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Centre for Medical Education Journal

Vol. 03, No. 01, December 2023

Official Publication of Centre for Medical Education (CME), Dhaka.

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CDC (Centers for Disease Control and Prevention) describes Public health as the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases. According to the World Health Organization (WHO), the goal of public health is to prevent disease, promote health, and prolong life among the population as a whole. Therefore, public health initiatives are aimed at fostering conditions in which people can be healthy within specific populations. Keeping in mind the above mentioned magnitude of public health, the present issue of CME journal is dedicated to issues related to the public health and medical education.

Riaz BK et al. conducted a mixed method study on 'Exploring competencies of public health professionals of Bangladesh as an emerging need for 21st century: findings of mixed method study'. This study was conducted on 654 health professionals and 176 key informants. Among all the public health professionals (PHP), 41% were doctors, 55% were nurses, and only 0.5% were paramedics and doctors of alternative medicine. The study revealed that 87.8% of PHPs were utilized properly, but only 19.4% had satisfactory efficiency. The study recommended that proper training, education, and nurturing of PHPs can meet the expected competencies for attaining SDG goals more successfully. National accreditation system, and the uniform public health education system, if strengthened by establishing Public Health University, can make it possible to meet all future needs and challenges.

A cross-sectional study was conducted by Mujahid AA et al. on 'Influence of socio-demographic and institutional factors on career choice of medical students, Intern doctors and recent graduates in Bangladesh'. The study was done on 640 respondents over one year period (July 2022 to June 2023) from six medical colleges of Bangladesh, which were selected by convenience sampling method. The study identified the following factors as influencing factors for career Choice encouragement from peers or colleagues (mean = 3.74), advice from seniors (mean = 3.48), preference on the basis of self-gender (men = 3.48), marital issue or family burden (mean = 3.48), present family income (mean = 3.42), self interest for the particular discipline (mean = 3.41), inspiration from the teachers (mean = 3.41), interest developed during working in particular discipline (mean = 3.41) and passion for the dream job (mean = 3.39).

A cross-sectional study was conducted by Akhter N et al. on 'Views of the female medical graduate doctors regarding why not involved in health care services / health professional education: A qualitative study'. This study was done on 500 Medical graduate doctors who conducted their internship training within 2005-2020. In-depth interview was taken using snow-ball sampling method on 10 Medical graduate doctors. This study revealed that, those who were not in medical profession, 70% were working as housewives and rest 30% were running online business. This study identified some reasons for non-involvement in medical profession such as – discontinuation from job due to maternity leave, for caring children/Family members, prolonged duty hours, transport problem, unacceptable working environment, and lack of day care centre for Children etc. About 30% moved to outside the country. The Suggestions from this study for involving female medical graduate in medical job/ health related Job were – ensuring social security, better family support, better transport facility and female friendly work place.

A study was conducted by Talukder MAS et al. on 'Overweight and obesity and associate factors among the medical teachers in Bangladesh'. The study was conducted among 285 randomly selected medical teachers who were participants in teachers' training program in CME. This study revealed that the prevalence of overweight and obesity is a problem among medical teachers of different medical colleges in Bangladesh. It was found that male teachers were more affected (63.28%) than female teachers (48.15%).

Hoque MM et al. conducted a cross- sectional study on 'Internet addiction and quality of life among undergraduate medical students of Bangladesh'. This study was conducted among 926 undergraduate medical students and interns from nine medical colleges of Bangladesh who were selected by convenience sampling method. This study revealed that 39.3%, 33%, and 2.3% of students had mild, moderate, and severe levels of internet addition, respectively. Many undergraduate medical students spend 3 hours daily on internet. It was found that non-academic internet use negatively affect the quality of life while internet use for academic purpose has positive impact.

Tusar MNN et al. conducted a cross-sectional study on 'Socio demographic conditions and its associations with foot ulcer among type 2 diabetic patients'. The study was done on 180 adult type 2 diabetes mellitus (DM) patients over one year period (Jan-Dec 2022). The participants were selected by convenience sampling method and data were collected by face-to-face interview. The study

showed that advanced age, poor educational qualification, retirement from specific occupation and middle income group are associated with foot ulcer among type 2 DM patients. The study recommended that addressing all associated factors with particular emphasis on proper health education starting from primary level, can prevent this complication.

Hossain SM et al. reviewed of the available documents and discussion with main stakeholders involved in the malaria elimination program. In this review article different authentic sources from 2017 to 2023 were used. From this review article the learned readers will know the epidemiological status of malaria in 13 endemic districts and the need for implementation of epidemiological surveillance system in the 51 non-endemic districts. By developing this epidemiological surveillance, will help for achieving elimination of malaria across the country.

Faisal AJ conducted a case study on 'The significance and positivity of normal vaginal delivery (NVD)'- Bangladesh perspective. The author showed that there is an alarming increase in the rate of cesarean- section in Bangladesh- 34% in 2017 and 45% in 2022, which is much more than WHO expected range of 10-15%. But in review of two clinics – run by Surjer Hashi Network (SHN), it was found that 487 were normal vaginal deliveries (NVD) where only 62 were cesarean- section. So, their recommendation is that all institutions, Government & non-government, who work with pregnant women, should undergo appropriate training and counselling to facilitate normal vaginal delivery and to avoid cesarean- section as much as Possible to avoid many hazards and cost associated with cesarean- section.

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Exploring Competencies of Public Health Professionals of Bangladesh as an Emerging Need for 21st Century: Findings of a Mixed-method Study

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Abstract

Background: In recent years, public health professionals (PHPs) have been facing new and increasing challenges globally to meet the health needs of diverse communities. To cope with these emerging challenges, we may need new or enhanced professional competencies and workforce development. Public health is the key to the successful achievement of SDGs. The competency and quality of public health professionals must be at an international standard to meet the needs of the country and to be properly utilized. This study aimed to assess the competency states and needs of PHPs, which might help us get an overview of the existing quality and perceived requirements to improve the quality of PHPs in the context of Bangladesh.

Methods: This study was conducted with a mixed-method approach containing both quantitative and qualitative parts. Data were collected from 654 health professionals and 176 key informants (KI). A semi-structured questionnaire, checklist, and key informant interview guide were used to collect data from the participants. The 30 items Hennessy Hicks Questionnaire was used to determine the utilization and efficiency of PHPs.

Results: Among the total of 654 participants in quantitative part, 67.0% were female and 33.0% were males, and their mean ($\pm$ SD) age was 44.23 ($\pm$ 9.34) years. Among all the PHP, 41.0% were doctors, 55.0% were nurses, and only 0.5% were paramedics and doctors of alternate medicine. The study revealed that 87.8% of PHPs were utilized properly, but only 19.4% had satisfactory efficiency. The key informants opined that PHPs need to be deployed in key positions in the public health field as well as in the country's policy-making, decision-making, health management, and health care delivery systems. The participants also opined that to produce quality public health professionals, the quality of education must be improved through a uniform course curriculum and effective supervision and monitoring. Moreover, the public health education system must be strengthened by the establishment of a higher education facility like a public health university.

Conclusion: The study revealed that proper training, education, and nurturing of PHPs could meet the expected competencies for attaining SDG goals more successfully in due course of time. A uniform public health education system and a national accreditation system are today's needs for the maintenance of the quality of public health professionals of Bangladesh who will represent the country both nationally and globally.

Keywords: Competencies, Public Health Professionals (PHP), Bangladesh, Efficiency, Utilization, Mixed-method

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Introduction

In this 21st century, the landscape of public health is rapidly evolving around the globe. The earlier decades were dominated by communicable diseases, but the past two decades witnessed a substantial paradigm shift towards lifestyle-related diseases and injuries. Overall, this gave a new dimension to the scope and need of public health and, consequently, public health professionals.¹

A public health professional is a person educated in public health or a related discipline who is employed to improve health through a population focus. Assessing the quality of public health professionals in different health service sectors should be a major concern for our policymakers. Because, only well-educated and quality public health professionals will be able to effectively

shape the programs and policies needed to improve population health during the coming century.²

In recent years, public health professionals have been facing new and increasing challenges globally while working to meet the health needs of diverse communities. To deal with these emerging challenges, public health professionals should maximize their resources and expertise to work effectively with various agencies to meet the community needs that they serve. However, this might require new or enhanced professional competencies and workforce development.³

The competency and quality of public health professionals must be at an international standard to meet the needs of the country and to utilize them to their full extent. In order to walk on that path, an initial quality assessment and need analysis is essential. This study aimed to assess the competency of PHPs to get an overview of their existing qualities and to find out the perceived requirements of the existing PHP workforce of Bangladesh.

Methods:

Study design, place and population

It was a mixed-method study containing both quantitative and qualitative parts. It was conducted from January 2019 to June 2019. The sample comprised 654 public health professionals and 176 Key Informants (KI) selected by convenience sampling method from all the medical colleges and allied departments of eight divisions of Bangladesh.

Data collection

A semi-structured questionnaire was developed incorporating Hennessy Hicks performance Questionnaire⁴ to collect quantitative data through face-to-face interviews. The questionnaire enquired about socio-demographic features, quality/performance, and utilization of PHPs. An interview schedule was used to collect data from KIs on the scope of public health professionals through Key Informant Interviews (KII). Data collection instruments were developed first in English and then they were translated into Bengali. It was validated through pre-testing, modification, translation and back translation. Utilization and efficiency of PHPs were determined by 30 items Hennessy Hicks Questionnaire (HHQ) (4). To assess competency, a list of 30 tasks of the public health professionals was considered, and then each one was rated by writing the appropriate number in the box. Each item was rated along a 7-point scale in two different ways - how important a task is to the respondent's job (Rating A); and how well the task is currently performed (Rating B).

The final score was obtained by subtracting the total points of rating B from the total points of rating A. The total score was then categorized from two different points of view. Firstly, regarding utilization of PHP, a total score of '0 and above' was considered as the proper utilization of PHPs according to their competency, and a score of 'Less than 0' was considered for PHPs being less utilized. Secondly, regarding the efficiency of PHP, getting a total score of '0 and less' was considered satisfactory for the efficiency of PHPs, and a score of '>0' was considered not satisfactory.

Statistical analysis

Continuous data were presented as mean $\pm$ standard deviation (SD). Categorical data were presented as frequency and percentage. A thematic analysis approach was used for qualitative data analysis.

Results:

Sociodemographic characteristics of the PHPs

The majority of the respondents were female (67%) with an average ($\pm$ SD) age of 44.23 ($\pm$ 9.34) years. Of all, 93.7% had a master's degree, and 65.1% were doing government service. Among all participants, 55% had nursing degree, 41% completed MBBS, 0.5% studied paramedics & alternative medicine, 1.7% were from social science and 1.8% were from other educational backgrounds. The maximum proportion (96.2%) of respondents obtained their degree from local institutions. They were engaged in one or more profession with highest proportion in teaching profession (53.6%). This was followed by clinical care (39.5%), administrative (28.5%), training work (24.5%), research (17.0%) and consultancy (17.0%) (Table 1).

Table 1. Socio-demographic characteristics of the PHPs

Attributes		Frequency	Percent
Sex	Male	216	33.0
	Female	438	67.0
Age (years)	24-35	128	19.6
	36-45	229	35.0
	46-55	221	33.8
	56-70	76	11.6
Educational Qualification	Master	613	93.7
	Diploma	6	0.9
	M. Phil	24	3.7
	PhD	11	1.7
	Consultancy/ Freelancing	9	1.4
	Private practice	6	0.9
Educational background	MBBS	268	41.0
	Nursing	360	55.0
	Paramedics & alternative medicine	3	0.5
	Social science	11	1.7
	Others	12	1.8
Source of public health degree	Local	629	96.2
	Foreign	14	2.1
	Both	11	1.7

Profession*	Teaching	350	53.6
	Clinical care	258	39.5
	Administrative	186	28.5
	Training work	160	24.5
	Research	111	17.0
	Consultancy	87	13.3

*Multiple response

Competency of the PHPs:

In this study, 574 (87.8%) PHPs were utilized properly, and 80 (12.2%) were not (Table 2). Of all, 127 (19.4%) of PHPs had satisfactory efficiency, and 527 (80.6%) did not have satisfactory efficiency (Table 2).

Table 2. Utilization and Efficiency of PHPs

Attributes		Frequency	Percent
Utilization	Properly utilized	574	87.8
	Less utilized	80	12.2
Efficiency	Satisfactory	127	19.4
	Not satisfactory	527	80.6

The proportion of proper utilization was 89.9%, 89.3%, 71.7%, 91.4% and 88.4% in communication/teamwork, management/supervisory, administrative, public health related and research/audit subcategories, respectively. While the proportion of satisfactory efficiency was found in 36.1%, 28.3%, 37.6%, 27.5% and 29.1% of PHPs, respectively (Table 3).

Table 3. Utilization and Efficiency of PHPs by categories of tasks

Task category			Frequency	Percent
Communication tasks	Utilization	Properly utilized	588	89.9
		Less utilized	66	10.1
	Efficiency	Satisfactory	236	36.1
		Not satisfactory	418	63.9
Management tasks	Utilization	Properly utilized	584	89.3
		Less utilized	70	10.7
	Efficiency	Satisfactory	185	28.3
		Not satisfactory	469	71.7
Administrative tasks	Utilization	Properly utilized	597	91.3
		Less utilized	57	8.7
	Efficiency	Satisfactory	246	37.6
		Not satisfactory	408	62.4
Public health related tasks	Utilization	Properly utilized	598	91.4
		Less utilized	56	8.6
	Efficiency	Satisfactory	180	27.5
		Not satisfactory	474	72.5
Research related works	Utilization	Properly utilized	578	88.4
		Less utilized	76	11.6
	Efficiency	Satisfactory	190	29.1
		Not satisfactory	464	70.9

HHQ: Hennessy Hicks Questionnaire; SD: Standard Deviation

Scopes in public health education (suggested by the key informants)

Overall, 176 key informants were available for interview and shared their valuable opinion. Most of them (55.7%) had a master's degree, a good number (23.3%) were graduates and about 13.6% had a PhD degree. The key informants were from various disciplines. Key informants included both professionals from academic and administrative fields. Principals, professors, and directors of different medical institutes and medical colleges, national consultants, professors, civil surgeons, program managers, and political leaders constituted the KIs in this study. The key findings from the Professionals during the interviews are listed below:

Scopes in undergraduate medical education:

- PHPs can play a key role in undergraduate medical education by teaching about important sectors of public health.
- Contribute to updating the MBBS course curriculum to make it more community and public health oriented.
- PHPs can reorganize the RFST program of the community medicine department to make it more comprehensive and effective.
- PHPs can facilitate development of expertise among student about health promotion, and prevention of NCD, food borne diseases, and tropical diseases.
- Assist the undergraduate students to improve their knowledge on biostatistics and research methodology.
- PHPs can contribute to update the department of community medicine in the flavour of public health.

Scopes in postgraduate medical education:

- Adequate scholarships should be available for public health students to achieve specialized post-graduate education in diverse disciplines. Tuition fee waivers, proper lab facilities and other relevant opportunities must be given to make them compatible for future endeavors.
- In every postgraduate medical education program, research activities should be made more comprehensive.
- All clinicians should have basic knowledge on public health in respect of burden of diseases, procedure of need assessment of patients, way of communication and improving relation with patients, and future planning for health services.
- Every university should have a masters in public health program along with multidimensional research facilities on public health issues.
- Postgraduate students should have the opportunity for training and practice on biostatistics and statistical analysis.

- PHPs should be involved in conducting various workshops, seminars and symposiums on public health issues and research methodologies.

Initiatives for quality improvements of PHPs (suggested by the key informants)

- Organization of training programs on recent public health issues for the improvement of the quality of PHPs.
- The MPH curriculum should also be updated for producing public health professionals following global standards.
- Quality control measures should be taken to produce quality public health teachers
- PHPs should be involved in comprehensive public health education and research activities including seminars, workshops and conferences to improve their professional skill.
- Policymakers should recognize the importance of PHPs in the health sector and allocate adequate funds for preventive sector.
- Effective strategies should be devised to increase remuneration, and improve recognition and working opportunities of PHPs.

Enhancing utilization of PHPs (suggested by the key informants):

- For effective utilization of PHPs, adequate posts and positions should be created for the PHPs at all levels of health service delivery of the country.
- The assigned roles of the PHPs should align with their education and skills to ensure they can apply their knowledge appropriately.
- Upgrading government policies is essential for involving the PHPs in the policy-making process.
- Steps should be taken for conducting dedicated research on health sector challenges backed by strong political commitment.
- Strengthening public health education by increasing number of organizations focusing various disciplines and emerging aspects of public health.
- To improve the utilization of PHPs, strategic plan should be developed.

Barriers of utilization of PHPs (identified by the key informants):

- The absence of appropriate national policies for effective utilization of the PHPs.
- A negative perception of policymakers regarding roles of PHPs within the health sector.
- Shortage of designated post and positions for PHPs in the health system.
- Funding constraints impeding proper utilization of PHPs.
- Lack of integration between clinical and preventive medicine.

- Lack of coordination among various departments and disciplines of public health.
- Scarcity of public health experts in the health sector.
- Unfair compensation, inappropriate job description, misplacements, lack of recognition, discrimination, substandard education, and a lack of self-motivation among PHPs.
- Prevailing communication gaps between PHPs and administrative authorities.
- Lack of unity and solidarity among PHPs.
- Absence of uniform course curriculum on public health education to be followed by all the institutes and universities of the country.
- Lack of quality control and accreditation activities for public health education.
- Lack of active movements of the professional association of PHPs.

Ways for overcoming the barriers (suggested by the key informants):

- Establishing a national policy for the effective utilization of PHPs.
- Creating post and increasing number of positions for PHPs at all levels of the health service delivery in the country.
- Enhancing coordination among government departments related to PHPs.
- Strengthening collaboration among government, private, and other relevant stakeholders.
- Changing attitude towards PHPs through effective communication among stakeholders.
- PHPs need to portray their activities to the policymakers and stakeholders.
- Enhancing involvement of PHPs in education, research, management and administration.
- Organizing need-based trainings for improving the professional skills of the PHPs.
- Establishing higher education and research infrastructure like public health university.
- Fostering leadership skills of the PHPs to apply in different tiers of the health sector.
- Ensuring fair remuneration and proper recognition for the PHPs.
- Policy directives like involvement of PHPs in policy-making, acknowledging PHPs as augmented health manpower, creating posts and job descriptions for PHPs, regulating public health practices and integrating PHPs into the clinical process.
- Enhancing national accreditation system for public health education. Quality of the PHPs producing institutions must be assessed by the authority under the accreditation system.

Discussion:

The study assessed the overall need of quality public health professionals in Bangladesh in different sectors and evaluated the pattern of production and utilization of the public health professionals from different perspectives.

Two separate ways were followed to collect the necessary information. A cross-sectional survey on public health professionals having designated degrees were done to assess their utilization and efficiency. A qualitative exploration of the opinions of the key informants who play both active and important roles in policy making was done regarding proper utilization and creating scopes for public health professionals. The major findings of the study are discussed below:

Two-third of the PHPs were female and only one-thirds were male. This is similar to that found in USA where 70% of the public health workforce was constituted by female professionals.⁵ This high proportion of female in this study could be due to high participation of nurses dominated by women in country. However, this is also reflective of women empowerment among public health professionals prevailing in our country. The average age of the participants was nearly 44 years, which is slightly higher than that of health professionals of the country.⁶ The average age of PHPs at their fifties probably indicates an older mean age of entry into the public health field among the professionals. This could be changed through attraction and recruitment of young public health professionals through an early and distinctive career pathway.

Most of them (97%) had masters degree (MPH) while only a few (1.5%) had PhD. This is much higher than that observed among the public health workforce of USA where only 38% had any kind of masters degree.⁵ This, however, necessitates the assessment of quality of masters degree provided by the local institutions from which majority achieved their degrees in our country.

More than fifty percent (55%) professionals were nurses along with doctors (41%) indicating a higher interest among nurses to pursue public health career. However, this could also be due to higher participation of nurses as they tend to be more receptive to answering and assisting in data collection. A concordant finding was also observed among public health workforce of Saint Lucia in 2016.⁷

With the aid of 30-item Hennessy Hicks Competency Assessment Research Instrument of WHO, the utilization and efficiency of PHPs were categorized. In total, 87.8%

of PHPs were found being utilized in different organizations but only less than one-fifth showed satisfactory efficiency. This is a key finding indicating the necessity of quality education and training for the development of skilled public health professionals, which has also been reflected in the opinions of the key informants regarding development of public health professionals in the country.

From the assessment of efficiency, the areas of priority for training in a decreasing order could be listed as follows: public health related task, management/supervisory tasks, research/audit, communication/teamwork and administrative tasks.

In comparison, research/audit was the priority training need in Saint Lucia followed by management/supervisory skills, clinical tasks, communication/teamwork and administration.

The key informants shared their valuable opinion regarding scopes, utilization of PHPs in different sectors. The key informants shared valuable knowledge and experience regarding PHPs. Their intellects and maturity has broadened the aim of the study and helped to come into certain valuable recommendations which can be implemented in policy level as well. PHPs can play a key role in undergraduate medical education by educating them about the important sectors of public health. Their field visits at district and upazila level should be increased in numbers for visualization of the entire health system as well as to gain practical knowledge. In BRAC JPG School of Public Health, students spend 6 months in a village campus which allows them to interact continuously with villagers as well as the local health systems which is indeed a practical initiative.⁸

In every postgraduate medical education, research should be made an essential part. Whether 6-month dissertation or 1-year thesis all must be done under expert supervision so that they can learn the whole research process. There should be standard system in PhD and masters. Every university should have MPH post-graduation facility maintain a quality with that of international standard. Development of multiple research wings in every level is essential. PHPs can help in initiation of post-graduation degree in dental public health, conducting research in fundamental development. In any kind of health emergency, disaster and outbreak PHPs should be in frontline team and lead the way.

For proper management, public health administrators should have public health exposure. Only then, they will be able to give their expert opinion about proper

functioning of health infrastructures. In all cases, introducing modern information technology is necessary. PHPs can coordinate with all sectors. There should be an integrated initiative for improvement of quality of health services and for this, both government, private and NGO should engage public health experts and consider their expert opinion to improve the quality of health services. A uniform, standard curriculum should be made for public health education to make skilled and expert PHPs. Uniform examination and evaluation system with uniform grading system should be established. Quality assessment and monitoring of the institutions should be strengthened and carried out on regular basis. International collaboration can also improve public health education. Quality of institution is also important. There should be Public Health University.

Conclusion

Public Health Professionals have diversified role in the essential aspects of the country, i.e. prevention of diseases, ensuring and monitoring healthcare services, policy making and implementation, making proper referral, conducting researches in the important fields and disseminating research findings through publications. Proper training, education and nurturing of PHPs can meet up the expected competencies for attaining SDG goals more successfully in due course of time. A uniform public health education system and a national accreditation system are the today's needs for maintenance of the quality of public health professionals of Bangladesh who will represent our country both nationally and globally.

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Influence of Socio-Demographic and Institutional Factors on Career Choice of Medical Students, Intern Doctors and Recent Graduates in Bangladesh

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Abstract

Background: Career choice is a process with many interacting factors. This study aimed to assess the institutional and socio-demographic factors influencing career choice of MBBS final year medical students, intern doctors and recent graduates in Bangladesh.

