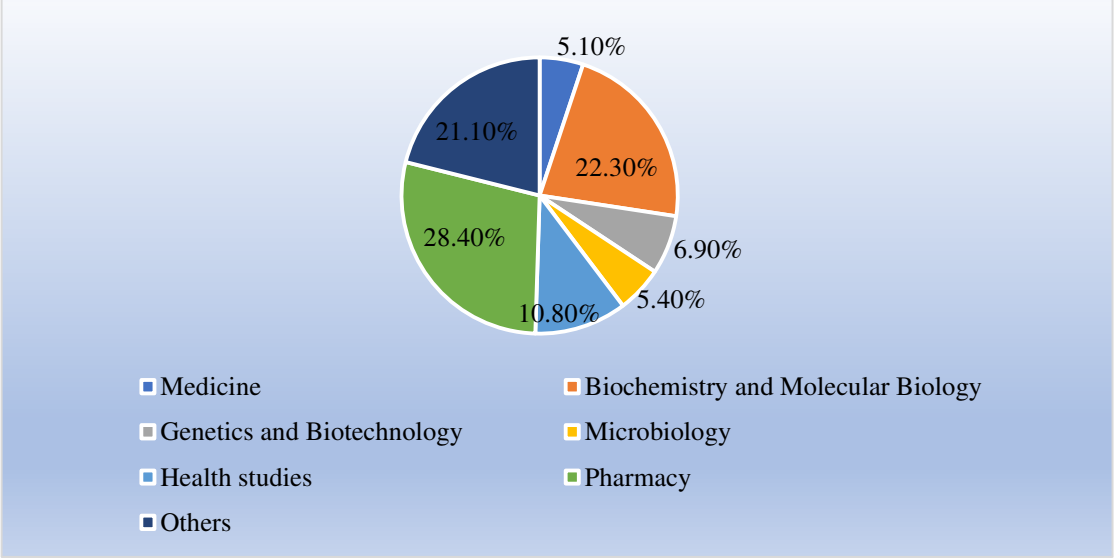

Fig. 1: Students demography.

Sampling and Data collection

The questioners consist of 38 questions, which were divided into 4 sections: Part-1 consisted of demographic data such as ages, gender, and educational degree. Part-2 consisted of 10 multiple choice questions related to the knowledge of genetic testing. Part-3 consisted of 9 multiple choice questions related to the awareness of genetic testing. Part-4 consisted of 13 multiple choice questions related to the perception of genetic testing. Key definition of Genetic testing, Molecular diagnostics, Genome, Proteome & Inherited diseases/ Genetic disorder/Hereditary disorder was provided to the participants in the instructions section of the survey. There were yes/no/may be questions in the survey. The survey also included the multiple-choice questions and a Likert scale for rating of agreement with various statements (i.e., agree, strongly agree, neutral, disagree, strongly disagree). An introductory cover page was attached describing the purpose and objectives of the study and inviting the students to participate in it.

Statistical analysis

All categorical variables were presented as frequencies and percentages, including participant demographics,

professional information, and responses to questions about the participants' opinions about genetic testing. SPSS software version 26 and Microsoft Excel were used for the data analysis. Using descriptive statistics, proportions were calculated. The knowledge, awareness and perception of genetic testing for hereditary disorder survey responses were compared to these attributes using the Chi-square test.

The p values were determined by chi-square analysis. All statistical tests were performed with a significance threshold of 5%, and the odds ratio (OR) and correspondence 95% confidence intervals (CI) were computed.

RESULTS:

Table 1: Total and percentage of the respondent's answers pertaining to knowledge of genetic testing.

Statement	Total (%)		
	Yes*	May be	No
Genetic testing allows the testing of vulnerability to inherited disease.	286 (70.1)	112 (27.5)	10 (2.5)
Genetic testing can reduce the prevalence of genetic disease.	273 (66.9)	109 (26.7)	26 (6.4)
Genetic testing can help understand of genetic feature and its sequences.	316 (77.5)	80 (19.6)	12 (2.9)
A parson's genetic profile can be used to check whether they are at risk of genetic or hereditary disease.	285 (69.9)	108 (26.5)	15 (3.7)
Genetic testing can identify specific diseases that run in the family.	292 (71.6)	100 (24.5)	16 (3.9)
Genetic disease can be passed on in a family.	296 (72.5)	93 (22.8)	19 (4.7)
Prenatal screening for diseases or conditions of the fetus or embryo before it is born.	248 (60.8)	140 (34.3)	20 (4.9)
Genetic testing can be done during pregnancy to find out whether the baby will develop disease, such sickle cell disease, thalassemia, or neural tube defects.	274 (67.2)	116 (28.4)	18 (4.4)
Blood test or DNA analysis is one of the methods used in genetic testing.	298 (73.0)	101 (24.8)	9 (2.2)
Genetic testing can identify various type of cancer, such as colon cancer, breast cancer.	258 (63.2)	123 (30.8)	27 (6.6)

*Correct answer

Table 2: P-values for the respective variable pertaining to questions on knowledge of genetic testing.

