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INFORMATION TO AUTHORS

Focus

Chattagram International Medical College (CIMC) established on 2013 is one of the famous and reputed Medical College among the Private Medical Colleges in Bangladesh as reflected by the performances of students in examinations of Chittagong Medical University. A very good number of academicians and researchers are performing in this institute.

Chattagram International Medical College commenced to publish a peer reviewed scientific Journal from 1st January 2016 which is recognized by BMDC and having International Standard Serial Number (ISSN) 2520-484X. The journal publishes article of authors from any part of the globe, but has a special interest in publishing research articles of authors from Bangladesh and of relevance to developing countries. It publishes Editorial, Original (Research) articles, Special articles, Review articles, Short Communications, Case report and letters on new findings of Medical Science.

Chattagram International Medical College journal is published in english, biannually eg. January and July with prior approval of Editorial board.

Appropriate measures has been taken to make the journal indexed / abstracted in major international indexing systems including the PubMed/MEDLINE, Index Medicus, Google Scholar, DOAJ, Hinari and Scopus etc. The theme of Chattagram International Medical College Journal is

"Excellence Through Peer Review"

Submission of Manuscript

Manuscript (Papers) are submitted to the Editor-In-Chief or authorised persons at any time. Papers accepted for publication are subjected to peer review and editorial revision. With full title (Title should be concise and informative) two copies of papers (Along with CD) accompanied by a covering letter signed by Principal and Co-authors including name, academic degrees, designation, the departmental and institutional affiliation. Complete address, Cell number including Email address of Corresponding author should be mentioned. Not more than 7 (Seven) authors will be accepted for all manuscripts.

Manuscript should be typed in English (Font size and style : 12, Times New Roman) on one side of white bond paper of A4 size with margins of at least 2.5 cm, using double space throughout.

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3 (Three) to 10 (Ten) key words may be provided below the abstract using terms from the medical subject heading (Index Medicus, NLM, USA).

Types of Manuscripts

Editorial : Its a invited article. Based on current affairs of Medical Science with any disciplines. Maxium length of the editorial may be with in 1000 words and number of references maxium in 10 (Ten).

Original Article : A research, observational and experimental article should be devided into the following sections with headings :

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Its a medical based text of any disciplines. Maximum length of the Special article / Short Communication may be with in 2500 words (Excluding abstract, table, figure and references). The total number of reference should not be less than 10 (Ten).

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Review article should not generally exceed 3500 words, including illustrations and the number of references should not be more than 30 (Thirty).

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- Conclusion
- Disclosure

Maximum length of the text may be with in 1500 words (Excluding abstract and references). The total number of reference should not be less than 10 (Ten).

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Letter should be brief and to the point with in 500-600 words only.

It is noted that standard abbreviations should be used whenever. The full form for which the abbreviations stands followed by the abbreviation in parenthesis should precede the use of the abbreviation in the text except for standard ones like 45^oc, 35mg/L etc in all types of text.

References

Regarding references please follow the Vancouver style (Uniform requirements for manuscripts submitted to biomedical journals prepared by the International Committee of Medical Journal Editors (ICMJE guideline <http://www.icmje.org>).

Reference citations in the text should be numbered in arabic numerals at the end of the sentence eg ^{1,2} consecutively in order in which they are mentioned in the text.

Book references should have the name of the authors, chapter title, editors, Book name, the edition, place of publication, the publisher, the year and the relevant pages.

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Book reference : Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. In : Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York, USA : McGraw Hill. 2002; 6:93-113.

Journal reference : Halpern SD, Ubel PA, Caplan AL. Solid organ transplantation in HIV infected patients. N EngL J Med. 2012; 34(4) : 284-287.

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Declaration

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Competing Interests

Chattagram International Medical College Journal requires authors to declare any competing financial or other interest in relation to their work. Where an author gives no competing interests, the listing will read the author (s) declare that they have no competing interests.

Future Generation Research

Md Tipu Sultan^{1*}

Research is, 'an investigation that is intentionally designed to help develop or contribute to knowledge'. When a medical purpose is added to 'research', the general definition stays the same, but the goal becomes more specific. Ultimately, the goal shifts to a focus on increasing medical knowledge, improving patient care, developing new medicines or procedures and enhancing the already existing medicines and procedures.¹

Every treatment, intervention, medication, way of care, and aftercare in the medical field or health care system came from discoveries. This high quality of care we can experience today was not discovered overnight, but rather through years of effort by medical professionals who investigated the risk factors, causes, preventions, and treatments of diseases. This type of investigation is known as medical research.

There are several forms of medical research being conducted today. Among these three common forms are :-

- i) Basic or Laboratory-based Research
- ii) Clinical Trials
- iii) Epidemiological Research

Medical research has led to many medical breakthroughs and developments. It would also strongly contribute to shaping the future of medicine.

Future trials would be based on Artificial Intelligence (AI) machine learning and deep neural networks to improve drug discovery, interpretation of images, streamlining electronic medical record data and improving trial workflow and adapted to recent advances in immunology, precision medicine, and immunology. Technological advances in the field of biology and translational research have led to a new era of therapeutic modalities. Most of these approaches are designed and developed in academic institutes.

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Future generation or next generation is also termed as Generation Z or iGeneration. Generation Z is the generation of people born between 1997 and 2010. It is defined as the first generation to be born into a world with the Internet, smart devices and apps. They are also more likely to be highly educated and include many participants in medical professions.²

They are the first generation to have always had the Internet, social networking and technology. Generation Z consists of active problem solvers and independent learners.^{3,4} Based on the above profile of Generation Z, educators who will teach this future graduate of medical education should consider current use of technology, communication and feedback, educational methods and wellness. Research experience is key for medical students. It gives them a chance to expand their knowledge and skills in the medical sector. Through research, they can comprehend various medical concepts and boost up medical knowledge. Moreover, it helps to develop critical thinking, problem-solving and analytical abilities, which are vital for their future career.

Besides personal advantages, research experience adds to the overall development of healthcare in Bangladesh. By fostering a culture of research among medical students, there is greater potential for creative solutions to arise and tackle healthcare challenges that are special to the country. This collective effort between academia and healthcare practitioners leads to improved health outcomes for patients.

Our future generation is our present students. The development of the next generation of scientists, physicians, and health care professionals is an important focus. It is important to contemplate potential changes in thinking. To develop and grow our healthcare and research workforce from future generation, different events should be arranged which can be influential and motivate students to choose career paths in research. Research experience is significant in shaping the career path of medical students. It strengthens their academic profile. Furthermore, publications from research work can fortify their credibility as professionals within the medical field. Research and publications play a vital role in the academic and professional

journey of medical students. By actively engaging in research, students can expand their knowledge, contribute to the medical field and enhance their future career prospects.

There are many limitations for research activities in our country. Inadequate availability of improved technology, insufficient well-equipped laboratory facilities, financial constraints are important among them. There is still, a lot of facilities available for research work. We should motivate our students to take these opportunities and engage them in research work.

Research Opportunities for Medical Students

- Scholars have entry to various research awards that can uphold their research projects.
- Medical student publications assist the dispersal of novel discoveries and improvements in the field.
- Many research aid is accessible, containing guidance from competent researchers and access to well-equipped laboratories and amenities.

It is essential for Medical students to proactively seek out research experiences and make use of the resources accessible to them. By interacting in research projects, they not only upgrade their academic profiles but also help to the overall advancement of healthcare techniques.

Medical Student Publications and Their Significance

Medical student publications are incredibly important. They give students a platform to share their research and add to the current medical knowledge. Medical students have access to research and publication opportunities. Writing academic pieces and engaging with publications helps students to think critically and gain an understanding of medical research procedures.

By publishing their work in esteemed journals or conferences, students make a contribution to the field of medicine and motivate other students and professionals to explore these areas.

Research Grants for Medical Students

Research grants for Medical students present great chances to get involved in research and publications. These grants permit students to study various aspects of medicine, add to existing knowledge, and improve their academic and professional profiles. With the support of research grants, Medical students can search into topics linked to healthcare. They can also work together with experienced researchers and gain practical experience in the research process.

There are a lot of benefits of engaging in research as a Medical student. Firstly, it helps to develop critical thinking skills and apply theoretical knowledge to real-life scenarios. Through research, students can better comprehend medical concepts and help progress medical science. Additionally, research grants allow students to collaborate with famous researchers and healthcare professionals, forming mentorship and knowledge transfer.

Furthermore, research grants inspire students to look into different medical fields and contribute to solving healthcare issues in Bangladesh. By conducting research, medical students can bring forth evidence-based knowledge that can help in improving healthcare policies, treatment strategies, and patient outcomes.

Career Advancement through Research for Medical Students

Research is key for Medical students to progress in their careers. It broadens knowledge, strengthens thinking skills and helps medicine progress. To maximize the benefits of research, Medical students must search for research opportunities provided by Universities, Bangladesh Medical Research Council, Directorate General of Medical Education, Ministry of Health and Family Welfare and different research institutes. Participating in research projects will give them practical experience, improve their resumes, and build professional networks. By actively seeking research opportunities, they can boost their resumes and make a difference in healthcare and patient care.

Research Support

Research support brings great chances for Medical students. They can access multiple research and publication opportunities to actively join different research projects. They can get resources and instruction from experienced faculties who give specialist direction and mentorship. Also, students can collaborate with other researchers and medical professionals, creating a collaborative environment that endorses knowledge sharing and exploration. Besides, various research conferences, seminars, and workshops are organized to offer platforms for students to present their findings and enhance their communication and presentation skills.

To make the most of the research support, Medical students should take an active part in research activities. By engaging in research projects and publications, students can broaden their knowledge, contribute to medical advancements, and establish themselves as professionals in the field.

Clinical research improves our lives. It leads to significant discoveries, improves health care and ensures that patients receive the best care possible. It is what makes the development of new medicines and treatments possible, without it we would not be able to move forward in the development of medicine.

Medical students have plentiful research and publication opportunities. They can join various research projects and submit findings for publication. Sources for research include medical journals and conferences. This platform allows students to contribute to medicine and gain recognition.

Participating in research projects can boost Medical student's knowledge and skills. Conducting research also let them explore their areas of interest in the medical field and potentially make groundbreaking discoveries. Furthermore, the research and publication opportunities offer a platform for networking and collaboration.

Students can collaborate with experienced professionals and researchers, which may open doors for future career opportunities. Actively participating in research projects lets students form connections in the medical community and build a network of mentors and colleagues who can help them professionally.

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Study of Anthropometric Parameters between Type 2 Diabetic and Non-Diabetic Population of Chattogram, Bangladesh

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Mohammad Monir Hossain⁵ Urmila Chowdhury⁶ Nabila Nasima Moin⁷

Abstract

Background: Overweight or obesity, characterized by excessive fat accumulation, poses a significant threat to the physical and psychological well-being of adults globally. This study introduces a recent screening index utilizing Skinfold Thickness (SFT) Mid Upper Arm Circumference (MUAC) and mid forearm circumference (MFAC) to assess overweight or obesity in the adult population. The primary aim is to evaluate anthropometric measurements in two distinct groups—individuals with diabetes and those without—in order to measure the health risks prevalent in the adult population. Focusing on the specific context of Chattogram, this research not only enhances our comprehension of health risks but also yields valuable insights for tailored interventions and health promotion strategies.

Materials and methods: This cross-sectional analytical study was carried out from March 2019 to March 2020 in the Department of Anatomy, Chittagong Medical College, Chattogram, upon one hundred Type 2 diabetic patients and hundred non-diabetic persons. Anthropometric measurements were taken by using various equipments. All required parameters such as skinfold thickness,

mid arm and mid forearm circumference were recorded in a predesigned case-record form. Measurements were expressed as range, mean and standard deviation. Unpaired student's t test was used to compare them between two groups. Data were analyzed by SPSS (Version 26.0). Finally, the results were presented by using table and figure and p values were found significant if they were less than 0.05 at the 95% level of confidence.

Results: Type 2 diabetic patients were having significantly thicker abdominal ($p < 0.001$) and triceps skin fold ($p < 0.001$). They were having significantly greater mid upper arm ($p < 0.001$) and mid forearm circumference ($p = 0.035$).

Conclusion: According to the findings of the current study, anthropometric measurements between those with Type 2 diabetes and those who do not have the disease significantly differ.

Key words: Anthropometry; Mid Upper Arm Circumference (MUAC); Mid Forearm Circumference (MFAC); Skin Fold Thickness (SFT); Type 2 diabetic patients.

Introduction

Diabetes Mellitus (DM) a chronic cardio metabolic disease associated to obesity and overweight circumstances, affects a considerable proportion of the world's population.¹ Diabetic complications account for 10% of all medical costs globally and affect over 460 million people between the ages of 20 and 79. The majority of people with diabetes (90–95%) have Type 2 Diabetes Mellitus (T2DM) which has been on the rise for several decades. Premature death is two to three times more likely in people with T2DM.² According to WHO estimates, the number of persons with diabetes will have climbed 114% from 2000 to 2030, with Asia experiencing the highest growth in the disease.^{3,4} The highly prevalent diabetes is increasing at an alarming rate. Type 2 diabetes mellitus and prediabetic condition like metabolic syndrome are commonly associated with obesity and body fat.⁵ Obesity and specifically central adiposity, is a significant public health issue and a significant predictor of CVD and T2DM risk.^{6,7,8,9}

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Additionally, it is linked to a substantial rate of morbidity and death that is widespread throughout the world.^{9,10} The number of diabetic patients worldwide has rapidly climbed from 108 million to 422 million in the previous 30 years.¹ In recent years, obesity has intensified into a global epidemic that affects both developed and developing nations. In the present era, lack of exercise and an imbalanced diet increase adipose tissue energy stores, which pave the way for a number of ailments.^{11,12}

The non-invasive, cost-effective, portable anthropometry technique is used to determine the dimensions, forms and makeup of the human body. Anthropometric data, however, might allow for a cross-sectional analysis of the relationship between obesity and the risk of developing diabetes.¹³ Identifying the best anthropometric index in any population is essential to predict chronic disease risk factor and to facilitate enhanced screening for disease risk factors.¹⁴ In affluent nations, where over two-thirds of people with T2DM are obese, obesity is a major risk factor for developing diabetes. They have a high prevalence of abdominal obesity and truncal fat, are insulin resistant and are anticipated to have the biggest percent increase in T2DM prevalence of any ethnic group.¹⁵

Obesity is defined by the WHO as an excess of body fat and BMI is a straightforward instrument to use in routine clinical examinations to assess it. However, BMI does not distinguish between fat and lean mass. As a result, the obesity diagnosis obtained by it is not always related to body fat percentage, which is linked to CVD or metabolic abnormalities. Skinfold thickness, which is one of the suggested benchmarks for excess body fat percentage, is still being examined in relation to key cardiometabolic risk factors such as T2DM. Excess body fat percentage based on skinfold thickness would show a stronger correlation with T2DM and hypertension (HT) than usual anthropometric markers.¹⁶

Skinfold measuring is a simple, affordable and practical method of determining body composition. Equations can be established based on the measurements of more precise laboratory techniques to evaluate the thickness of skinfolds in various places in order to determine body fat ratio. Skinfold assessment includes measures of the thickness of skinfolds in various areas on the body. The sum of the thicknesses of the skinfolds is utilized as an indirect body fat measurement.¹⁷ Abdominal adiposity is a risk factor for obesity-related problems and there is growing evidence that abdominal adiposity may be a contributing

factor to complications not related to adiposity at the waist.^{18,19} Skin Fold Thickness (SFT) assessments have revealed a reasonably significant association with increased body fat percentage and related morbidity in both children and adolescents, however other consider these factors to be of limited clinical utility.²⁰ In the evaluation of body composition, skinfold thickness was measured using a skinfold caliper at the indicated anatomical locations.²¹ Despite the fact that Body Mass Index (BMI) is the most often used measure of obesity, it has limitations in terms of capturing body frame size, relative leg length, and fat free mass. Furthermore, it is determined by two separate measurements: height and weight. Mid Arm Circumference (MAC) is less impacted by localized accumulations of excess fluid and height than BMI, relies on a single measurement and is appropriate for clinical practice. There are numerous research on the use of MAC to screen for obesity in children when patients cannot be conveniently weighed or measured, but literature on the use of Mid Upper Arm Circumference (MUAC) as a screening tool for adult obesity is limited.²²

MUAC affords consistent clinical benefits by being rapid, portable, and inexpensive, simple and noninvasive, and can be measured without difficulty and administered on the majority of disabled patients.²³ The current study's goal is to compare skinfold thickness, mid arm circumference and mid forearm circumference across Type 2 diabetic and non-diabetic groups in order to find the best useful screening method for identifying patients at high risk for Type 2 diabetes mellitus for use in clinical practice and public health.