Methods: This cross-sectional study was conducted from July 2022 to June 2023 after getting institutional ethical approval. It was conducted upon 640 respondents from conveniently selected six medical colleges of Bangladesh. After taking consent from the college authorities and respondents, data were collected by administering a self-administered semi-structured questionnaire from 300 students, 200 interns and 140 recent graduates. Data were analyzed by SPSS 24.0 and presented by tables and graphs. Convenience sampling technique was used for selection of the respondents and medical colleges.

Results: Out of 5-point Likert scales the mean scores that were obtained from the respondents' agreements, the top ten contributing factors affecting positively their career choice were ranked as encouragement from peers or colleagues (mean = 3.74), advice from seniors (mean = 3.48), he or she was very much interested on that discipline (mean = 3.41), preferable for his /her gender (mean = 3.48), marital issue / family burden (mean = 3.48), parental wish (mean = 3.47), present family income (mean = 3.42), inspiration from the teachers (3.41), became interested during working in the discipline (mean = 3.41), and passion for the dream job (mean = 3.39) had a great influence on choosing career pathway.

Conclusion: The study suggested that various influences and factors at different stages in medical education may help students and future doctors to choose their specialty for career as per the community healthcare delivery system needs.

Keywords: Final year MBBS students, Intern doctors, Recent medical graduates, Medical career choice.

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Introduction

Career planning remains relatively unexplored as a domain of medical education. In today's world, career planning is recognized as a complex and multifaceted process across all professions¹. It is essentially the expression of career-related goals and choices that provide the necessary motivation for future educational and career success². With the increasing focus on technological development and quality of life, the preferences of medical students in Bangladesh have evolved over time³. While many students enter medical school with a clear idea of their desired specialty, it is common for early preferences to change. Even those who are certain about their career path at the beginning may change their minds as they progress through their undergraduate studies. This places significant pressure on students to select the right specialization for a fulfilling lifelong career, as this decision can profoundly impact personal happiness and career satisfaction later in life⁴.

Most of the factors did not show statistically significant differences between students of different years as scarce

study are available regarding this matter in our country context. To address the existing knowledge gap, this study was conducted to gain more insight into the factors that influence the career preferences of medical students, recent graduates and interns in selected medical colleges of Bangladesh.

Methods

This was a cross sectional study. The study was conducted for 12 months from July 2022 to June 2023. Convenience sampling technique was adopted to select the medical colleges and to collect data from the respondents. This study was conducted in six selected medical colleges of Bangladesh wherein four were from inside Dhaka (two were government and two non-government medical colleges) and two were from outside Dhaka (one government and one non-government medical colleges). A self-administered semi-structured questionnaire were used as data collection instrument. Pretesting of the instruments were conducted and the result of pretesting was not included in the study.

Prior to the study, ethical clearance was obtained from the Institutional Review Board (IRB) of Center for Medical Education(CME). The study was carried out after taking informed written consent from the respondents. After briefly explaining the purpose of the study, the questionnaire was distributed to the respondents to give their opinions. A total of 300 MBBS final year students, 200 intern doctors and 140 recent graduates of selected medical colleges of Bangladesh were enrolled in the study.

After collection of all the required data, questionnaire were checked, verified for consistency and tabulated using the SPSS/PC 24.0 software. A five point Likert scale was used to measure responses of the respondents of each item. For each variable percentage was calculated. Data were presented by tables and graphs with necessary description for easy understanding and interpretation mostly with number of participants along with its percentage and means.

Results

The factors those were contributing career choices of the respondents are grouped in to following 5 tables:

Table-1: Distribution of the respondents by their social factors affecting career choice (n=531)

Social factors affecting career choice	Frequency (%) of level of agreement					Mean (±SD)
	SDA=1	Dis =2	Nut=3	Ag=4	SA= 5	
Community health problem	117 (22%)	131 (24.7%)	66 (12.4%)	173 (32.6%)	44 (8.3%)	2.80 (1.323)
Social status of student/doctor	43 (8.1%)	46 (8.7%)	162 (30.5%)	252 (47.5%)	28 (5.3%)	3.33 (0.994)
Future workplace	76 (14.3%)	119 (22.4%)	89 (16.8%)	230 (43.3%)	17 (3.2%)	2.99 (1.166)
Future security of life	49 (9.2%)	42 (7.9%)	162 (30.6%)	243 (45.8%)	34 (6.4%)	3.32 (1.031)
Future workload	91 (17.1%)	125 (23.5%)	84 (15.8%)	186 (35%)	45 (8.5%)	2.94 (1.269)

SA= Strongly Agree, Ag =Agree, Nut=Neutral, Dis=Disagree, SDA=Strongly Disagree

Table-2: Distribution of the respondents by their economic factors affecting career choice (n=531)

Economic factors affecting career choice	Frequency (%) of level of agreement					Mean (±SD)
	SDA=1	Dis =2	Nut=3	Ag=4	SA= 5	
High income in future	44 (8.3%)	116 (21.8%)	165 (31.1%)	187 (35.2%)	19 (3.6%)	3.04 (1.023)
Availability of jobs	44 (8.3)	103 (19.4%)	166 (31.3%)	119 (22.4%)	99 (18.6%)	3.24 (1.201)
Present personal income	58 (10.9%)	41 (7.7%)	146 (27.5%)	248 (46.7%)	38 (7.2%)	3.32 (1.082)
Private practice	89 (16.8%)	75 (14.1%)	151 (28.4%)	190 (35.8%)	26 (4.9%)	2.98 (1.169)
Present family income	54 (10.2%)	57 (10.7%)	124 (23.4%)	204 (38.4%)	92 (17.3%)	3.42 (1.191)

SA= Strongly Agree, Ag =Agree, Nut=Neutral, Dis=Disagree, SDA=Strongly Disagree

Table-3: Distribution of the respondents by their family related factors affecting career choice (n=531)

Family related factors affecting career choice	Frequency (%) of level of agreement					Mean (±SD)
	SDA=1	Dis =2	Nut=3	Ag=4	SA= 5	
Parental wish	76 (14.3%)	33 (6.2%)	114 (21.5%)	179 (33.7%)	129 (24.3%)	3.47 (1.312)
Relatives in same profession	105 (19.8%)	75 (14.1%)	109 (20.5%)	109 (20.5%)	133 (25%)	3.17 (1.454)
Advice from guardians	74 (13.9%)	115 (21.7%)	106 (20%)	161 (30.3%)	75 (14.1%)	3.09 (1.279)
Relatives with certain illness	116 (21.8%)	115 (21.7%)	159 (29.9%)	124 (23.4%)	17 (3.2%)	2.64 (1.152)
Economical support from family	123 (23.3%)	148 (28.1%)	96 (18.2%)	140 (26.6%)	20 (3.8%)	2.59 (1.212)
Family -owned hospital/diagnostic center	62 (21.5%)	89 (31.1%)	141 (26.6%)	183 (16.8%)	56 (4.1%)	3.16 (1.174)

SA= Strongly Agree, Ag =Agree, Nut=Neutral, Dis=Disagree, SDA=Strongly Disagree

Table-4: Distribution of the respondents by their personal factors affecting career choice (n=531)

Personal factors affecting career choice	Frequency (%) of level of agreement					Mean (±SD)
	SDA=1	Dis =2	Nut=3	Ag=4	SA= 5	
Preferable discipline for gender	86 (16.2%)	16 (3%)	108 (20.3%)	201 (37.9%)	120 (22.6%)	3.48 (1.318)
Marital issue/Family burden	89 (16.8%)	15 (2.8%)	107 (20.2%)	194 (36.5%)	126 (23.7%)	3.48 (1.338)
Dream job for future	95 (17.9%)	28 (5.3%)	106 (20%)	175 (33%)	127 (23.9%)	3.39 (1.379)
Personal preference	178 (34.3%)	38 (7.3%)	92 (17.7%)	69 (13.3%)	142 (27.4%)	2.92 (1.634)
Predetermination for future career	91 (17.1%)	20 (3.8%)	91 (17.1%)	171 (32.2%)	158 (29.8%)	3.54 (1.397)
Academic achievements	169 (31.8%)	68 (12.8%)	70 (13.2%)	124 (23.4%)	100 (18.8%)	2.85 (1.539)
Future research opportunity	103 (19.4%)	67 (12.6%)	55 (10.4%)	193 (36.3%)	113 (21.3%)	3.28 (1.430)
Availability of postgraduation training	89 (16.8%)	48 (9%)	86 (16.2%)	201 (37.9%)	107 (20.2%)	3.36 (1.349)

SA= Strongly Agree, Ag = Agree, Nut=Neutral, Dis=Disagree, SDA= Strongly Disagree

Table-5: Distribution of the respondents by their institutional factors affecting career choice (n=531)

Institutional factors affecting career choice	Frequency (%) of level of agreement					Mean (±SD)
	SDA=1	Dis =2	Nut=3	Ag=4	SA= 5	
Inspiration from teacher	90 (16.9%)	33 (6.2%)	104 (19.6%)	175 (33%)	129 (24.3%)	3.41 (1.369)
Advice from seniors	76 (14.3%)	17 (3.2%)	112 (21.1%)	228 (42.9%)	98 (18.5%)	3.48 (1.243)
Encouragement by senior doctor	44 (6.9%)	213 (40.1%)	143 (26.9%)	77 (14.5%)	54 (10.2%)	2.78 (1.113)
Interested during work	93 (17.5%)	28 (5.3%)	107 (20.2%)	176 (33.1%)	127 (23.9%)	3.41 (1.371)
Encouragement from peers or colleagues	47 (8.9%)	77 (14.5%)	125 (23.5%)	143 (26.9%)	139 (26.2%)	3.74 (1.264)
Advice from career councilor	57 (10.7%)	1 (2%)	165 (31.1%)	209 (39.4%)	99 (18.6%)	3.55 (1.127)

SA= Strongly Agree, Ag = Agree, Nut=Neutral, Dis=Disagree, SDA=Strongly Disagree

Discussion

A specialty selection entails a transformation from the undifferentiated undergraduate stage to a completely differentiated professional enterprise where all future efforts would be focused to a single specialized field of medical discipline⁵. However, this study was focused to evaluate the factors influencing carrier choice of MBBS final year medical students, intern doctors and recent graduates.

According to the study findings, the mean ages (and its stander deviations) of the MBBS final year students, intern doctors and recent graduates were 27.05 (± 1.914), 28.75 (± 2.568) and 33.06 (± 3.873) respectively. Though among MBBS final year participants mostly were male (55%), but, among intern doctors and recent graduates majority were female (53.5% and 77.9% accordingly). Similar study conducted in Saudi Arabia, showed there were 165 female and 55 male students with average age of 23 years⁵. This study showed that, 82.7% of MBBS final year students and 62.1% recent graduate were unmarried, however, 63.5% of intern doctors were married.

Some of all three groups of participants had parents or other relatives in medical background, though, majority of them had none. Similar study stated that about 36.1% MBBS student or doctors had a family member or relative who was a doctor⁶.

Social factors that affected participant's career choice was mostly to social status of student/doctor (mean=3.33) 'Future security of life (mean=3.32)' and 'Future workplace (mean=2.99)'. But many of the respondents mentioned that 'Future workload (mean=2.94)', 'Easy to get admission for post-graduation (mean=2.63)' and 'Community health problem (mean=2.80)' does not have much contribution. This is similar to the study findings that indicates the vast majority of medical students regard job position and future opportunity for promotion as importance when choosing a specialty. Quality of life is also an important consideration for medical students selecting a specialty⁷.

Participants mostly agreed to economic factors for choosing career was 'Present family income (mean=3.42)'; other economic factors that can impact the respondents opinions were 'Personal income (mean=3.32)', 'Availability of jobs (mean=3.24)', 'High income in future (mean=3.04)' and lastly the factor of 'Private practice (mean=2.98)'. Similar studies have found that economic factors and amount of future income were uniformly important considerations for medical students selecting a specialty.

In contrast, a study found that "future income" and "establishing one's own practice" — two criteria that are highly linked with economic incentives⁸. The findings of a study in Turkey revealed that the most important reasons for the choice of specialty were "better financial opportunities" and prestige, followed by personal development, more benefits for the patient⁹.

According to the family related factors that affected participant's career choice, were mostly agreed to parental wish (mean=3.47) Other family related factors affecting the career choice were 'Relative in same profession (mean=3.17)', 'Family owned hospital/diagnostic center (mean=3.16)' and 'Advice from guardians (mean=3.09)'. 'Relatives with certain illness (mean=2.64)', and 'Economical support from family (mean=2.59)' does not make any impact on their career choice.

In this study there were also several personal factors regarding participant's career choice. Majority of the participants agreed that most prominent personal factor affecting the career choice of the respondents was 'Predetermination of future career (mean=3.54)'; Other personal factors affecting the career choice was 'Preferable to gender (mean=3.48)', 'Marital issue/family burden (mean=3.48)', 'Dream job (mean 3.39)', 'Future research opportunity (mean=3.28)'. Majority of the respondents disagree with 'Academic achievement (mean=2.85)' that it influence their career choice. Similar study found that Extremely long working hours, gender discrimination, harassment, unequal promotion, and negative perception about surgeons in terms of their family life restrict the women's choices of career in 'traditional male specialties', for example, surgery¹⁰.

There were some institutional factors that affected participant's career choice. Majority of the participants agreed that they got inspiration from peer medical student/colleagues (mean=3.74) Other studies also support the similar results¹¹. Other institutional factors affecting the career choice was 'Advice from seniors (mean=3.48)', 'Inspiration from teacher (mean=3.41)', 'Interest developed working in the respective department (mean 3.41%)'. But in case of 'Encouragement by senior doctor (mean 2.78)' most of them disagree.

Conclusion

This study provides valuable insights into the complex factors that influence final year MBBS students, intern doctors and recent graduates in their choice of specialty. The process of career choice in medical discipline is multifaceted, involving a combination of internal and

external factors that shape a student's interest in a particular specialty. Among the external factors those means scored more than 3 the Out of 5-point Likert scales by the respondents agreements were high demanding carrier path, availability of the course, inspiration from the teachers, advice from seniors, encouragement from peers or colleagues, future research opportunity, parental wish, relatives in same professions, advice from guardians, social status of doctors and availability of jobs. Among the internal factors those means scored more than 3 using the same scales were he or she was very much interested on that discipline, became interested during working in the same discipline, marital issue / family burden, passion for the dream job and future security of life. This information will be helpful for the experts in medical education and curriculum development in order to develop a medical education system which is responsive and relevant to the needs of the country.

Acknowledgements

The authors would like to express their appreciation to all of the faculty members at the Center for Medical Education in Dhaka for their invaluable guidance and assistance throughout the study.

Ethical Clearance: The research protocol was approved by Institutional Review Board (IRB) of Center for Medical Education, Dhaka.

Funding Source: Self-funded

Conflict of Interest: None

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Views of the Female Graduate Doctors Regarding Why not Involved in Health Care Services/ Health Professional Education: A Qualitative Study

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Abstract

Background: Females constituted majority of the students in different medical colleges in Bangladesh. After graduation few females fail to involve in health care services / health professional education due to some reasons and those needed to be investigated properly. So this research was aimed to find out the views of female graduate doctors why they were currently not involved in any health care services / health professional education despite of having MBBS recognized by Bangladesh Medical & Dental Council (BM&DC) registration.

Methods: This descriptive type of cross-sectional study was conducted among 500 female graduate doctors with BM&DC registration number who completed their internship within 2005-2020. An in-depth interview was conducted among 10 female graduate doctors using snow ball sampling techniques.

Results: Around 70% female graduate doctors were housewives and rest 30% running online business. Majority (70%) mentioned that they were not involved in health care services / health professional education due to maternity leave, to care children / family members, prolong duty hours etc and 30% moved to another country. All of them felt psychological pressure due to their non-involvement with identity crisis. On considering positive sides, 60% mentioned that as they were free from duty so gave more time to children / family, 30% earned enough as they were involved in online business. About 50% mentioned their family members' dissatisfaction regarding their non-involvement and 30% mentioned social acceptability towards their business profession not good which were negative sides of their non-involvement. Around 40% of female graduate doctors decided not to involve in future.

Conclusion: Maternity leave, providing care to their children, prolong duty hours and moving to another country after marriage were mentioned as main reasons by the female graduate doctors in health related jobs.

Keywords: Female graduate doctors; Medical education; Health care services; Health professional Education.

Introduction

Females have established themselves as a member of the medical community and comprising half of the medical

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students and residency populations all around the world. Considering the total number of world population, about 49.6% are women and plays a significant role in almost every field, not only in developed countries but also in developing ones.¹ About 32% of medical graduates were female worldwide.² In Pakistan, in last few years about 70-80% seats in different medical colleges were enrolled by the female students which was almost reversed 20 years back scenario and that alarmed the policy makers of this country.³ Moving from the global trend, in the session 2015-2016 about 48% female students were admitted into the different medical colleges of Bangladesh and in 2013, about 31% of physician registered by Bangladesh Medical & Dental Council (BM&DC) were female.⁴ In the press conference, the honorable Health Minister disclosed the admission test results in different medical colleges of Bangladesh and mentioning that out of 4,350 seats in government medical colleges, a total percentage of female students passed in the admission test for 2021-2022 session was 53.9%.⁵ In the 2022-2023 session, out of total of 49,194 students 1885 male and 2345 female students got chance into different government medical

colleges of Bangladesh and the total percentage of students passed in the admission test were 57.69% (28,381) female and 42.31% (20,813) male.⁶

Despite a huge representation in world's population, women had lower number of representation in academic leadership positions and only 37% employed as full-time academic physicians.⁷ A research conducted by Fatima et al. (2014) mentioned that almost 70% graduates in Pakistan from medical profession were female but a fair number of female doctors left their profession due to social and domestic issues.³ These social and domestic issues whether same in Bangladesh or not needed to be investigated properly. So this research was aimed to find out the views of female graduate doctors why they were currently not involved in any health care services / health professional education despite of having MBBS recognized by BM&DC.

Methods

This descriptive type of cross-sectional study was conducted from July 01, 2022 to June 30, 2023 after getting ethical clearance from the Institutional Review Board (IRB) of Center for Medical Education (CME). It was conducted among 500 female graduate doctors having MBBS recognized by BM&DC who completed their internship within 2005-2020 using snow ball and convenient sampling techniques.

An in-depth interview was conducted among 10 female graduate doctors who are currently not involved with any sorts of health care services / health professional education, and were willing to participate in this research. Those who did not give consent or were having any physical disability or chronic illness were excluded from study. Before taking interview, a schedule was taken via phone call. Purpose of the research was clearly explained among the female graduate doctors and notes were taken according to the questions but recording was not done as respondent's female graduate doctors were not feeling comfortable for recording. The following issues were addressed through in-depth interview:

1. Current status of the respondent female graduate doctors
2. Reasons for not involving in health care services / health professional education
3. Psychological or mental pressure felt by female graduate doctors for being not involved in health care services / health professional education
4. Positive and negative sides of not being involved in health care services / health professional education

5. Leaving medical profession on your decision solely
6. Chance to enroll in future
7. Steps taken by the Government which can improve female graduate doctor's involvement in health care delivery system
8. Gender discrimination / working environment in working place
9. Perspective of your spouse / family members / children (if u has) regarding decisions

Results

In-depth interviews (IDI) were conducted purposively with snowballing technique among 10 female graduate doctors who were currently not involved in any health care services / health professional education.

Respondents' views from IDI were given below:

About current status of the respondent female graduate doctors

70% were housewife and 30% were running online business.

Reasons for not involving in the health care services / health professional education

Among the key informants, 70% gave reasons for not serving the health related sector anymore were as follows- after maternity leave or after birth of their babies there was a long gap in their career. Now they had lack of confidence and some mentioned that as they were not getting appropriate job according to their expectation. Poor salary and prolonged duty hours along with issues of night duties were reasons for not serving the health related profession anymore. Rest 30% of the key informant interviewees mentioned that after marriage, they had moved to another country with their husbands.

Psychological or mental pressure felt by female graduate doctors for being not employed or serving the health related job

All key informant interviewees mentioned about feeling of psychological or mental pressure in different periods of their life for not involving themselves in any job. About 40% accepted that they felt tremendous psychological pressure and rest of them mentioned some sort of psychological or mental pressure. Sometimes there had feeling of lack of identity / had identity crisis.

Positive and negative sides of not being involved in any kind of health related job

All key informant interviewees mentioned the first positive side of not being involved in any kind of health related job was that they were able to spend more time with their children and family members. About 60% key informants mentioned their in-laws and children and

spouses were very much happy because of their more attachment towards family as spending more time with family than usual. Rest mentioned that they earned more through their business than serving as medical officer / lecturer. They became economically independent.

Negative sides of not being involved were a wastage of valuable time to achieve MBBS degree. 50% of them mentioned that their parents were very much unhappy regarding their decisions and 20% mentioned about their husband dissatisfaction regarding their decisions. One of the key informant interviewee mentioned that:

“Sometimes I felt lost, depressed and had money crisis to fulfill my needs” The online sellers mentioned that their relatives or social acceptability towards their business profession not good.

Leaving medical profession on your decision solely

Almost all of the participants mentioned the presence of more or less invisible family pressure / domestic violence for leaving their profession or job. About 30% of them who moved to another country after their marriage were the main cause of leaving medical profession.

Chance to enroll in future

About 40% were not interested to enroll in any health related sector in future as there was a long gap after quitting their job. Rest of 40% mentioned that if possible they are preparing themselves for different post-graduate entrance examination. Two of them already completed MPH but as they moved to another country, so they were preparing themselves for licensing examination of those countries.

Steps taken by the Government which can improve female graduate doctor's involvement in health care delivery system

Most of the key informant interviewees mentioned that following steps may be taken by the Government to use female work force effectively;

- i) Establishment of day care center
- ii) Ensuring social security all level of health care delivery system
- iii) Providing transportation and residential support for all doctors (both male and female)
- iv) Suitable duty hours
- v) Creating need based opportunities for female graduate doctors

Gender discrimination / working environment plays an important role for many female graduate doctors for not serving the health related job

Yes, half of the key informant interviewees mentioned about facing gender discrimination in work place which played an important role for not serving the health related job. Others did not remember such discriminative behavior in work place.

Perspective of your spouse / family members / children (if any) regarding decisions

Majority of the key informant interviewees mentioned that there was some sort of negative behavior faced from their spouse / family members. Two of them mentioned: “Despite of male dominating society in Bangladesh, male person was the earning source but when an educated or Doctor Female did not contribute properly. Then they may receive discriminative behavior”.

Some of the key informant interviewees mentioned that their children and husband always inspire them to get enrolled into health again by any means. Some of them were not free enough to share the perspective of their children / husband regarding that point. Two mentioned about their partners confusion regarding their decision.

Discussion

It has been better to recall that this research aimed to find out the views of female graduate doctors why they were currently not involved in any health care services / health professional education despite of having BM&DC registration as medical graduates. While considering the profession of female graduate doctors who currently were not involved in health care services / health professional education, majority were housewives and rest were online business owner.