	Variables	Total (%)	P-value
Gender	Male	269 (65.9)	0.376
	Female	139 (34.1)	
Age	18-26	269 (65.9)	
	27-34	133 (32.6)	0.128
	35-42	6 (1.5)	
	43-50	0	
Field of study	Medicine	21 (5.1)	
	Biochemistry and Molecular Biology	91 (22.3)	
	Genetics and Biotechnology	28 (6.9)	
	Microbiology	22 (5.4)	0.004*
	Health studies	44 (10.8)	
	Pharmacy	116 (28.4)	
	Others	86 (21.1)	
Level of education	HSC	8 (2.0)	
	BSc	244 (59.8)	
	MSc	153 (37.5)	0.442
	MPhil	2 (0.5)	
	PHD	1 (0.2)	

*Significant value

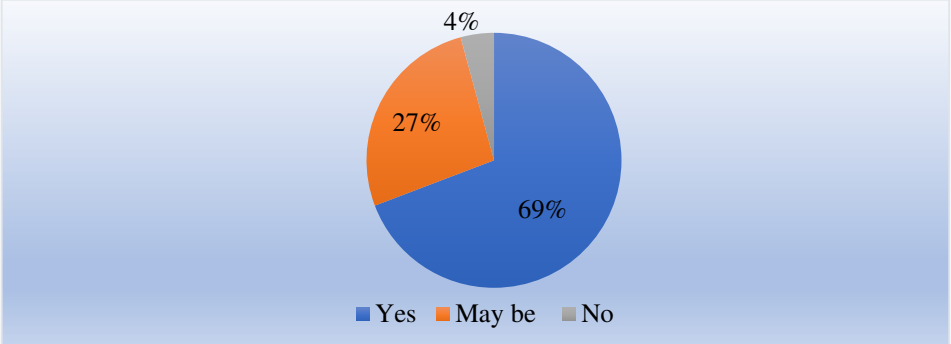

Fig. 2: Respondents knowledge of genetic testing.

Table 3: Total and percentage of the respondent's answer pertaining the awareness of genetic testing.

Statement	Total (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am aware that not all genetic disorder can be curable.	13 (3.2)	19 (4.7)	95 (23.3)	225 (55.1)	56 (13.7)
I am aware that I have unique genetic features compared with others.	24 (5.9)	19 (4.7)	154 (37.7)	157 (38.5)	54 (13.2)
I would like to have genetic testing.	14 (3.4)	12 (2.9)	109 (26.7)	227 (55.6)	46 (11.3)
Genetic testing tells me the risk of acquiring certain disease.	12 (2.9)	9 (2.2)	92 (22.5)	237 (58.1)	58 (14.2)
A Genetic test should only be performed in the hospital with a doctor's prescriptions.	20 (4.9)	24 (5.9)	87 (21.3)	207 (50.7)	70 (17.2)
A genetic test can be sold in store.	63 (15.4)	129(31.6)	112 (27.5)	89 (21.8)	15 (3.7)
Genetic testing is closely related to science and medicine.	16 (3.9)	8 (2.0)	77 (18.9)	238 (58.3)	69 (16.9)
There are technologies in documenting genetic profiles for genetic disorders.	11 (2.7)	8 (2.0)	113 (27.7)	231 (56.6)	45 (11.0)
Public's views and awareness of genetic testing is important.	11 (2.7)	11 (2.7)	66 (16.2)	224 (54.9)	96 (23.5)

Table 4: Total and percentages of respondent's answers pertaining to awareness of genetic testing.