Materials and methods

This cross-sectional analytical study was conducted from March 2019 to March 2020 in the Department of Anatomy, Chittagong Medical College and Department of Endocrinology, Chittagong Medical College Hospital, Chattogram. After acquiring approval from the ethical review committee of Chittagong Medical College 100 Type 2 diabetic patients (Diabetic for at least last five years but without severe co-morbidity) and 100 non-diabetic persons (Random blood glucose < 7.8 mmol/l or 140mg/dl at the time of enrolment) aged ≥30 years were selected by convenient sampling. Pregnant female and persons on medication other than oral hypoglycemic drug were excluded from the study. Several pieces of equipment were used to take anthropometric measurements. Following the guidelines of the World Health Organization, the anthropometric measurements were carried out by

qualified staff under standardized settings. The subjects stood erect with feet together, shoulders relaxed and the arms hanging freely at the sides. The observer stood in front of the participant. The fold between the navel and the anterior superior iliac spine, i.e., closer to the navel was lifted and grasped gently with thumb. Then jaws of the calipers were placed at the marked level, perpendicular to the length of the fold, and the skin fold thickness was measured.²⁴

To measure the triceps skin fold the point on the posterior surface of the right upper arm was located in the same area as the marked midpoint for the upper arm circumference. A fold of skin and subcutaneous adipose tissue was grasped gently with thumb and fingers approximately 2.0 cm above the marked level with the skinfold parallel to the long axis of the arm. The jaws of the calipers were placed at the marked level, perpendicular to the length of the fold, and the skinfold thickness was measured. The measuring tape was placed around the upper arm at the previous marked point perpendicular to the long axis of the upper arm. The tape rests on the skin surface, but was not pulled tight enough to compress the skin for measuring Mid Arm Circumference (MAC). For measurement of Mid Forearm Circumference (MFAC) locate the olecranon process and styloid process (The prominent bone of the wrist) and marked the mid-point by using pen. Then measuring tape was placed around the arm at the mid-point line of forearm.^{24,25} All measurements such as abdominal & triceps skinfold thickness (using Holtain skin fold caliper) MAC and MFAC (Using measuring tape) were recorded in a pre-designed case-record form. All subjects included in the study were informed and explained about the study and written permission was taken.

Data were analyzed by SPSS (Version 26.0). Measurements were presented as range, mean \pm SD and compared by unpaired student's t test. Finally, the results were presented by using table and p value was considered significant if it was < 0.05 at 95% level of confidence.

Results

As mentioned in methods, total two hundred non-diabetic (Control) and Type 2 diabetic (Case) people were enrolled in the study. The participant's age ranged from ≥ 30 years. Anthropometric measurements were taken using direct physical procedure. The range, mean values and standard deviations were calculated for the anthropometric measurements.

Table I Skin fold thickness measurements in Type 2 diabetic patients and non-diabetic people (n=200)

Variables	Type 2 diabetic (n=100)		Non-diabetic (n=100)		p value
	Range	Mean \pm SD	Range	Mean \pm SD	
Abdominal skin fold thickness (mm)	25.65–33.45	29.74 \pm 1.93	18.05–27.35	23.31 \pm 2.67	<0.001
Triceps skin fold thickness (mm)	13.35–22.45	17.57 \pm 2.24	10–41.10	15.14 \pm 5.02	<0.001

(p <0.001 = Very highly significant).

Table I shows that the mean abdominal skin fold thickness and triceps skin fold thickness of Type 2 diabetic patients were comparatively greater than those of non-diabetic people, and the differences were very highly significant (p<0.001).

Table II Arm circumference measurements in Type 2 diabetic patients and non-diabetic people (n=200)

Variables	Type 2 diabetic (n=100)		Non-diabetic (n=100)		p value
	Range	Mean \pm SD	Range	Mean \pm SD	
Mid upper arm circumference (cm)	23–30	25.96 \pm 2.07	18–28	23.78 \pm 2.319	<0.001
Mid forearm circumference (cm)	16.85–26.20	20.96 \pm 2.30	12.10–25.10	20.24 \pm 2.504	0.035

(p <0.05 = Significant, p <0.001 = Very highly significant)

Regarding mid upper arm circumference, Type 2 diabetic patients were having significantly more mid upper arm circumference than non-diabetic subjects (p<0.001). The mean mid forearm circumference of Type 2 diabetic patients was greater than that of non-diabetic persons; the difference was significant (p=0.035) (Table II).

Discussion

Different anthropometric cut-off values for various ethnic groups and populations make comparisons often difficult and limit the generalizability of result.²⁶ So, tribal people were excluded in our study to make the comparison easier. A variety of anthropometric indices have been used as a proxy for total fat or abdominal fat to assess risk for diseases, particularly CVD and diabetes. In the present study, in non-diabetic persons mean \pm SD abdominal skin fold thickness was 23.31 \pm 2.67 (Range: 18.05–27.35) mm and in Type 2 diabetic patients mean \pm SD abdominal skinfold thickness was 29.74 \pm 1.930 (Range: 25.65–33.45) mm. This difference in abdominal skin fold thickness was statistically very highly significant (p<0.001) between the study groups. Study conducted by

Devulapally et al. reported that mean \pm SEM ASF (mm) was 25.580 ± 0.321 in control group and 28.460 ± 0.535 in diabetic patients group ($p < 0.001$).²⁷ Study shows that, in non-diabetic persons mean \pm SD triceps skinfold thickness was 15.14 ± 5.02 (Range: 10–41.10) mm and in Type 2 diabetic patients mean \pm SD triceps skinfold thickness was 17.57 ± 2.24 (Range: 13.35–22.45) mm. This difference in triceps skin fold thickness was statistically very highly significant ($p < 0.001$) between the study groups. Marcadenti et al. found that, mean \pm SEM TSF (mm) 9.860 ± 0.234 in control group and 9.540 ± 0.162 in diabetic patients ($p = 0.264$).²⁸ In the study non-diabetic persons mean \pm SD mid upper arm circumference was 23.78 ± 2.32 (Range: 18–28) cm and in Type 2 diabetic patients mean \pm SD mid upper arm circumference was 25.96 ± 2.07 (Range: 23–30) cm. This difference in mid upper arm circumference was statistically very highly significant ($p < 0.001$) between the study groups. In the study of Ting et al. the Mid Upper Arm Circumference (MUAC) in right hand was 29.8 ± 3.8 in control group and in Type 2 diabetic patients, 31.0 ± 4.0 ($p < 0.0001$). Mid upper arm circumference in left hand was 30.2 ± 4.0 in control group and 31.3 ± 4.2 in Type 2 diabetic patients ($p < 0.0001$).²⁹ In the study of Devulapally et al. mean \pm SEM MAC (cm) 26.900 ± 0.170 was in control group and 28.600 ± 0.221 in diabetic people ($p < 0.001$).²⁷ Present study shows in non-diabetic persons mean \pm SD mid forearm circumference was 20.24 ± 2.50 (Range: 12.10–25.10) cm and in Type 2 diabetic patients mean \pm SD mid forearm circumference was 20.96 ± 2.30 (Range: 16.85–26.20) cm. This difference in mid forearm circumference was statistically significant ($p = 0.035$) between the study groups. In the study Ting et al. the mid forearm circumference in right hand was 24.2 ± 2.5 in control group and in Type 2 diabetic patients, 24.9 ± 2.7 ($p < 0.0001$). In left hand, mid forearm circumference was 24.4 ± 2.8 in control group and 24.9 ± 2.8 in Type 2 diabetic patients ($p < 0.0001$).²⁹ Another study done by Devulapally et al. reported mean \pm SEM MFAC (cm) was 25.480 ± 0.138 in control group and 26.260 ± 0.136 in Type 2 diabetic patients ($p < 0.001$).²⁷

Limitations

It's conceivable that the population of Bangladesh is not accurately represented by the current study because of the extremely small sample size and the usage of only Chattogram.

Conclusion

The findings of this study indicates that skinfold thickness, MUAC, and MFAC can be utilized as an

alternative index to assess obesity because of their strong correlation to BMI. Given their strong association with BMI, these measurements offer a dependable means to identify individuals who may be at an elevated risk of developing cardiovascular diseases or diabetes. This screening approach holds significant potential for raising awareness not only within the population of Chattogram but also on a broader scale in Bangladesh. Utilizing these measurements enables the effective early recognition of health risks, facilitating timely intervention and the promotion of preventive measures. The proactive screening strategy is pivotal in cultivating a health-conscious community, leading to improved public health outcomes and a more informed population in Bangladesh, thereby contributing to the global effort against the obesity epidemic.

Recommendation

In order to enhance the sample size and acquire more reliable results, consideration should be made to a multicenter, nationwide survey that covers the nation's indigenous population. Future studies may carry out more extensive anthropometry utilizing computerized non-contact methods including laser scanning, stereo-photogrammetry, ultrasound, infrared imaging, computed tomography, and MRI in order to increase the reliability.

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Disclosure

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Prevalence of Negative Appendectomy in Children in a Tertiary Care Hospital

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Mohamed Hasan Meah³ Ummay Honey⁴

Abstract

Background: Appendectomy is commonly performed for acute appendicitis to prevent its grave complication such as perforation, lump, abscess and sepsis. Clinical diagnosis of acute appendicitis is quite challenging in children where there is a chance of negative appendectomies. Removing a normal appendix on histopathological background is known as Negative Appendectomy (NA). This study aimed to determine the prevalence of negative appendectomy in pediatric surgery in our hospital.

Materials and methods: It was a prospective study of 45 cases aged 5 to 18 years of children, clinically diagnosed as acute appendicitis selected over a period of six months (Jan 2023 to June 2023) from Pediatric Surgical Ward of Chattagram International Medical College Hospital. All the demographic and clinic-pathological data were noted and statistical analysis was conducted on the obtained data.

Results: 45 children underwent appendectomy with clinical diagnosis of presumed or suspected acute appendicitis where 60% boys and 40% girls. The peak age was 11-15 years. The rate of pathologically diagnosed (positive) appendicitis was 90.74% (41/45) and the negative appendectomy (NA) rate was 11.11% girls and 7.40% boys, with mean NA rate was 8.89%.

Conclusion: Intraoperative diagnosis in suspected appendicitis is unreliable so routine histopathological examination should carry on for definitive diagnosis as well for other incidental findings.

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Key words: Acute Appendicitis; Appendectomy; Histopathology; Negative appendectomy.

Introduction

Appendectomy for acute appendicitis is one of the most commonly performed surgical procedure in children.¹ Various etiologies for acute appendicitis have been identified, but luminal obstruction is considered the most critical factor, as it triggers the inflammatory process.² Lymphoid hyperplasia and fecoliths are the most common causes of luminal obstruction and other unusual causes like mucocele, intestinal parasites, endometriosis, granulomatous diseases (Tuberculosis) appendiceal malignancies (Carcinoid tumor).³ The diagnosis of appendicitis is mainly clinical and appendectomy is the treatment of choice.⁴ Delayed diagnosis of appendicitis and its negative outcome like perforation, peritonitis, abscess, sepsis and prolonged hospitalization.^{5,6} However, these clinical features are also closely related to the other abdominal conditions, which may lead to an unnecessary appendectomies.^{7,8} The term 'Negative Appendectomy' (NA) is used for an operation done for suspected appendicitis, in which the appendix is found to be normal on histological evaluation.⁴ The aim of this study is to evaluate the incidence of negative appendectomies in children.

Materials and methods

After Institutional Review Board (IRB) approval, we conducted a prospective observational study in the Department of Pediatric Surgery at Chattagram International Medical College (CIMC) from Jan 2023 to June 2023.

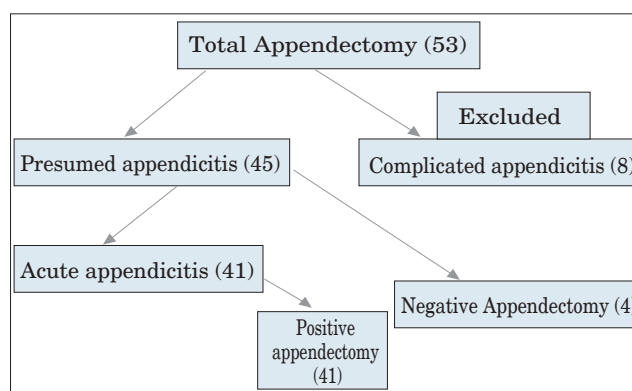


Figure 1 Inclusion criteria for study

This study included 45 children aged between 5 years to 18 years through convenient and purposive sampling, who were admitted with clinical diagnosis of acute appendicitis and underwent emergency appendectomy. The proper written informed consent was taken from each patient's guardian before operation. On naked eye examination all the complicated appendicitis cases excluded from this study, only suspicious types of appendix were sent to Pathology Department of CIMCH for histopathological diagnosis. Data regarding demography, medical history, laboratory report, USG report, intraoperative findings and histopathology findings were recorded in a pre-designed semi-structured questionnaire. Data were checked, coded manually and then entered into computer. To see the association between two categorical variables Chi-squared test and Fisher's Exact test were done. Statistical significance level was at 0.05 probability level. Statistical analysis was done by using SPSS version 25.

Results

Total 53 children underwent appendectomy where 45 were presumed Acute Appendicitis (AA) and 8 were complicated appendicitis. Patients with complicated (perforated) appendicitis were excluded from this study. Out of 45 children 27 (60%) were male and 18 (40%) were female. The age of the patients ranged from 5 to 18 years with a median of 11 years. Distribution of patients according to the age and sex group is summarized in Table I.

Table I Age and sex distribution who underwent appendectomy (n=45)

Gender	Age (Year)	Appendectomy	Percentage (%)
Male (27)	5-10	10	37.03
	11-15	15	55.55
	16-18	2	7.40
	Total		60%
Female (18)	5-10	7	38.89
	11-15	10	55.55
	16-18	1	5.55
	Total		40%

All children who underwent appendectomies the common presentation was abdominal pain where 31 (68.89%) reported migratory right iliac fossa (RIF) pain, then vomiting 37 (67.68%), nausea 29 (57.92%), anorexia 21 (59.45%), fever 20 (58.23%), tender RIF 36 (66.46%), Rebound tenderness 34 (64.02%), constipation 11 (24.69%) (Table II).

Table II Correlation of clinical feature of presumed appendicitis (n=45)

Variable	PA (%)	NA (%)
Abdominal pain	41(100)	4(100)
Vomiting	35(85.36)	2(50)
Fever	17(41.46)	3(75)
RIF pain	29(70.73)	2(50)
Periumbilical pain	9(21.95)	1(25)
Epigastric pain	2(4.88)	1(25)
Tender RIF	34(82.92)	3(75)
Rebound tenderness	32(78.05)	2(50)
Nausea	27(65.85)	2(50)
Anorexia	18(43.90)	3(75)
Diarrhea	2(4.88)	00
Constipation	10(24.39)	1(25)

On USG of whole abdomen most of the children 28 (62.22%) were diagnosed as acute appendicitis and 11 (24.44%) were Enlarge Mesenteric Lymph Node (EMLN) followed by others (Table III).

Table III USG findings of the presumed appendicitis (n=45)

Findings	Frequency	Percentage (%)
Acute appendicitis	28	62.22
Enlarged mesenteric lymph node (EMLN)	11	24.44
Small amount of collection in RIF	1	2.22
Loaded bowel loops	3	6.67
Cystitis with gaseous bowel loops	1	2.22
EMLN with polycystic ovaries	1	2.22

The histopathological characteristics of 45 specimen of appendix are summarized in Figure 2, among them 34 (75.0%) were marked infiltration of neutrophils within lumen and upto muscularis mucosa (Acute appendicitis), 7 (15.55%) were features of acute appendicitis with faecolith with in the lumen and 4 (8.89%) were showed no pathology except congested wall of appendix. Therefore, Negative Appendectomy (NA) rate in our study was calculated to be 8.89 %.

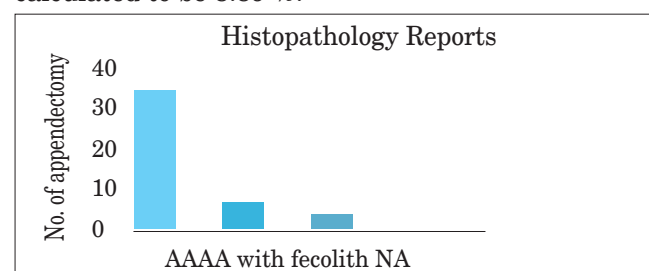


Figure 2 Histopathological findings in appendectomy specimen

Table IV shows that, in Negative Appendectomy (NA) 11.11% were female and 7.40% were male. The result showed that there was no statistical difference between Negative Appendectomy (NA) and Positive Appendectomy (PA) as the p-value was >0.05.

Table IV Distribution of Negative Appendectomy (NA) and Positive Appendectomy (PA) in different gender

Gender	PA	NA	p value
Male	25 (92.59%)	2 (7.40%)	
Female	16 (88.89%)	2 (11.11%)	1.74
Total	41 (91.11%)	4 (8.88%)	

Discussion

In this study, majority of children were male i.e. total of 27 (60%) presenting with the complaints of suspected appendicitis. Rabindranath D et al. Sharma S et al. Chawda HK et al. showed that 58.7%, 68.2% and 60.95% male respectively.^{9,10,11}

In our study, age incidence of appendicitis was higher in 11-15 (55.55%) years of age group. David G. et al. reported that, the peak incidence at 10-14 years in males and at 15-19 years in female.¹² Upadhyaya p et al. reported that the highest frequency was in the second decade (33.51%) followed by the third decade (28.93%).¹³

In our study, the primary clinical features i.e. abdominal pain, followed by vomiting, nausea, anorexia, fever, tender RIF were almost same in both positive and negative appendectomy patients. David G. et al. reported that the classic sign and symptoms are not feasible distinguish between two groups.¹²

USG is noninvasive and rapidly performed tools that usually used to augment the diagnosis of acute appendicitis. Pedram A et al. was found that positive and negative predictive values of USG in acute appendicitis were 77% and 46%, respectively. In our study the positive predictive value was 66.22%.¹⁴

In our study 34 (75.55%) were acute appendicitis, 7 (15.55%) were acute appendicitis with fecoliths and 4 (8.88%) were normal appendix and there was not any unexpected pathological findings. So negative appendectomy rate in our study is 8.89%. Oyewole B et al. and Wagner et al. was found the rate of NA 15.5% and 7.65% respectively.^{15,16} In developed countries negative appendectomy rate was 15-30% and suggested acceptable rate of negative appendectomy is 20%.^{6,17}

Conclusion

The rates of negative appendectomy in acute appendicitis in our study was within the acceptable range. A surgeon should gather more clinical knowledge to diagnose acute abdomen as appendicitis to reduce the rate of negative appendectomy. Histopathological examination of the resected appendix should continue to find out the actual causes of appendicitis.