The finding was similar to the finding of Chowdhury (2022) where 65% were housewives and 25% online business owner and 10% were running beauty parlour.⁸ In the present research, most of the key informants were not involved in health care services / health professional education due to family responsibilities, day care centre, issues with prolonged and night duties etc. Day care is a burning issue for every working mother all over the world. It is such an important issue for working mothers that it affects their career a lot.³ The issues of prolonged duty hour specially for post graduate doctors was a matter of concern worldwide which affect their family as well as social life and their academic and professional competencies. It was very difficult for them to maintain the balance between family life and professional life.^{9,10} All the key informant interviewees mentioned about their psychological pressure for not involving themselves in any kinds of health care services / health professional education.

When asking the key informant interviewees about positive sides of not involving in any health care services / health professional education, majority mentioned about happiness and satisfaction of their spouse / in-laws /

children as they are able to spend more time with them. Rest mentioned about imbalance between social acceptance and their current profession as businesswoman but they became more economically independent than their previous health care services / health professional education jobs. Negative sides of not involving in medical profession were in wastage of valuable time to achieve MBBS degree, unhappiness and dissatisfaction of their husband / children regarding their decisions.

Regarding their decision for not involving in health care services / health professional education, almost all of them mentioned the presence of more or less invisible family pressure / domestic violence for leaving their profession or job. Some of them moved to another country after their marriage were the main cause of leaving medical profession. The chance of future enrollment among them was not so inspiring as they had lacking level of confidence. Gender discrimination and working environment played an important role behind their decision which was mentioned by the key informant interviewees of the present research. Gender discrimination and attitude of male colleagues and non-cooperative / non-friendly working environment were addressed by 35%.¹¹

In the present research, the key informant interviewees mentioned few points about how to improve from present situation like establishment of day care centre, ensuring social security, providing transportation and residential support for all doctors (both male and female), suitable duty hours and creating need based opportunities for female graduate doctors. Transport is a real hectic and limiting factor for working females. In Pakistan, 47 % of female doctors reported that they have problems due to transport. They said that there is a very bad attitude of society towards female drivers, the public transport is in very miserable condition and if family gives them pick and drop then their timings are affected. These problems exist at all levels from house officers (73%) to consultants (42%).^{12,13}

Conclusion and recommendations

The study found out different reasons why female graduate doctors were not involved in health care services / health professional education, and also recommended some suggestions to improve the present situation to utilize female work force by the Government such as to establish day care center, ensure social security, family support and female friendly workplace all over Bangladesh.

Limitations of the study

1. Small sample size so generalization of findings of the present research not possible.
2. Obtaining data and conducting in-depth interviews of those female graduate doctors who were currently not involved in health care services / health professional education was the most difficult challenge so large sample interview was not possible and
3. Since the data was self-reporting, there was a chance of bias

Acknowledgements

The authors would like to thank all the female graduate doctors who participated in the in-depth interview schedules.

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Overweight and Obesity and Associated Factors Among the Medical Teachers in Bangladesh

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Abstract

Background: Overweight and obesity are increasing world-wide; medical teachers are also not immune to this morbidity. Due to gradually increasing prevalence of obesity among Bangladeshi adult population, surveys about overweight and obesity and identifying modifiable factors among medical teachers are needed, which will help to prevent overweight and obesity and identifying modifiable factors and improve the health status of the medical teachers of Bangladesh.

Methods: This cross sectional survey was driven to estimate the proportion of overweight and obesity and associated factors among the medical teachers participating in training program in Centre for Medical Education (CME). Randomly selected 285 medical teachers who participated in teachers' training program at the Centre for Medical Education (CME), were respondents of this study to seek information regarding the proportion of overweight and obesity and associated factors among them, during the period of six months from July 2022 to December 2022 with a pretested self-administered questionnaire.

Results: This study showed that, out of 285 participants, according to BMI, maximum 57.5% teachers were overweight, 27% teachers were obese, 15.4% teachers were acceptable weight and underweight. Between the age 41 to 50 years, 60.47% teachers were relatively more overweight and 28.68% teachers were obese. In this study out of 177 male teachers 63.28% were overweight and 23.16% were obese; on the other hand, out of 108 female teachers 48.15% were overweight and 33.33% were obese. There was no association between taking fresh vegetable and the BMI. But there is a strong association in case of taking fresh fruit and the BMI among the teachers. In this study it was showed that there was an association between spent time for sleeping of the teachers and the BMI. It was also seen in case time spending for entertainment, the teachers who were enjoying less time for entertainment they were both over-weighted and obese. In case of non-communicable diseases like diabetes mellitus, hypertension and dyslipidaemia are more prone to male rather than female.

Conclusion: In this study it was found that the prevalence of overweight and obesity is being a problem among medical teachers of different medical colleges in Bangladesh. It was found that male teachers (63.28%) were more prone to develop overweight and obesity than female teacher (48.15%).

Key Words: Overweight, Obesity, BMI, Medical Teacher, Medical College.

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Introduction:

In recent years, overweight and obesity have become an important health issues across the developed and developing countries and considered as fifth leading cause of mortality worldwide. Since 1980s, the prevalence of overweight and obesity have increased dramatically throughout the global level and estimation according to World Health Organization (WHO) in 2014; at least 600 million adults worldwide were obese¹.

WHO has recommended classifications of bodyweight that include degrees of underweight and gradations of

excess weight or overweight that are associated with increased risk of some non-communicable diseases. In 1993, a WHO expert committee meeting¹ proposed BMI cut-off points of 25.0–29.9 kg/m² for overweight grade 1, 30.0–39.9 kg/m² for overweight grade 2, and ≥ 40.0 kg/m² for overweight grade 3².

But in case of Asian populations, additional trigger points of BMI for public health action are as follows: less than 18.5 kg/m² underweight; 18.5–23 kg/m² increasing but acceptable risk; 23–27.5 kg/m² increased risk or overweight; and 27.5 kg/m² or higher high risk or obese².

According to World Health Organization (WHO) in 2016, more than 1.9 billion adults age 18 years and older were overweight and of these over 650 million adults were obese. Bangladesh is a developing nation of South Asia, is experiencing economic transition and rapid shifts in demographics. The population is expected to increase from 165 million in 2017 to 218 million in 2050. In Bangladesh non-communicable diseases (NCDs) are emerging as major causes of morbidity and mortality which account for about 61% of total deaths in this country³. The most common NCDs include cardiovascular diseases, diabetes mellitus, cancer, and chronic respiratory diseases, overweight and obesity act as a predisposing factor for these NCDs⁴.

As with other types of profession, Health-care workers (HCWs) are also affected by overweight and obesity. Despite working in an environment related to disease prevention and health promotion, in several studies have shown a trend towards obesity over time and to have higher levels of overweight and obesity than the general population among the medical teachers⁵.

In recent years working condition and lifestyle of teachers in medical colleges have been changed like other professional categories which contributed to the development of lifestyle related diseases, including overweight and obesity⁶.

Though most of the physicians have adequate knowledge about the factors and consequences of overweight and obesity, some may not put it into practice in their daily life. Buowari DY et al.⁷ stated in a study which was conducted among doctors in Nigeria at 2021, where 62.7% doctors had overweight, 21.6% doctors had Class 1 obesity, 2.0% doctors had Class 2 obesity and 3.9% doctors had Class 3 obesity. This shows that a few of doctors are not maintaining ideal body weight no matter the knowledge they have on nutrition⁷.

Shankar SP et al.⁸ stated in a study which was done at

2019 in a tertiary care hospital in Pondicherry, India, out of total of 100 physicians 61% of physicians had BMI 25-29.9 which comes under over weight, 15% physicians had BMI range of 30-34.9 which comes under obese.

Another study which was conducted among medical teachers during 2011 in medical college in Kufa university, Iraq, where the study shows that there is 36.5% of participants suffering from overweight and 18.8% suffering from obesity⁹.

Due to gradually increasing prevalence of obesity among Bangladeshi adult population, surveys about overweight and obesity and identifying modifiable factors among medical teachers were needed. The purpose of this study was to identify the proportion of overweight and obesity and associated factors among the medical teachers in different medical colleges, medical institutes and Medical Universities in Bangladesh. As Centre for Medical Education (CME) is a teachers' training center in Bangladesh and a survey was conducted among the medical teachers who were participating in teachers training program organized by CME to know about the proportion of overweight and obesity with associated factors.

Methodology

This cross sectional study was conducted among 285 medical teachers from government medical colleges and non-government medical colleges in Bangladesh, who were participants in teachers' training program at the Centre for Medical Education (CME). Data were collected by using a pre-tested self-administered semi-structured questionnaire. The questionnaires were distributed among the teachers and were collected immediately after completion. Teachers' participation was voluntary. Confidentiality and anonymity were strictly maintained. All ethical issues were considered and necessary permission was taken from ethical committee of the Bangladesh University of Health Sciences (BUHS), Dhaka and Centre for Medical Education (CME) before the data collection. Collected data were verified, compiled, tabulated and analyzed by using SPSS software version 19 and Microsoft software programme.

Results

Figure 1 Pie chart shows that out of 285 respondents teachers, 177 (62%) were male and 108 (38%) were female.

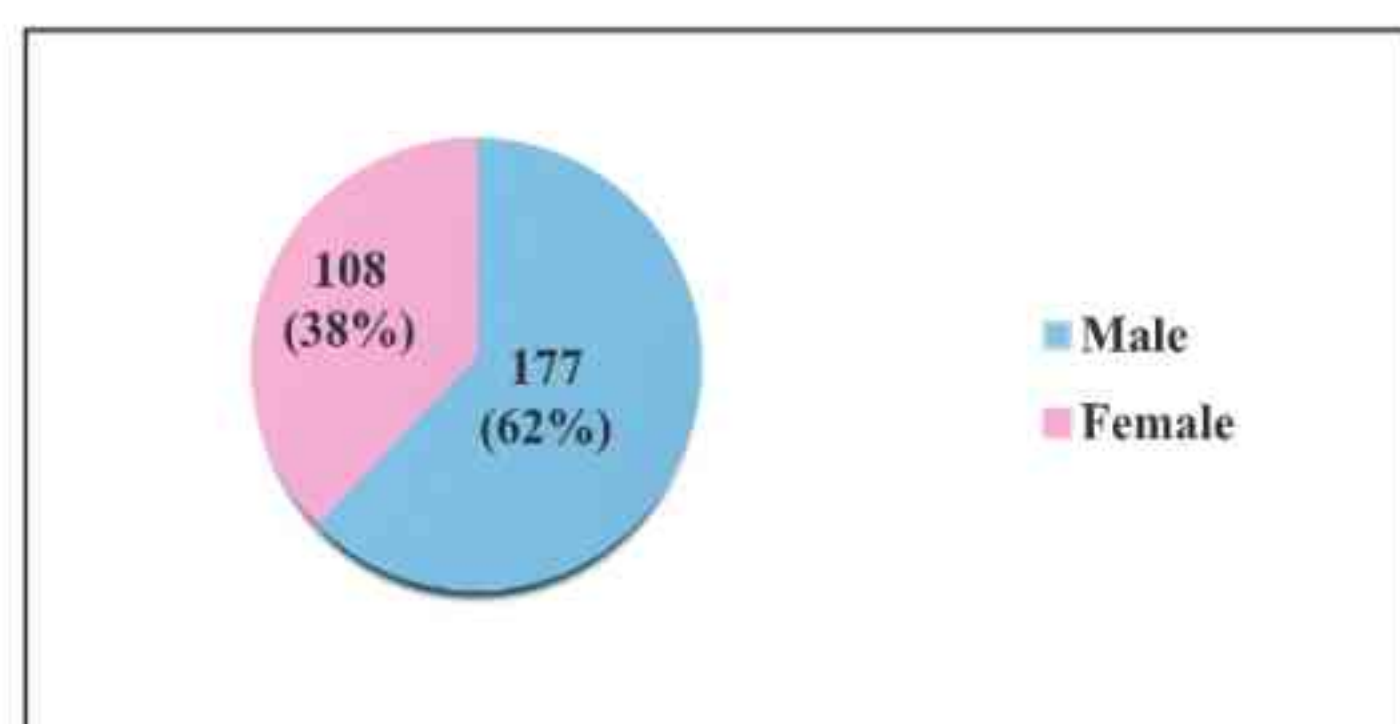


Figure 1: Distribution of the medical teachers by their gender (n=285)

Figure 2 bar diagram shows that out of 285 teachers, maximum 48.07% teachers were Assistant Professors, 23.86% were Associate Professors, 20.35% were lecturers and 7.72% were Professors.

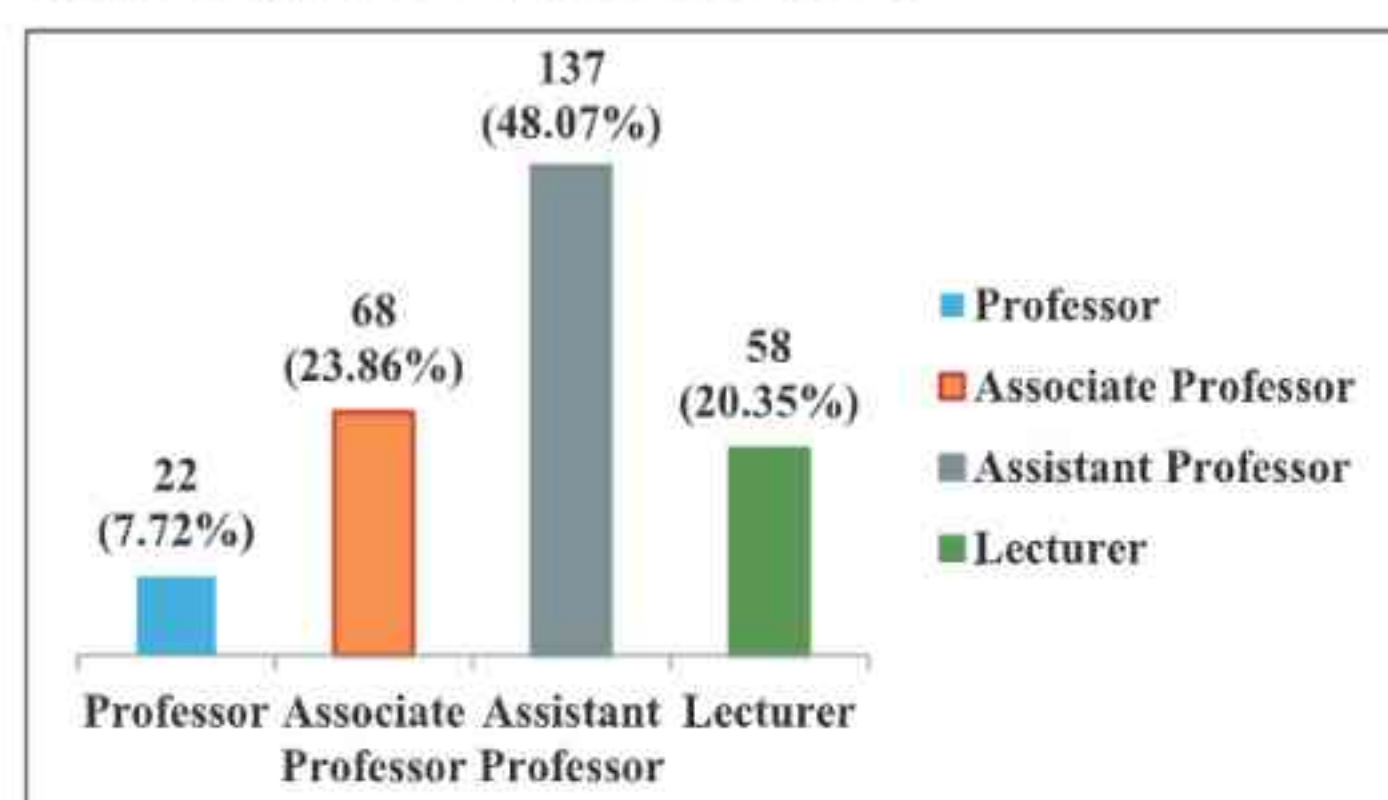


Figure 2: Distribution of the medical teachers by their designation (n=285)

Figure 3 Pie chart shows that out of 285 respondents teachers, 212 (74%) were from government medical colleges and 73 (26%) were from non-government medical colleges.

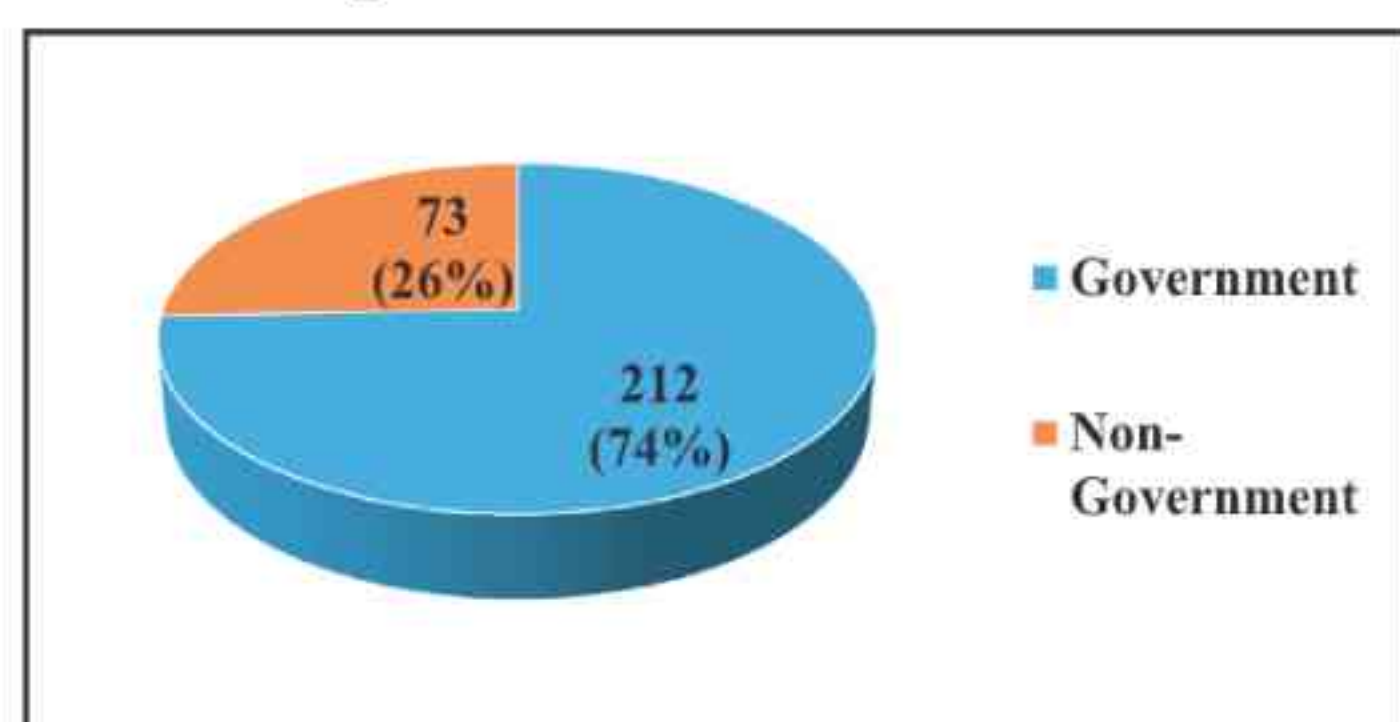


Table 3: Distribution of the medical teachers regarding the relation between BMI category and age category

Age Category * Category of BMI Cross-tabulation					
Age Category	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
Below 30 Years	6 (50%)	5 (41.67%)	1 (8.33%)	12	0.027
31 to 40 Years	15 (16.30%)	50 (54.35%)	27 (29.35%)	92	
41 to 50 Years	14 (10.85%)	78 (60.47%)	37 (28.68%)	129	
Above 51 Years	9 (17.30%)	31 (59.62%)	12 (23.08%)	52	
Total	44	164	77	285	

Figure 3: Distribution of the medical colleges by their types (n=285)

Table 1 shows that out of 285 teachers according to BMI, maximum 57.5% teachers were overweight, 27% teachers were obese, 15.4% teachers were acceptable weight and under-weight. .

Table 1: Distribution of the medical teachers regarding category of BMI

Category of BMI	Frequency	Percent
Normal weight and under weight	44	15.44
Over weight	164	57.54
Obese	77	27.02
Total	285	100.0

Table 2 shows that out of 285 teachers, maximum 45.3% teachers were between 41 to 50 years, 32.3% teachers were between 31 to 40 years, 18.2% teachers were above 51 years and 4.2% teachers were below 30 years, mean is 43.43 and SD is 7.688.

Table 2: Distribution of the medical teachers regarding age category

Age Category	Frequency	Percent	Mean	SD
Below 30 Years	12	4.2	43.43	7.688
31 to 40 Years	92	32.3		
41 to 50 Years	129	45.3		
Above 51 Years	52	18.2		
Total	285	100.0		

Table 3 shows that the teachers who's age were between 41 to 50 years, 60.47% and 28.68% were over weighted and obese respectively, the teachers who's age were between 31 to 40 years, 54.35% and 29.35% were overweight and obese respectively, the teachers who's age were above 51 years, 59.62% and 23.08% were overweight and obese respectively and the teachers who's age were below 30 years, 41.67% and 50% were overweight and normal weight with under-weight respectively. There was an association between different age group and category of BMI which was statistically significant ($p < 0.05$).

Table 4 shows that out of 177 male teachers 63.28% were overweight and 23.16% were obese, on the other hand out of 108 female teachers 48.15% were overweight and 33.33% were obese. There was an association between gender of the teachers and category of BMI which was statistically significant ($p < 0.05$).

Table 4: Distribution of the medical teachers regarding the relation between BMI category and gender

Gender in number * Category of BMI Cross-tabulation				
Gender in number	Category of BMI			p-value
	Normal weight and under weight	Over weight	Obese	
Male	24 (13.56%)	112 (63.28%)	41 (23.16%)	0.043
Female	20 (18.52%)	52 (48.15%)	36 (33.33%)	
Total	44	164	77	

Table 5 shows that out of 22 professors, 63% were overweight and 23% were obese, out of 68 associated professors 53% were overweight and 34% were obese, out of 163 assistant professors 61% were overweight and 25% were obese and out of 58 lecturers 46% were overweight and 26% were obese. There was no association between designation of the teachers and category of BMI as it was statistically not significant ($p < 0.05$).

Table 5: Distribution of the medical teachers regarding the relation between BMI category and their designation

Designation * Category of BMI Cross-tabulation				
Designation	Category of BMI			p-value
	Normal weight and under weight	Over weight	Obese	
Professor	3 (14%)	14 (63%)	5 (23%)	0.088
Associate Professor	6 (9%)	39 (53%)	23 (34%)	
Assistant Professor	19 (14%)	84 (61%)	34 (25%)	
Lecturer	16 (28%)	27 (46%)	15 (26%)	
Total	44	164	77	

Table 6 shows that out of 118 upper middle income and high income group teachers, 64.41% were overweight and 25.42% were obese and out of 167 middle income group teachers, 52.69% were overweight and 28.15% were obese. There was no association between monthly income of the teachers and category of BMI as it was statistically not significant ($p < 0.05$).