	Variables	Total (%)	P-value
Gender	Male	269 (65.9)	0.042*
	Female	139 (34.1)	
Age	18-26	269 (65.9)	
	27-34	133 (32.6)	0.364
	35-42	6 (1.5)	
	43-50	0	
Field of study	Medicine	21 (5.1)	
	Biochemistry and Molecular Biology	91 (22.3)	
	Genetics and Biotechnology	28 (6.9)	
	Microbiology	22 (5.4)	0.022*
	Health studies	44 (10.8)	
	Pharmacy	116 (28.4)	
	Others	86 (21.1)	
Level of education	HSC	8 (2.0)	
	BSc	244 (59.8)	
	MSc	153 (37.5)	0.370
	MPhil	2 (0.5)	
	PHD	1 (0.2)	

*Significant value

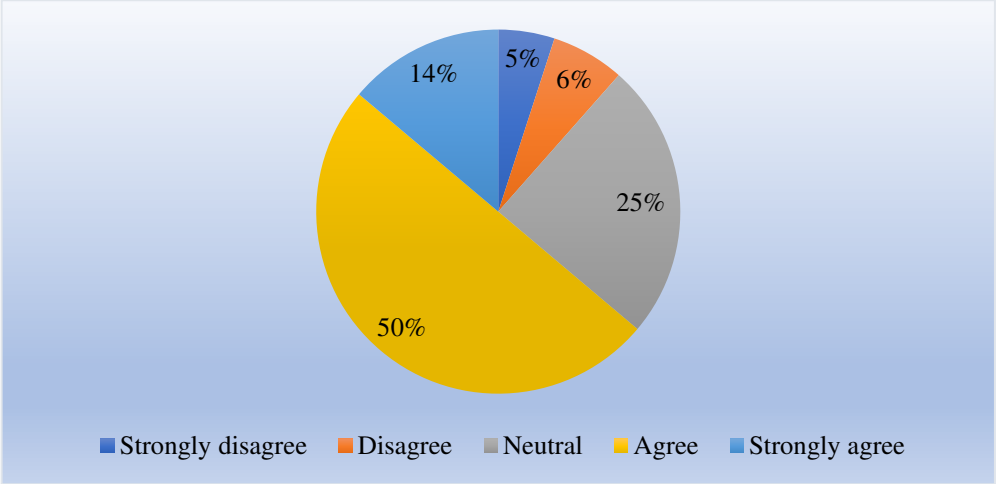

Fig. 3: Respondents awareness of genetic testing.

Table 5: Total and percentage of the respondent's awareness pertaining to perception of genetic testing.

Statement	Total (%)				
	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Genetic testing is important.	12 (2.9)	8 (2.0)	55 (13.5)	216 (52.9)	117 (28.7)
Genetic testing is mainly for preventive care purpose.	12 (2.9)	23 (5.6)	103 (25.2)	208 (51.0)	62 (15.2)
Genetic test should be offer to all newborn babies.	13 (3.2)	23 (5.6)	101 (24.8)	214 (52.5)	57 (14.0)
Genetic test should be offer to pregnant women.	14 (3.4)	25 (6.1)	113 (27.7)	198 (48.5)	58 (14.2)
Knowledge of the genetic background of a disease will help people to live longer.	16 (3.9)	17 (4.2)	109 (26.7)	212 (52.0)	54 (13.2)
Genetic testing does better than harm.	16 (3.9)	22 (5.4)	110 (27.0)	213 (52.2)	47 (11.5)
Genetic testing will not influence one's health.	21 (5.1)	34 (8.3)	110 (27.0)	208 (51.0)	35 (8.6)
Genetic test aid to improving one's quality of life.	15 (3.7)	14 (3.4)	101 (24.8)	230 (56.4)	48 (11.8)
Genetic testing tempers with nature.	29 (7.1)	47 (11.5)	171 (41.9)	139 (34.1)	22 (5.4)
Genetic testing opposes religion and their belief.	43 (10.5)	65 (15.9)	146 (35.8)	127 (31.1)	27 (6.6)
Lack of education and knowledge of genetics and genetic tests are what raised ethical issues in genetic testing.	11 (2.7)	22 (4.9)	111 (27.2)	222 (54.4)	44 (10.8)
It is necessary to raise awareness of genetic testing.	13 (3.2)	2 (0.5)	64 (15.7)	243 (59.6)	86 (21.1)
Government laws and politics is needed to ensure the safe and effective use of genetic testing.	15 (3.7)	10 (2.5)	80 (19.6)	218 (53.4)	85 (20.8)

Table 6: P-value for the respective variables pertaining to questions on perception of genetic testing.