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Disclosure

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Health Care Seeking Behavior during Antenatal Period among Pregnant Women Attending at Gynecology and Obstetric OPD in a Tertiary Level Hospital

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Abstract

Background: Antenatal Care is an important determinant of maternal mortality ratio. The aim of the study was to find out the health seeking behavior during antenatal Period at Gynecology and Obstetrics OPD in Chattagram International Medical College Hospital.

Materials and methods: This was a descriptive type of cross-sectional study in which 110 married women of reproductive age group (15-49 years) were interviewed. Study period was June 2022 to September 2022.

Results: Majority of the respondents (35.56%) were in 23-27 years (48 respondents) age group. Most of them belonged to lower middle Socio-Economic Status (SES) (71.89%). Around half of them (42.96%) were from joint family with 5-6 family members. Maximum respondents were HSC Passed (34.82%). However, around 3% were illiterate. The barriers explored for Antenatal Care (ANC) were, improper knowledge about ANC (15.56%), not access to ANC clinic (9.63%), illiteracy (3%), transport, choice of home as delivery place (2%) negative attitudes towards health care provider (10.37%) etc. The study revealed that majority of the respondents (84.44%) had basic knowledge about ANC. Among them 53% took their ANC service in all three trimester of pregnancy. About 90.37% of the respondents had ANC service available at their community. About 80% preferred hospital delivery and 62.24% of respondents had no problem for male doctor compliance. Half of the respondents 53% had completed the 5 doses TT vaccination.

Conclusion: The study emphasized on the health seeking behavior of ANC, which can be achieved by multi- sector approach to give the nation a healthy mother and a healthy baby.

Key words: Antenatal Care (ANC); Antenatal visit; Pregnancy; Trimester.

Introduction

The maternal mortality ratio is widely used to assess the quality of obstetric care in different countries and regions. Over the last decade, the maternal mortality ratio has dropped significantly in Bangladesh, from per hundred thousand in 1991, to 21.7 per hundred thousand. In Bangladesh, Many people are in a vulnerable situation in terms of health care facilities. The situation is worse for women when it comes to their health care seeking behaviors and the services they receive during pregnancy and after childbirth. Health care seeking behavior is not an isolated event, rather, it is an integral part of a woman's status in her family and community. It is a result of an evolving mix of her personal, familial, social, religious, and economic factors. The process of seeking health care can be too complicated to be describe in a straightforward term. A woman's decision to seek a particular health care service is the composite result of her personal needs, social forces, the availability and qualifications of the care providers, and the location of the services.¹ Although significant development has been achieve in the area of maternal care over the past several years, the situation deserves further attention and action for improvement. Women are increasingly using antenatal care and maternal mortality has evidently decreased. However, many women still face one or more life threatening complications during pregnancy. Only one in three women seeks treatment from a qualified provider. Poor nutrition, inadequate health care and large number of closely spaced pregnancies give the women high maternal mortality. Malnutrition is another common feature among the women in rural Bangladesh. Dietary practices are important

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indicators of pregnant women's care seeking behaviors for safe motherhood.² Although most of the women have awareness of dietary requirements, half of the women in the survey report unchanged or reduced food intake during pregnancy. A very low rate of utilization of health-care services results in maternal morbidity, mortality and other complications.³ Education level is the most important determinant for utilization of antenatal care, choice of place of delivery, and types of assistance at delivery. Complications, such as maternal morbidity caused by the place of delivery. Most of the deliveries take place at either woman husband's house or at the parents' house. These deliveries are often assisted by untrained birth attendants or by elderly relatives.⁴ Delay in seeking care is another crucial factor in women's maternal health.⁵ Delay in accessing obstetric care facilities is highly related to maternal mortality in rural areas of Bangladesh.⁶ Additionally, formulation of policies and their successful implementation have always been a challenge for both government and non-government organizations. One of the problems in this regard is a lack of correspondence between people's notions of care seeking behavior and the definitions used in maternal health programs.⁷ The importance of safe motherhood to the overall development of a country has already been acknowledge at the highest levels.⁸ Without improving women's health care seeking behavior regarding safe motherhood, the overall development of the country will hindered. This study, therefore, aims to find out the health seeking practice of pregnant women attending in the Outpatient Department (OPD) of Chattagram International Medical College Hospital. Based on the findings of the study, the report also provides some recommendations, which can be crucial to policy formulation and implementation to ensure proper health care in pregnant women of Bangladesh.

Materials and methods

A descriptive type of cross-sectional study was conducted with a sample size 110 from 1st June 2022 to 28th September 2022 in Gynecology & Obstetrics OPD at Chattagram International Medical College Hospital (CIMCH). All pregnant women attending the OPD in CIMCH were taking in consideration. Non-probability purposive type of sampling technique was followed. Inclusion criteria were pregnant mother willing to participate and Exclusion criteria i) Those, who are not willing to participate in the study ii) Suffering from mental disorders used. A Pretested, semi-structured questionnaire was used as research instrument.

The questionnaire was prepared in both Bangla and English language, but only the Bangla questionnaire used for data collection. For face-to-face interviews, verbal consent taken from the respondent after introductory conversations and the aims of the study were explained. They were informed in detail about the necessity and importance of data collection. The students stated their purpose and assured each person interviewed that the information collected would remain confidential and nothing would be disclosed anywhere rather than for study purposes. It would not harm their secrecy and privacy. Participation was voluntary and anonymous, respondents were informed that they could withdraw from the survey at any time. All collected data were scrutinized with the help of calculator and computer. For descriptive statistics means, standard deviations and range for numerical data and frequency was calculated, presented by table, bar and pie diagram.

Results

Table I Information related to ANC and birth spacing

ANC received during last pregnancy ☐	Frequency ☐	Percentage (%)
Yes ☐	67 ☐	60.90
No ☐	43 ☐	39.10
Number of ANC visits		
1 visit ☐	15 ☐	22.40
2 visits ☐	35 ☐	52.20
3 visits ☐	10 ☐	15.00
4 visits ☐	07 ☐	10.40
Place of receiving ANC		
CIMCH ☐	42 ☐	62.73
Other Places ☐	25 ☐	37.27
Knowledge on spacing of child birth		
Yes ☐	80 ☐	72.73
No ☐	30 ☐	27.2

Table I shows 60.90% respondents receive ANC visit during their last pregnancy, 52.20% respondents receives minimum 2 visits, most of them (62.73%) have their ANC visits at CIMCH and 72.73% have knowledge on spacing of child birth.

Table II Information related to medical and surgical problems during pregnancy

Awareness about complication of pregnancy	Frequency	Percentage	n=110
Yes	72	65.50%	
No	38	34.50%	
Source of getting information about complication of pregnancy			n=72
Health complex	11	14.81%	
Health worker	31	42.96%	
Media	20	27.41%	
Self	10	14%	
Medical disease during pregnancy			n=110
Yes	15	13.64%	
No	95	86.36%	
Medical Care received			n=15
Yes	5	30.90%	
No	10	69.10%	
Received post-surgical care			n=110
Yes	14	12.73%	
No	96	87.27%	
Place of receiving post-surgical care			n=14
Hospital	14	100%	
Home	0	0	

Table II shows awareness about complication of pregnancy was 65.50% about (42.96%) got information about complication of pregnancy from health worker followed by from health complex (14.81%) Media (27.41%) self (14%). 15 respondents (13.64%) suffered from medical diseases and among them 30.90% received medical care. 14(12.73%) received surgical care among them all (100%) received surgical care from hospital.

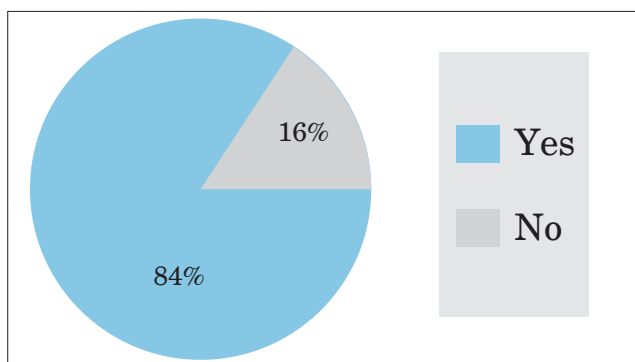


Figure 1 Distribution of respondents according to their knowledge about antenatal care

The pie chart shows that, Majority (84%) of the respondents has idea about antenatal care but 16% doesn't have much idea about it.

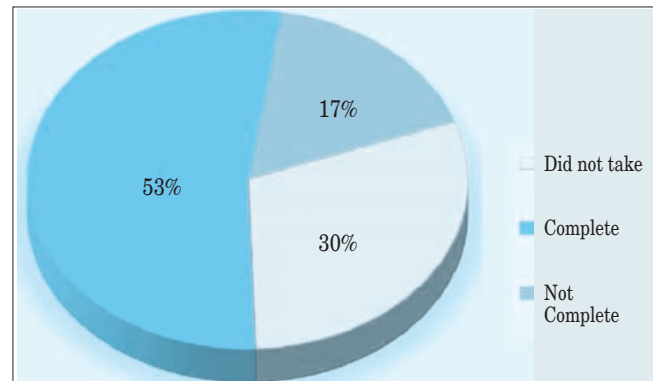


Figure 2 Distribution of respondents with their TT vaccination status

From the pie chart, it revealed that 53% respondents completed their TT vaccination, 17% did not complete and 30% did not take TT vaccination.

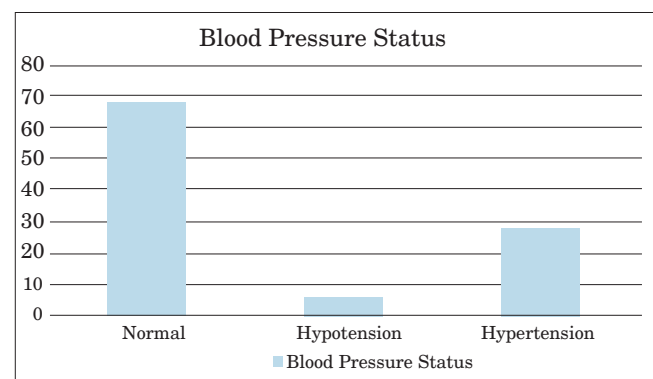


Figure 3 Bar Diagram showing distribution of respondents according to their blood pressure status

The bar chart shows that about 68.15% of the respondent's blood pressure status is normal, 26.67% of the respondent has hypertension and 5.18% had hypotension.

Discussion

Maternal mortality is the outcome of a complex web of causal factors that include social, economic, educational, political and cultural causes as well as issues such as gender inequity, state of physical infrastructure, geographic terrain and the health system.

Evidence from parts of India and elsewhere demonstrates that it is possible to substantially reduce maternal mortality by addressing health factors alone to ensure that all women have access to safe delivery services. Age of a woman during pregnancy plays a very vital role in determining the health of both mother and the child. In our study about 35.56% of women were in 23-27 years' age group which is an ideal age for pregnancy.

Our study also revealed that only (34.82%) of respondents completed Higher Secondary level of education followed by (27.40%) completed Secondary level education, Graduate (13.33%), 2.96% of them were illiterate. Which was not similar to another study where (47.5%) were illiterate, 29% were at the level of primary education, (21%) received secondary education and only (2.5%) had HSC and highest education level.⁹ About (90.37%) received ANC during last pregnancy and (9.63%) did not receive, which was not similar to another study where about (60.90%) women used to go for antenatal Care for their baby's good health and safe delivery during their last pregnancy.¹⁰ Among the respondents (32.79%) were received ANC from CIMCH and (67.21%) of respondents received ANC form other places.

Majority (73.60%) of the respondents had visited ANC Clinic more than 4 times which was similar to another study where Antenatal checkup had done more than 4 times to 78% of the respondents by any health service provider.¹¹ Among them, doctor conducted ANC service to majority (67%) of the respondents which is also similar to our study and it was (69%).

Almost (53%) of the respondents had completed their TT vaccination, (17%) didn't complete and 30% didn't take any dose of TT vaccine yet; which is similar to another study which revealed that 56.3% had received two or more doses of Tetanus toxoid and 26.0% of mothers had taken at least one TT dose vaccination.¹²

About 61.60% of respondents had last delivery at Upazila Health Complex (UHC) and 6.40% of respondents had delivered at the home. It was found that 65.50% of respondents aware about complications of pregnancy whereas 34.50% of the respondents did not aware of it which is similar to another study in Mirsarai.¹³ It showed that about (69.30%) of the women know the complication. About (42.96%) got information about complication of pregnancy from health worker followed by from health complex (14.81%), Media (27.41%), self (14%). Mass media plays a strong role by creating awareness about complication that may occur during maternal delivery and improve the future health of mother and newborn babies.

Limitation

- Single Centre non-government hospital based study with small sample size

Conclusion

Our study findings reveal that maximum pregnant women received antenatal care in all 3 trimesters but few percentages received government recommended four visits. Majority of women preferred in hospital as their delivery place. However, a small portion were unaware about complications of pregnancy. Therefore, awareness program related to complication of pregnancy must be satisfactory level to reduce maternal morbidity and mortality in pregnant women of Bangladesh.

Recommendation

- Proper counselling should be need for encouraging mother to take primary health care services.

Disclosure

All the authors declared no conflicts of interest.

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Respiratory Bacterial Co-infection in Patients with Pulmonary Tuberculosis in Chattogram, Bangladesh

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Abstract

Background: Bangladesh, a lower middle-income country of about 16 million individuals in southeast Asia, endures a high burden of both Pulmonary Tuberculosis (PTB) and other lower respiratory infections. This study aimed to investigate the clinical characteristics and outcome confirmed PTB cases with and without respiratory bacterial co-infection.

Materials and methods: This prospective observational study was conducted in Chittagong Medical College Hospital and Faujderhat Chest Disease Hospital, Chattogram. One hundred and eight patients with confirmed PTB were recruited. Their sputum was subjected to gram staining and culture. Patients were treated per National TB guidelines and followed up on the 30th day. Mortality rate and laboratory parameters were noted 30 days after diagnosis.

Results: Of the 108 patients studied, 75.9% were male, and the overall median age was 50 (IQR:30-60) years. On sputum testing, 25.9% of patients had bacterial co-infection. Clinical characteristics (Presenting symptoms, signs and laboratory findings)

were significantly severe in patients with bacterial co-infection compared to their counterparts at enrollment and 30-day follow-up and 77.8% of patients with bacterial co-infection survived till 30 days, compared with 89% without co-infection ($p=0.194$). Among those with bacterial growth on sputum culture, Gram negative bacilli (*Klebsiella* and *Pseudomonas* spp.) were the most commonly isolated.

Conclusion: Bacterial co-infection is common and contributes to increased severity of confirmed PTB cases.

Key words: Bacteria; Co-infections; Pulmonary tuberculosis; 30-days mortality.

Introduction

Tuberculosis (TB) remains a major public health issue in Bangladesh. Bangladesh ranks fifth regarding incidence in South East Asia Region and first among the 20 major TB and Multi Drug Resistant (MDR)/TB burden countries globally.^{1,2} Death toll of TB is high and TB is the fifth major cause of death in the Bangladeshi general population.³ Goal 3 of the United Nations Sustainable Development Goals (SDG) aims for ending the TB epidemic by 2030. Though National Tuberculosis Program has made remarkable progress to provide diagnosis, treatment and other supports to TB patients, controlling of the disease is still a major impediment in Bangladesh.⁴

One of the factors related to mortality from TB is associated Lower Respiratory Tract Infection (LRTI). Co-infection with TB and bacteria is not a commonly reported entity. A few studies have demonstrated a high prevalence of bacterial co-infection among PTB patients in HIV-endemic counties in Africa.⁵⁻⁷ Recently, similar bacterial co-infection among PTB patients have been reported from low HIV prevalence countries.⁸⁻¹⁰

Co-infection among PTB may leads to delayed diagnosis and inadequate treatment. Detection of one infection usually masks the diagnosis of the other. Increasing the availability of resources for microbiologic diagnostics for PTB and bacterial pneumonia is critical to ensure appropriate

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administration of antimicrobial agents in this era of expanding antimicrobial resistance among mycobacterial and bacterial pathogens. Nevertheless, little information is available on this co-infection in Bangladesh. Differentiating TB from other LRTIs such as bacterial pneumonia is an important clinical challenge in our settings and inability to differentiate TB from other LRTIs may result in poorer health outcomes.¹⁰ An improved understanding of the impact of co-infections on PTB could assist in TB control strategies, TB treatment approaches and TB diagnostics. Considering this background, we conducted this study to determine the prevalence and etiologies of respiratory bacterial co-infection in patients with PTB and to observe their short-term outcomes compared to those without co-infection.

Materials and methods

A prospective observational study was conducted in Chittagong Medical College Hospital and Faujderhat Chest Disease Hospital, Chattogram, Bangladesh from October 2019 to September 2020. The study protocol was approved by the Ethical Review Committee of Chittagong Medical College (Memo No.: CMC/PG/2019/582, Date:22/10/2019). Informed written consent was obtained from each eligible subject after a full explanation of the outcome and purpose of the study.

Patient with confirmed PTB presented within 14 days of Anti-TB treatment age > 18 were included in this study. Patients with confirmed multi-drug resistant TB were excluded. Confirmed PTB was defined as the patient with sputum for AFB / Gene Xpert positive.

Demographic profiles (Age, sex) history (smoking habits, H/O TB and TB contact), clinical characteristics and usage of antibiotics were obtained from medical records. A history of previous anti-TB treatment was determined according to the registration card. The chest radiographs were reviewed. Diagnostic testing was performed in a bacterial microbiology laboratory. For bacterial testing sputum specimens were evaluated first by Gram stain and acceptable samples were cultured onto sheep blood, chocolate, and MacConkey agars; bacteria were subsequently identified by standard laboratory procedures.