Table 6: Distribution of the medical teachers regarding the relation between BMI category and their monthly income

Monthly Income Group * Category of BMI Cross-tabulation				
Monthly Income Group New	Category of BMI New			p-value
	Normal weight with under weight	Over weight	Obese	
Middle Income Group	32 (19.16%)	88 (52.69%)	47 (28.15%)	0.065
Upper Middle and High Income Group	12 (10.17%)	76 (64.41%)	30 (25.42%)	
Total	44	164	77	

Table 7 shows that out of 106 teachers who were taking fresh vegetable 7 days a week, 56.60% of them were overweight and 29.25% were obese, out of 94 teachers who were taking fresh vegetable 5 to 6 days a week, 56.38% of them were overweight and 29.79% were obese, out of 61 teachers who were taking fresh vegetable 3 to 4 days a week, 59.02% of them were overweight and 22.95% were normal weight and under-weight, out of 24 teachers who were taking fresh vegetable 1 to 2 days a week, 62.50% of them were overweight and 29.17% were obese. There was no association between taking fresh vegetable by the teachers and the BMI of them, as it was statistically not significant ($p < 0.05$).

Table 7: Distribution of the medical teachers regarding the relation between BMI category and their dietary habit by taking fresh vegetable

Eat fresh vegetable * Category of BMI Cross-tabulation					
Eat fresh vegetable	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
1 to 2 days in a week	2 (8.33%)	15(62.5%)	7 (29.17%)	24 (8.42%)	0.449
3 to 4 days in a week	14 (22.95%)	36 (59.02%)	10 (16.39%)	61 (21.40%)	
5 to 6 days a week	13 (13.83%)	53(56.38%)	28 (29.79%)	94 (32.98%)	
7 days a week	15 (14.15%)	60(56.60%)	31(29.25%)	106(37.20%)	
Total	44	164	77	285	

Table 8 shows that out of 112 teachers who were taking fresh fruit 3 to 4 days a week, 61.61% of them were overweight and 21.43% were normal weight with under-weight, out of 85 teachers who were taking fresh fruit 1 to 2 days a week, 68.24% of them were overweight and 27.06% were obese, out of 48 teachers who were taking fresh fruit 7 days a week, 39.58% of them were overweight and 35.42% were obese, out of 37 teachers who were taking fresh fruit 5 to 6 days a week, 48.65% of them were overweight and 45.94% were obese, out of 3 teachers who were not taking fresh fruit in a week, 66.67% were normal weight and under-weight and 33.33% were obese. Most of the medical teachers who were taking fresh vegetable had overweight and obesity. There was an association between taking fresh fruit by the teachers and the BMI of them which was statistically significant ($p<0.05$).

Table 8: Distribution of the medical teachers regarding the relation between BMI category and their dietary habit by taking fresh fruit

Eat fresh fruit * Category of BMI Cross-tabulation					
Eat fresh fruit	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
1 to 2 days in a week	4 (4.70%)	58 (68.24%)	23 (27.06%)	85(29.82%)	0.000
3 to 4 days in a week	24 (21.43%)	69 (61.61%)	19 (16.96%)	112(39.30%)	
5 to 6 days in a week	2 (5.41%)	18 (48.65%)	17 (45.94%)	37(12.98%)	
7 days in a week	12 (25%)	19 (39.58%)	17 (35.42%)	48(16.84%)	
Do not take in a week	2 (66.67%)	0	1 (33.33%)	3(1.05%)	
Total	44	164	77	285	

Table 9 shows that out of 167 teachers who were performing physical exercise, 61.68% of them were over weighted and 23.95% were obese and out of 118 teachers who were not performing physical exercise, 51.69% of them were over weighted and 31.36% were obese. But there was no association between performing physical exercise of the teachers and category of BMI as was not statistically significant ($p<0.05$).

Table 9: Distribution of the medical teachers regarding the relation between BMI category and their performing physical exercise

Performing physical exercise * Category of BMI Cross-tabulation					
Performing physical exercise	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
Yes	24 (14.37%)	103 (61.68%)	40 (23.95%)	167 (58.60%)	0.235
No	20 (16.95%)	61 (51.69%)	37 (31.36%)	118 (41.40%)	
Total	44	164	77	285	

Table 10 shows that out of 4 teachers who were sleeping less than 4 hours daily, 75% of them were over weighted and 25% were obese, out of 33 teachers who were sleeping 4 to less than 5 hours daily, 75.76% of them were overweight and 18.18% were obese, out of 115 teachers who were sleeping 5 to less than 6 hours daily, 61.74% of them were overweight and 18.26% were obese, out of 122 teachers who were sleeping 6 to 7 hours daily, 49.18% of them were overweight and 36.89% were obese, out of 11 teachers who were sleeping more than 7 hours daily, 45.46% of them were overweight and 33.33% were obese. There was an association between spent time for sleeping and the BMI, which was statistically significant ($p < 0.05$).

Table 10: Distribution of the medical teachers regarding the relation between BMI category and their spent time for sleeping

Sleep * Category of BMI Cross-tabulation					
Sleep	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
Less than 4 hours daily	0	3 (75%)	1(25%)	4 (1.40%)	0.025
4 to less than 5 hours daily	2 (6.06%)	25(75.76%)	6 (18.18%)	33(11.58%)	
5 to less than 6 hours daily	23 (20%)	71 (61.74%)	21 (18.26%)	115(40.35%)	
6 to 7 hours daily	17 (13.93%)	60(49.18%)	45 (36.89%)	122(42.81%)	
More than 7 hours daily	2 (18.18%)	5 (45.46%)	4 (36.36%)	11(3.86%)	
Total	44	164	77	285	

Table 11 shows that out of 257 teachers who were enjoying entertainment less than 4 hours daily, 59.92% of them were over weighted and 26.07% were obese, out of 14 teachers who were enjoying entertainment 4 to less than 5 hours daily, 42.86% of them were normal weight with under-weight, 21.43% of them were over weighted and 35.71% were obese, out of 7 teachers who were enjoying entertainment 5 to 6 hours daily, 71.42% of them were over weighted and 14.29% were obese, out of 7 teachers who were enjoying entertainment more than 7 hours daily, 28.57% of them were over weighted and 57.14% were obese. There was an association between spent time for enjoying entertainment of the teachers and category of BMI which was statistically significant ($p < 0.05$).

Table 11: Distribution of the medical teachers regarding the relation between BMI category and their spent time for enjoying entertainment

Enjoy entertainment * Category of BMI Cross-tabulation					
Enjoy entertainment	Category of BMI			Total	p-value
	Normal weight and under weight	Over weight	Obese		
Less than 4 hours daily	36(14.01%)	154(59.92%)	67(26.07%)	257(90.18%)	.019
4 to less than 5 hours daily	6(42.86%)	3(21.43%)	5(35.71%)	14 (4.90%)	
5 to 6 hours daily	1(14.29%)	5(71.42%)	1(14.29%)	7(2.46%)	
More than 7 hours daily	1(14.29%)	2(28.57%)	4(57.14%)	7(2.46%)	
Total	44	164	77	285	

Table 12 shows that out of 177 male teachers, 22.60% were suffering from diabetes mellitus, 77.40% were not suffering from diabetes mellitus and out of 108 of female teachers, 11.11% were suffering from diabetes mellitus, 88.89% were not suffering from diabetes mellitus. There was an association between gender and presence of diabetes mellitus which was statistically significant ($p < 0.05$). Out of 177 of male teachers, 38.77% were suffering from hypertension,

67.23% were not suffering from hypertension and out of 108 of female teachers, 15.74% were suffering from hypertension, 84.26% were not suffering from hypertension. There was an association between gender and presence of hypertension which was statistically significant ($p < 0.05$). Out of 177 of male teachers, 29.38% were suffering from dyslipidaemia, 70.62% were not suffering from dyslipidaemia and out of 108 of female teachers, 12.96% were suffering from dyslipidaemia, 87.04% were not suffering from dyslipidaemia. There was an association between gender and presence of dyslipidaemia which was statistically significant ($p < 0.05$). Out of 177 of male teachers, 11.30% were suffering from arthritis, 88.70% were not suffering from arthritis and out of 108 of female teachers, 11.11% were suffering from arthritis, 88.89% were not suffering from arthritis. There was no association between gender and presence of arthritis as it was statistically not significant ($p < 0.05$). Out of 177 of male teachers, 0.56% were suffering from cancer, 99.44% were not suffering from cancer and out of 108 of female teachers, 0.93% were suffering from cancer, 99.07% were not suffering from cancer. There was no association between gender and presence of cancer as it was statistically not significant ($p < 0.05$).

Table 12: Distribution of the medical teachers regarding the relation between gender and presence of chronic diseases

Presence of Chronic diseases*Gender Cross-tabulation					
Name of chronic disease	Presence of Chronic disease in gender				p-value
	Male {177 (62%)}		Female {108 (32%)}		
	Present	Absent	Present	Absent	
Diabetes mellitus	40 (22.60%)	137 (77.40%)	12 (11.11%)	96 (88.89%)	0.015
Hypertension	58 (38.77%)	119 (67.23%)	17 (15.74%)	91 (84.26%)	0.002
Dyslipidaemia	52 (29.38%)	125 (70.62%)	14 (12.96%)	94 (87.04%)	0.001
Arthritis	20 (11.30%)	157 (88.70%)	12 (11.11%)	96 (88.89%)	0.961
Cancer	1 (0.56%)	176 (99.44%)	1 (0.93%)	107 (99.07%)	0.723

Discussion

According to the study carried out in 2012 by, Finkelstein E A et al.¹⁰ it has been found that the fifth leading risk for global deaths are overweight and obesity, that lead to at least 2.8 million adult deaths each year. An increase in the prevalence of overweight and obesity is expected over the next two decades, also the prevalence of obesity has increased in high and low income countries but high income countries, obesity affects mainly the less advantaged population⁹. Physicians due to excessive number of work hours (more than 65 hours per week) are faced with challenges like stress, lack of sleep; long working hours, over-exhaustion plus lack of physical activity, skipping breakfast and irregular dietary habit have put them under high risk of obesity and insulin resistance and diabetes mellitus.

In this study according to BMI, it was found that out of 285 participants, maximum 57.5% teachers were overweight, 27% teachers were obese, 15.4% teachers were acceptable weight and underweight (Table 1). Quite similar result was found in a study, conducted in Aarupadai Veedu Medical College and Hospital, Pondicherry in 2018, 27 male physicians and 34 female physicians were having body mass index in the range of 25 to 29.9 and were diagnosed as overweight. Overall overweight was present in 61 (61%) of the physicians,

which was more than that of the general population. Another 15 physicians had mild obesity with a body mass index of 30 to 34.9, almost similar to general population⁸.

According to this study maximum 45.3% teachers were between the age of 41 to 50 years, 32.3% teachers were between 31 to 40 years, 18.2% teachers were above 51 years and 4.2% teachers were below 30 years (Table-2). Shankar SP et al.⁸ stated in one study which was conducted at 2019, showed that 35% were of age between 31 to 40 years and 37% were of age between 41 to 50 years 23% were of age between 51 to 60 years. Table 3 shows that the teacher whose age were between 41 to 50 years were relatively more overweight (60.47%) and obese (28.68%). There was an association between different age group and category of BMI which was statistically significant ($p < 0.05$).

Among the 285 respondents teachers, 177 (62%) were male and 108 (38%) were female (Figure-1) and Table 4 shows that out of 177 male teachers 63.28% were overweight and 23.16% were obese, on the other hand out of 108 female teachers 48.15% were overweight and 33.33% were obese. There was an association between gender of the teachers and category of BMI which was statistically significant ($p < 0.05$). But in Iran a study was

done where obesity is more common in women (39.5%) while (14.5%) among men¹¹. This difference may be related to dietary habits and physical activity between male and female from country to country⁹.

From this study it was found that out of 285 teachers, maximum 48.07% teachers were Assistant Professors, 23.86% were Associate Professors, 20.35% were lecturers and 7.72% were Professors (Figure-2). Table 5 shows that out of 22 professors, 63% were overweight and 23% were obese, out of 68 associated professors 53% were overweight and 34% were obese, out of 163 assistant professors 61% were overweight and 25% were obese and out of 58 lecturers 46% were overweight and 26% were obese. Among them 74% teachers were from government medical colleges and 26% teachers were from non-government medical colleges (Figure-3).

This study shows that out of 118 upper middle income and high income group teachers, 64.41% were overweight and 25.42% were obese and out of 167 middle income group teachers, 52.69% were overweight and 28.15% were obese (Table 6). There was no association between monthly income of the teachers and category of BMI as it was statistically not significant ($p < 0.05$).

There was no association between dietary habit by taking fresh vegetable of the teachers and category of BMI as it was statistically not significant ($p < 0.05$) (Table-7). In the other hand there was an association between dietary habit by taking fresh fruit by the teachers and the BMI of them which was statistically significant ($p < 0.05$) (Table-8). This finding is quite different from another study which was conducted in 2012 by Mohammed SJ and Hamid HG⁹ stated that there is no significant difference between number of meal and BMI and this may be due to those with large BMI try to decrease their meals to decrease body weight and this agree with a study which show that eating frequency has been negatively related to body mass index (BMI).

This study shows that out of 167 teachers who were performing physical exercise, 61.68% of them were overweight and 23.95% were obese and out of 118 teachers who were not performing physical exercise, 51.69% of them were overweight and 31.36% were obese. But there was no association between performing physical exercise by the teachers and their BMI, as it was not statistically significant ($p < 0.05$) (Table-9). There was an association between spent time for sleeping of the teachers and their BMI which was statistically significant ($p < 0.05$) (Table-10) and also there was an association between spent time for enjoying entertainment by the teachers and their BMI, which was statistically significant ($p < 0.05$) (Table-11).

In this study it was found that there were relation between gender and some comorbidity. Table 12 shows that out of 177 of male teachers, 22.60% were suffering from diabetes mellitus, 77.40% were not suffering from diabetes mellitus and out of 108 of female teachers, 11.11% were suffering from diabetes mellitus, 88.89% were not suffering from diabetes mellitus. There was an association between gender and presence of diabetes mellitus which was statistically significant ($p < 0.05$). Similar result was found in a study which was conducted in Aarupadai Veedu Medical College and Hospital, Pondicherry in 2018⁸.

Conclusion

In this study it was found that the prevalence of overweight and obesity is a problem among medical teachers of different medical colleges in Bangladesh. The age group of between 30 to 50 years of medical teachers had developed more overweight and obesity. It was found that male teachers were more prone to develop overweight and obesity than female teacher. It was also found that there is need to change food habit to reduce overweight and obesity among medical teachers and they also need change their sedentary life style. There is need adequate time for sleeping and enjoying entertainment for reducing overweight and obesity among medical teachers. Chronic diseases like diabetes mellitus, hypertension and dyslipidaemia are more prone to male teachers than female teacher.

Acknowledgements

The authors are grateful to Director Professor Dr. Syeda Shahina Subhan and all other faculty members and staffs of Centre for Medical Education (CME), Dhaka for their valuable instructions, guidance, supervision and encouragement during whole research work.

Ethical Clearance: The research protocol was approved by Institutional Review Board (IRB) of Centre for Medical Education (CME), Dhaka.

Funding source: Self-funded.

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Internet Addiction and Quality of Life Among Undergraduate Medical Students of Bangladesh

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Abstract

Background: The excessive use of internet is a significant issue among medical students globally. Internet addiction has a profound impact on students' well-being and academics. This section of a larger research aimed to measure the relationship between internet addiction and quality of life among undergraduate medical students.

Methods: This cross-sectional study was performed among 926 undergraduate medical students and interns from nine medical colleges of Bangladesh, who were selected using the convenience sampling method. The extent of internet use was assessed by the duration of internet use for academic and non-academic purposes, as well as by the Internet Addiction Test (IAT) developed by Kimberly Young. The quality of life was assessed using selected items from the WHOQOL-BREF questionnaire. Relationship between internet addiction and quality of life was measured by appropriate statistical tests.

Results: This study revealed that the mean (SD) hours of internet use for academic purposes, non-academic purposes and total duration of internet use were 2.34 (± 1.991), 3.74 (± 2.413) and 6.08 (± 3.124) respectively. Additionally, 39.3%, 33%, and 2.3% of students had mild, moderate, and severe levels of internet addiction, respectively. The scores for different items related to quality of life ranged from 2.46 to 3.56 on a 5-points scale, with only 2 items scored above 3.5 (70%). This study revealed there was a negative correlation between total internet addiction score and overall quality of life of the students ($r = -0.147$), and internet use for non-academic purposes and overall quality of life ($r = -0.239$). On the other hand, internet use for academic purpose had a positive impact on quality of life ($r = 0.098$).

Conclusion: This study revealed that many undergraduate medical students spend over 3 hours daily on the internet, and most of them (74.6%) exhibit signs of internet addiction. The students' overall quality of life was not satisfactory, and a negative correlation between internet addiction and quality of life was observed. Notably, non-academic internet use negatively affected their quality of life, while academic internet use had a positive impact.

Keywords: Internet addiction, Quality of life, Blended learning, Online learning, Hybrid learning.

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Introduction:

The internet is a fantastic tool for sharing information, having fun, and interacting with others. It has become a vital requirement of our society in the information and technological century we currently live in. It serves as a crucial instrument for entertainment, knowledge, and social connection.^{1,2} Currently, it seems hard to do personal, social, administrative, and intellectual activities without the internet.³ The internet's ability to provide diverse groups of individuals with infinite temporal and geographic access to a variety of information sources is one of its most important accomplishments.⁴ Depending on their educational or employment situation, students in various countries use the internet excessively.

Quality of life (QoL) is a multifaceted concept that encompasses various dimensions, including psychological health, physical well-being, social relationships, and environmental conditions.⁵ Despite being trained to attend to these aspects during their medical studies, health professionals

themselves may experience a decline in their QoL throughout their time in medical school.⁵

Nowadays, unlike in the past, computers are taught in schools. They have grown up with computers and the internet. In addition to using the internet for their academic education, they also use it to improve their social lives.^{6,7} Studies have shown that, despite the internet's impressively positive effects, its abuse and excessive use can have addictive and pathological effects.⁸

Every student now spends a significant amount of time online on a smartphone or tablet.⁹ Although only a small minority of students use the internet for restricted instructional purposes, the majority of them just keep squandering time on "non-educational sites".¹⁰ According to studies, how much time a student spends online for learning versus for other purposes might have a big impact on how successful he is.¹¹

Medical students cannot resist using the internet because it has revolutionized healthcare with the rise of telemedicine and evidence-based medicine.¹² Due to its low cost and availability, students frequently utilize the internet to do literary searches and to find pertinent medical information.¹³ Yet, doctors and educators strongly advise against excessive internet use because it might result in related medical and psychological issues.¹⁴

Medical students will eventually be the major healthcare providers, therefore if they develop internet addictions, it could have additional negative effects. Also, it might harm their professional development, way of life, and personality as doctors. It is vital to look into the pattern, prevalence, severity of internet addiction and relationship between internet addiction and quality of life among Bangladeshi undergraduate medical students.

Methodology

This cross-sectional descriptive study was conducted from July 01, 2022 to June 30, 2023 (01 year) after approval from Institutional Review Board (IRB) of Centre for Medical Education (CME) as a part of thesis of Masters in Medical Education (MMEd) under Bangabandhu Sheikh Mujib Medical University (BSMMU). Data were collected from 926 undergraduate medical students and interns from conveniently selected nine medical colleges of Bangladesh after getting permission from concerned authorities and respondents. Their responses regarding extent of internet use and the quality of the life of the students and interns were collected in a self-

administered semi structured questionnaire. The questionnaires were distributed to the undergraduate medical students and interns and responses were collected face to face. Data was manually checked and edited after collection, and then processed and analyzed by using Statistical Package for Social Science Version 25 (SPSS-25). All figures were generated using the refined data by Microsoft Excel worksheet. Relationship between internet use and quality of life was measured by appropriate statistical tests.

To achieve the purpose of the present study, the instrument was divided into four sections. First section consists of background information of participants. Second section was used to assess the academic and non-academic duration of internet use by students. Third section of the questionnaire was used to measure the level of internet addiction by Internet Addiction Test (IAT) of Young. IAT is a self-rated questionnaire that contains 20 items, each item was scored in scale from 0 (0=Not applicable) to 5 (5=Always). Total internet addiction score was calculated with possible scores for the sum of the 20 items ranging between 0 and 100. Total score range from 0 to 30 points was considered as normal level of internet use; scores of 31 to 49 considered as mild level of internet addiction; 50 to 79 considered as moderate level of internet addiction; and scores of 80 to 100 considered as a severe form of internet addiction.¹⁵ Fourth section was used to assess the quality of life of medical students. In this study, world health organization (WHO) quality of life questionnaire-short version (WHOQOL-BREF) was used. It is 26 items on a five-point Likert scale. The 26 items are divided as follows: Two global items about quality of life and health, seven items about physical health, six items about psychological health, three items about social relationship and eight items about environment. The higher the score, the better quality of life. 16 Sixteen items of WHOQOL-BREF were used to assess the quality of life of undergraduate medical students in this study. Bangla translation has been used along with English language in the IAT and WHOQOL-BREF questionnaire sections so that students can easily understand the questions.

Results

This study found that out of 926 participants, 56.3% were female and 43.7% were male. And they belonged to first (10.5%), second (18%), third (37.5%) and fourth (23.2%) academic phase of MBBS course, and 10.8% belonged to internship training phase. The participants were from both government (55%) and non-government (45%) medical institutes, and they were studying/working at Dhaka (54.1%) and outside of Dhaka (45.9%).

Figure 1 represents that out of 926 participants, the majority (39.4%) spend between 1.1 to 3 hours, 34% spend between 0.1 to 1 hour, 15.2% spend between 3.1 to 6 hours and only 7.5% spend more than 6 hours on the internet for academic purposes. A little percentage (3.9%) reported that they were not using the internet for academic purposes at all. Figure 2 represents that out of the participants, highest (43.1%) reported using the internet for non-academic purposes for 1.1 to 3 hours per day, followed by 33.8% were using it for 3.1 to 6 hours per day and 12.5% reported using more than 6 hours per day. Only a small proportion (0.4%) of participants reported that they were not using the internet for non-academic purposes at all. Figure 3 represents that out of the participants, majority (45.4%) reported using the internet for a duration of 3.1 to 6 hours per day, followed by 37.1% who reported using it for more than 6 hours per day. Only a small proportion (0.2%) of participants reported that they were not using the internet at all.