	Variable	**Total (%)**	**P-value**
Gender	Male Female	269 (65.9) 139 (34.1)	0.174
Age	18-26 27-34 35-42 43-50	269 (65.9) 133 (32.6) 6 (1.5) 0	0.570
Field of study	Medicine	21 (5.1)	

	Biochemistry and Molecular Biology	91 (22.3)	
	Genetics and Biotechnology	28 (6.9)	
	Microbiology	22 (5.4)	0.048*
	Health studies	44 (10.8)	
	Pharmacy	116 (28.4)	
	Others	86 (21.1)	
Level of education	HSC	8 (2.0)	
	BSc	244 (59.8)	
	MSc	153 (37.5)	0.176
	MPhil	2 (0.5)	
	PHD	1 (0.2)	

*Significant value

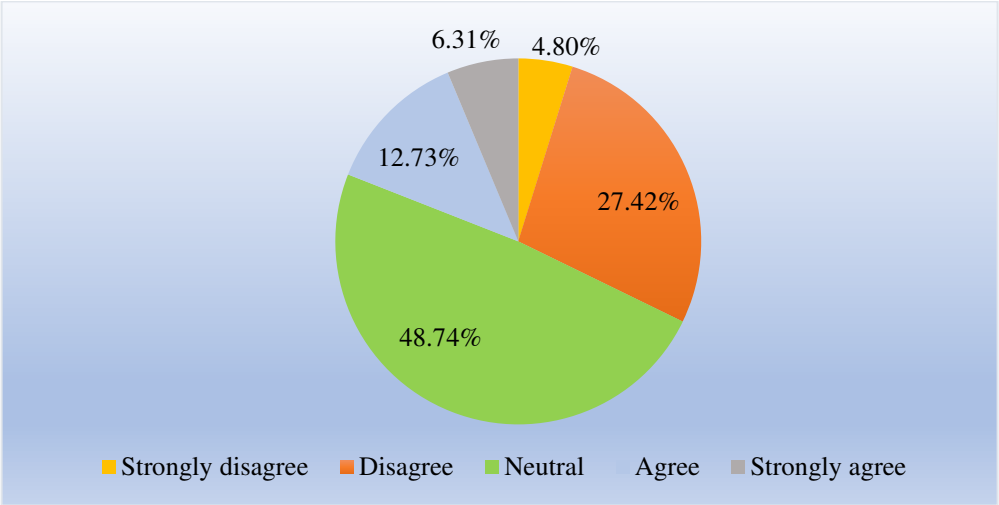

Fig. 4: Respondents perception of genetic testing.

Basic demographic data

A large percentage of respondents, 65.9%, fall within the age of 18 to 26. When it comes to the educational attainment of survey participants, 59.8% of them were bachelor degree. Interestingly, the substantial portion of the defendants studying science related subjects. In fact, 78.9% of the survey participants came from such fields.

Knowledge of genetics testing for the hereditary disorders

In the latest research, the majority of participants were familiar with genetic testing. From **Table 1** it is seen that about 70.1% of the respondent know that genetic diseases or the inherited diseases can be diagnosed by genetic testing. A notable portion of respondents, accounting for 33.2%, displayed doubt regarding the efficacy of genetic testing in reducing the occurrence of genetic disorders. Moreover, a considerable percentage of them, that is, 39.2% were not aware about the concept of the prenatal screening, which refers to testing for sicknesses or abnormalities of the fetus and embryo before delivery. Additionally, a large proportion of the respondents, which was 37.4%0 lacked knowledge of the fact that genetic testing can also be utilized for identifying different kinds of cancer. The survey results indicate that a large proportion of the respondents possess a sufficient understanding of the genetic examination. This fact ascribed that the majority of participants come from life science and health science disciplines. As per **Table 2**, their level of the knowledge regarding genetic testing appears to be linked to their area of specialization, with a P-value of 0.004 indicating a statistically significant relationship.

Understanding genetic testing for the hereditary conditions

Table 3 illustrates that the most participants (66.9%) indicated their readiness to undergo genetic testing. The survey also inquired about the potential providers of the genetic testing, and the results showed strong support (67.9%) for the genetic testing to be conducted

only in the hospitals under a doctor's prescription, while a considerable proportion (47%) favored a ban on the scale of genetic testing kits in stores. Additionally, a substantial number of participants (78.5%) concurred that public awareness and understanding of genetic testing are the crucial. Overall, the participants showed substantial comprehension of genetic testing for hereditary conditions, with notable differences based on their areas of study. The statistical analysis, presented in **Table 4**, reveals that these variations were significant, with a p value of 0.022.