PTB-Respiratory bacterial co-infection was considered in patient positive for sputum AFB/Gene Xpert and sputum Gram stain and culture growing a potentially pathogenic (Non-mycobacterial) bacterial organism within 14 days of Anti-TB treatment.¹¹ Short term outcome

parameters were 30 days mortality or survival, improvement of clinical parameters (CBC with ESR, CRP, and resolution of CXR shadow).

Data were analyzed using SPSS version-23.0. Continuous variables were statistically described in terms of mean and Standard Deviations (\pm SD) or median (Interquartile range). Means were compared using Student's t-test and median by Mann Whitney U test. Categorical variables were described as frequencies and proportions. Proportions were compared using chi-square or Fisher's exact test whichever was applicable. Statistical significance was defined as $p \leq 0.05$.

Results

One hundred and eight patients were enrolled during the study period. Out of them, sputum samples of 28 patients revealed bacterial co-infection and in other 80 samples no bacterial co-infection was detected. Of the 28 isolates, 50% were *Klebsiella pneumoniae*, 21.4% were *Pseudomonas aeruginosa*, 17.9% were *Staphylococcus aureus* and 10.7% were *Escherichia coli*. Overall, Gram-negative bacilli (*Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*) accounted for 82.1% of the isolates

Overall the median age was 50 years (IQR: 30-60) years and ranging between 18 to 82 years. There was male predominance with a male to female ratio of 3.15:1. Table I shows that, patients with bacterial co-infection was significantly older compared to the patients without co-infection ($p < 0.001$). This history of TB was significantly more in patients with bacterial co-infections compared to their counterpart. Symptoms except cough were more prevalent in the patients with bacterial co-infection compared to the patients without. However, shortness of breath, hemoptysis and weight loss were found to be significantly higher and regarding other symptoms the differences failed to reach statistical significance (Table I).

Table I Sociodemographic characteristics of the PTB patients with or without bacterial co-infection

Variables \square	PTB with \square co-infection (n=28)	PTB without \square co-infection (n=80)	p value
Age (Years) \square	65 (60-67) \square	40 (27-55) \square	<0.001 [†]
Sex			
Male \square	23 (82.1) \square	59 (73.8) \square	0.371 [*]
Female \square	5 (17.9) \square	21 (26.2) \square	
Residence			
Rural \square	18 (64.3) \square	41 (51.3) \square	0.233 [*]
Urban \square	10 (35.7) \square	39 (48.8) \square	
Ex or current \square	18 (64.3) \square	40 (50.0) \square	0.192 [*]

Variables	PTB with co-infection (n=28)	PTB without co-infection (n=80)	p value
Any co-morbidity	11 (39.3)	13 (16.3)	0.012*
Diabetes mellitus	5 (17.9)	8 (10.0)	0.271*
COPD	6 (21.4)	7 (8.8)	0.076*
Previous TB history	18 (64.3)	26 (32.5)	0.003*
On Anti-bacterials	17 (60.7)	24 (30.0)	0.004*
Shortness of breath	26 (92.9)	29 (36.3)	<0.001*
Cough	28 (100)	80 (100)	NA
Hemoptysis	17 (60.7)	13 (16.3)	<0.001*
Chest pain	7 (25.0)	7 (8.8)	0.028*
Weight loss	18 (64.3)	43 (53.8)	0.012*
Fever	28 (100)	78 (97.5)	1.000 [‡]

Data were expressed as Median (Interquartile range) or Frequency (%) as appropriate. COPD: Chronic Obstructive Pulmonary Disease, †Mann Whitney U test, *Chi-square test. ‡Fisher's exact test, NA: Not Applicable.

PTB patients with bacterial co-infection presented a lower hemoglobin and higher ESR and CRP than PTB patients without bacterial co-infection (Table II). All of the PTB patients with bacterial co-infection have some pathology in their X-ray, whereas 15% of the patients without bacterial co-infection had normal baseline chest X-ray. Most common findings in the patients with bacterial co-infection were cavitory lesions (35.7%) and Infiltrate and/or consolidation. On the other hand among the patients without bacterial co-infection, infiltrate with or without consolidation was the most common finding (72.5%).

Table II Baseline hematological, biochemical, and radiological characteristics of the PTB patients with or without bacterial co-infection

Variables	PTB with co-infection (n=28)	PTB without co-infection (n=80)	p value
Hemoglobin, g/dl	10.02±1.28	10.91±1.71	0.014 [‡]
ESR, mm 1 st hr	118 (102-131)	84 (74-112)	0.006 [†]
CRP, mg/dl	42 (19-48)	18 (12-24)	<0.001 [†]
Radiological			
Normal	0 (0)	12 (15.0)	
Cavitory lesion	10 (35.7)	0 (0)	
Infiltrate	10 (35.7)	58 (72.5)	<0.001 [†]
Fibrosis	3 (10.7)	10 (12.5)	
Bronchiectasis	5 (17.9)	0 (0)	

Data were expressed as mean ±SD or Median (Interquartile range) or frequency (%). ‡Student's t test, †Mann Whitney U test, *Chi-square test.

Patients were followed up one month after enrollment. Out of 108 patients 8 (7.4%) patients were not available in follow-up [1(3.6%) and 7 (8.8%) respectively in patients with co-infection and patients without co-infection, p=0.378]. Figure 1 shows that, out of 100 patients 14 were expired within 30 days following diagnosis (6 in patients with co-infection and 8 in patients without co-infection). Though 30 day mortality was higher in patients with co-infection compared to patients without co-infections the difference failed to reach statistical significance (p=0.194, obtained from Fisher's exact test).

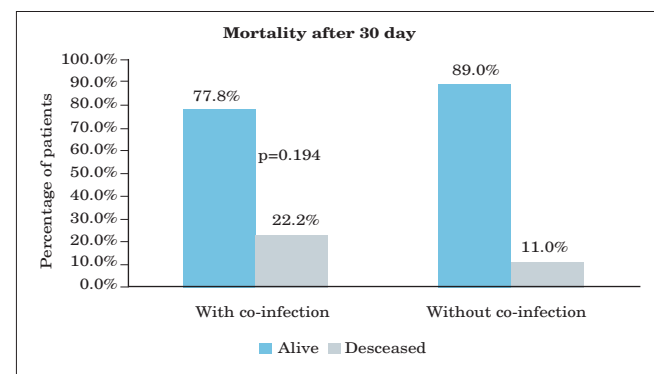


Figure 1 Comparison of 30 day mortality between PTB patients with or without bacterial co-infection

It was observed that, after one month serum hemoglobin increased and ESR and CRP level reduced from the respective baseline values. Nevertheless, PTB patients with bacterial co-infection had a lower hemoglobin and higher ESR and CRP than PTB patients without bacterial co-infection after one month (Table III). After one month it was observed that, chest x-ray was normal in 81.8% of the patients with co-infection and 86.2% in the patients without co-infection (Table III).

Table III Hematological, biochemical, and radiological characteristics of the PTB patients with or without bacterial co-infection after one month

Variables	PTB with co-infection (n=28)	PTB without co-infection (n=80)	p value
Hemoglobin, g/dl	11.78±1.93	12.70±1.23	0.004 [‡]
ESR, mm 1 st hr	36 (36-56)	30 (22-36)	<0.001 [†]
CRP, mg/dl	12 (5-24)	5 (5-5)	<0.001 [†]
Radiological			
Normal	18 (81.8)	56 (86.2)	0.224*
Fibrosis	3 (13.6)	9 (13.8)	
Bronchiectasis	1 (4.5)	0 (0)	

Data were expressed as mean ±SD or Median (Interquartile range) or frequency (%). ‡Student's t test, †Mann Whitney U test, *Chi-square test.

Discussion

Bacterial co-infection was common among PTB patients and was associated with an increased risk of early mortality.¹⁰ This is the one of the few studies to demonstrate the high prevalence of bacterial co-infection and its effect on early mortality among HIV-negative PTB patients. The prevalence of bacterial co-infection among HIV-negative PTB patients was as high as 25.9% in our setting. This figure is comparable to a series in Philippines, but higher than in previous studies in Botswana (18%) and South Africa (16%), where HIV prevalence is high.^{10,6,7}

Without the appropriate diagnostic modalities, the presence of either or both TB and bacterial respiratory infection is often difficult to distinguish. In the present study, an attempt was taken to determine the differences in clinical presentation of the PTB patients with or without bacterial co-infection. It was observed that, bacterial co-infection was detected more in older patients. This is in agreement with the findings of Attia et al. who reported that mean age was 52 years in patients having TB and co-infection compared to 42 years in patients with TB only.⁸ Regarding other demographic factors like, sex and residential location there was no significant difference between the PTB patients with or without bacterial co-infection.

In the current study, it was observed that, PTB patients with co-morbid medical conditions (COPD and DM) or prior history of PTB treatment were more likely to have bacterial co-infection compared to PTB patients without bacterial co-infection. Attia et al. reported similar observation, where significantly higher proportion of TB and bacterial co-infection patients had previous PTB compared to patients with PTB only.⁸

Baseline chest X-ray findings of the current study suggested that most common findings in the patients with bacterial co-infection were cavitory lesions and infiltrate and/or consolidation. On the other hand among the patients without bacterial co-infection infiltrate with or without consolidation was the most common finding. It is to be noted that, as in other studies, the current study results highlight that clinical and radiographic characteristics are insufficient to meaningfully distinguish between pulmonary TB and TB-bacterial co-infection in TB endemic regions, given overlapping presentations.^{8,12,13}

Thirty eight percent of the patients in the current study were taking antibiotics prior to presentation. Moreover around 22% of the participants had

chronic co-morbidities. These factors might influence the culture results and may provide false negative result.⁸ It remains unknown whether PTB infection increases the risk of bacterial super-infection or whether acute presentation of PTB is precipitated by development of bacterial pneumonia. Regardless, misdiagnosis of either TB or other bacterial pulmonary infection has the potential to lead to poorer outcomes, including increased healthcare costs, antimicrobial resistance and mortality.^{10,14,15}

Study of Shimazaki et al. demonstrated that bacterial co-infection was associated with a 1.7-fold higher early mortality among HIV-negative PTB patients.¹⁰ In the current study 30 day mortality rate was comparatively higher in patients with bacterial co-infection compared to PTB patients without bacterial co-infection without any statistical significance. The most likely explanation for this observation is that bacterial co-infection worsened the clinical course of PTB patients; its causal association, however, requires careful interpretation. Present study demonstrated that potentially pathogenic bacteria are commonly isolated in the sputum in patients with PTB. However, it was not possible to determine the exact clinical significance of these organisms. Accumulating evidence indicates that co-infections frequently do matter, but it is often difficult to predict how and when they matter.¹⁶ The interactions between the blurred boundaries of infection and colonization will undoubtedly need to be considered in the future. We hope this small scale initiative would explore the scenario in our perspective.

Limitation

The sample size in this study was small and were collected from two government hospital, results may not be generalizable to other health care institutions or at community level. The observational nature of the study design, limits its ability to provide conclusive evidence of causality between bacterial co-infection on mortality.

Conclusions

Respiratory bacterial co-infection is common and contributes to an increases severity of the disease among confirmed PTB patients in Chattogram, Bangladesh.

Recommendations

Greater availability of microbiologic diagnostics for PTB and bacterial infection is critical to ensure appropriate diagnosis and management. Further studies are needed to establish appropriate management programmes for bacterial co-infection among PTB patients.

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Disclosure

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Prevalence of Deviated Nasal Septum in Outpatient Department of Otorhinolaryngology in Chattogram

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Abstract

Background: Presence of deviated nasal septum (DNS) in any stage of life give rise to different pathological condition like nasal obstruction, headache, mouth breathing, which hampers the quality of life. This current study focused on the prevalence of DNS among the patients attending the outpatient department of Otorhinolaryngology in Chattogram.

Materials and methods: A descriptive cross sectional study was conducted in all the patients attending the Otorhinolaryngology department of B.G.C trust medical college hospital and Society for Assistance to Hearing Impaired Children (SAHIC) Chattogram. Data were collected through history taking, Clinical examination and Anterior Rhinoscopy.

Result: The study included 390 patients. Among them 252 (64.61%) had DNS with or without symptoms. DNS was diagnosed on the right side among 143 (56.74%) and on the left side among 109 (43.3%) patients. Regarding the shape of DNS, 129 (50.8%) had 'C' shape, 83 (32.93%) had 'S' shape, 35(13.9%) had anterior dislocation and 6 (2.4%) had thickened mucosa. The common clinical features associated with DNS were nasal obstruction, 186/252 (73.8%) followed by recurrent sinusitis (166/252, 65.87%).

Conclusion: More than half of the patients had DNS. Right sided and 'C' shape DNS were the most frequent. Nasal obstruction is the most common symptoms of DNS.

Key words: Deviated nasal septum; Nasal obstructyion; Prevalence.

Introduction

The nasal cavity, situated in the midface, is divided into two parts by a central septum. It's enclosed by bones like the frontal, nasal, ethmoid, and sphenoid, and it contains structures like the nasal septum and turbinates. Its main role is to warm and humidify the air we breathe in.¹ A physical disorder of the nose called a Deviated Nasal Septum (DNS) involves the displacement of the nasal septum. A deviated septum might go unnoticed for years and might not always require correction. Nevertheless, individuals may express concern regarding the compromised airflow resulting from the diminished nostril size attributed to this deviation.² In 1954, Lindahl distinguished between developmental (Often smooth, "C-shaped" or "S-shaped" nasal septum with incidence more frequently in the anterior septum) and traumatic (Typically uneven, angulated and occasionally dislocated) causes of nasal septal abnormalities.³ Nasal septum deviation is one of the most common causes of nasal obstruction, which is manifested as a decrease in nasal airflow and chronic mucosal irritation.⁴ Nasal obstruction may be alternate or persistent in nature. In some circumstances, the persistent exposure of a deviated septum produce health complications like nasal peeling, epistaxis or sinusitis.⁵ DNS is characterized by symptoms like postnasal drip and nasal blockage.⁶ In addition to causing a nasal blockage, a deviated nasal septum may also be linked to headaches.⁷ Halitosis and DNS may occasionally coexist.⁸ Mouth breathing is associated symptom with DNS.⁹ There is also association of deviated nasal septum and sinusitis.¹⁰ Sinusitis persisting for more than 12 weeks is termed as chronic sinusitis.¹¹ Nasal deformity can happen at any age owing to trauma, however it is more common in

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children. The term "nasal deformity" refers to irregularities in the nasal septum, soft tissue and pyramid.¹² Deviated nasal septum alters eustachian tube function, which affects hearing and middle ear ventilation. It causes ear fullness, impairs middle ear airflow and impairs hearing.¹³ Due to the middle ear's connection to the nasopharynx through the eustachian tube, a deviated nasal septum may contribute to upper respiratory tract and nasal blockage, which may result in middle ear infection (Otitis media).¹⁴ Patency, the aesthetics of the nose, the resistance to nasal airflow, and occasionally snoring are all influenced by DNS.¹⁵

Symptoms and potential complications of DNS can remain unrecognized if the DNS is not diagnosed promptly. So identifying individuals with DNS is crucial for enhancing their quality of life. This study aimed in identifying the prevalence of DNS among the Outpatient Department of Otorhinolaryngology.

Materials and methods

This study was a cross sectional questionnaire based study held in the Outpatient Department of Otorhinolaryngology of B.G.C. Trust Medical College Hospital and Society for Assistance to Hearing Impaired Children (SAHIC), Chattogram from June 2023 to August 2023. The patients who came to the outpatient department of Otorhinolaryngology were the subjects of this study. Permission was taken from Ethical Review Committee before conducting this study. Informed consent was taken from the patients before data collection.

A total of 390 patients who gave consent were conveniently included in this study. The data were collected through history taking regarding symptoms and medications related to DNS, Clinical examination by anterior rhinoscopy and patency test to identify type of DNS, otoscopy to diagnose middle ear infection was done. Then data were enrolled in the data collection sheet.

Data were processed and analyzed using software SPSS Version 24. Frequency and percentages were used to describe the frequency distribution of the different collected variables including patient's demographic data. Chi-squared test was used to analyze the categorical variables.

Results

A total of 390 patients of all age groups irrespective of sex were included in this study. Among them 252 (64.61%) had DNS. Among 252 participants, 96(38.09%) were female and 156

(61.90%) were male which showed a significant relationship with DNS. The frequency of DNS among age group 19 to 36 years was 105 (41.66%) which showed a significance of 0.007 (Table I).

Among those with DNS, 186 (73.8%) had nasal Obstruction, 131 (51.98%) suffered from headache, 166 (65.87%) had recurrent sinusitis and these clinical features showed greater significance (p=0.000) with DNS (Table II). 89 (35.3%) had cough, 79 (31.3%) had earache, 77 (30.6%) had allergic rhinitis, 60 (23.8%) had the habit of snoring, The frequency and percentage of other symptoms are shown in Table III.

DNS was diagnosed on the right side among 143 (56.74%) and on the left side among 109 (43.3%) patients. On examination by anterior rhinoscopy, 128 (50.80%) had C shape, 83 (32.93%) had S shape, 35(13.9%) had anterior dislocation and 6 (2.4%) had thickened mucosa (Figure1).

The number of DNS patients with birth history of normal vaginal delivery (NVD) were 200 (79.4%) and Caesarean Section (C/S) were 52 (20.6%) shown in Figure 2. Patients having DNS with a history of birth trauma were 9 (3.57%).

Regarding the history of medications for symptoms of DNS in the last three months 171/252(67.9%) consumed Antihistamines, 126/252(50%) used nasal decongestant, 48/252(19.04%) used steroid nasal spray and 46/252(18.20%) consumed Antibiotics (Figure3). 7/252 (2.8%) had history of Septoplasty operation.