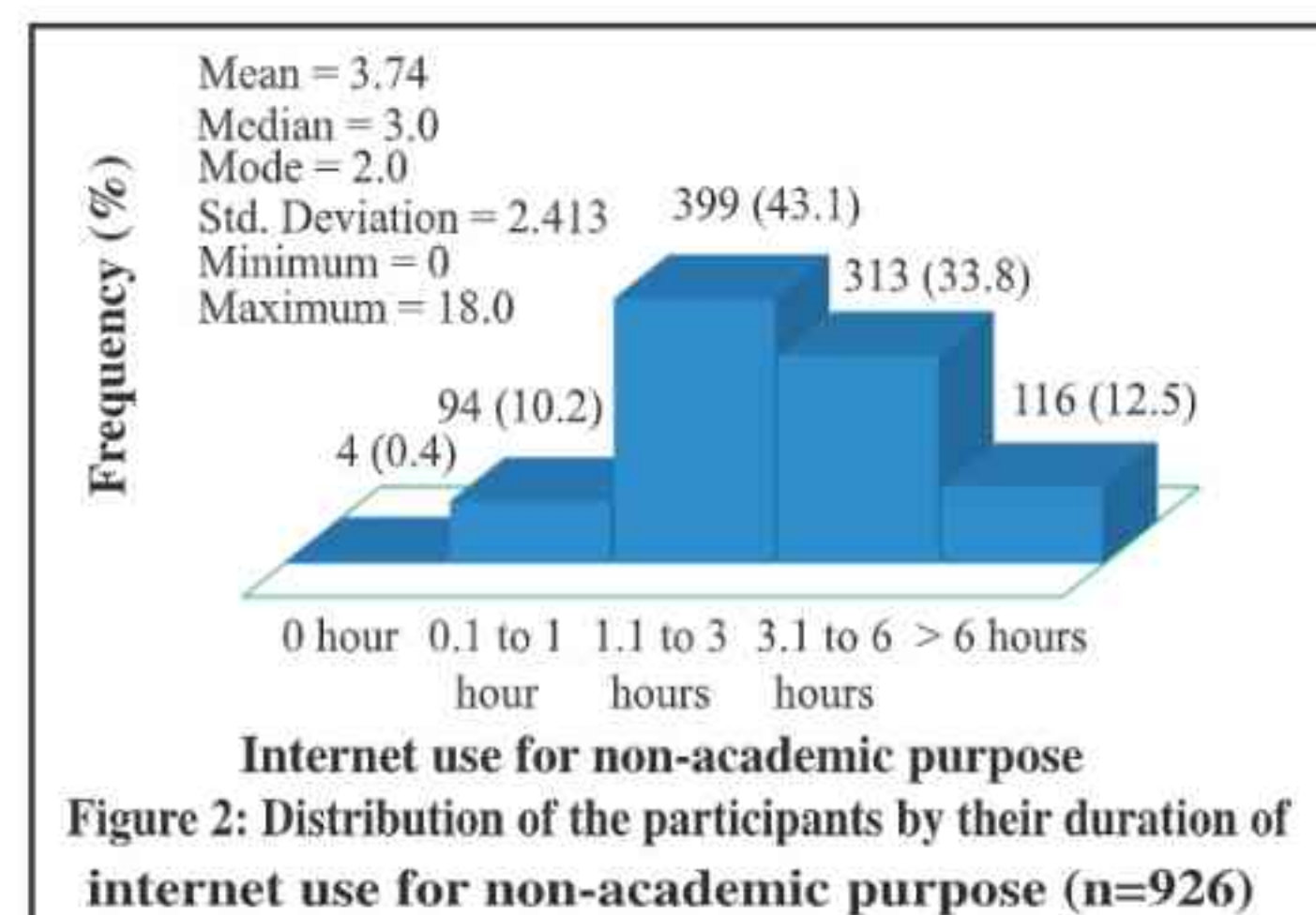
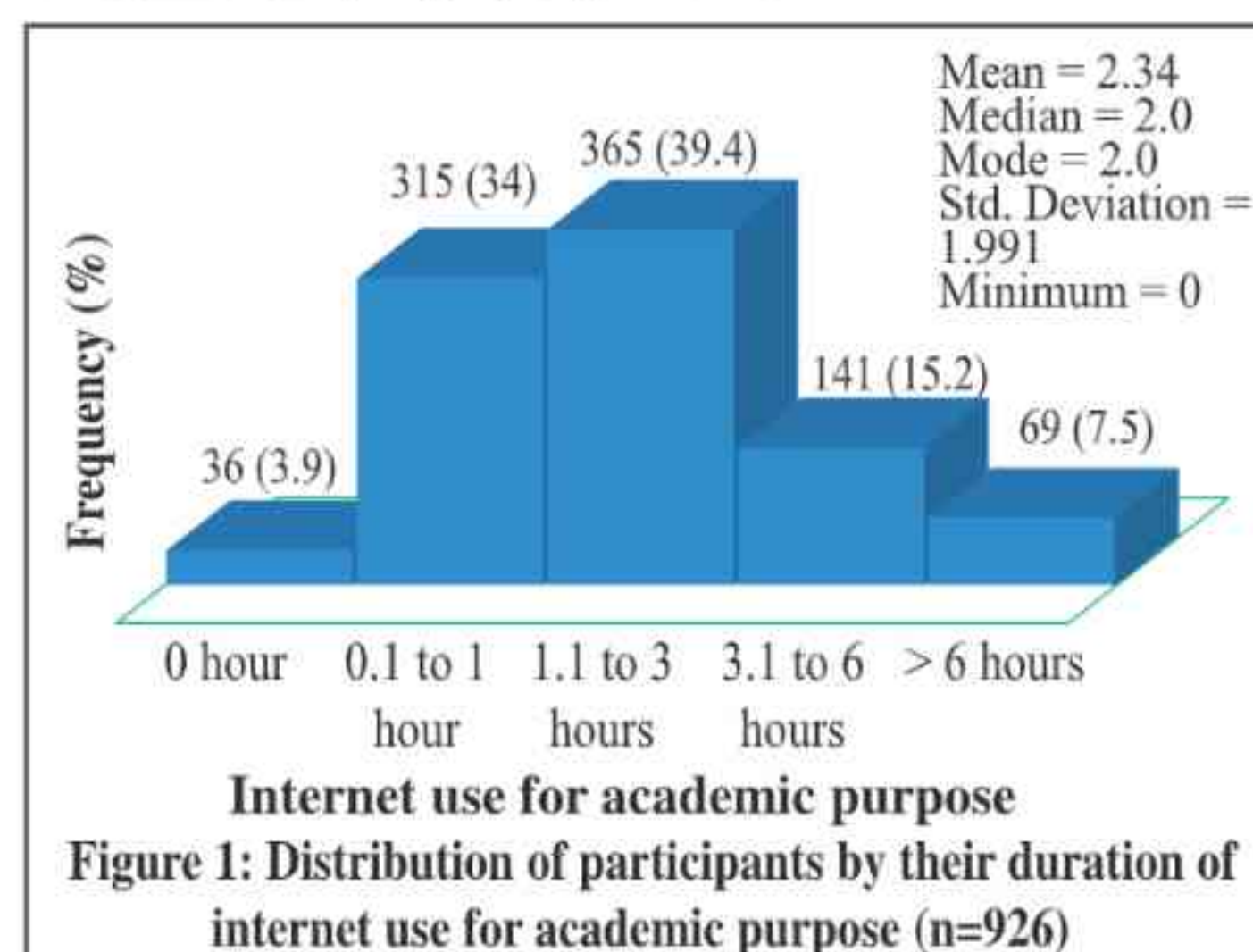
Figure 4 shows that distribution of participants by their level of internet addiction. It was found that highest percentage of internet addiction (39.3%) of the participants had mild (Scored 31 to 49 out of 100) followed by 33% moderate (Scored 50 to 79 out of 100) and 2.3% severe (scored 80 to 100) internet addiction. Only 25.4% of the total participants do not have any level of internet addiction (Scored 0 to 30).

Table 1 shows the distribution of the participants' quality of life related to their physical domain as per selected items of WHOQOL-BREF. It was found that out of 5-point scales the mean scores of these issues were within 2.86 to 3.56. Similarly, table 2 shows the mean scores of the participants' quality of life related to psychological domain were within 2.68 to 3.27. Table 3 shows the mean scores of the participants' quality of life related to environmental domain were within 2.46 to 3.18. Table 4 shows the mean scores of the participants' quality of life related to social domain were within 3.37 to 3.51. Lastly, table 5 shows the mean score of the participants' quality of life related to life enjoyment was 2.99.

Table 6 shows that there was a significant difference in the mean scores of quality-of-life categories between students who were addicted to the internet and those who were not addicted. Specifically, students who were not addicted to the internet have statistically significant higher mean scores for physical, psychological, social, and average quality of life categories (all P-values < 0.001), compared to students who were addicted. There was no significant difference in the mean scores for environmental quality of life category between addicted and non-addicted students (P value = 0.74).

Figure 5 shows that there is a negative (beta coefficient, $\beta = -0.075$) correlation between internet addiction and overall quality of life and table 7 shows that the strength of this relationship is small (Pearson correlation coefficient, $r = -0.147$) and it is highly significant (one-sided significance level, $P=0.000$). Figure 6 shows that there is a positive ($\beta = 0.455$) correlation between duration of internet use for academic purpose and overall quality and table 8 shows that the strength of this relationship is small ($r = -0.098$) and it is highly significant (one-sided $P=0.0015$). Figure 7 shows that there is a negative ($\beta = -0.915$) correlation between duration of internet use for non-academic purpose and overall quality and table 9 shows that the strength of this relationship is small ($r = -0.239$) and it is highly significant (one-sided $P=0.000$).

From model summary (Table 10), the overall contribution of independent variables (Gender, ownership of medical college, location of medical college, living status of students, phase of MBBS course, total internet addiction score, duration of internet use for academic purpose, internet use for non-academic purpose, and professional mean marks in percentage) show adjusted $R^2 = 0.0092$ and it was statistically highly significant ($P=0.000$). And from the standardized Beta-coefficients of the different independent variables, highest contribution for quality of life is negatively contributed by internet use for non-academic purpose (Beta coefficient = -0.200) and it was statistically highly significant.



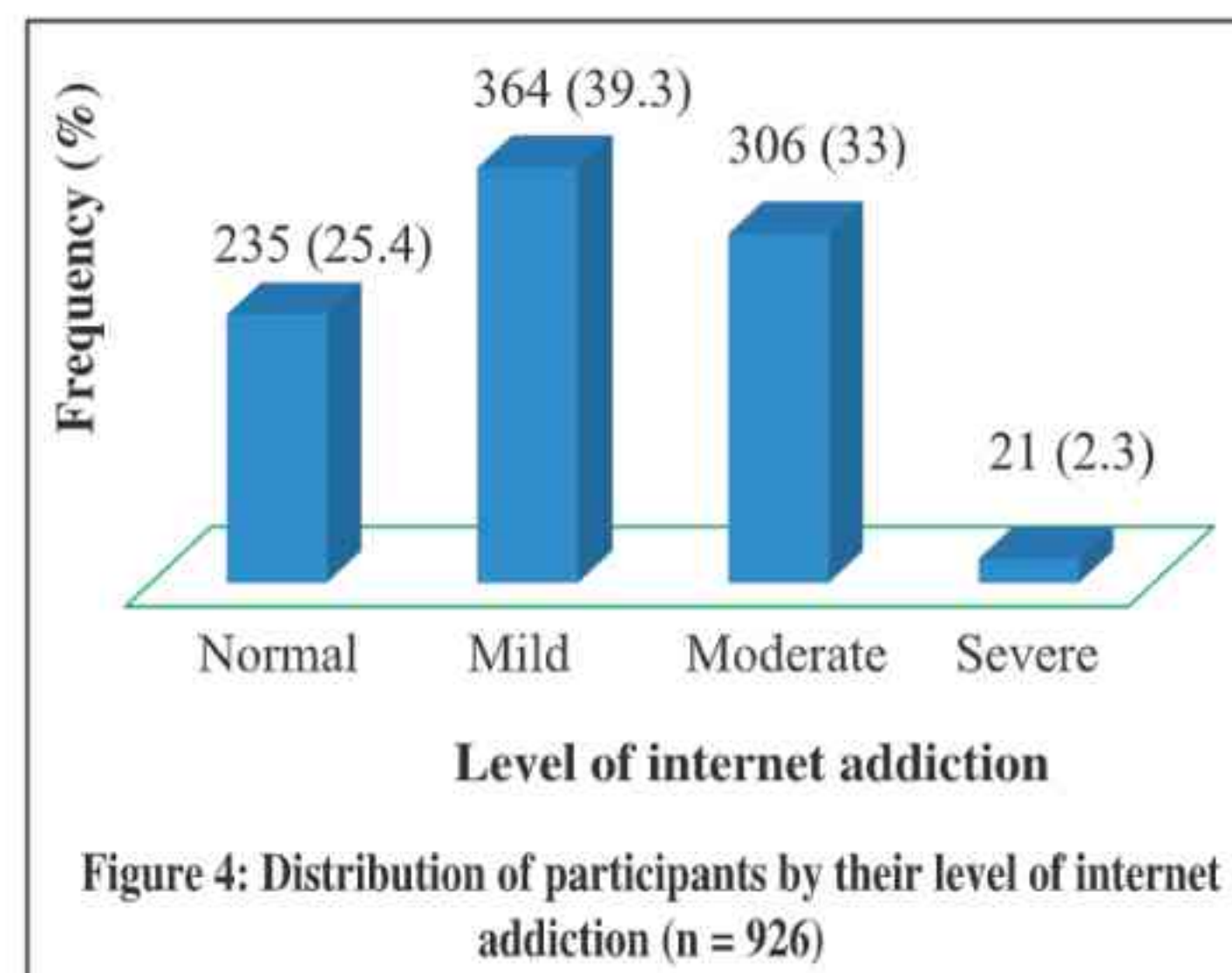
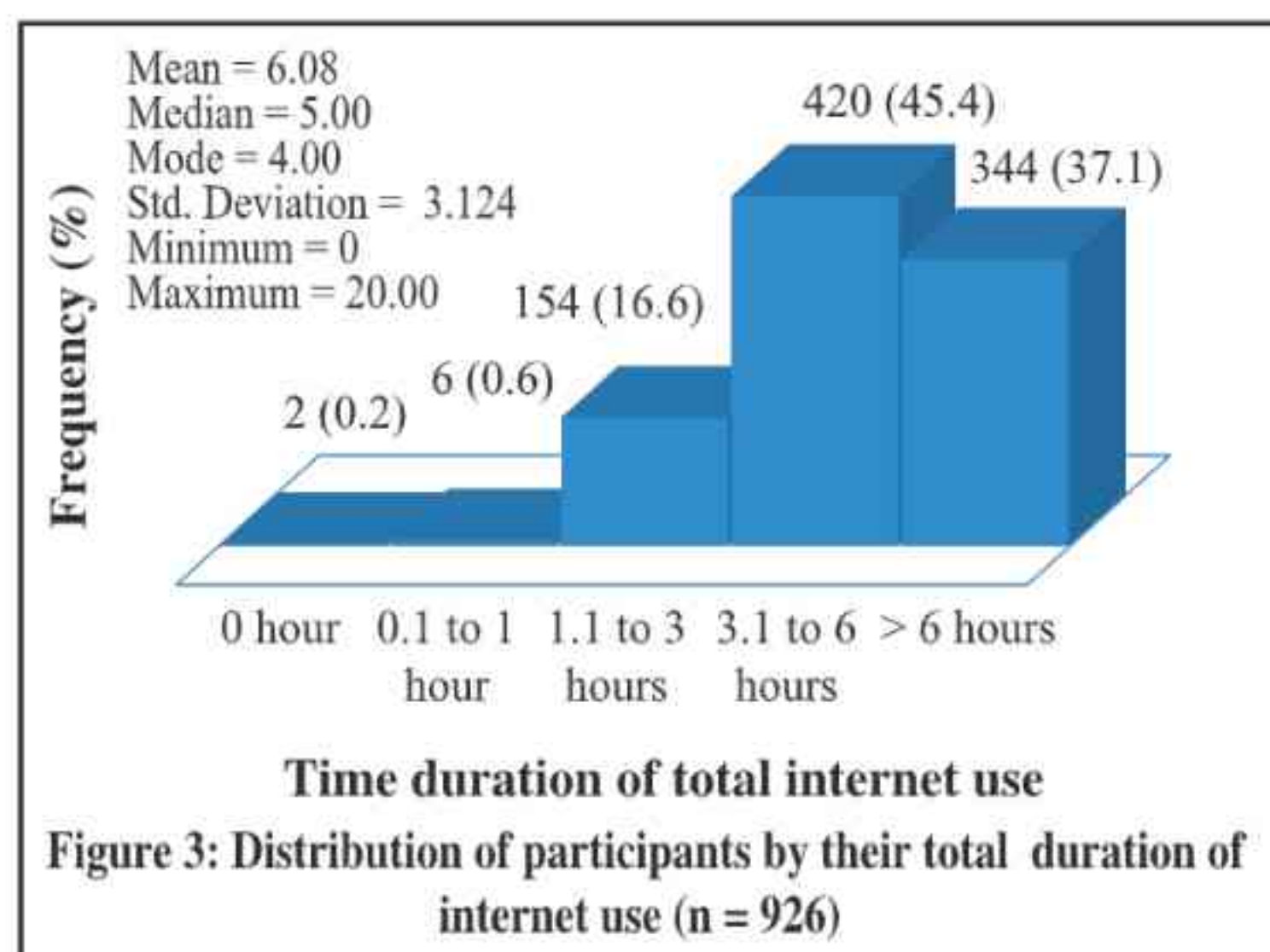


Table 1: Distribution of the participants related to physical domain of the quality of life as per selected items of WHOQOL-BREF (n=926)

Questions related to physical domain of qua lity of life	Frequency (%) of					Mean(±SD)
	Level of agreement with corresponding scores					
	NAA=1	AL=2	M=3	Mo=4	C=5	
Do you have enough energy for everyday life?	86(9.3)	197(21.3)	385(41.6)	186(20.1)	72(7.8)	2.96(1.047)
Are you able to accept your bod ily appearance?	62(6.7)	117(12.6)	250(27)	231(24.9)	266(28.7)	3.56(1.215)
NAA = Not at all =1, AL= A little =2, M = Moderately = 3, Mo = Mostly = 4, C = Completely =5						
Questions related to physical domain	VD=1	DS=2	NSNDS= 3	S=4	VS=5	Mean(±SD)
How satisfie d are you with your sleep?	111(12)	240(25.9)	300(32.4)	214(23.1)	61(6.6)	2.86(1.103)
Have satisfied are you with your capacity for work?	62(6.7)	182(19.7)	385(41.6)	258(27.9)	39(4.2)	3.03(0.955)

VD = Very dissatisfied, DS=Dissatisfied, NSNDS = Neither satisfied nor dissatisfied, S = Satisfied, VS = Very satisfied

Table 2: Distribution of the participants related to their psychological domain of the quality of life as per selected items of WHOQOL-BREF (n=926)

Questions related to psychological domain of the quality of life	Frequency (%) of Level of agreement with corresponding scores					Mean(±SD)
	NAA=1	AL=2	MA=3	VM=4	Ex=5	

To what extent do you feel your life to be meaningful?	69(7.5)	129(13.9)	350(37.8)	243 (26.2)	135(14.6)	3.27(1.102)
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How well are you able to concentrate?	62(6.7)	179(19.3)	498(53.8)	154 (16.6)	33(3.6)	2.91(0.873)
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NAA = Not at all, AL= A little, MA = Moderate amount, VM = Very much, Ex = An extreme amount

Questions related to psychological domain	VD=1	DS=2	NSNDS=3	S=4	VS=5	Mean($\pm$ SD)
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How satisfied are you with yourself?	67(7.2)	140(15.1)	310(33.5)	316(34.1)	93(10)	3.25(1.06)
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VD = Very dissatisfied, DS=Dissatisfied, NSNDS = Neither satisfied nor dissatisfied, S = Satisfied, VS = Very satisfied

Questions related to psychological domain	A=1	VO=2	QO=3	S=4	N=5	Mean($\pm$ SD)
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How often do you have negative feelings such as blue mood, despair, anxiety, depression?	110(11.9)	288(31.1)	343(37)	161(17.4)	24(2.6)	2.68(0.980)
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A= Always, VO = Very often, QO= Quite often, S= Seldom, N=Never

Table 3: Distribution of the participants related to environmental domain of the quality of life as per selected items of WHOQOL-BREF (n=926)

Questions related to the environmental domain	Frequency (%) of Level of agreement with corresponding scores					Mean($\pm$ SD)
	NAA=1	AL=2	MA=3	VM=4	Ex=5	
How safe do you feel in your daily life?	65(7)	155(16.7)	420(45.4)	207(22.4)	79(8.5)	3.09(1.003)
How healthy is your physical environment?	138(14.9)	255(27.5)	386(41.7)	126(13.6)	21(2.3)	2.61(0.972)

NAA = Not at all, AL= A little, MA = A moderate amount, VM = Very much, Ex = An extreme amount

Questions related to the environmental domain	Frequency (%) of Level of agreement with corresponding scores					Mean($\pm$ SD)
	NAA=1	AL=2	M=	Mo	C	
Have you enough money to meet your needs?	102(11)	139(15)	341(36.8)	218(23.5)	126(13.6)	3.14(1.163)
To what extent do you have the opportunity for leisure activities?	149(16.1)	391(42.2)	232(25.1)	123(13.3)	31(3.3)	2.46(1.019)

NAA = Not at all = 1, AL= A little = 2, M = Moderately = 3, Mo = Mostly = 4, C = Completely = 5

Questions related to environmental domain	Frequency (%) of Level of agreement with corresponding scores					Mean($\pm$ SD)
	VD=1	DS=2	NSNDS=3	S=4	VS=5	
How satisfied are you with the condition of your living place	93(10)	153(16.5)	291(31.4)	274(29.6)	115(12.4)	3.18(1.153)

VD = Very dissatisfied, DS=Dissatisfied, NSNDS = Neither satisfied nor dissatisfied, S = Satisfied, VS = Very satisfied

Table 4: Distribution of the participants related to social domain of the quality of life as per selected items of WHOQOL-BREF (n=926)

Questions related to the social domain	Frequency (%) of Level of agreement with corresponding scores					Mean($\pm$ SD)
	VD=1	DS=2	NSNDS=3	S=4	VS=5	
How satisfied are you with your personal relationship?	64(6.9)	98(10.6)	226(24.4)	375(40.5)	163(17.6)	3.51(1.109)
How satisfied are you with the support you get from your friends?	67(7.2)	102(11)	304(32.8)	328(35.4)	125(13.5)	3.37(1.076)

VD = Very dissatisfied, DS=Dissatisfied, NSNDS = Neither satisfied nor dissatisfied, S = Satisfied, VS = Very satisfied

Table 5: Distribution of the participants' quality of life related to the life enjoyment as per selected items of WHOQOL-BREF (n=926)

Questions related to life enjoyment	Level of agreement with corresponding scores					Mean(±SD)
	Frequency (%)					
	NAA=1	AL=2	MA=3	VM=4	Ex=5	
How much do you enjoy life	94 (10.2)	157 (17)	426 (46)	161 (17.4)	88 (9.5)	2. 99 (1.063)

NAA = Not at all, AL= A little, MA = Moderate amount, VM = Very much, Ex = An extreme amount

Table 6: Relation between different categories of quality of life and internet addiction (n=926)

Categories of Quality of life	Internet addiction	N	Mean	Std. Deviation	t	df	P value. (2 -tailed)
Physical	Non addicted	235	13.27	2.813	5.194 [®]	924	0.000
	Addicted	691	12.13	2.935			
Psychological	Non addicted	235	12.94	2.939	5.160 [®]	924	0.000
	Addicted	691	11.81	2.877			
Social	Non addicted	235	7.49	1.605	6.504 [©]	459.022	0.000
	Addicted	691	6.67	1.841			
Environmental	Non addicted	235	23.91	2.537	.332 [©]	446.387	0.740
	Addicted	691	23.84	2.827			
Average quality of life	Non addicted	235	14.40	1.936	5.176	924	0.000
	Addicted	691	13.61	2.042			

® = Regular independent samples t-tests were done due to homogeneity of variances,

© = Welch independent samples t-tests were done due to heterogeneity of variances,