Perceptions of the genetic testing for hereditary disorders

Based on the findings presented in the **Table 5**, the majority of respondents (81.6%) believed that genetic testing is the essential. Among them, most agreed that genetic testing is primarily used for preventive care purpose (62.2%) and should be made available to all newborns (66.5%) and the pregnant women (62.7%). Furthermore, the participants unanimously agreed that there is a need to raise awareness about genetic testing (80.7%) and acknowledged that insufficient education and knowledge could give rise to ethical concerns associated with genetic testing practices (65.2%). As a result, a significant portion of the participants (72.2%) felt that government intervention, such as the implementation of laws and policies, is necessary to address ethical issues related to the use of the genetic testing. **Table 5** shows that although the respondents generally held positive views about genetic testing, a considerable number remained neutral when questioned about the potential adverse consequences of genetic testing. Specifically, 41.9% of the participants were neutral on the issue of whether genetic testing interferes with nature, and 35.8% remained neutral on the topic of the whether genetic testing goes against their religious beliefs. In contrast, a smaller proportion of respondents disagreed with these statements (26.4%) compared to those who agreed with them. In accordance with the data presented in **Table 6**, the respondents' attitudes towards genetic testing were positive. This finding can be described by the variations observed in their ages, educational backgrounds, and fields of study.

DISCUSSION:

The findings of our research indicate that some of the students have insufficient knowledge regarding genetic testing for hereditary disorders, and their awareness of the topic is also lacking. In comparison to non-life science students, those enrolled in the life science programs displayed more substantial knowledge and the higher levels of awareness. This outcome can be linked with the increased coverage of the genetic testing in Bangladesh through various channels such as academic publications, the media, and public awareness campaigns (Hosen *et al.,* 2021; Yesmin *et al.,* 2018; Akter *et al.,* 2022). This heightened exposure has led to a better understanding of genetic testing for hereditary conditions among the general population. The comparable observations were made in other regions of the world, such as the Middle East, for example Jordan, where a major percentage of individuals acquainted with genetic testing (Hashemi-Soteh *et al.,* 2019). Further-more, a significant number of individuals in northern Iran have shown keen interest in availing genetic counseling services and undergoing genetic testing prior to marriage.

Awareness of genetic testing for hereditary disorder

The majority of respondents, 66.9%, indicated their readiness to the undertake genetic testing, while 6.3% were opposed to the idea and 26.7% were neutral. Most of the individuals (78.9%) willing to the undergo genetic testing are students in the life sciences. This finding is consistent with a study conducted in the U.S., where 45% of the general population was aware of genetic testing (Krakow *et al.,* 2018). A similar trend was observed in Malaysia's King Valley, where 50.2% of the public had knowledge about genetic testing. Moreover, research by Hann *et al.* (2017) and Cheng *et al.* (2016) highlighted that a significant obstacle preventing patients from participating in genetic testing is the lack of access to genetic information (Hann *et al.,* 2017). According to Cheng and colleagues, two major factors that influencing participants' readiness to undergo genetic testing are significant expense associated with testing and concerns regarding potential discrimination. Other factors like how a test is offered, method of testing and perceived risk is also influencing to take the decision (Marteau & Croyle, 1998). The factors mentioned were not investigated in this study. However, the research demonstrated that healthcare professionals and genetic counselors could significantly contribute to the improving

patient care. This could be helping patients to understand and appreciate genetic testing, and boost their interest in undergoing such tests. Many studies have exposed the role of healthcare providers and genetic counselors for increases genetic testing uptake among general patients. For example, a study by Kaphingst et al. found that patients who received counseling from a genetic counselor were more likely to undergo genetic testing than those who did not. The study also found that healthcare providers could play a key role in the increasing patients' interest in genetic testing by providing accurate information and addressing their concerns (Chen *et al.,* 2018). Likewise, a study by the DeMarco *et al.* found that patients who received genetic counseling before testing reported higher levels of knowledge, understanding, and satisfaction with the testing process. The study also suggested that genetic counselors could help to mitigate patients' concerns about genetic discrimination by providing information about the legal protections available to them (DeMarco *et al.,* 2004). The respondents of the study strongly endorsed the idea that genetic testing should only be conducted in hospitals, under the supervision of a doctor and with a valid prescription. Furthermore, the majority of participants indicated their objection to the sale of genetic testing kits in retail stores or online platforms. Several reports have investigated patients' attitudes and the preferences towards genetic testing.