Table I Distribution of patients with DNS according to age and gender

Personal Data	DNS				p value
	Yes		No		
	Frequency (n=252)	Percentage	Frequency (n=138)	Percentage	
Gender					0.045*
Male	156	61.90%	71	51.44%	
Female	96	38.09%	67	48.55%	
Age in years					
0-18	71	28.17%	59	42.75%	
19-36	105	41.66%	42	30.43%	
37-54	26	10.30%	20	14.49%	0.007*
55-72	42	16.66%	12	8.69%	
≥ 73	08	3.17%	05	3.62%	

P: Pearson χ^2 -test. *p < 0.05 (Significant).

Table II Clinical Symptoms with or without DNS

Symptoms	DNS (Yes) n=252	DNS (No) n=138	Chi square value	p value
Nasal Obstruction				
Yes	186	12	151.26	0.000*
No	66	126		
Headache				
Yes	131	131	74.5806	0.000*
No	121	70		
Recurrent Sinusitis				
Yes	166	70	133.55	0.000*
No	86	131		

P: Pearson χ^2 -test. *p < 0.05 (Significant).

Table III Clinical features associated with DNS among patients

Symptoms	Frequency (n=252)	Percentage (%)
Nasal Obstruction	186	73.8
Headache	131	51.98
Cough	89	35.3
Nasal discharge	84	33.3
Earache	79	31.3
Nasal drip	64	25.3
Snoring	60	24
Fever	48	19
Hearing Impairment	46	18.3
Anosmia	38	15.1
Mouth Breathing	37	14.7
Epistaxis	31	12.3
Nasal Crusting	23	9.1
Feeding difficulties	17	6.7
Halitosis	13	5.2
Dental Pain	13	5.2
Sign	Frequency (n=252)	Percentage (%)
Recurrent Sinusitis	166	65.87
Allergic Rhinitis	77	30.6
Middle ear infection	74	29.4

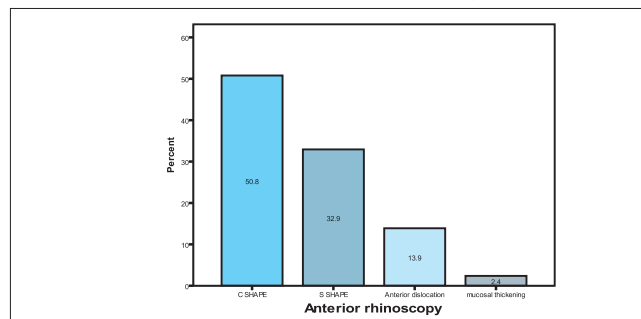


Figure 1 Distribution of shape of DNS by Anterior rhinoscopy

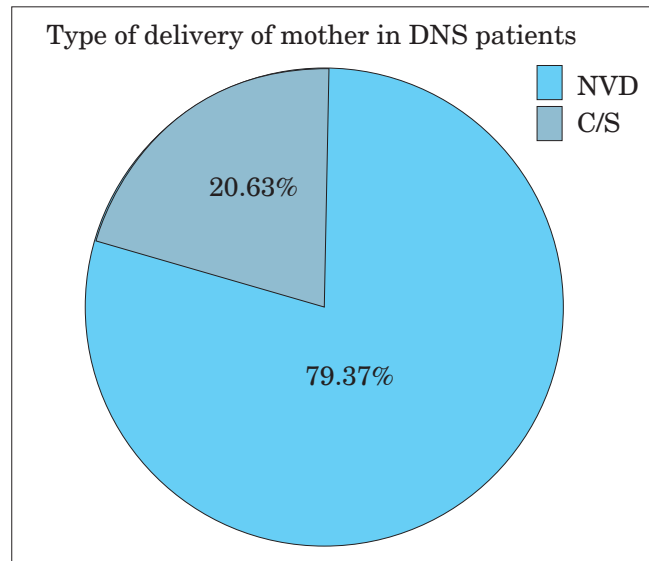


Figure 2 Distribution of type of delivery by mother among DNS patients

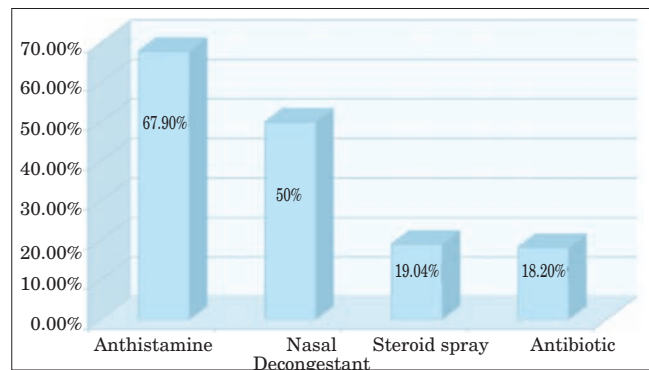


Figure 3 Distribution of drug history in last 3 months among patients with symptoms related to DNS

Discussion

The current study revealed that more than half of the patients (64.61%) attending the outpatient department of Otorhinolaryngology in Chattogram had Deviated Nasal Septum (DNS). Ahmed et al, reported similar findings (68.14%) in a study in Dhaka.¹⁶ Al Anazy in Bahrain stated similar findings (64.6%) with that of current study.¹⁷

A large number of patients in this study were in the 19 to 36 age group (41.66%) which is significant with DNS. This may be due to more complain among this age group regarding DNS.

In our study, the DNS was discovered in 96 (38.09%) female and 156 (61.90%) male out of 252 patients, which showed significance with DNS. Similar finding was observed in a study in Saudi Arabia¹⁸.

143 (56.74%) had right sided nasal septal deviation and 109 (43.3%) had left sided nasal septal deviation. Here right sided nasal septal deviation was more than left sided. Ahmmed et al, stated in his study that right sided nasal septal deviation was more prominent than that of left.¹⁶ 50.8% had C shaped DNS followed by S shaped DNS (32.93%). The percentage of Anterior dislocation (13.9%) and mucosal thickening (2.4%) were least followed by absence of spur in any of the patient. Similar findings that C shaped DNS were more prevalent than S Shaped were found in another study.¹⁹

In the present study, 186 (73.8%) had Nasal obstruction, 131 (51.98%) complained headache which are the important features of DNS and revealed highly significant with DNS. More or less indistinguishable features were reported in studies by Kwon et al. and Low and Willatt.^{7,20} 166 (65.87%) suffered from recurrent sinusitis in this current study which was highly significant with DNS, while 88% suffered from maxillary sinusitis among DNS patient expressed by Kumbhare et al.²¹ 31 (12.3%) experienced epistaxis and 38 (15.1%) suffered from Anosmia. In a study conducted by Swain and Pani, they observed epistaxis and anosmia 13.3% and 10.9% respectively.²² 29.36% suffered from middle ear infection which is similar to a study conducted by Shanker and Shettigar.²³

9 (3.57%) narrated history of birth trauma. Cashman et al, stated birth trauma has frequently been implicated in the aetiology of nasal malformation.¹²

200 (79.37%) patients with DNS reported birth by vaginal delivery and 52 (20.63%) by caesarean section. Patients with DNS who had a history of vaginal birth by their mothers were prevalent in this study due to the greater prevalence of vaginal delivery in rural area.

Considering the drug history 171(67.9%) consumed Antihistamines, 126(50%) used nasal decongestant, 48(19.04%) applied nasal steroid spray, 46(18.20%) took Antibiotics for last three months. Nasal decongestants are used as first line treatment for nasal congestion which is commonly seen in DNS. By activating adrenergic receptors on the lamina propria of arteries, this medication causes local vasoconstriction.²⁴ Antihistamine and steroid sprays are prescribed in DNS with symptoms of allergic rhinitis. An observational study in Asia revealed that antihistamines at around 50% were used to treat patients with allergic rhinitis frequently followed by nasal steroid spray (30%).²⁵

7(2.8%) furnished history of Septoplasty. So Septoplasty is occasionally done by patient in this current study though this operation improves nasal symptoms associated with DNS and enhances the quality of life.²⁶

Limitations

This study was conducted in selected area for a limited period of time. Patients could not give an adequate history of birth trauma. So, the result may not represent the picture of whole Bangladeshi population.

Conclusion

DNS was prevalent amidst male patients compared to female patients ($p < 0.05$). The result showed a greater right sided DNS than that of left side. 'C' shaped DNS was more than 'S' shape. Age group 19-36 years showed a greater significance with DNS (< 0.05). Nasal obstruction, headache and recurrent sinusitis were the common features of DNS. DNS among those with birth history of vaginal delivery was more than caesarean section. Awareness of deviated nasal septum and its implications is still insufficient among patients.

Recommendation

In recommendation, the study's findings shed light on the varying prevalence of DNS among different demographic groups and underscore the need for heightened awareness and education regarding this condition. By implementing the recommended strategies, healthcare professionals and public health personnels can collectively contribute to improve patient's quality of life and a better understanding of DNS and its implications.

Acknowledgement

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Disclosure

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Magnetic Resonance Angiography (MRA) Based Comparison of Sex-Related Variations in Vascular Diameter of Circle of Willis in Bengali Population of Chattogram Division

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Abstract

Background: Magnetic Resonance Angiography (MRA) is a sensitive, non-invasive and non-radiation dependent most widely used method for detecting the morphology of Circle of Willis (COW). By using the 3D-TOF-MRA the present study was aimed to determine whether there is any difference of COW vessels diameters between male and female in Bengali population of Chattogram Division.

Materials and methods: This cross-sectional observational study was conducted in the Department of Anatomy, Chittagong Medical College, Chattogram, upon 60 study subjects by dividing them into two groups, males were 29 and females were 31. For statistical analysis unpaired student's t-test was done and p-value was considered significant if it was <0.05 at 95% level of confidence.

Results: The participant's age range was between 02 -76 years with a mean \pm SD age of 35.20 \pm 18.25 years. The mean vessel diameters of vessels were compared between male and female and majority of vessels showed statistically nonsignificant differences between two sex groups except the diameter of left Internal Carotid Artery (ICA), which shows significantly larger ($p=0.045$) in male subjects than in female subjects.

Conclusion: Results of the present study provides some baseline data upon which further studies can be performed by other investigators in this field. These findings might also be helpful during the surgery in the base of skull.

Key words: Bengali; Circle of Willis; 3D-TOF-MRA.

Introduction

The brain represents only 2% of the total body weight, but it receives 1/5th of the resting cardiac output. This blood supply is carried by the two internal carotid arteries and the two vertebral anastomose at the base of the brain to form the "Circle of Willis" (COW).¹ It connects the anterior and posterior circulation by uniting the internal carotid and vertebrobasilar systems to maintain an adequate cerebral perfusion.² It is formed by the pre-communicating segment of the right and left anterior cerebral arteries that is joined by the anterior communicating artery; and pre-communicating segments of the right and left posterior cerebral arteries that arise from the basilar artery and are connected to their corresponding internal carotid arteries via the two posterior communicating arteries.³

It provides collateral flow to the brain especially in situations of arterial incompetency such as cerebrovascular disease.^{4,5} The arterial circle is essential for maintenance of a stable and constant blood flow to the brain.⁶ Its ability to redistribute the blood flow depends upon its morphology (Presence and size of its component vessels, which may vary in calibre, being often partially hypoplastic, sometimes even absent).⁷

COW is called complete when all components of the anterior and posterior parts of the circle are visible, continuous and demonstrates a diameter of at least 0.8 mm. An incomplete configuration means that neither the anterior nor posterior part of the circle (A hypoplastic or absent vessel) form a complete circle. A partially complete configuration means either anterior or posterior parts of the arterial circle forms a complete circle.⁸

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Previously studies dedicated to analysis of mean diameters of the arteries of COW were mainly based on autopsy study, with numerous limitations on connection between morphology and physiological changes in hemodynamic system.⁹ With the advent of modern imaging technologies like CTA, MRA- significant progress has been made in the imaging of COW with unparalleled details.¹⁰ Among them MRA (Magnetic Resonance Angiography) is a sensitive and non-invasive imaging modality suitable for detecting the morphology of COW.^{1,11} It has high level of sensitivity as well as specificity as compared to other techniques.^{12,13} The aim of this study was to determine the normal luminal diameters of the arteries of COW and to compare the diameters of the arteries of COW between male and female in Bengali population of Chattogram Division.

Materials and methods

This cross-sectional observational study with some analytical component was carried out in the Department of Anatomy, Chattogram Medical College, Chattogram during the period from September 2021 to August 2022. After getting approval from the ethical review committee of Chattogram Medical College, study subjects were selected according to enroll mentcriteria. Data were collected from the Radiology and Imaging unit of Epic Health Care, Max Hospital and Diagnostic Ltd, Chevron Laboratory Ltd, Chattogram- who have undergone MRI of the brain with MRA for different clinical reasons. Informed written consent was taken from the patient after givingdetailed information about using their MRA images in the study. The study population were 60 in number (29 male and 31 female). Age was recorded according to NID/Birth certificate. Subjects having any history of head and neck surgeries, pathological lesions at the base of the brain, had pacemakers, ferromagnetic intracranial aneurysm clips or other metallic implants and tribal people were excluded. The 3D-TOF-MRA of the circle of were obtained with a 3-tesla MRA scanner (Siemens, Germany, Philips, Netherlands). Imaging parameters are repetition time (TR): 20-24ms, echo time (TE): 3.4-3.6ms, 18 o flip angle: 18-20degree, field of view: 200-220, axial slice: 48-52/slab, slice thickness: 0.4-0.6mm, total imaging time: approximately 4min 1sec - 5min 3 sec. The measurements were done with the image analysis software with the MRI machine. Vessels which were visualized as continuous segments of at least 0.8mm diameter were considered as present. Those smaller than 0.8 mm indiameter were considered as hypoplastic. The anterior and posterior part of

the COW were evaluated separately by an expert radiologist of Chattagong Medical College Hospital (CMCH). Vessels which were visualized as non-continuous segments were considered as absent. Absent vessel diameters were regarded as zero when determining mean vessel diameter. The diameters of the vessels were measured as follows, Basilar Artery (BA) just before it gives branch to Posterior cerebral arteries (Figure 1) pre communicating segment of Posterior cerebral arteries (P1) (Figure 2) cavernous segment of Internal Carotid Arteries (ICA) (Figure 3), pre communicating segment of Anterior cerebral arteries (A1) (Figure 4). The diameters of vessels were expressed in millimeter (mm).

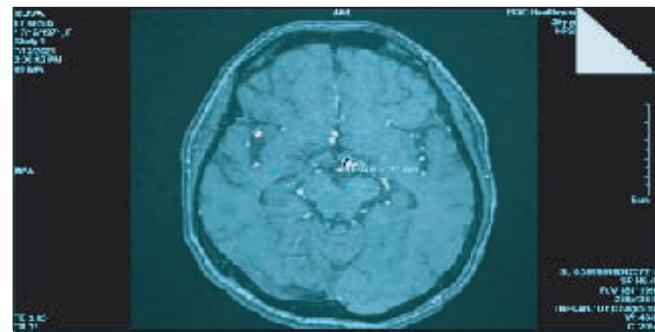


Figure 1 MR angiogram of a Circle of Willis showing diameter of basilar artery

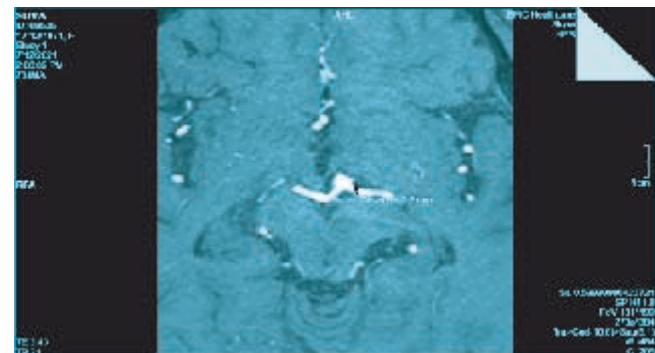


Figure 2 MR angiogram of a Circle of Willis showing diameter of left posterior cerebral artery

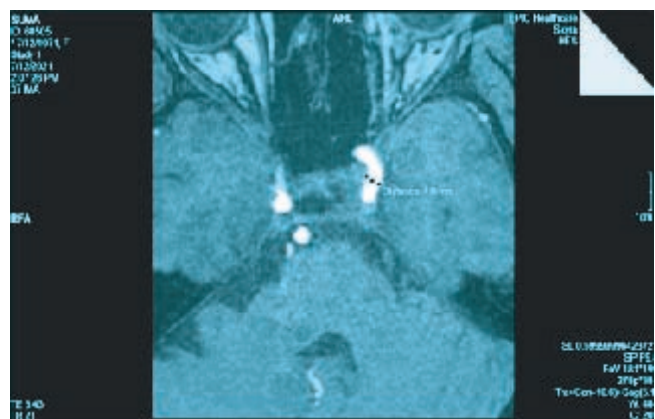


Figure 3 MR angiogram of a Circle of Willis showing diameter of left internal carotid artery

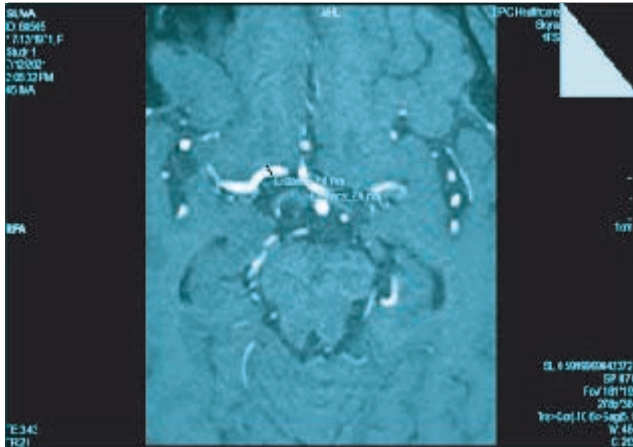


Figure 4 MR angiogram of a Circle of Willis showing diameter of right and left anterior cerebral artery

All collected data were entered into computer and analyzed by SPSS (Statistical Package for Social Science) version-25 software programme. The participants were divided into two groups (Male and Female). Mean diameters of the arteries were compared between these two sex groups of study subjects by using unpaired t-test. The result was considered as significant if the p value is <0.05 at 95% level of significance.