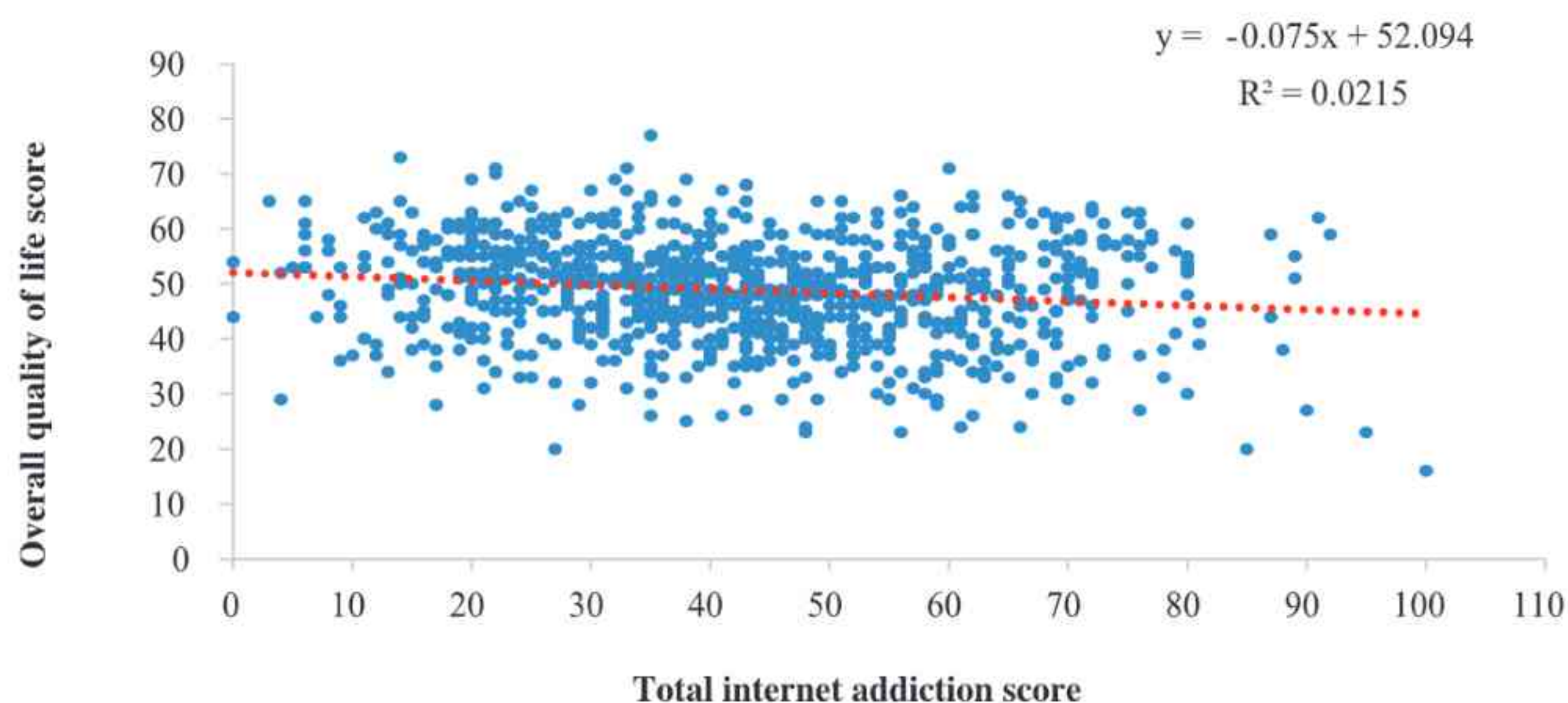
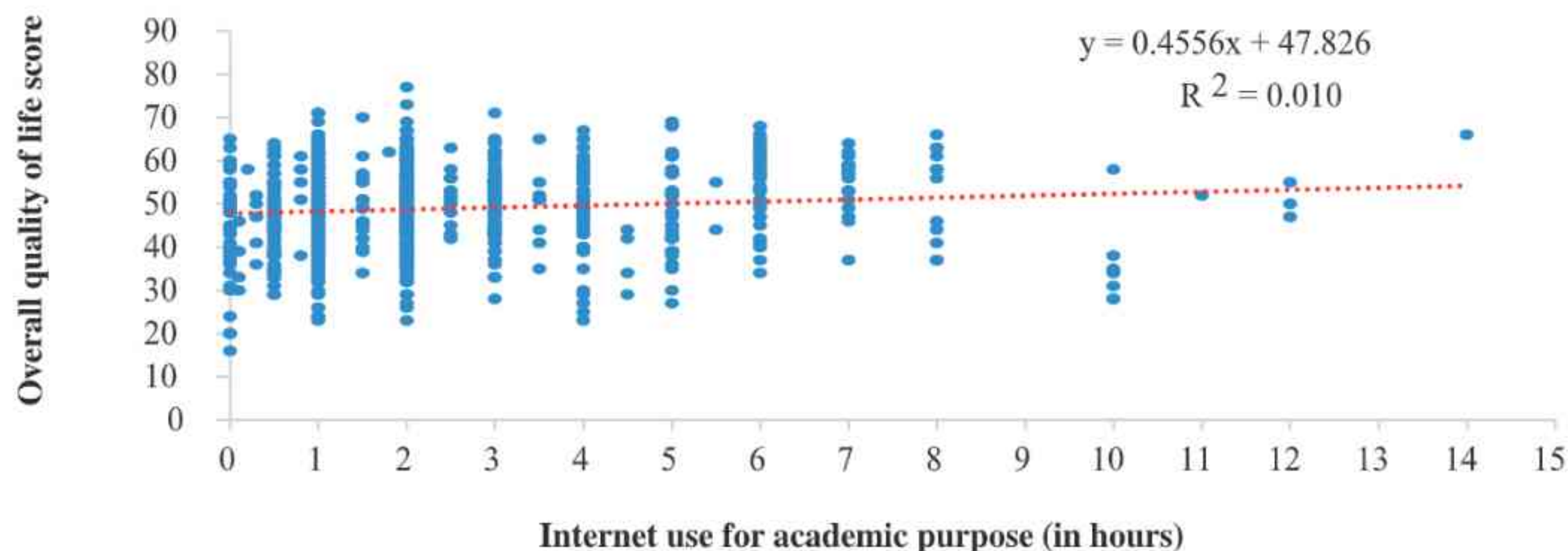
**Figure 5: Relationship between level of internet addiction and overall quality of life**

Table 7: Relation between level of internet addiction and overall quality of life of the participants (n=926)

Variables	Mean ($\pm$ SD)	Statistical inference
Independent variable: Level of internet addiction scores	43.15 ($\pm$ 18.0346)	r-value = - 0.147 t= -4.511 df= 924
Dependent variable: Overall quality of life	48.86 ($\pm$ 9.2181)	P- value= 0.000

**Figure 6: Relationship between duration of internet use for academic purpose and overall quality of life****Table 8: Relationship between duration of internet use for academic purpose and overall quality of life (n=904)**

Variables	Mean ($\pm$ SD)	Statistical inference
Independent variable: Internet use for academic purpose	2.34 ($\pm$ 1.991)	r-value = 0.098 t= 2.961 df= 902
Dependent variable: Overall quality of life	48.89 ($\pm$ 9.234)	P- value= 0.0015

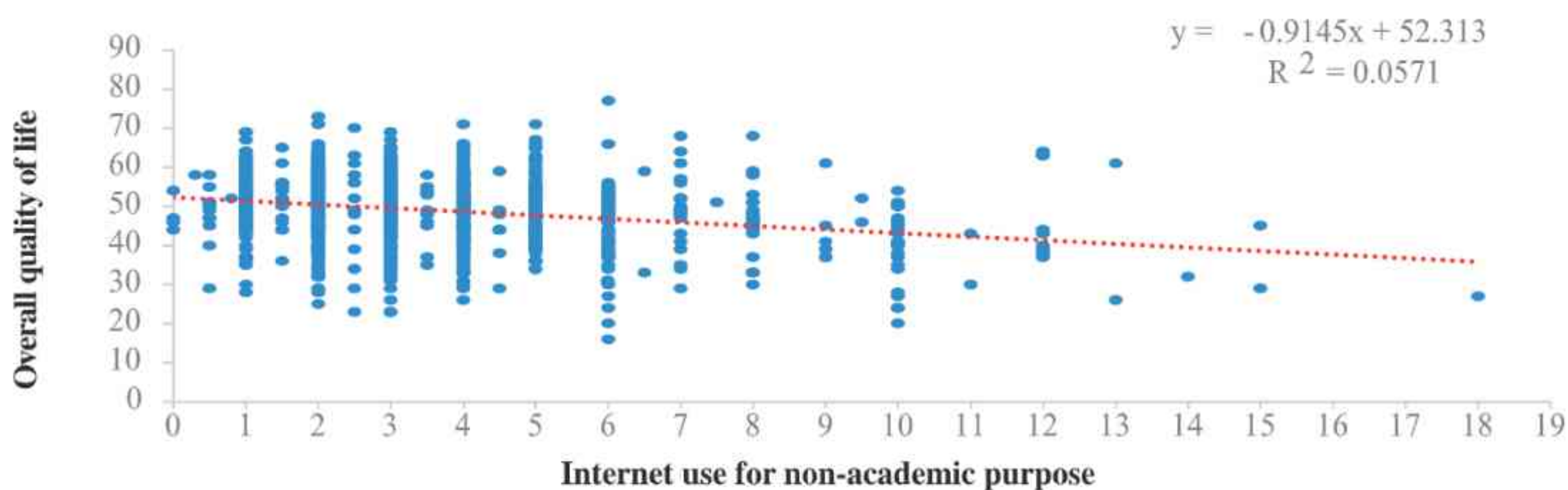
**Figure 7: Relationship between internet use for non-academic purpose and overall quality of life**

Table: 9: Relationship between internet use for non-academic purpose and overall quality of life (n=905)

Variables	Mean $\pm$ SD	Statistical inference
Independent variable: Internet use for non-academic purpose	3.742 $\pm$ 2.4134	r-value = - 0.239 t= -7.401
Dependent variable: Overall quality of life	48.89 $\pm$ 9.229	df = 903 P-value= 0.000

Table 10: Relation between different independent variables with Quality of life (n=812)**a. Model summary**

R	R Square	Adjusted R Square	F	P-Value (2 sided)
0.325	0.105	0.0092	7.733	0.000

Predictors (Independent variables): Gender, Ownership of medical college, Location of Medical college, Living status of students, Students phase of study, Total internet addiction, Duration of Internet use for academic purpose, Internet use for non-academic purpose, and Professional mean marks in percentage.

Dependent (outcome) Variable: Quality of life

b. Beta coefficients

Independent variables used in the multiple regressions	Unstandardized		Standardiz		
	Coefficients		ed		
		Std.	Coefficients		
	B	Error	Beta	t	Sig.
(Constant)	46.214	7.023		6.580	0.000
Type of medical college: Non -government	0.545	0.713	0.029	0.764	0.445
Location of medical college: Outside Dhaka	-0.388	0.725	-0.021	-0.536	0.592
Gender: Female	-0.512	0.653	-0.028	-0.783	0.434
Phase of study: Phase 1	-	-	-	-	-
Phase of study: Phase 2	0.252	1.029	0.010	0.245	0.807
Phase of study: Phase 3	-2.298	0.912	-0.121	-2.521	0.012
P hase of study: Phase 4	-1.120	0.963	-0.051	-1.163	0.245
Living status: Individual	-4.813	1.339	-0.125	-3.594	0.000
Living status: Family	-0.686	0.803	-0.031	-0.855	0.393
Total Internet Addiction score	-0.036	0.026	-0.070	-1.374	0.170
Internet use for academic purpose	0.390	0.163	0.084	2.392	0.017
Internet use for non -academic purpose	-0.762	0.139	-0.200	-5.500	0.000
Professional mean marks in percentage	0.108	0.082	0.067	1.319	0.188

Discussion

This study was carried out among 926 undergraduate medical students from 1st year to 5th year and interns of nine different medical colleges with diverse backgrounds to enhance the understanding of complex phenomena, allows for generalizability, and helps identify potential confounding factors or interactions that may influence research outcome.

In this study (Figure 1), the majority (39.4%) spent between 1.1 to 3 hours on the internet for academic purpose. Comparing the findings to similar articles, a study conducted by Smith and Anderson (2018) examined internet usage patterns among college students showed that the majority of students spent around 2 to 3 hours on the internet for academic purposes.

In this study (Figure 2), 43.1% and, 33.8% students reported spending between 1.1 to 3 hours and 3.1 to 6 hours per day respectively on non-academic purposes. This suggests a considerable number of students engage in longer periods of online leisure activities, which is consistent with the findings of Brown et al. (2022), who reported a comparable proportion (35%) of students spending 3 to 6 hours per day for nonacademic purposes.¹⁷ It is worth noting that only a small proportion (0.4%) of respondents in our study reported not using the internet for non-academic purposes at all. This finding is consistent with the study by Fernandez-Villa et al. (2015), who similarly reported a small percentage (0.5%) of non-users.¹⁰

According to this study (Figure 3), the majority of respondents (45.4%) reported using the internet for a duration of 3.1 to 6 hours per day. This finding aligns with a study conducted by Johnson (2007), where they reported a similar proportion (47%) of students spending 3 to 6 hours per day on internet use.¹⁸ Furthermore, 37.1% of respondents in our study reported using the internet for more than 6 hours per day. Comparatively, Brown et al. (2022) reported a slightly lower proportion (34%) of students spending over 6 hours per day.¹⁷ It is worth noting that only a small proportion (0.2%) of respondents in our study reported not using the internet at all. This finding is consistent with the study by Fernandez-Villa et al. (2015), who similarly reported a small percentage (0.3%) of non-users.¹⁰ The median duration was 5 hours per day in the present study further emphasize the concentration of students around these time durations. Comparatively, Ching et al. (2017) reported a median of four hours is spent by the students.¹⁹

The current study (Figure 4) showed that the highest percentage (39.3%) of students were found to have mild

internet addiction. This finding is slightly higher with a study conducted by Ahmed et al. (2019), where they reported a prevalence (23.1%) of mild internet addiction among students.²⁰ Furthermore, 33% of the respondents in our study were classified as having moderate internet addiction. A comparable proportion (35.5%) of students with moderate internet addiction was reported by Asokan et al. (2019) in their study, indicating similarities in the prevalence of moderate addiction across different samples. Interestingly, a relatively low percentage (2.3%) of respondents were classified as having severe internet addiction. A study by Asokan et al. (2019) reported a slightly lower percentage (0.8%) of severe internet addiction among students, suggesting some variability in the prevalence of severe addiction across studies.²¹ Only 25.4% of the total students in our study reported not having any level of internet addiction. Comparatively, a study by Pan et al. (2020) reported a similar percentage (26%) of non-addicted individuals among students, implying some consistency in the proportion of non-addicted students across different samples.²²

In the physical domain (Table 1), it is observed that out of 5-point scale, the mean scores for were ranged from 2.86 to 3.56. Converting these findings into percentages indicate varying levels of agreement regarding the physical domain were in between 57.2% to 71.2%. Similarly, the psychological domain (Table 2) was ranging from 53.6% to 65.4%, the environmental domain (Table 3) was ranged from 49.2% to 63.6%, the social domain (Table 4) was ranging from 67.4% to 70.2%, and the life enjoyment domain (Table 5) was 59.8%. From the above findings it can be assumed that no single domain of the students' quality of life were excellent (< 80%). Several studies have explored similar domains and reported findings relevant to student well-being. For example, a study by Fatehi et al. (2016) examined the quality of life among medical students using the WHOQOL-BREF questionnaire.²³ The study found that medical students faced challenges in multiple domains, including physical health, psychological well-being, social relationships, and environmental factors.

Table 6 showed that there was a highly significant higher mean scores of different categories of quality-of-life among non-addicted to the internet compared to the addicted ($P < 0.001$) except environmental quality of life ($P = 0.74$). The reason behind might be the internet addicted might create a different environment which give them a good feeling.

The results presented in figure 5 and table 7 demonstrate a negative relationship ($\beta = -0.075$) between internet addiction and overall quality of life among students.

However, it is important to note that the strength of this relationship is small (Pearson correlation coefficient, $r = 0.147$) but the relationship is highly significant ($P=0.000$). A study conducted by Fatehi et al. (2016) found a similar negative association between internet addiction and quality of life among college students.²³ The researchers observed that excessive internet use, characterized by addictive behaviors, was linked to poorer physical and mental well-being, social relationships, and overall life satisfaction. A systemic review and meta-analysis conducted by Noroozi et al. (2021) also showed a negative relationship between internet addiction and quality of life.²⁴ On the other hand, the figure 6 and table 8 demonstrate a positive relationship ($\beta = 0.4556$) between internet use for academic purposes and overall quality of life. The strength of this relationship is very small (Pearson correlation coefficient, $r = 0.098$) but the relationship is highly significant ($P=0.0015$). The figure 7 and table 9 demonstrate a negative relationship ($\beta = -0.9145$) between internet use for non-academic purposes and overall quality of life. The strength of this relationship is very small (Pearson correlation coefficient, $r = -0.239$) but the relationship is highly significant ($P=0.000$). From the above findings it can be assumed that poor quality of lives of the students are resulted from internet use for non-academic purpose and internet.

The table 10 presents the results of a multiple regression analysis examining the relationship between different independent variables and quality of life. Marital status was not included here because it does not fit the model. The model summary indicates that the independent variables collectively explain 10.5% of the variance in quality of life ($R^2 = 0.105$). The phase of study was found to be significantly associated with quality of life. Specifically, students in phase 3 had a negative relationship with quality of life, as indicated by a Beta coefficient of -0.121 ($p = 0.012$). This finding aligns with a study by Zhang et al. (2012), which reported that medical students in later phases of study tend to have higher levels of stress and decreased quality of life compared to their peers in earlier phases.²⁵ Another significant predictor was living status. Students living individually had a significantly lower quality of life compared to those living with their families. This finding is consistent with previous research by Alsubaie et al. (2017), which highlighted the importance of social support and familial relationships in maintaining a higher quality of life.²⁶ Additionally, internet use for non-academic purposes was negatively associated with quality of life (Beta = -0.200 , $p < 0.001$), indicating that excessive non-academic internet use may contribute to lower quality of life. This finding is supported by a study

by Tekinarslan et al. (2017), which revealed a negative association between problematic internet use and quality of life among university students.²⁷ In contrast, internet use for academic purposes showed a positive association with quality of life (Beta = 0.084 , $p = 0.017$), suggesting that utilizing the internet for academic-related activities may have a slight positive impact on quality of life. Other variables, such as gender, ownership and location of medical college, total internet addiction, and professional mean marks in percentage, did not show significant associations with quality of life in this analysis.

Conclusion

Based on the findings of the present study, it can be concluded that a majority of medical students (82.5%) used internet 3.1 to 6 hours per day on average. Among these students, 74.6% displayed varying levels (mild / moderate / severe) of internet addiction. However, the study revealed that the overall quality of life of the students was not satisfactory; because, from the mean values it revealed that only in case of two issues out of the 16 items related to quality of life the students scored more than 70% of the desired level. The study revealed that internet addiction is strongly associated with poor quality of life. Furthermore, the study found that internet use for non-academic reasons had the most prominent negative impact on the quality of life but internet use for academic purposes had a positive impact on the quality of life. Finally, it can be concluded that medical students should judiciously use the internet for the betterment of their quality of life.

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Sociodemographic Conditions and its Association with Foot Ulcer Among Type 2 Diabetic Patients

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Abstract

Background: Foot ulcer is one of the most common complications among diabetes mellitus (DM) patients affecting approximately 15% of diabetic patients during their lifetime and about 10% to 30% of diabetic foot ulcer patients will eventually go for amputation. It is preventable to a large extent if the risk factors are identified early. The aim of this study was to determine the sociodemographic factors associated with foot ulcer among type 2 DM patients.

Methods: A cross sectional study was conducted from January to December 2022 with 180 adult type 2 Diabetes Mellitus patients attending Bangladesh Institute of Health Sciences Hospital (BIHSH). The participants were selected by convenience sampling technique. Data were collected by face-to-face interview using a semi-structured questionnaire and by reviewing records using a checklist. Data analysis was done using necessary statistical software. Data quality and ethical issues were maintained strictly.

Result: Mean $\pm$ SD age of the participants was 59.78 ± 10.97 years. About 46.4% of the participants in age group of 60-90 years, 55.6% with primary level of education, 64.7% of retired person and 27.6% in monthly family income group of 19489-60252 BDT had foot ulcers.

Conclusion: In this study, advanced age, poor level of education, retirement from occupation and monthly family income (middle income group) are found to be associated with foot ulcer among type 2 diabetes mellitus patients.

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Introduction:

Diabetes mellitus (DM) is a rapidly growing public health issue affecting both developed and developing countries.¹ According to the International Diabetes Federation, approximately 415 million people worldwide had diabetes in 2015, with a projected increase to 642 million by 2040. It was predicted that by 2040, the number could be more than double.² Type 2 diabetes is the most common and prevalent clinical classification of diabetes in certain ethnic groups. Type 2 diabetes is estimated to be up to six times more common in people of South Asian descent, three times more common in people of African and African-Caribbean descent, and more common in people of Chinese descent than in the white population.³ It is extremely common in Bangladesh, as it is in other developed and developing countries. According to data, 9.7% of Bangladeshi adults (aged 35 and up) are diabetic, and 22.4% are prediabetic.⁴ A trend analysis revealed that the prevalence of diabetes in Bangladesh has risen from 4% in 1995-2000 and 5% in 2001-2005 to 9% in 2006-2010.⁵ The prevalence of long-term diabetes-related complications is likely to rise as the prevalence of diabetes rises. Foot ulcers are a common and serious complication of diabetes, posing a significant healthcare burden and causing significant morbidity.⁶

Foot ulcers, on the other hand, are thought to be highly preventable. From a public health standpoint, identifying the role of risk factors to facilitate the early detection of patients at high risk for subsequent foot complications is a critical pillar in the prevention of foot ulcers.⁷ The findings on risk factors for foot ulcers in T2DM patients were compiled in a recent and comprehensive systematic review. Different studies produced inconsistent results. Despite the use of predefined stringent inclusion and exclusion criteria in this systematic review, there was significant heterogeneity among the included studies.⁸ This heterogeneity and inconsistency in the results of the included studies emphasizes the need for additional research on factors associated with foot ulcers in various parts of the world. Further research can help to improve prevention and early detection strategies, improve patient quality of life, and reduce the financial burden on the public health system.⁹

On the other hand, there is a scarce of research about the risk factors of foot ulcer in Bangladesh. As a result, I was inspired to investigate the risk factors for foot ulcers in type 2 diabetes mellitus patients in Bangladesh. The goal of this study was to use real-world data from indoor and outdoor patients to determine which factors are associated with foot ulcers in patients with type 2 diabetes mellitus. The study findings can be used to take the necessary steps to prevent foot ulcers in type 2 diabetes mellitus patients in our community.