While no comparable studies were identified in Bangladesh, Koufaki *et al.* discovered in their research that most participants favored genetic testing being carried out in a healthcare environment with the support of a trained healthcare professional. The study also found that patients had concerns regarding the accuracy and reliability of direct-to-consumer genetic testing kits and the potential for harm resulting from the misuse of genetic information (Koufaki *et al.,* 2022). Moreover, in keeping with the findings of previous studies, most of the study respondents expressed their agreement regarding the significance of the public's perception and awareness of genetic testing (Marzuillo *et al.,* 2013). While no comparable studies were identified in Bangladesh, Koufaki *et al.* discovered in their research that most participants favored genetic testing being carried out in a healthcare environment with the support of a trained healthcare professional.

Perception of genetic testing for the hereditary disorders

Over half of the participants in the study acknowledged the significance of genetic testing in terms of the preventive care and agreed that genetic testing should be made available to all pregnant women and neonatal babies (**Table 5**). This result can be attributed to the respondents' life science and health science backgrounds, which may have made them more cognizant of the susceptibility of pregnant women and new born babies to the inherited disorders. Although no similar research studies were found in Bangladesh, a study conducted among university students at the International Islamic University Malaysia revealed a comparable result. In this study, a notable portion of respondents concurred that it is advisable to the encourage prenatal screening for pregnant women with a family history of genetic disorders (Associate Professor Dr. Zaliha Ismail *et al.,* 2021). Almost 44% of the respondents did not take a clear stance when asked if genetic testing interferes with nature and goes against their religious and personal beliefs. In addition, approximately 40% of participants agreed with these statements, and this could be linked to their ethnic background. Previous research conducted in New York City has shown that individuals' perceptions of the advantages and drawbacks of the genetic testing are influenced by their ethnic and the racial identities. (Sussner *et al.,* 2011). Most participants in the survey acknowledge the significance of genetic testing. However, they believe that there is a need to increase awareness and education about genetics and available tests to avoid ethical issues related to genetic testing. As indicated in **Table 5**, participants propose that the government should enact legislation and policies to guarantee the secure and effective utilization of genetic testing. These regulations should prioritize consumers' advantages, including their convenience for medical purposes and insurance coverage. The authors of a different study conducted in Bangladesh discovered that inadequate knowledge and unfavorable attitudes towards cancer among healthcare professionals could lead to suboptimal care delivery in rural areas (Mubin *et al.,* 2021). Recent studies have highlighted that a major challenge faced in California, Malaysia, the Netherlands, and Italy is the limited understanding of genetic testing among healthcare professionals (Amini

et al., 2014; Qian *et al.,* 2019; Baars *et al.,* 2005; Marzuillo *et al.,* 2013). However, to promote the benefits of genetic testing without running into problems, we need a balance between what scientists know & what the public understands. Remember, not everyone in the public is a scientist, so the information about genetic testing should be easy for everyone to grasp.

Strength and limitations

The results of the study may not apply to the broader population of Bangladesh or other nations as it solely focused on undergraduate and graduate students from a limited number of universities in Bangladesh. The study neglected to investigate the reasons that underlie the participants' opinions and attitudes towards genetic testing, which could have furnished a more profound comprehension of their perspectives. Although the study achieved a complete response rate of the 100%, there may be inaccuracies and biases due to selection of the study location and respondents. The chosen participants are aged between 18 to 50 years & considered to have a greater capacity to comprehend the study's subject matter. Despite limitations in respondent selection, this survey was conducted on a large scale, covering the entirety of Bangladesh, which sets it apart from other comparable research that was conducted on a smaller scale. In addition, this study represents the update on Bangladeshi's knowledge, awareness, and perceptions of genetic testing for hereditary disorder. As a result, this study revealed the basis for future similar studies that can be conducted on an even large scale, providing a more precise assessment of Bangladeshi's attitudes towards genetic testing.

CONCLUSION:

Globally, the acceptance of genetic testing for inherited illnesses is increasing, including in Bangladesh. This survey revealed that most of the participants were familiar with genetic testing and willing to undergo it. Individuals with backgrounds in life science and health science demonstrated a stronger grasp of genetic testing for hereditary diseases in comparison to those from different fields. Despite this, a small number of respondents held unfavorable views on genetic testing. To diminish this stigma, efforts should focus on enhancing public knowledge and awareness. Public education about the benefits of genetic testing could be bolstered through media campaigns and initiatives organized by both government and non-governmental entities, such as seminars and workshops. Furthermore, the implementation of laws and policies is essential to ensuring the secure and efficient utilization of genetic testing practices.

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CONFLICTS OF INTEREST:

Each author affirmed that they do not have any competing interests.

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