Results

A total of 60 respondents were enrolled in the study. The participant's age ranges were between 02-76 years with a mean \pm SD age of 35.20 ± 18.25 years. The participants were divided into two groups (Male and Female). There were 29 (48.3%) males and 31 (51.7%) females. The mean age \pm SD of male was 37.21 ± 18.395 years and mean age of the female was 33.22 ± 18.218 years (Table-I). Table II shows the comparison of the diameters of vessels of COW between male and female. On comparing the mean vessels diameters by using unpaired student's t-test for gender, mean diameter of left internal carotid artery was significantly larger ($p=0.045$) for male subjects as compared to female subjects. The comparison of the diameters of Basilar Artery (BA) pre communicating segment of Posterior Cerebral Artery (PCA-P1) right Internal Carotid Artery (ICA) pre communicating segment of Anterior Cerebral Artery (ACA-A1) and Anterior Communicating Artery (ACoMA) between male and female showed no significant differences.

Table I Distribution of the study subjects according to gender (n=60)

Gender	Age (In years)		
	Age	Number	Mean \pm S.D
Male	04-74	29	37.21 ± 18.395
Female	02-76	31	33.22 ± 18.218
Total	02-76	60	35.20 ± 18.253

Table II Comparison of the diameters of vessels of COW between male and female.

Vessel	Mean vessel diameter (mm)				p-value
	Male		Female		
	Mean	SD	Mean	SD	
ICA					
Right	4.4	0.44	4.22	0.61	0.19
Left	4.42	0.39	4.16	0.57	*0.045
Basilar	3.15	0.28	3.16	0.27	0.891
ACA-A1					
Right	2.07	0.26	2.02	0.33	0.541
Left	1.98	0.18	1.93	0.28	0.438
PCA-P1					
Right	2	0	2.1	0.3	0.083
Left	1.98	0.19	2.04	0.23	0.237
ACoMA	1.1	0.1	1.14	0.16	0.215

{*= Significant ($p < 0.05$), ICA= Internal Carotid Artery, BA= Basilar artery, ACA-A1= Pre communicating segment of Anterior Cerebral Artery, PCA-P1= Pre communicating segment of Posterior Cerebral Artery, ACoMA= Anterior Communicating Artery}.

Discussion

In the current study, the mean diameter of left internal carotid artery in male was (4.42 ± 0.39 mm) and in female was (4.16 ± 0.57 mm) and this difference is statistically significant ($p= 0.045$) (Table II).

Similar findings also observed in the study performed by Maaly and Ismail in Egypt among 180 participants. The mean vessel diameter of Internal Carotid Arteries (ICA) = 3.72 ± 0.20 mm was larger in male than in female (ICA= 3.71 ± 0.22 mm). The difference was statistically significant ($p < 0.001$).¹⁴ In another study conducted by Hafez et al in Egypt studied among 120 patients and found that in male study subjects, the mean diameter of ICA= 3.9 ± 0.07 mm was larger as compared with the diameter of ICA (3.8 ± 0.06 mm) in female. The difference was statistically significant ($p < 0.05$).¹⁵

In another study conducted by Kizilgoz V et al. among 100 participants of both sexes (64 males and 36 females) in Egypt where the mean vessel diameter of Internal Carotid Arteries (ICA)= 5.00 ± 0.6 mm was larger in male as compared with the diameter of ICA (4.7 ± 0.6 mm) in female.¹⁶ The difference was also statistically significant ($p < 0.001$). In the present study the diameters of both sided ICAs, ACA-A1 and PCA- P1 in both male and female have shown some difference but were not statistically significant (Table II). The diameter of AComA was also measured among male and female and have shown little variation but was not statistically significant $p = 0.215$ (Table II). In another study conducted by Chen H W et al. in Taiwan among 507 participants did not find any significant difference between any of the mean vessel diameters among male and female.¹⁷ This observation is slightly disagreed with the findings of present study. The differences may be due to their larger sample size.

Limitations

The study has certain limitations such as only three centers study, small sample size and short duration of period.

Conclusion

In this study, when comparing the mean vessel diameters by using unpaired student's t-test, left internal carotid artery was found to be larger in diameter in male subjects and that was statistically significant ($p = 0.045$). A detailed knowledge of the vascular variants with diameters of the vessels of COW is useful to surgeons in planning their shunt operations, choice of the patients and also keeps away iatrogenic vascular traumas during surgeries. Moreover, the knowledge obtained from this study may also useful to anatomists and sonologists in enhancing their knowledge in teaching and investigative procedures.

Recommendation

Studies with larger sample size & multicenter based study is to be recommended.

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Disclosure

All the authors declared no competing interests.

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Relationship between State of Nutrition and Outcome of Common Infections among Elderly Patients Admitted to a Tertiary Hospital in Bangladesh

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Abstract

Background: Older adults' health, independence, and quality of life depend on their nutritional well-being. Less attention has been given to the nutritional status and its relation with and impact on common infectious aetiology of hospitalized elderly in Bangladesh. The study aimed to determine the relationship between the state of nutrition and the outcome of common infections among elderly patients admitted to a tertiary care hospital in Bangladesh.

Materials and methods: This prospective observational study was conducted in Chittagong Medical College Hospital, Chattogram. Two hundred and six patients, aged ≥ 60 , admitted with a diagnosis of infectious aetiology in the medicine department were enrolled. Nutritional assessment was done by Mini nutritional assessment- short form tool (MNA-SF) and in-hospital outcomes were noted. Development of sepsis, need for ICU support, expired in-hospital, and > 6 -day hospital stay were considered unfavourable outcomes.

Results: According to the MNA-SF, 75.7% of patients were either malnourished (25.7%) or at

risk of malnutrition (50%). Compared to patients with normal nutritional status, a significantly higher proportion of patients with malnutrition or at risk of malnutrition develop sepsis (35.3% versus 18%, respectively, $p=0.022$). Patients categorized as at risk of malnutrition or malnutrition were more likely to have unfavourable outcomes compared to the patients with normal nutritional status [Odds Ratio (OR): 2.835, 95% Confidence Interval (CI): 1.215-6.614].

Conclusion: This study result suggests that sepsis development was more prevalent in malnutrition among hospitalized elderly with infectious aetiology and associated with increased mortality.

Key words: Elderly; Hospitalized; Infections; MNA; Nutritional Status; Outcome.

Introduction

The world is on the edge of a demographic transition, most countries around the globe, including Bangladesh, are experiencing population ageing, increasing the number of older adults.^{1,2} Infections are the most frequent cause of hospital admission, accounting for 14.5% of elderly emergency department patients in middle-income countries. Almost two-thirds of these patients with infection are admitted to hospital. One-third of elderly patients with infection died within one year.^{3,4}

Worldwide, malnutrition and nutritional risk affect up to 50% of hospitalized patients. A high prevalence of malnutrition is particularly evident among aged people and individuals with comorbid conditions associated with nutritional intake.⁵ The interaction of nutrition and infections is manifold and needs to be addressed. More specifically, the association between nutritional status and infections is bidirectional; malnourished patients are more prone to having severe infections due to impaired immunity.⁶ Infectious diseases also impact the nutritional status, specifically or through unspecific mechanisms, such as anorexia, tachypnea, and vomiting.⁷

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Despite these consequences, several reports have shown that malnutrition remains under-recognized in the hospitalized elderly, where no standard procedure is available for proper documentation due to insufficient awareness among healthcare professionals.⁸ Therefore, early identification of malnutrition and nutritional intervention is of considerable importance in helping to delay or prevent associated poor outcomes.⁹ This indicates the need to activate/establish services dedicated to assessing the nutritional status of older adults. In this respect, several screening tools have been developed to identify malnutrition.⁹ Mini Nutritional Assessment- Short Form tool (MNA-SF) has been created as a time-saving nutritional screening tool that is easy to use in routine practice with comparable diagnostic accuracy to the full MNA.^{10,11} It was designed specifically for use among the elderly population and has been validated in many care settings, including communities, hospitals, and nursing homes.¹¹

Materials and methods

A prospective observational study was conducted in Chittagong Medical College Hospital, Chattogram, Bangladesh, from October 2019 to September 2020. The study protocol was approved by the Ethical Review Committee of Chittagong Medical College (Memo No.: CMC/PG/2019/583, Date:24/10/2019). Informed written consent was obtained from each eligible subject or close family member in case they could not respond accurately after a full explanation of the outcome and purpose of the study.

Hospitalized elderly patients aged 60 years and above admitted to the medicine ward with infectious aetiology were included in the study. Unconscious patients and patients who required treatment in specialized units such as HDU and ICU on admission were excluded.

Data regarding age, sex, educational status, present vocational status, economic dependency and family type, smoking habit, comorbid conditions and site of infections were collected by a structured proforma.

Common infections were documented as diagnosed by the respective ward's attending/treating physician, such as urinary tract infections, lower respiratory tract infections, skin and soft tissue infections, Intra-abdominal infections (cholecystitis, choledocholithiasis, pancreatitis) and others. Nutritional status was assessed by MNA-SF and nutritional status was classified as: satisfactory nutritional status (score 12-14) at risk of malnutrition (Score 8-11) and malnutrition (Score < 7).

All study patients were monitored in-hospital until their discharge or death to observe the outcome. Favourable outcome was considered for those who did not develop sepsis, did not need ICU support or expired in-hospital and duration of length of hospital stay. Development of sepsis, need for ICU support, expired in-hospital, and >6days stay in hospital were considered as unfavorable outcomes.

Statistical package for social science (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp) for processing and analysis. Based on their nutritional status study population were divided into two groups: person with normal nutritional status and persons with either at risk of malnutrition or malnutrition. Sociodemographic and outcome parameters were compared between these two groups by Student's t-test or Mann-Whitney U test for quantitative data and Chi-square test or Fisher's exact test for categorical data. Finally binary logistic regression was performed with outcome as dependent variables to determine the independent predictive factors. OR with 95% CI were estimated. $p < 0.05$ was considered statistically significant.

Results

Two hundred and six patients were enrolled during the study period. Age range from 60 to 90 years with a mean (\pm SD) age of 65.82 (\pm 5.56) years. There was almost equal representation from both sexes in this group with a male to female ratio of 1.06:1. Majority of the elderly patients lived in a jointed or extended family and only 2.9% of the participants had education primary or above and majority of them were either partially or completely dependent other (Table I).

Table I Sociodemographic characteristics of the elderly patients (n=206)

Variables		Mean \pm SD/ Frequency (%)
Age (Years)	Mean \pm SD	65.82 (\pm 5.56)
Sex	Male	106 (51.5)
	Female	100 (48.5)
Type of family	Nuclear/single	27 (13.1)
	Jointed or extended	179 (86.9)
Educational level	Below primary	200 (97.1)
	Primary and above	6 (2.9)
Vocational status	Employed	66 (32.0)
	Not employed	140 (68.0)
Economic dependency	Independent	10 (4.9)
	Partly dependent	43 (20.9)
	Dependent	153 (74.3)

Overall, more than one third of the patients 53 (25.7%) were overtly malnourished, while exactly half 103 (50%) were at risk of becoming malnourished, making a total of 75.7% who were either malnourished or at nutritional risk, and the rest 50 (24.3%) were within normal value. Short term hospital outcome of the patients were presented in the Table II.

Table II Distribution of the patients by their in-hospital outcome (n=206)

Variables	Frequency (%) / Median (range)
Developed sepsis	64 (31.1)
Required ICU transfer	17 (8.3)
Length of hospital stay, Days	6 (2-17)
In-hospital mortality	11 (5.3)

*Data were expressed as frequency (Percentage) if not otherwise mentioned.

Relationship between different sociodemographic factors and nutritional status are presented in Table III. It depicts that, mean age was significantly higher among the malnourished patients or patients at risk of malnutrition compared to patients with normal nutritional status (p=0.013). It indicates that, patients with higher age was more likely to have malnutrition compared to their counterpart. On the other hand there was no significant association between sex, type of family, present vocational status and economic dependency of the patients and their nutritional status.

Table III Relationship between nutritional status and sociodemographic factors

Variables	Nutritional status		p value
	Normal (n=50)	Others ^a (n=156)	
Age (Years)	64.1±4.0	66.4±5.9	0.013 [‡]
Sex			
Male	25 (50.0)	81 (51.9)	0.241 [†]
Female	25 (50.0)	75 (48.1)	
Type of family			
Nuclear	13 (26.0)	14 (9.0)	0.002 [†]
Jointed	37 (74.0)	142 (91.0)	
Vocational status			
Employed	19 (38.0)	47 (30.1)	0.288 [†]
Not employed	31 (62.0)	109 (69.9)	
Economic dependency			
Independent	2 (4.0)	8 (5.1)	
Partly dependent	11 (22.0)	32 (20.5)	0.932 [†]
Dependent	37 (74.0)	116 (74.4)	

^a Included both patients with malnutrition and at risk of malnutrition. Data were expressed as frequency (%) or mean±SD. [‡]Independent sample t test; [†]Chi-square test.

Table IV depicts that, elderly patients who had malnutrition or at risk of malnutrition at the time of admission had comparatively unfavorable outcome in terms of sepsis development, need for ICU support and in-hospital mortality. Significantly higher proportion of patients with malnutrition or at risk of malnutrition develops sepsis (p=0.022). On the other hand mortality and need for ICU transfer was more in patients with malnutrition or at risk of malnutrition compared to patients with normal nutritional status the difference was not statistically significant. Similarly, patients with malnutrition or at risk of malnutrition had a statistically non significant higher median length of hospital stay compared to patients with normal nutritional status (7 days versus 6 days, p=0.236).

Table IV Comparison of outcome between patients with or without normal nutritional status

Variables	Nutritional status		p value
	Normal (n=50)	Others ^a (n=156)	
Developed sepsis	9 (18.0)	55 (35.3)	0.022 [†]
Need ICU transfer	2 (4.0)	15 (9.6)	0.209 [†]
Length of stay, days	6 (5-7)	7 (5-8)	0.236 [*]
In-hospital mortality	1 (2.0)	10 (6.4)	0.227 [†]

^a Included both patients with malnutrition and at risk of malnutrition. Data were expressed as frequency (%) or Median (Interquartile range). Mann Whitney U test, [†]Chi-square test.

Based on outcome parameters, patients were categorized into two groups: patients with favorable outcome (Not develop sepsis, or need ICU transfer or died) and patients with unfavorable outcome (Develop sepsis or need ICU transfer or died after hospitalization). Binary logistic regression revealed that the significant independent predictors for unfavorable outcome were present vocational status and nutritional status at admission (Table V).

Table V Predictors of outcome following hospital admission among elderly patients with infection

Variables	Odds ratio (OR)	95% CI of OR		p value
		Lower	Upper	
Age	1.038	.982	1.098	0.187
Sex				
Male	Reference category			
Female	1.037	.546	1.969	0.911
Family type				
Nuclear				
Joint/extended	.774	.292	2.048	0.606
Vocational status				
Employed	Reference category			
Not employed	2.784	1.207	6.423	0.016
Economic dependency				
Independent	Reference category			0.904
Partly dependent	1.291	.217	7.670	0.779
Dependent	1.079	.181	6.411	0.934
Nutritional status				
Normal	Reference category			
Others	2.835	1.215	6.614	0.016

Discussion

The screening by MNA-SF identified a quarter of the patients as either at risk of malnutrition or having malnutrition, and the rest of the 24.3% were categorized as having normal nutritional status. These figures indicate that malnutrition is highly prevalent among hospitalized elderly patients with infectious aetiology. According to MNA, Persson et al. reported that more than two-thirds of newly admitted geriatric patients had a nutritional status either malnutrition or at risk of malnutrition.¹² Alzahrani et al. observed that, according to the MNA-SF, 76.6% of patients were either malnourished or at risk of malnutrition, similar to the present study's findings.¹³ Orlandoni et al. reported that more than 28% of geriatric patients admitted to acute geriatric wards had a high risk of malnutrition.¹⁴ Imoberdorf et al. higher than 18% of the patients admitted to the departments of internal medicine were classified as severely malnourished or at high risk for malnutrition.¹⁵ The variations in the reported prevalence of malnutrition are probably attributable to the methodology and variability of the study setting. Hospital prevalence of malnutrition in elderly patients was consistently 40% - 60% at admission in Latin American countries.¹⁶ Still, the majority of the countries of Southeast and Northeast Asia reported a prevalence of malnutrition of more than 60% in

elderly patients.¹⁷ The finding of the current study regarding the high presence of risk of malnutrition as well as malnutrition could be explained by the fact that the entire cohort was selected from a government-run tertiary care hospital and the whole group was suffering from some infectious disease.