Methods

The study was a cross sectional study to determine the factors associated with foot ulcer among type 2 diabetes mellitus patients. This study was conducted from January to December 2022 in Bangladesh Institute of Health Sciences Hospital (BIHSH), Mirpur, Dhaka, Bangladesh. The sample size was 180. Sampling technique used for the study was convenience sampling technique. A Semi structured questionnaire with added checklist was used for the collection of data. Before the collection of data, pre-testing of the questionnaire and the checklist was done at Ibrahim General Hospital, Mirpur, Dhaka. According to the finding of pre-testing, necessary modification was done in the questionnaire and the checklist. After taking permission of data collection from relevant authority and informed written consent from every participant, data were collected by face-to-face interview. The purpose and objectives of the study were explained to the participant before interview. Privacy and confidentiality of each and every participant was maintained strictly. Individual information was recorded on a questionnaire and a checklist. Consistency and relevancy of the data were checked.

Verification and validation of the data were assured. Coding, editing, cleaning and categorization were done as required. Collected data were edited and analyzed according to the objectives and variables by Statistical Package for the Social Sciences (SPSS) software, version 26. This article was derived from the thesis, which was a prerequisite for MPH final part examination under Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka.

Results:

Table 1: Distribution of participants by age group

Attributes	Frequency	Percentage	Statistics
Age of participant (years)			
30-39	1	0.6	Mean $\pm$ SD = 59.78 $\pm$ 10.97 (years)
40-49	31	17.2	
50-59	51	28.3	
60-90	97	53.9	Minimum=35
Total	180	100.0	Maximum=90

Among 180 participants, 97 (53.9%) of the participants were in the age group of 60-90 years and 51 (28.3%) were between 50-59 years. Mean $\pm$ SD age was 59.78 $\pm$ 10.97 (years) (Table 1).

Table 2: Distribution of participants by gender

Attributes	Frequency	Percentage
Gender		
Male	110	61.1
Female	70	38.9
Total	180	100.0

Among 180 participants, men were predominant 110 (61.1%) and females were 70 (38.9%) (Table 2).

Table 3: Distribution of participants by education

Attributes	Frequency	Percentage
Education of participant		
Primary	36	20.0
Secondary	27	15.0
Higher Secondary	38	21.1
Graduates and above	79	43.9
Total	180	100.0

Majority of the participants, 79 (43.9%) were graduates and above, 38 (21.1%) participants had higher secondary and 36 (20.0%) had primary education (Table 3).

Table 4: Distribution of participants by occupation

Attributes	Frequency	Percentage
Occupation of participants		
Business	34	18.9
Service	47	26.1
Agriculture	4	2.2
Unemployed	2	1.1
Retired	34	18.9
House wife	59	32.8
Total	180	100.0

By the occupation of the participant, 59 (32.8%) were housewives, 34(18.9%) were retired and 34(18.9%) were service holder (Table 4).

Table 5: Distribution of participants by monthly family income

Attributes	Frequency	Percentage	Statistics
Monthly family income (BDT)			
4907-19488	2	1.1	Mean±SD
19489-60252	174	96.7	= 39000 ± 13068.363
>60252	4	2.2	(BDT)
Total	180	100.0	Minimum= 15000
			Maximum= 70000

Among 180 participants, 174 (96.7%) of the participants had monthly family income 19489-60252 BDT and 4 (2.2%) participants had monthly family income more than 60252 BDT (Bangladeshi Taka) (Table 5).

Table 6: Association between gender, age, educational qualification and occupation of the participants and foot ulcer

Sociodemographic characteristics		Foot ulcer f(%)		Total f(%)	Significance
		Present	Absent		
Gender of the participants	Male	32 (29.1)	78 (70.9)	110 (100)	$\chi^2 = 0.850$ df = 1 p = 0.357
	Female	16 (22.9)	54 (77.1)	70 (100)	
	Total	48 (26.7)	132 (73.3)	180 (100)	
Age groups of participants	30 -39	0(0)	1(100)	1(100)	Fisher's Exact Test p = 0.000
	40 -49	0(0)	31(100)	31(100)	
	50 -59	3(5.9)	48(94.1)	51(100)	
	60 -90	45(46.4)	52(53.6)	97(100)	
	Total	48(26.7)	132(73.3)	180(100)	
Educational qualification of the participants	Primary	20(55.6)	16(44.4)	36(100)	$\chi^2 = 19.481$ df = 3 p = 0.000
	Secondary	6(22.2)	21(77.8)	27(100)	
	Higher Secondary	8(21.1)	30(78.9)	38(100)	
	Graduates and above	14(17.7)	65(82.3)	79(100)	
	Total	48(26.7)	132(73.3)	180(100)	
Occupation of the participants	Business	6(17.6)	28(82.4)	34(100)	Fisher's Exact Test p = 0.000
	Service	2(4.3)	45(95.7)	47(100)	
	Agriculture	2(50)	2(50)	4(100)	
	Unemployed	0(0)	2(100)	2(100)	
	Retired	22(64.7)	12(35.3)	34(100)	
	House wife	16(27.1)	43(72.9)	59(100)	
	Total	48(26.7)	132(73.3)	180(100)	

Table 7: Association between family income, housing condition and area of residence of the participants and foot ulcer

Sociodemographic characteristics		Foot ulcer	f(%)	Total	f(%)	Significance
		Present	Absent			
family income (BDT)	4907 - 19488	0(0)	2(100)	2(100)		Fisher's Exact Test p = 0.000
	19489 - 60252	48(27.6)	126(72.4)	174(100)		
	>60252	0(0)	4(100)	4(100)		
	Total	48(26.7)	132(73.3)	180(100)		
Housing condition	Semi -pucca	7(29.2)	17(70.8)	24(100)		$\chi^2 = .089$
	Pucca	41(26.3)	115(73.7)	156(100)		df = 1
	Total	48(26.7)	132(73.3)	180(100)		p = 0.766
Area of residence	Rural	7(28)	18(72)	25(100)		$\chi^2 = .026$
	Urban	41(26.5)	114(73.5)	155(100)		df = 1
	Total	48(26.7)	132(73.3)	180(100)		p = 0.871

Discussion

In the study, it was found that the mean age of the participants was 59.78 ± 10.97 years. Among the participants, males were predominant. There was association between foot ulcer and some factors like, monthly family income, previous history of foot ulcer, shoe using type, uncontrolled diabetes, nephropathy and hypertension.

In this study, the mean age of the participants was 59.78 ± 10.97 years and majority 50 (27.8%) of the participants were in the age group of 55-64 years. A study from Bangladesh also reported a similar trend where the mean age of participants was 51.6 ± 11.9 years.¹⁰

Current study shows that there is a male predominance among the participants, males constitute 61.1 percent of participants which is similar to the study done in Ethiopia.¹¹ Males travel and work outside the house more than females. This may predispose them for more foot injuries leading to foot ulceration among the participants. It could also be due to the attendance of more males in hospitals than the female counterparts.

Regarding association between age of participants and

presence of foot ulcer, 22 (45.8%) participants in age group of 65-74 years had foot ulcers, whereas 18 (37.5%) participants in age group of 75 and above years had foot ulcers. The occurrence of foot ulcer increased with the increased ages of patients and the increase rate was statistically highly significant ($p=0.000$) (Table 6). Similar finding was found in a study of Bangladesh where the odds for the risk of diabetic foot ulcer was higher among those who were ≥ 50 years old.¹⁰

In this study, there was association between educational qualification of the participant and presence of foot ulcer. Regarding association between educational qualification of the participant and presence of foot ulcer, 20(55.6%) participants having primary education had foot ulcers whereas 6(22.2%) participants having secondary level of education had foot ulcers. The occurrence of foot ulcer increased with the decreased level of education of patients and the increase rate was statistically highly significant ($p=0.000$) (Table 6). A study of Saudi Arabia showed that there is a significant relationship between diabetic foot ulcer and the poor level of education.¹²

Regarding association between occupation of the participants and presence of foot ulcer, 22(64.7%)

participants who were retired had foot ulcers, whereas 2(50%) participants who were farmers had foot ulcers. There was statistically highly significant association between retirement from job of the participants and the presence of foot ulcer ($p=0.000$) (Table 6). In retired life, people normally have more age and less physical activity which may be a cause for the increased foot ulcer formation. An Ethiopian study also showed that diabetic foot ulcer was significantly associated with the retirement from occupation.¹³

In current study, a statistically highly significant association was found between monthly family income of the participants and the presence of foot ulcer, 48(27.6%) participants in family income group of 19489-60252 BDT had foot ulcers whereas participants from low-income group and high-income group had no foot ulcer ($p=0.000$) (Table 7). So, foot ulcer was more in middle socioeconomic class. Generally, the people of low-income group do more physical activity than other groups and the people of high-income group enjoy better healthcare facility than others. But the middle-income group enjoy relatively sedentary life style and has less ability to obtain highest level of health care. This may be the cause for the increased incidence of foot ulcer in middle-income group. Another probable reason is that the study was conducted in the hospital where patients generally come from middle-income group and most of the study participants were from the middle-income group (96.7%). In a study in Bangladesh, monthly income 19488 and less BDT showed higher odds for the risk of diabetic foot ulcer.¹⁰

Conclusion:

Foot ulcer is one of the most common complications of diabetes mellitus. But it can be greatly prevented by detecting the associated factors and by taking appropriate measures to protect against it. In this study, it was found that foot ulcer had been associated with increased age, poor level of education, retirement from the job and middle-income group. The findings of this study can greatly help the policy makers and the healthcare professionals to take necessary measures to prevent foot ulcer in type 2 diabetes mellitus patients and also its associated financial burden of individual, family and the society.

Recommendation:

To prevent foot ulcer in type 2 diabetic patients following measures should be taken:

1. To prevent foot ulcer special attention should be given to the patients with increased age and middle-income group.

2. Adequate care should be given to retired persons.
3. Proper health education should be given from primary level
4. To stop the debilitating consequences of foot ulcer specialized diabetic foot care centres should be established in both urban and rural areas.

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Phase Wise Malaria Elimination in Bangladesh: A Review Report

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Introduction:

Malaria is a devastating public health problem in the 13 endemic districts of Bangladesh. Over the last decades, Bangladesh has demonstrated significant progress in reducing the malaria caseload and is showing steady progress toward achieving the goal to eliminate malaria by 2030. The number of malaria cases per 1,000 risk population has decreased to 0.38 in 2021 from 3.51 in 2010.¹ The burden of malaria has decreased in recent years, with improvements in socioeconomic conditions coupled with strategic, social, and financial investments of government and external financing in a vertically driven malaria elimination program all the way to the community level and integrated with the primary healthcare system of Bangladesh.

In 2022, it is estimated that around 12 percent (19.37 million) of the population of Bangladesh (163 million) are at risk of getting infected with either *Plasmodium falciparum* or *Plasmodium vivax*.² Of the 64 districts in the country, 13 (20 percent) are in the endemic zone, of which three Chittagong Hill Tracts (CHT) districts (Bandarban, Rangamati, and Khagrachari) are the high-burden districts, with around 94 percent of total reported cases in 2021.² According to the survey conducted in 2022, only 8 deaths were reported up to June 2022, compared to 45 deaths in 2014.³ Intense malaria transmission is largely restricted to the hilly, forested, and hard-to-reach area of the highly endemic upazila (sub-district) of Bandarban district.

The goal as set in the National Strategic Plan (NSP) 2021–2025¹ to eliminate malaria is “By 2025, reduce malaria annual parasite incidence (API) to less than 1 per 1,000 population at risk in three CHT districts compared

to 2019, interrupt local transmission of and eliminate indigenous malaria in phased manner in 10 other endemic districts, determine malaria-free status of remaining 51 districts, and maintain malaria-free status in areas where malaria transmission has been interrupted and prevent re-establishment of local transmission.”

Methodology

Review of the available documents and discussion with main stakeholders involved in the malaria elimination program was the main tools in writing this review report.

Documentary Review

The existing NSP for Malaria Elimination in Bangladesh 2021–2025 and the CDC Operational Plan of the 4th Health Population Nutrition Sector Development Program (HPNSDP) for 2017 to 2023 and the Global Fund Funding Request (Allocation period 2020–2022) were the key national documents reviewed. Other documents reviewed included the National Malaria Surveillance Manual, Grand Agreement with Global Fund and BRAC, Implementation Workplan of BRAC, Joint Monitoring Mission (JMM) reports and report on the field visit for malaria epidemiological and entomological analysis in Lama, Alikadam and Thanchi 2022.

Consultation with Stakeholders

Discussed with the district and national level stakeholders to obtain views from their experience and lessons learned when working for the malaria elimination in Bangladesh by 2030.

Findings and Observations

Epidemiological Situation

In 2022, it was estimated that 19.37 million people (12 percent of the country's total population of 163 million) living in 13 districts (72 upazila) were at risk of being infected with malaria. Those at the highest risk are the populations of the 3 high-burden districts of CHT, an area of 13,294 square kilometers, most of which is highland, with an estimated population of around 2.5 million, based on the National Census Report.³

The level of malaria risk in these districts is highest because all the determinants of risks like endemicity, accessibility, and strength of the health system, in addition to socioeconomic factors are adverse.

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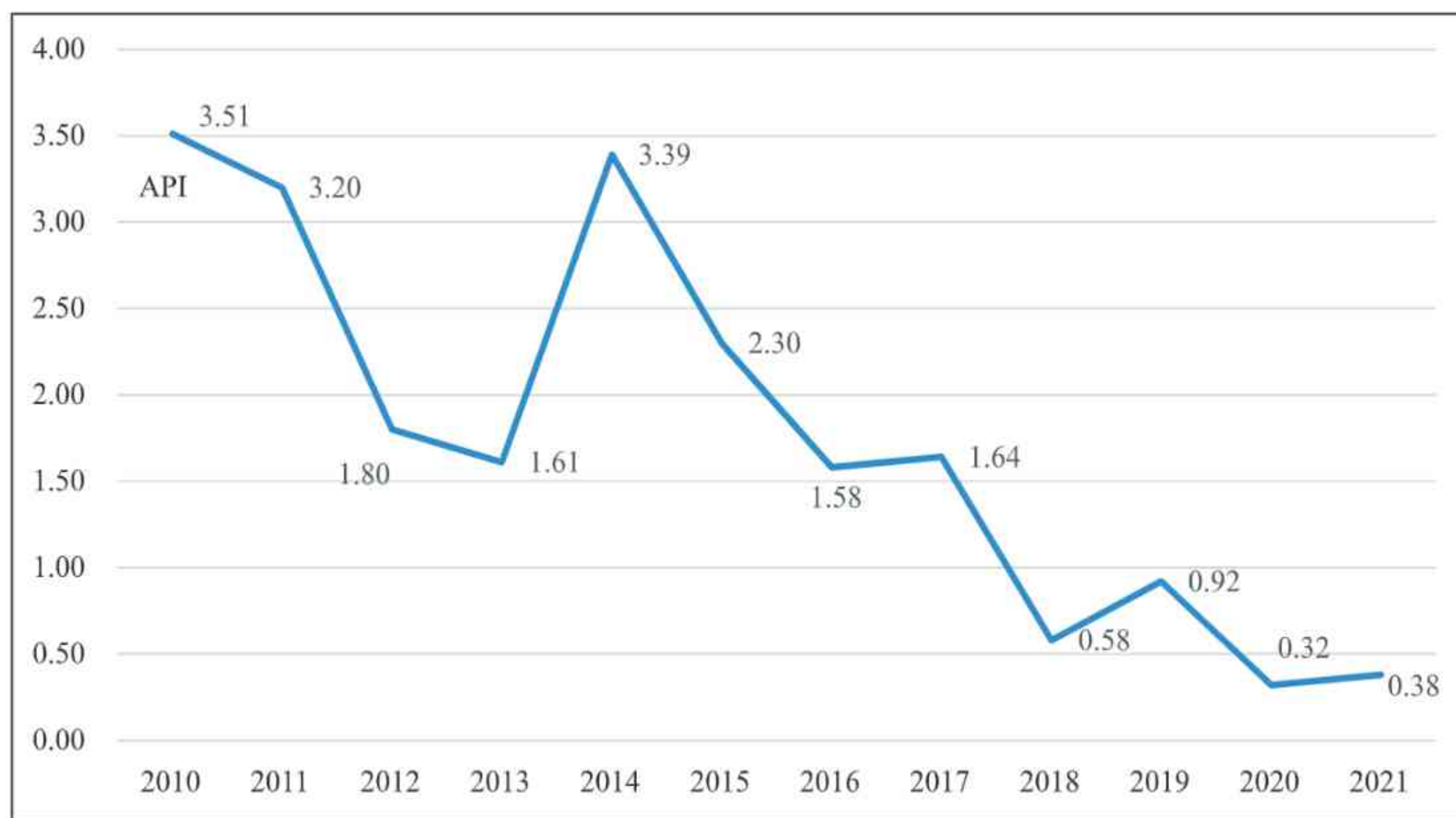
The number of malaria cases reported has steadily declined since 2010 (Table 1).³ There were two peaks in 2014 and 2019, but the general trend has been a steady decline. However, there was a slight increase in 2021, and an even greater increase is expected in 2022, given the trend through the end of June 2022 (Figure 1). This increase may be due to a number of reasons, including service disruption due to the COVID-19 pandemic, early monsoonal showers, and a possible change in migration patterns of the population.

Table 1. Malaria incidence in Bangladesh 2010–2021

Year	Population at risk	<i>P. vivax</i>	<i>P. falciparum</i>	Total cases	Malaria deaths	API (number of cases per 1,000 risk population)
2010	15,922,319	3,824	52,049	55,873	37	3.51
2011	16,172,623	2,580	49,215	51,795	36	3.20
2012	16,428,991	1,699	27,819	29,518	11	1.80
2013	16,691,607	983	25,908	26,891	15	1.61
2014	16,960,664	3,348	54,132	57,480	45	3.39
2015	17,236,360	4,011	35,708	39,719	9	2.30
2016	17,518,901	3,306	24,431	27,737	17	1.58
2017	17,801,442	4,444	24,803	29,247	13	1.64
2018	18,090,830	1,675	8,848	10,523	7	0.58
2019	18,744,803	2,126	15,099	17,225	9	0.92
2020	19,053,728	1,245	4,885	6,130	9	0.32
2021	19,370,244	1,954	5,340	7,294	9	0.38

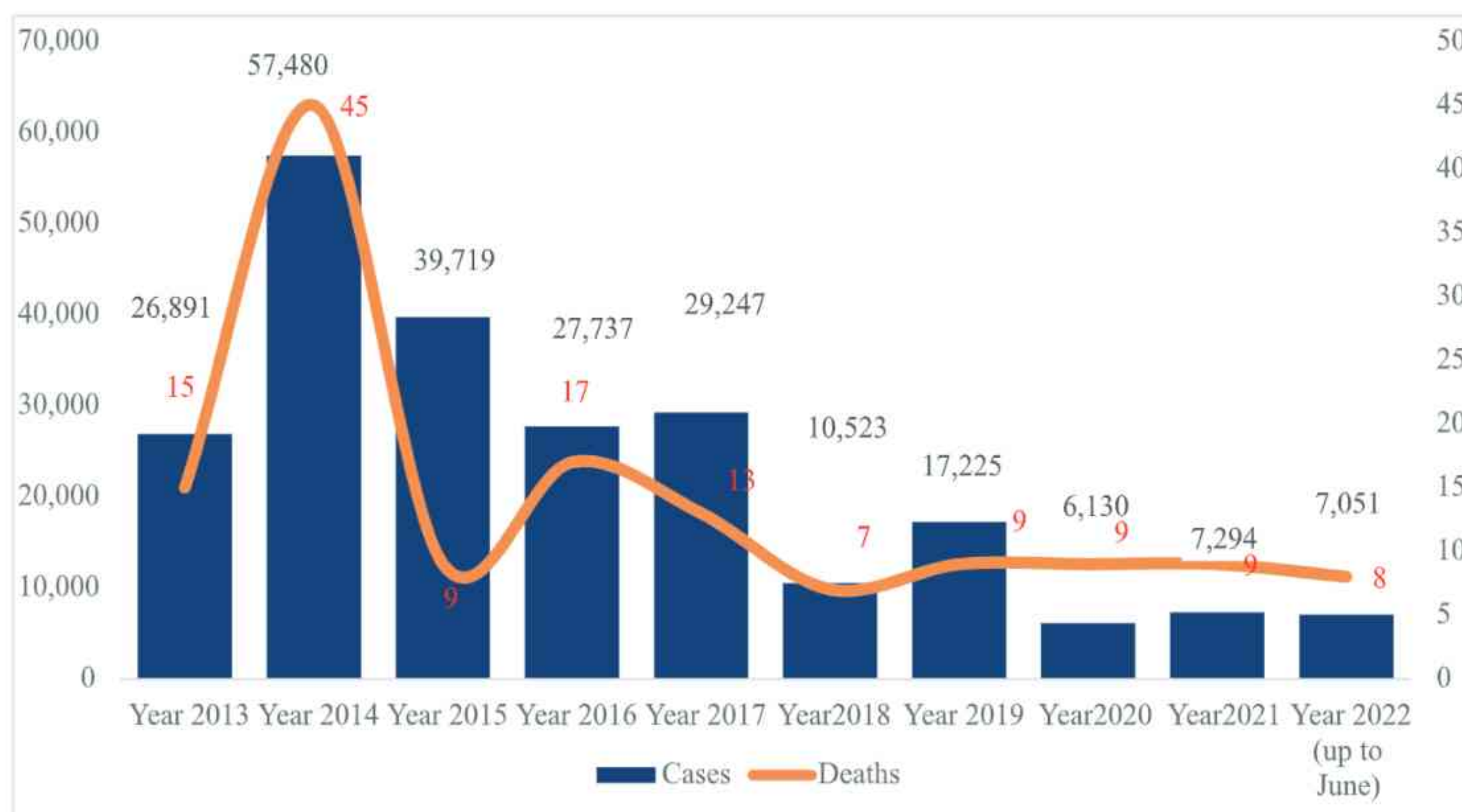
Source: NMEP, CDC, DGHS (2021)

Figure: 1 API trend in Bangladesh for the period 2010-2021



API: cases/1,000 persons at risk

Source: NMEP, CDC, DGHS (2010-2021)

Figure 2. Malaria cases and death in Bangladesh 2013–June 2022

Source: NMEP, CDC, DGHS (2013-2022)

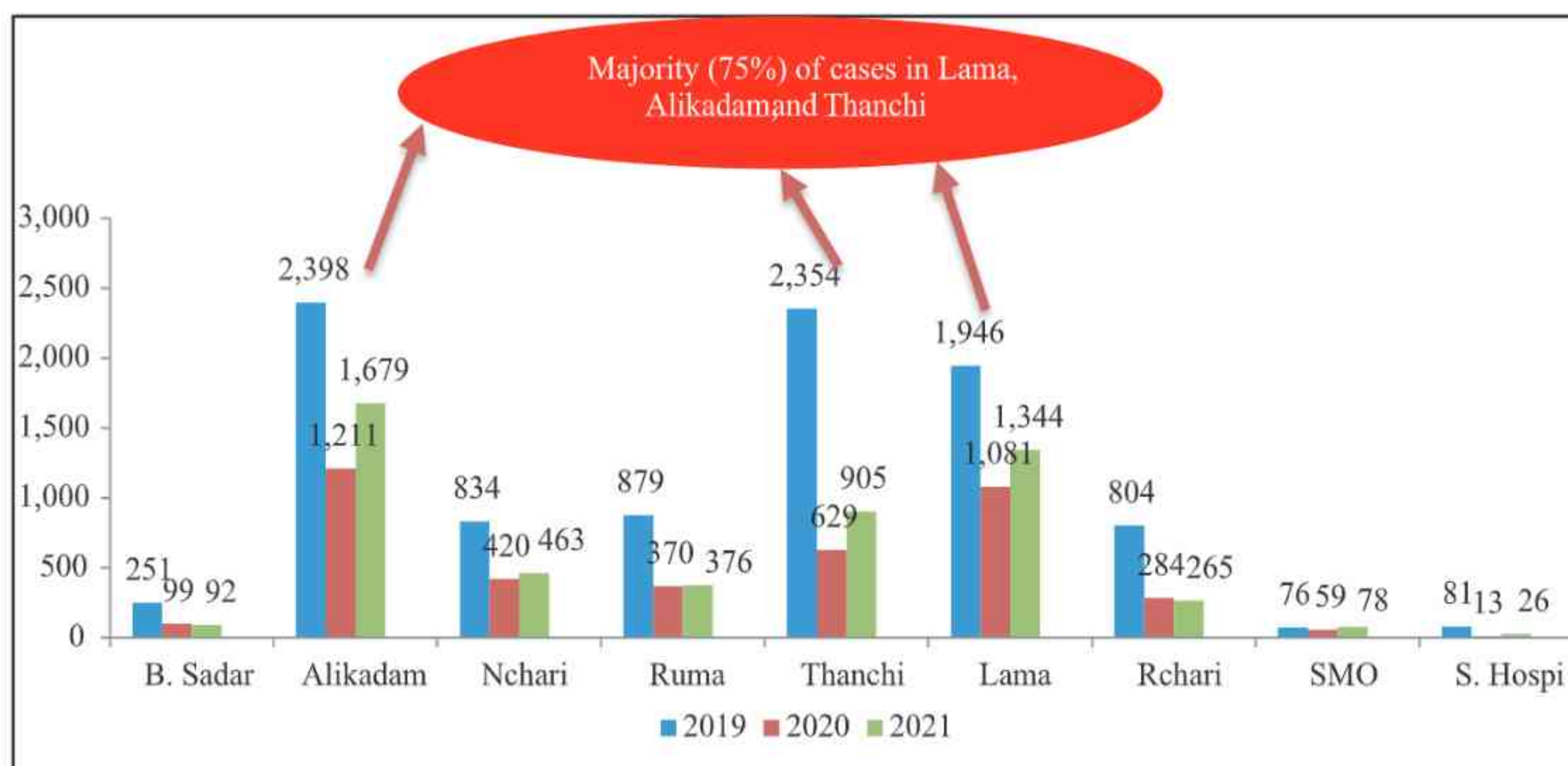
A high differentiation is reflected in the epidemiological situation across the districts in terms of disease incidence and social determinants. In the 13 districts in which malaria transmission occurs, 10 districts are in the elimination phase and 3 districts in the control phase.⁴

The 3 CHT districts have accounted for the highest number of malaria infections since 2010 and accounted for about 93% of the malaria burden in 2021. In the remaining 10 endemic districts accounted for about only 500 cases in 2021.

In the CHT districts, several ethnic groups are found. In Bandarban district, the main groups are the Marma (the highest in number), the Chakma, the Mro/Murong, the Bawm, and the Tripura, among others. Of these, Mro/Murong and Marma communities are lagging behind in terms of accessing education, healthcare, and health facilities. The incidence of malaria is highest among the Mro and the Murmu, although they represent a much smaller a proportion of the population.⁵

Ethnic minority groups tend to be concentrated in remote areas (commonly along borders), where access to healthcare services (both public and private) is relatively limited. All age groups tend to be exposed seasonally to periods of transmission, which can be intense. Adults are usually partially immune, but children and pregnant women are extremely vulnerable.

The majority of the ethnic groups live in the three upazilla of Bandarban district, namely Alikadam, Thanchi, and Lama, which are more prone to malaria transmission. Around 75 percent of the malaria cases in Bandarban district were identified in these high-prevalence upazilla during a survey conducted in 2022 (Figure 3).⁶

Figure 3. Bandarban upazila-wise case distribution: 2019-2021

Source: Report of 2022 field visit

According to the findings of JMM5, the population groups in the endemic districts at risk are as follows:⁷

- Ethnic minority groups and ethnic majority groups, including forest fringe communities, traditional farming communities
- “Jhum” (traditional slash-and-burn) and paddy field farming communities visiting their forest farms (commonly ethnic minority groups)
- Seasonal agricultural workers, particularly those moving between low-endemic plains areas and high-endemic forested foothill areas
- Forest workers in the formal sector (police, border guards, forest/wildlife protection services)
- Forest workers/goers in the informal sector (hunters, people gathering forest products such as precious timber, construction timber, rattan, bamboo)
- Staffs of defense services working in CHT
- Staffs of national and international organizations working in endemic districts
- Cross-border workers
- Tourists in the CHT districts

Epidemiological Transition Strategy

The strategy prioritizes progressive transition of high-burden areas to low burden and low-burden areas to elimination and sustains this by preventing the resurgence of indigenous malaria and maintaining the non-endemic status of the rest of the districts.

Based on the malaria endemicity of the country, malaria elimination is targeted in a phased manner. The NSP for Malaria Elimination 2021–2025 prioritizes the following activities:¹

- Accelerated and sustained reduction of malaria burden in endemic districts (three CHT districts: Bandarban, Khagrachari, and Rangamati). Since the launch of the NSP, Khagrachari district has transitioned to the elimination phase.
- Phased elimination of malaria from remaining 10 endemic districts (currently 11) and maintaining the status
- Determination of the rest of the 51 districts (and a few areas within endemic districts) as non-endemic and maintaining the status.

The targeted phased elimination of malaria is as follows (Figure 4):

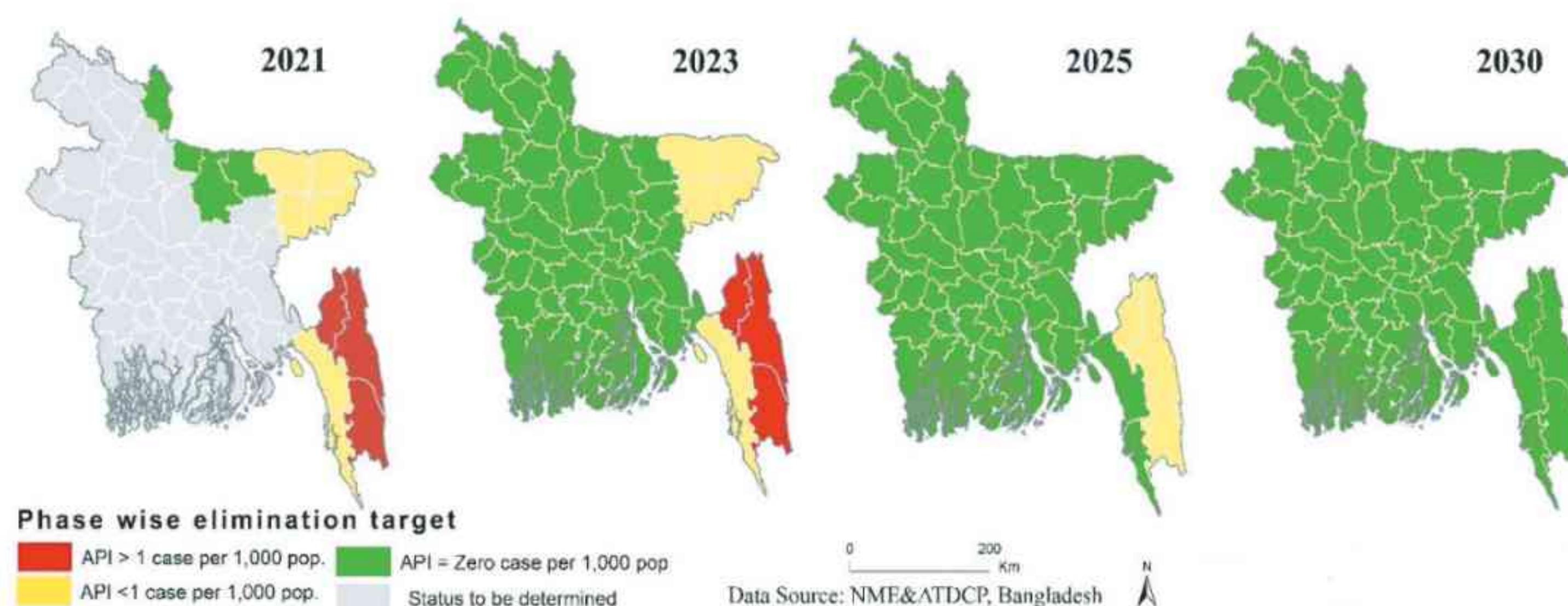
2021 Local transmission interrupted in four districts of Mymensingh zone

2023 Malaria-free status in 51 districts determined

2025 Local transmission interrupted in four districts (Sylhet zone, Chattogram, and Cox's Bazar)

2030 Local transmission interrupted nation-wide

Figure 4. Targeted phased elimination: Milestones and targets



Source: NMEP, 2021

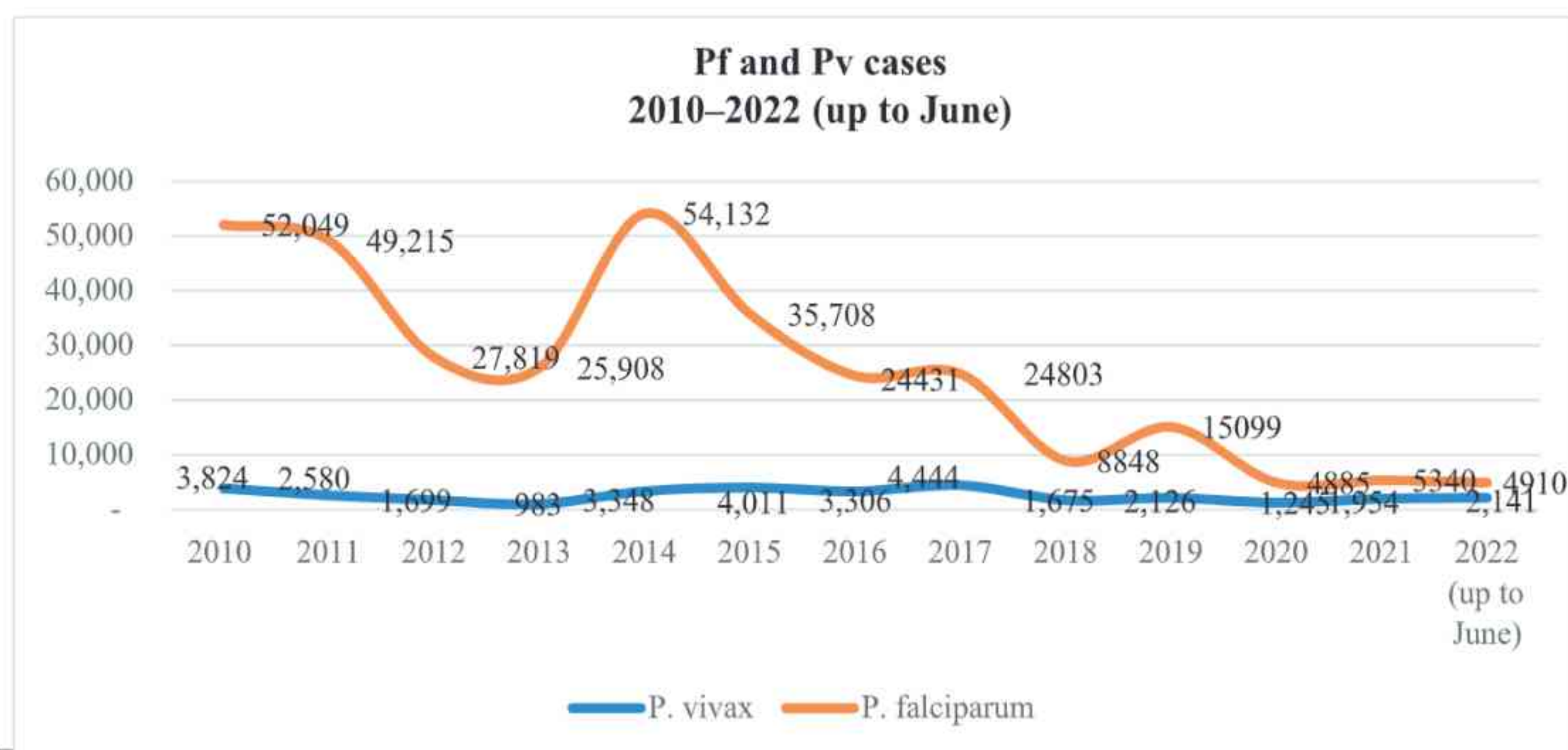
In the 13 districts in which malaria transmission occurs, 10 districts are in the elimination phase, and 3 districts in the control phase. Of these, Khagrachari, could be moving into the elimination phase in 2022. Of the 10 districts in the elimination phase, Chattogram and Cox's Bazar districts border two high-endemic CHT districts and have high imported cases, but because local transmission is limited, they are categorized as districts in the elimination phase. In 2021, the number of cases reported from the other eight districts was either zero or in single digits. They are in alignment of reaching the intended goal of elimination by 2025.

The three high-burden districts remain very much in the control phase, and two of these districts—Bandarban and Rangamati—have seen increases in the last year. This is related to geo-ecological, social, economic, and cultural factors and the weaknesses of health systems. There is a need to think of a specific additional package of measures that can lead to a breakthrough in these areas that is more tailored to the local context. Even within these three districts, Bandarban is the crisis district and is in need of additional measures.

Malarial Parasites

The malaria parasites reported in Bangladesh are *P. falciparum*, *P. vivax*, and mixed infections of these. A research study noted infection with *P. malariae* in 2014 and with *P. ovale* in 2010, but no infections have been subsequently reported. *P. knowlesi* has not been reported in Bangladesh.⁸

The relative proportion of *P. vivax* cases has been increasing, despite the decrease in the number of malaria cases reported. In 2022 (through June), the number of *P. vivax* cases was the highest since 2010, comprising approximately 30 percent of all malaria cases reported in the country. With the increase in *P. vivax* transmission, the reporting of mixed cases (*P. falciparum* and *P. vivax* cases) has also increased.⁸

Figure 5. Malaria cases by species 2010–2021

Source: NMEP, 2022

The seasonality of malaria transmission in the endemic districts shows a rapid rise in June with the onset of monsoonal rains, which peak between June and August. Few cases are seen between February and April. For *P. vivax* malaria, the picture is broadly similar, although relapses might result in a significant number of cases being reported after transmission has decreased from September to December.

Conclusions

This report displays the current strategic, programmatic and operational status of the Malaria National Elimination Program (NMEP) to transition to self-reliance. Data sources have been diverse, so documentary review and primary qualitative data from interviews and journal review were obtained, analyzed, and summarized in this report.

Malaria statistics are confined to 13 endemic districts and this report reflects the epidemiological status of this endemic districts only. Epidemiological surveillance system yet to be implemented in the 51 non-endemic districts. For achieving the elimination status surveillance across the country need to develop.

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The Significance and Positivity of Normal Vaginal Delivery

Faisel AJ

Introduction:

It is a miraculous and deep event that marks the beginning of a new life, and childbirth is the commencement of that life. Normal vaginal delivery (NVD) stands out as a natural and physiological procedure that has been the predominant form of childbirth throughout the entirety of human history. It is one of the many methods that can be used to deliver a baby. The purpose of this case study is to conduct a review that investigates the significance and beauty of normal vaginal delivery. The review will investigate the physiological benefits, emotional aspects, and the role that it plays in fostering the mother-child bond. This review is conducted in response to the increasing number of births that are occurring through cesarean section.

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A report that was issued in 2023 by the National Institute of Population Research and Training (NIPORT)¹ revealed that the percentage of deliveries that were performed via cesarean section had increased from 34% in 2017 to 45% in 2022. When compared to the figures found in government hospitals and birthing centers, these numbers are surprisingly very high in private facilities. According to the same report, the rate was 4% in 2004, rising to 34% in 2017-18 and currently standing at 45%, which is more than 11 times more than it was in 2004. This represents a significant increase over the course of twenty years. Assuming that the WHO benchmark² is between 10% and 15%, the present rate is significantly higher than that. There are lots of life and death issues arises in the field of cesarean sections, where the physicians must simultaneously deal with the lives of the mother and the baby.

There are several potential risks that are associated with cesarean sections. These risks include thromboembolic disease, injury to pelvic organs, incision scar dehiscence in subsequent pregnancies, secondary infertility, complications from anesthesia, infection, placenta previa,

hemorrhage, and an increased risk of uterine rupture in future vaginal deliveries. Nowadays in several cases iatrogenic obstetrical fistulae are found to occur. In addition, it is important to note that the rates of maternal death following cesarean section are much higher in nations with low and intermediate incomes in comparison to other settings.

Normal Vaginal Delivery (NVD) – Case Study of 3 Private Clinics:

We are aware of a limited number of natural vaginal deliveries (NVDs) in Bangladesh nowadays, but there is a greater prevalence of cesarean sections (C-sections). I selected two clinics at random from the total of 134 clinics in the Surjer Hashi Network (SHN)³, as

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as well as one clinic run MedGlobal⁴, an international NGO. This clinic is located at the furthest point from Cox's Bazar airport and caters to a significant number of internally displaced Bangladeshi individuals. This review encompasses 809 normal vaginal births that occurred during the past 6 months (June – November 2023) across these three clinics. The two SHN clinic facilities are situated at Ramu, Cox's Bazar, and Tata Para, of Narshingdi Sadar. The SHN clinics are called 'advance clinics' which means they have all the arrangements for performing C-Sections. In these two clinics there had been 487 NVDs in comparison to only 62 C-Sections.

Reasons for having the NVDs:

In reviewing the NVD cases long interviews were conducted with the clinic providers. They mentioned that the preference for vaginal deliveries are influenced by cultural attitudes on childbirth, pregnant women health, and labor and delivery procedures that have been practiced traditionally. There is a significant cultural and religious support among the community that supports the practice of natural childbirth. The social leaders and guardians have a great deal of influence, and the traditional maternal health care services available to them are their first choice. They believe that these services should be the same as those provided by their predecessors. When it comes to conventional deliveries, a significant proportion of them still opt to avoid any

operative procedure. In addition, rural guardians continue to discourage their daughters and pregnant women from traveling to hospitals for birth and that is why still about 48% deliveries are happening at home as NVDs. Regardless of the religions the support for NVDs is universal, this occurs with any religion in the community including the ethnic groups.

One of the providers mentioned that for many women, the experience of giving birth naturally is empowering and enriching. The sense of accomplishment and connection with the ancient rhythm of womanhood can foster a deep sense of pride and self-worth. The mother often feels an immediate bond with her newborn, having actively participated in the birthing process. The bondage further deepens when the delivering mother can immediately puts her baby to her breasts for suckling.

Having NVDs there is a great role of the field workers. In addition to going door to door to see ANC mothers and following up monthly with women who are getting close to their EDD, community health workers (CHWs) also hold awareness sessions in the community (located in the mothers' club) and always discusses the benefits of NVDs. During the ANC checkup, the clinics carry out all of the necessary investigations, including a physical examination and a check of vital signs. Additionally, with practically all ANC mothers, the clinics become familiar with them. Enough counseling, timely follow-up (both over the phone and in the community through CHW), and creating a pleasant atmosphere in the clinic are only some of the elements that encourage pregnant women to choose non-operative methods of delivery of the babies.

In reviewing the 807 NVD cases³ it was found as narrated by the providers that they should be aware of a referral site where any case facing any problem during the delivery can be sent to those centers for having a safe conclusion of the problematic deliveries. Only about 2% cases were referred to the referral centers. The problems for which the pregnant women were referred included delayed/obstructed labour, unrepairable perineal tear or episiotomy, and postpartum hemorrhage.

Lastly it was very clear that the providers (doctors, nurses, midwives, and paramedics) in these 3 clinics were properly trained to handle normal vaginal deliveries. In two of the three clinics there were midwives which was an additional support available in the clinics. The providers were available on a rotation basis round the clock.

Addressing Concerns:

In recent years, common people, government, and

clinicians have all voiced their concern regarding the rise in the number of deliveries that are performed via Cesarean section and the potential adverse effects that this trend may have on the health of both mothers and newborns.

Very recently, the HC bench of Justice Naima Haider and Justice Kazi Zinnat Hoque delivered a verdict on 12th October 2023⁵. This verdict elevates the issue to a formal judgment, per Article 111 of the Bangladesh Constitution to follow a policy to be developed by MOHFW.

Accordingly, the Health Ministry proposed a policy under the title "Bangladesh National Guidelines and Technical Standards and Operating Procedure for Promotion of Normal Vaginal Delivery (NVD), Prevention of Unnecessary Cesarean Section, Creating Awareness about Necessity and Justification of Cesarean Section".

The verdict was made against a writ (Public Interest Litigation/PIL) petition (No. 7117/2019) was filed by the Bangladesh Legal Aid and Services Trust (BLAST) back in 2019. The petition was urging the High Court to intervene. The prayer wanted directives to stop practicing un-necessary C-sections in private hospitals and clinics and all other places where surgeries are being done.

This groundbreaking decision states women's right to sexual and reproductive health protection. The verdict is accompanied with a four-pager direction providing a comprehensive national strategic guideline to address.

However, there are no clear indications in the policy to strictly follow the Robson classification⁶ for all women coming for delivering their babies. In 2015, the World Health Organization (WHO) officially endorsed a classification system that distinguishes itself from existing systems by encompassing all women who experience childbirth, rather than solely focusing on those who undergo cesarean section. This is known as the Robson classification, alternatively referred to as the 10-groups classification or ten groups classification system (TGCS). It is a widely utilized technique employed to categorize pregnant woman who endure the process of birthing into possible 10 groups which are very easy to use. This Robson classification easily helps the providers to confidently decide in allowing the pregnant women to go for NVD, at least give a trial for vaginal delivery.

Conclusion:

It is now abundantly clear that to increase the number of vaginal deliveries, the work must begin at the community

level. This may be accomplished by educating all women in the community about the various aspects of vaginal deliveries. At the facilities, the physicians and all providers at all levels should make sure that all women, especially pregnant women, receive the appropriate counseling and that they are informed about the differences between vaginal deliveries and cesarean sections. The drawbacks of C-sections need to be articulated in a clear and concise manner.

Individuals should be encouraged to have normal deliveries at any health institution, and the authorities in charge of healthcare in the government should endeavor to ensure that the facilities for cesarean sections are utilized in an appropriate manner. Furthermore, the government and professional organizations ought to work together to develop a national guideline for the utilization of ordinary vaginal deliveries in addition to cesarean sections. This guideline ought to be based on the physiological state of both the woman and the fetus, and it ought to be formulated according to the Robson categorization. This would therefore uphold the implementation of the High Court ruling, which would make it possible for all women who are in need to have access to C-sections that are both required and lifesaving, and it would also put an end to the occurrence of C-sections that are not necessary.

Furthermore, it is imperative that all institutions, whether they are run by the government or the private sector, require the providers who work with pregnant women to undergo the appropriate training requirements particularly counseling.

The facilities that are responsible for the handling of regular deliveries ought to be supported by a referral center, and the referral process should be made as streamlined as is humanly possible.

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