In our study, though most geriatric patients lived in joint families, most were economically dependent on others and had no employment at enrollment. These factors and economic factors may well affect the frequency, quantity, and quality of food intake. The present study found that patients at risk of malnutrition or malnutrition had increased risks of more complications than those with normal nutritional status. About 35.3% of the patients without normal nutritional status developed sepsis compared to 18% in the group with normal nutritional status. Regarding ICU requirements and in-hospital mortality, higher frequencies were observed in patients without normal dietary quality than those with normal nutritional status. Still, the differences failed to reach statistical significance. Patients without normal nutritional status had to stay longer in the hospital than those with normal. Other studies reported that malnourished elderly patients, when admitted to the hospital, have increased risks of more complications than well-nourished patients with infections.^{13,18} Yeo et al. reported that about 39% of hospitalized patients with community-acquired pneumonia were malnourished at admission, and malnutrition was associated with poor long-term outcomes, particularly among the elderly.¹⁹ In the current study, 10 out of the 156 patients without normal nutritional status died, reporting a mortality rate of 6.4% compared to 1 out of 50 patients with normal nutritional status, with a rate of 2.0%. These findings agree with other recent studies.^{13,14} It is expected that malnourished patients had a significantly longer length of stay than their well-nourished counterparts due to the associated complications.^{14,18}

More than a decade ago, Kagansky et al. found that in patients who were malnourished or at risk of malnutrition, the hospitalization period was longer and in-hospital and long-term mortality were higher.²⁰ Moreover, for over 7 decades, it has been documented that malnutrition among elderly hospitalized patients influences their mortality rate, which ranges from 20 to 50%.²¹ In the present study, probably due to the small number of mortality, a significant association between mortality and nutritional status was not detected. Nevertheless, the presence or risk of malnutrition

among hospitalized elderly with infectious aetiology during admission was revealed as an independent predictive factor for unfavourable outcomes in the present study.

Limitations

Patients were collected from a single tertiary-level government hospital; results may not be generalizable to other healthcare institutions. Lastly, no information on the detailed functional independence of patients was collected in the present study. Still, that information should be gathered to test how it influences length of stay and hospital mortality.

Conclusions

In conclusion, the present study results show sepsis development was more likely in malnutrition and at risk of malnutrition among hospitalized elderly with infectious aetiology. Malnutrition, or even the risk of malnutrition, predicted hospital outcomes. It is, therefore, necessary to assess the nutritional status of elderly patients early in admission, particularly those with infectious aetiology, and to provide appropriate dietary therapy to minimize its serious consequences on the patients and health care system. Future prospective multi-centre studies on larger populations should be carried out to confirm the present study's findings.

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Disclosure

All the authors declared no conflicts of interest.

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Triple Burden of Non-communicable Diseases Among Tribal Patients Attended to a Primary Health Care Facility in Bangladesh

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Abstract

Background: Socioeconomic and cultural transitions among individuals from vulnerable groups introduce epidemiological transition, with a concomitant increase in the prevalence of Non-Communicable Disease (NCD) risks. An accepted conventional wisdom exists for Bangladeshi tribes that they are undernourished and away from NCDs. However, the extent of the triple burden of diabetes, hypertension and obesity affecting them is unknown. This study aimed to assess the triple burden of DM, HTN and obesity among tribal patients who attended a primary healthcare facility in Bangladesh.

Materials and methods: This hospital-based descriptive cross-sectional study included 103 tribal patients (Age \geq 40 years) attending the Medicine Outpatient Department of Ramgarh Upazila Health Complex, Khagrachari, Bangladesh, from October 2023 to November 2023. Each participant was interviewed for sociodemographic characteristics and preexisting diabetes and hypertension. Anthropometric assessment (Height, weight and waist circumference) blood pressure measurement and capillary blood glucose estimation was done for all participants. The double burden of NCDs

(DBNCDs) and triple burden of NCDs (TBNCDs) was referred to as a combination of two and three of hypertension, diabetes and overweight or obesity respectively.

Results: Mean age of the patients was 52.4 \pm 10.1 years and 48 (46.6%) were male. This study found the prevalence rate of generalized obesity, abdominal obesity, hypertension and diabetes, were 23.3%, 56.3%, 32% and 16.5%, respectively. The prevalence of DBNCDs and TBNCDs were 18.8% and 6.8%, respectively. Abdominal obesity was higher among female (85.5 % vs. 22.9%, $p<0.001$) and diabetes (25% vs. 9.1%, $p=0.03$) was higher among male compared to their counterpart. Overall, NCD burden was significantly higher among female than male ($p=0.002$).

Conclusion: The alarming trend of an increasing prevalence of overweight/obesity, hypertension, and diabetes is observed among indigenous populations, emphasizing the incorporation of a specific health management policy.

Key words: Diabetes; Hypertension; Obesity; Non-communicable disease; Tribal.

Introduction

NCDs kill 41 million people each year worldwide, equivalent to 71% of all deaths globally, and a large proportion of these deaths occurred before the age of 60, during the most productive period of life. The magnitude of these diseases continues to rise, especially in low- and middle-income countries.^{1,2} Although Bangladesh has achieved most of the Sustainable Development Goals and made rapid progress over the last decade in meeting, NCDs remain a crucial public health challenge.³ Over the last decades, the prevalence of NCDs has increased in Bangladesh.^{4,5} In Bangladesh, about 1% of the population consists of what are locally termed 'tribal groups' and live primarily in the hilly areas of the southeastern region of the country, specifically Rangamati, Khagrachhari and Bandarban districts of the Chittagong Hill Tracts (CHT) and in the regions of Mymensingh, Sylhet and Rajshahi.^{6,7} Bangladeshi tribal populations are experiencing phenomenal

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changes on the social, cultural and economic fronts, for the past 30 years.⁸ Like all developing countries, large-scale developmental activities and urbanization in Bangladesh have brought significant changes in the lifestyles, occupational patterns, and dietary habits of these tribal communities, once considered outreach groups. Furthermore, new "urban centers" are developing quickly near rural and tribal areas.^{9,10} As the health issues of tribal infants and children are increasingly being recognized, few concrete efforts have been made to understand the problems of adult and elderly population with special reference to emerging public health problems of degenerative diseases, such as hypertension, diabetes and obesity.^{11,12} DBNCDs and TBNCDs are comparatively new issues and the research on these burdens are less explored.^{13,14} The present study estimated the prevalence of the DBNCDs and TBNCDs of obesity, hypertension and diabetes among adult indigenous attended to a primary healthcare facility in CHT, Bangladesh.

Materials and methods

This hospital-based descriptive cross-sectional study was conducted in Ramgarh Upazila Health Complex, Khagrachari, Bangladesh, from October 2023 to November 2023. The study population selected comprised 103 new patients reporting to the Out-patients Departments of the hospital aged between 40 years and above. Severely ill patients who needed admission were excluded. Participants were given consent forms to fill out and were seen privately in the consulting rooms.

Patients had their body weight, height, waist, and blood pressure measured to check their Body Mass Index (BMI) and raised blood pressure after completing the questionnaire. Spot blood was checked for Capillary Blood Glucose (CBG) to determine the glycemic status. Asian criteria-based BMI was used as follows: <18.5 for underweight, 18.5-22.9 for normal-weight, 23.0-27.5 for overweight, and >27.5 for obese.¹⁵ Central obesity was defined as WC \geq 90 cm for men and 80 cm for women according to the guidelines of the International Diabetes Federation (IDF) for Asian populations.¹⁶ Diabetes was considered as blood CBG level >11.0mmol/l.¹⁷ Hypertension was defined as systolic blood pressure 140mmHg and/or diastolic blood pressure \geq 90mmHg.¹⁸ Reported diabetes and hypertension was defined as having a previous diagnosis and on medication for diabetes and hypertension by a registered physician.

Data were analyzed by using SPSS version 23. Continuous variables were expressed as mean \pm standard deviation and are compared by Student's

t-test for two groups. Qualitative or categorical variables are described as frequencies and proportions. Proportions are compared using chi-square test. Statistical significance was set at $p < 0.05$ level.

Results

The age ranges from 40 to 90 years with a median age of 52.4 \pm 10.1 years and 48 (46.6%) were male. Majority of the patients belong to 50-59 years age group. Though mean age was similar between female than male ($p=0.941$), proportion of male was the highest in 50-59 and female was the highest in 40-49 years age group ($p=0.002$) (Table I). Only 13 (12.6%) participants had no formal education and 37.9%, 30%, 19.4% had education upto secondary, primary and higher secondary level (And above). The most common occupational categories in descending order were service (33%), housemaker (27.2%), and farmer (19.4%).

Table I Distribution of the patients by their age and gender (n=103)

Age \square	Male \square	Female \square	Total
Age category \square	\square	\square	
40-49 years \square	18 (37.5) \square	30 (54.5) \square	48 (46.6)
50-59 years \square	26 (54.2) \square	12 (21.8) \square	38 (36.9)
≥ 60 years \square	4 (8.3) \square	13 (23.6) \square	17 (16.5)
Total \square	48 (46.6) \square	55 (53.2) \square	103 (100.0)
Mean age (\pm SD) \square	52.2 \pm 9.0 \square	52.3 \pm 11.1 \square	52.4 \pm 10.1

Data were expressed as frequency (%) if not mentioned otherwise. SD: Standard deviation

Overall, 23.3% and 53.4% of the participants were overweight and obese, respectively, as per BMI criteria. Abdominal obesity was present in 56.3% of the participants. Abdominal obesity were significantly more prevalent among female than male ($p < 0.001$) (Table II).

Table II Obesity pattern of the participants stratified by sex

Obesity parameters \square	Male \square (n=48) \square	Female \square (n=55) \square	Total \square (n=103)	p value*
BMI category				
\square Underweight \square	2 (4.2) \square	2 (3.6) \square	4 (3.9) \square	0.130
\square Normal weight \square	13 (27.1) \square	7 (12.7) \square	20 (19.4) \square	
\square Overweight \square	26 (54.2) \square	29 (52.7) \square	55 (53.4) \square	
\square Obese \square	7 (14.6) \square	17 (30.9) \square	24 (23.3) \square	
WC category \square	\square	\square	\square	
\square Normal \square	37 (77.1) \square	8 (14.5) \square	45 (43.7) \square	<0.001
\square Central obesity \square	11 (22.9) \square	47 (85.5) \square	58 (56.3) \square	

Data were expressed as frequency (%). BMI: Body Mass Index, WC: Waist Circumference,

*Chi-square test.

Overall prevalence of hypertension and diabetes in the studied participants were 32% and 16.5%, respectively. Prevalences of hypertension and diabetes were higher in male than female, but only the difference in diabetes reached statistical significance (Table III).

Table III Prevalence of diabetes and hypertension among the studied participants stratified by sex

Variables	Male (n=48)	Female (n=55)	Total (n=103)	p value*
Hypertension				0.267
▫ Absent ▫	30 (62.5)	40 (72.7)	70 (68.0)	
▫ Present ▫	148 (37.5)	15 (27.3)	33 (32.0)	
Diabetes				0.030
▫ Absent ▫	36 (75.0)	50 (90.9)	86 (83.5)	
▫ Present ▫	12 (25.0)	5 (9.1)	17 (16.5)	

Data were expressed as frequency (%). *Chi-square test.

Table IV shows the prevalence of DBNCDs and TBNCDs. Overall, 18.4% and 6.8% of the participants were having DBNCDs and TBNCDs. Only 22 (21.4%) participants have none of the NCDs from hypertension, diabetes and obesity.

Table IV Clustering of obesity, hypertension and diabetes in the studied participants stratified by sex

Clustering of NCDs	Male (n=48)	Female (n=55)	Total (n=103)	p value*
No NCD	18 (37.5)	4 (7.3)	22 (21.4)	0.002
Only one NCD	20 (41.7)	35 (63.6)	55 (53.4)	
DBNCD	6 (12.5)	13 (23.6)	19 (18.4)	
TBNCD	4 (8.3)	3 (5.5)	7 (6.8)	

Data were expressed as frequency (%). DBNCD: Coexistences of any two conditions- hypertension, diabetes and obesity. TBNCD: Combination of hypertension, diabetes and obesity, *Chi-square test.

Discussion

The present study provides crucial insights into tribal health in Bangladesh. The data generated from this survey have reported a high prevalence of obesity, diabetes and hypertension that pose a significant threat to the tribal population. The gender differentials have also been identified. Further, the survey result highlights the DBNCDs and TBNCDs in a tribal population receiving health care services from a public primary-level hospital.

In the current study, overall, 53.4% and 23.3% of the patients were respectively overweight and obese as per BMI criteria. Abdominal obesity was

present in 56.3% of the patients. Both general and abdominal obesity were significantly more prevalent among females than males. In the NCD survey 2010, the prevalence of obesity and abdominal obesity was respectively 11.6% and 14.0%.¹⁹ In the 2018 survey, 13.7%, 20.5% and 5.4% of adults were underweight, overweight and obese.²⁰ Obesity is still not widely considered a health risk factor in Bangladesh, and the converse, that losing weight is an indicator of illness, is more likely to be believed. However, prevention and management of obesity are significant challenges, especially in developing countries, where obesity often coexists with underweight.²¹

The prevalence of hypertension was 32%, which exceeds the national data. Self-reported hypertension was 12.5% in 2010, and the prevalence of raised blood pressure was 21.0% in the NCD survey in 2018.^{19,20} The prevalence of diabetes was 16.5% in the current study. There are lines of evidence that the prevalence of diabetes is rising in Bangladesh. The pooled prevalence of diabetes in the general population was 7.8% and the prevalence of pre-diabetes was 10.1% in Bangladesh, as reported by a recent meta-analysis.²² A possible explanation for the higher prevalence in the current study was its hospital-based design. However, a recent nationally representative survey from Bangladesh found the prevalence of hypertension, diabetes and overweight or obesity rate were 55.9%, 23.4% and 24.6%, respectively.¹⁴

In the current study, the prevalence of DBNCDs and TBNCDs was 18.4% and 6.8%, respectively. The prevalence of DBNCDs and TBNCDs were 21.4% and 6.1%, respectively, in another recent nationally representative survey from Bangladesh.¹⁴ Our results and the recent study results were higher than a previous study in Bangladesh, and similar type output like DBNCDs and TBNCDs was 14% and 1.3%.^{19,20}

Limitation

However, this study had certain limitations. Since it was a cross-sectional study conducted at a single centre, its findings cannot be extrapolated to a larger population. Generally, the prevalence among the hospital populace was higher compared to the general population studies, probably due to the existence of the risk factors among the new attendants and also due to the relatively smaller sample size of study participants.

Conclusions

In conclusion, the study demonstrated a high prevalence of overweight or obesity, diabetes, hypertension and DBNCDs among the tribal

patients receiving service from a primary healthcare facility in Bangladesh. The prevalences were much higher than the general Bangladeshi population.

Recommendations

Though this study is a snapshot of NCDs in the Bangladeshi tribal population, findings could help draw the attention of health authorities to adopt preventive strategies against NCDs.

Disclosure

All the authors declared no conflict of interest.

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Association of Lipid Profile with Overweight in Young Adult Students

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Abstract

Background: Overweight and obesity is an emerging epidemical issue in young population. It may lead to many complications like diabetes mellitus, hypertension, cardiovascular disease, dyslipidemia, atherosclerosis, osteoarthritis, gout, cancer etc. Dyslipidemia is frequently present in overweight people and it is a modifiable vascular risk factor. Overweight people are usually unaware about their increased BMI unless it leads to obesity. This study was designed to assess the relation of lipid profile with overweight in young adult students.

Materials and methods: This case control study was conducted in the Department of Physiology, Chittagong Medical College, Chattogram during from June 2018 to July 2019. Total study population consists of 120 students, aged between 18-24 years. They were enrolled from Chittagong Medical College in collaboration with 3 different colleges of Chattogram. 60 Subjects with a BMI of 25-29.9kg/m² were included in case group as overweight subject and 60 subjects of same age with a BMI of 18.5-24.9kg/m² were taken as a control group. Height, weight, BMI and lipid profile (Total Cholesterol=TC, Triglyceride=TG, Low Density Lipoprotein=LDL, High Density Lipoprotein=HDL) were measured. General physical

examinations were done. For statistical analysis unpaired student's 't' test, Chi-square test and correlation coefficient were done by using SPSS for windows version-25.

Results: TC, TG, LDL were significantly high in overweight (Case) students (p<0.001). HDL was significantly low in overweight (Case) students (p<0.01). Frequency of dyslipidemia was more in overweight group (p<0.001) comparing to normal weight group.

Conclusion: Based on the present results it was concluded that healthy overweight young adult students had high lipid profile than normal weight students.

Key words: BMI; Dyslipidemia; Lipid profile; Overweight; Young adult.

Introduction

Overweight and obesity is recognized as a major cause of morbidity and mortality around the world. It indiscriminately affects all classes of populations.¹ Moreover prevalence of overweight is increasing both in developed and in developing countries.² It is related to metabolic and cardiovascular diseases.² Excessive weight also increases the risk of osteoarthritis, gout, liver disease, renal disease and reproductive dysfunction.³ The American cancer society reported that risk of cancer was prevalent among obese. Other health risks associated with overweight include breathlessness, obstructive sleep apnea, back pain, gastrointestinal disturbance and gynecological disorders.³ Weight gain during pregnancy, high birth weight and gestational diabetes were observed to be associated with obesity in later age.⁴ To achieve optimum health, the median body mass index for adult population should be maintained in the range of 21-23 kg/m.^{2,5} Overweight in young adult are rising & its deleterious health hazard is becoming a major threat to the 21st century.⁶ Young individual of 18-24 years of age are an important group for the study of risk factors of several disease as it is a transition period from adolescent to adulthood.⁷

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During this period social, working status and lifestyle become changed.⁷ For the prevention of hypertension, dyslipidemia, cardiovascular and other complications, health education, lifestyle modification should be done in this young aged group of people.⁸

According to WHO dyslipidemia is associated with more than 4 million deaths per year. Abnormal lipid profile was found directly related to excess body fat.² Some studies observed that overweight subjects showed a significant increase in lipid profile with high atherogenic index.^{9,10} In adult high LDL is strongly associated with coronary heart disease while high HDL is usually protective.¹¹ Dyslipidemia are disorder of lipoprotein metabolism including lipoprotein overproduction and deficiency which is associated with obesity regardless of ethnic group.¹² A common dyslipidemic pattern: Increased TG, elevated LDL-cholesterol and TC, lower HDL-cholesterol was observed by different researchers.^{9,10,12,13}

Individual with high TC or LDL may have genetic disorder of lipid metabolism such as familial hypercholesterolemia. Those with familial lipid disorder can experience MI or other diseases in early age.¹¹ Aidah Juliaty et al found no significant differences between dyslipidemia incidences on blood pressure.² This can be explained that lipid abnormality was not only caused by insulin resistance but also influenced by some factors like physical activity, stress, diet, hormonal or genetic disorder.² Several studies found lipid profile was significantly correlated with obesity.^{7,9,10,13} Sorig H A et al found lipid profile is significantly increased in obese group than non-obese group. They also demonstrated the limitations of BMI for estimating the body fat.

Incidence of dyslipidemia can be decreased by reducing lipid through dietary and pharmacological therapy. Omega-3 fatty acid, fruits, vegetables, carotenoids, vit-C, vit-E, dietary fibre, whole grain, legumes are good source of soluble fibers and antioxidant food.¹¹

Based on survey by National Health and Nutritional Status in the USA (NHANES) approximately 30% obese teenage had metabolic syndrome. It is a clinical syndrome consisting of Insulin resistance, glucose tolerance, abnormal lipid profile, high blood pressure associated with obesity.² As there is a high incidence of metabolic syndrome in obese children, it is necessary to do screening for biomedical parameters among young group.²

Overweight people more prone to develop obesity and obesity related complications like dyslipidemia, atherosclerosis.² So, early detection and prevention

of overweight may reduce chronic complications in later life.⁷ Therefore, the study was aimed to assess the relation of lipid profile with overweight in young adult student. By this way, young people may aware about excessive weight related complications. This will reduce the extra burden on medical cost and on our limited health budget.

Materials and methods

This case control study was conducted in the Department of Physiology, Chittagong Medical College in collaboration with Enayet Bazar Girls College, Chattogram Science College and Premiere University Chattogram during June 2018 to July 2019. Procedures of the study and ethical aspects were reviewed and approved by ethical review committee of Chittagong Medical College. The study subjects were selected by consecutive sampling.

Inclusion criteria

60 overweight young adult students aged 18-24 years having BMI within 25-29.9 kg/m² (Case) who gave consent and willing to comply with the study procedure were included. Also normal weight young adult students aged 18-24 years having BMI within 18.5-24.9 kg/m² were selected.

Exclusion criteria

60 Subjects with diabetes mellitus, hypertension, hypothyroidism, hyperthyroidism, cushing's syndrome, any systemic illness or acute illness, pregnancy, lactation, cigarette smoker, alcohol consumer or receiving any medication such as antiepileptic, anti-hypertensive drugs, antilipidemic drugs, antidiabetic drugs, anticoagulant therapy, OCP and subjects unwilling to participate were excluded from this study.

The teachers of each institute helped the researcher for making initial selection of overweight students visually. Simultaneously normal weight student were also selected from each institute. After proper counseling, the aim, objectives and the procedure of the study were explained in details to all subjects. They were encouraged for voluntary participation. All students were allowed to withdraw at any time during the study. They were ensured that all the data will be confidential and were used for research purpose only. Informed written consent was taken. Before data collection students were informed over telephone about the date and time of survey. Data were collected 3 days in a week after their class hour from 2 pm to 5 pm. Each day data were taken from 20 students from specific institute. A predesigned data collection form was provided to the students for collecting demographic information,

information of general health, parents profile, family history, history of present and past illness, physical activities and sedentary activities of each participant. Questionnaires were filled up by the students. For the purpose of exclusion we took history and general examination (Such as appearance, anemia, jaundice, cyanosis, oedema) and systemic examination (Like palpation of abdomen, liver, kidney, auscultation of heart and lung).

Heights, weight, BMI, pulse and blood pressure of students were measured. Weight was measured on bare foot and avoiding excess clothing or any baggage by analogue standard weight machine (CAMRY model BR 2017-China) and was measured in kilogram (Kg).

Height was measured by a meter scale, drawn on the wall of the classroom. It was made by the researchers by using wood scale, measuring tap and pencil. Subjects were stood up straight with their bare feet together back to the wall and the back of their heads, backs and heels were touching the wall against the meter scale. Then height was measured from the top of the vertex to the bottom of the foot.

BMI was calculated as a ratio of the weight in kg and height in square meter.³ Then calculated BMI was analyzed to categorize initially selected participants as normal weight and overweight.

Then blood sample were collected on another day for estimation of lipid profile and fasting blood glucose. Each day blood sample were received from 20 students and they were informed previously over telephone to present on the specific day of blood collection. They were instructed not to drink or eat anything after 10 PM of previous night. Data was collected 3 days in a week between 8:00am-9:00am before their class start. Later students were provided with breakfast. Under aseptic precaution 5 ml venous blood was drawn by vacu needle from median antecubital vein of each student by the researcher. Skin was cleaned with spirit and gauze and tourniquet was applied 2-3 cm above the elbow. Blood sample was taken using disposable syringe and collected in vacuette red and gray tube with 3 ml and 2 ml blood respectively.

Sample were transported by the researcher to the laboratory within 3-4 hour in a sample transport box kept in cold (2 C-8 C) temperature with minimum vibration. First, 2 ml blood of gray tube containing EDTA (Ethylene-Di-amine-Tetraacetic Acid) and sodium-fluoride was placed in the centrifuge machine (Hettich, Rotofix 32A). Fasting

blood glucose was measured by hexokinase-glucose-6-phosphate dehydrogenase method using biochemical auto-analyzer (1347-Siemens Dimension EXL USA). Reagent used with this instrument was GLUC Flex reagent cartridge.

For assaying lipid profile (TC, LDL, HDL and TG), 3ml blood of red vacuette tube was allowed to clot for 30 minutes. Then centrifugation was done in centrifuge machine (Hettich, Rotofix 32A). Supernatant clear serum was transferred into auto-analyzer using Flex reagent cartridge.

Triglycerides was measured by enzymatic method, total cholesterol by cholesterol oxidase – peroxidase method, High Density Lipoprotein (HDL) by direct measure-PEG method and Low Density Lipoprotein (LDL) by direct measure method.

Initially 152 subjects were taken on the basis of BMI. 92 students were overweight and 60 students were normal weight. After analysis of case record forms, general physical examination and blood analysis 32 overweight subjects were excluded. There was no problem with the normal weight (Control) group. Finally total 120 subjects were selected and each group included 60 subjects.

After collection, all data were compiled and processed. The results were calculated by SPSS for windows version-25 (Statistical Package for Social Sciences, Inc. Chicago, IL, USA). Quantitative or continuous variables were described as mean \pm standard deviation. Between groups comparison of these variables were done by unpaired 't' test. Qualitative or categorical variables were expressed as frequency and percentages and compared by chi-square (χ^2) test. Correlation analysis was done by Pearson's correlation coefficient test.

95% confidence limit was taken as minimum level of significance. In the interpretation of results, p value <0.05 was accepted as level of significance.

Results

According to selection criteria total 120 students were selected. 60 overweight students as case and 60 normal weight students were as control group. The mean age of case group (n=60) was 20.12 ± 1.78 years and in control group (n=60) was 20.47 ± 1.94 years. In the present study overweight (Case) and normal weight (Control) group were of similar age ($p > 0.05$) (Table I).

Table I Age, height, weight and BMI of normal and overweight young adult students

Parameters	Normal weight (Control) (n=60)	Overweight (Case) (n=60)
Age (Years)	20.47 ± 1.94	20.12 ± 1.78^{NS}
Height (cm)	164.466 ± 9.28	163.46 ± 8.55
Weight (kg)	58.90 ± 7.72	74.73 ± 8.52
BMI (kg/m^2)	21.70 ± 1.47	27.78 ± 1.61

Data were given as Mean \pm SD. Statistical analysis was done by unpaired 't' test.^{NS} = statistically not significant ($p > 0.001$) BMI= Body Mass Index

The mean height of cases was 163.46 ± 8.55 cm and of the controls was 164.46 ± 9.28 cm. The mean weight of cases was 74.73 ± 8.52 kg and of the controls was 58.90 ± 7.72 kg and mean BMI of the overweight (Case) group was 27.78 ± 1.61 kg/m² and of the normal weight (Control) group was 21.70 ± 1.47 kg/m².

Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein (LDL-C) were significantly higher in overweight group comparing to normal weight group ($p < 0.001$) (Table II). HDL was significantly low in case group than control group ($p < 0.001$) (Table II).

Table II Comparison of lipid profile between normal weight and overweight young adult students.

Parameters	Normal weight (Control) (n=60)	Overweight (Case) (n=60)
TC (mg/dl)	138.63 ± 26.03	$167.70 \pm 26.55^{***}$
TG (mg/dl)	91.97 ± 28.95	$113.27 \pm 34.10^{***}$
LDL (mg/dl)	88.67 ± 19.08	$122.51 \pm 29.26^{***}$
HDL (mg/dl)	45.97 ± 10.62	$41.87 \pm 6.06^{**}$

Data were given as Mean \pm SD. Statistical analysis was done by unpaired 't' test. TC= Total Cholesterol, TG= Triglyceride, LDL= Low Density Lipoprotein, HDL= High Density Lipoprotein, **= statistically significant ($p < 0.01$), ***= statistically significant ($p < 0.001$).

8.3% (5 overweight students) and 78.3% (47 overweight) subjects in this study, had high TC and high LDL level ($p < 0.05$) (Table III). In this study 8.3% (5) overweight students had high TG and 45% (27) overweight students had low HDL, though it was not significant ($p > 0.05$) (Table III).

Table III Comparison of frequency of dyslipidemia in normal and overweight young adult students

Normal weight	Overweight	
	Frequency	(Percentage)
High TC (200mg/dl)	0(0%)	5(8.3%)*
High TG (150mg/dl)	3(5%)	5(8.3%) ^{ns}
High LDL (100mg/dl)	12(20%)	47(78.3%) ^{***}
Low HDL (<40mg/dl)	20(33.3%)	27(45%) ^{ns}

Chi-square test was done, values were expressed as frequency (Percentage) n = number of subject, ns= statistically not significant ($p > 0.05$), *= statistically significant ($p < 0.05$), ***= statistically highly significant ($p < 0.001$), TC= Total cholesterol, TG= Triglyceride, LDL= Low Density Lipoprotein, HDL= High Density Lipoprotein

BMI was positively related with TC, TG and LDL and negatively related with HDL (Table IV) in overweight group though it was not significant ($p > 0.05$) (Table IV).

Table IV Correlation coefficient of BMI with lipid profile in overweight young adult students

	Overweight (BMI)
TC	0.052 ^{ns} (r value)
TG	0.040 ^{ns} (r value)
LDL	0.102 ^{ns} (r value)
HDL	-0.053 ^{ns} (r value)

Pearson's correlation coefficient test was done, ns = statistically not significant ($p > 0.05$), TC= Total Cholesterol, TG= Triglyceride, LDL= Low Density Lipoprotein, HDL= High Density Lipoprotein.

Discussion

In this study Total Cholesterol (TC) Triglyceride (TG) and Low Density Lipoproteins (LDL-C) were significantly higher in overweight group comparing to normal weight group. These findings are in accordance with some previous studies.^{9,14} Some researchers found significantly high value of TC, TG and LDL in overweight people.^{9,14} Overweight students were more likely exposed to hypercholesterolemia and high LDL compared to normal weight group in the present study. It may be due to westernization of diet, consumption of high saturated fat, physical inactivity and changing lifestyle of overweight young adult students. Excessive fatty acid released from visceral fat might be the causes of high value of TG, Very Low Density Lipoprotein (VLDL) and LDL.⁹ Some researchers observed that high lipid profile in obese students comparing to non-obese students though the mean values of lipid parameters were within normal range. The results of their study suggested that overweight and obesity may be related to dyslipidemia though their study subjects were only female.^{9,15}

On the other hand, some authors did not find any significant changes of lipid profile in overweight students comparing to normal weight students.¹¹ While other researchers found significantly high LDL level in overweight group but other parameters were normal.¹⁶ In another studies a significantly high Total Cholesterol (TC) in overweight group but others parameters were normal.^{7,11}

On the other hand in another study the authors found that total cholesterol was not significantly differ between normal and overweight subjects.¹⁷

But they observed that triglyceride (TG) was significantly high in overweight people whereas in another studies the researchers found TG was not high in overweight group.^{17,11}.

In this study the mean High Density Lipoprotein (HDL) value was significantly low in overweight group. Similar results are found in some other studies.^{14,18} Obesity is significantly associated with dyslipidemia mainly with reduction of HDL.¹⁹ It might be due to impaired lipolysis of HDL in lipid disturbance resulting in small unstable HDL¹⁴. Some researchers observed that HDL was normal between normal weight and overweight people which is dissimilar with this study.²⁰

In the current study hypertriglyceridemia and low HDL were not significant as the frequency of high TG and low HDL were approximately similar between overweight and normal weight students. According to this result it may be recommended to measure lipid profile routinely in the young adult group both in normal weight group and overweight group. On the other hand Bijari B et al also observed that no association of types of dyslipidemia between normal weight and overweight group.²¹

In the present study BMI was positively related with TC, TG and LDL in overweight group though it was not significant. This result is in accordance with some studies.^{17,22} On the other hand some investigators found that BMI was significantly correlated with all lipid parameter²¹. But in one study the researchers found negative correlations among TG with BMI and body fat in overweight student. This might be due to the overweight group are vegetarian and physically active.²³

The abnormality of lipid profile seen in fat people is increased triglycerides, cholesterol with high LDL level and low HDL value.¹⁴ Excessive amount of triglyceride rich lipoproteins level results in increased Cholesterol Ester Transfer Protein (CETP) activity which leads to triglyceride rich HDL. Further lipolysis of this HDL occurs by hepatic lipase resulting in small HDL which is thermodynamically unstable.¹⁴ This leads to low HDL level. In this study BMI was negatively correlated with HDL in overweight students though it was not significant which support Aziz J et al. who also observed non-significant negative correlation between HDL and BMI.¹⁷

Limitation

This short period study was done with small sample size and only focused on limited age group. Measurement of Apo B or non-HDL-C or TC:HDL concentrations was not done.

Conclusion

According to this result, it may be concluded that overweight students are more prone to risk of dyslipidemia than normal weight people. More intake of fast food, poor dietary habit, more dependency on devices and unhealthy life style of young adult students may be reason of this result. The abnormality of lipid profile in asymptomatic overweight young adult students emphasizes the need for routine health screening for early preventive measures.

Recommendation

Similar study with large sample size, different age groups and longer duration can be done to found out the actual scenario. Increased cardiometabolic factors, in asymptomatic overweight young adult students emphasizes the needs for routine health screening for early preventive measures.

Disclosure

All the authors declared no competing interest.

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Pattern of Childhood Tuberculosis among Clinically Suspected Cases in an Outpatient Department of a Tertiary Level Hospital in Chattogram, Bangladesh

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Abstract

Background: Tuberculosis (TB) is Bangladesh's one of the major public health concerns. Childhood TB diagnosis is challenging and it contributes significantly to the global TB case load. The profile of childhood TB in the southeastern region of Bangladesh is still limited. This study was conducted to evaluate the frequency and pattern of TB among children with clinical suspicion for TB attended to a Outpatient Department (OPD) of a tertiary level hospital in Southeastern Bangladesh.

Materials and methods: This prospective cross-sectional study was carried out over a period from September 2021 - August 2022 in Pediatrics OPD of Chittagong Medical College Hospital, Chattogram. A total of 265 children aged below 12 years with clinical suspicion of tuberculosis were subjected to multi-phase screening procedure to reach a diagnosis. Comparison were made between TB and Non TB cases as well as PTB and EPTB cases.

Results: Out of 265 screened cases, 26(9.8%) were diagnosed as TB of which 10 (38.5%) were PTB, 13 (50%) were EPTB, and 3 (11.5%) were clinically diagnosed TB. Among the EPTB cases, 84.6% were diagnosed as Tubercular lymphadenitis, 7.7% as pleural TB and 7.7% as tubercular choroiditis. The

commonest age group of the TB cases were 6-10 years (46.2%) and 53.8% were female. Fever and lump in neck remains the main symptoms among the TB cases (53.8% vs 28% and 46.2% vs 20.5%) whereas non-TB cases more commonly presented with persistent cough (59% vs 38.5%). Positive contact history, positive Mantoux test and chest X-ray abnormality were higher in TB cases than non-TB cases and these were statistically significant. Persistent cough in PTB cases and lump in neck in EPTB cases were more common. Significantly higher number of PTB cases provided positive close contact history within past 12 months (90% vs. 38.5%, $p=0.012$) than the EPTB cases. Positive Mantoux test and abnormality on chest X-ray was noticed in all PTB cases and nearly half (46.2%) of the EPTB cases ($p=0.007$).

Conclusion: Childhood TB in both pulmonary and extrapulmonary forms is a common occurrence in our setting. TB is detected in one in every ten children having clinical suspicions of the disease. EPTB is more frequent than PTB with gland TB being the most common form of EPTB.

Key words: Children; Extrapulmonary; Pulmonary; Tuberculosis.

Introduction

Childhood TB had been historically defined as less emphasized and understudied condition, despite its major impact on child health globally.¹ According to World Health Organization (WHO) global TB report 2021, TB still affects >1 million children annually and about 14% of the estimated 1.6 million deaths due to TB involved children.² TB in children indicates ongoing infection in the community and they are at the highest risk of progressing, disease-causing significant morbidity and mortality.^{3,4}

The WHO floated the 'End of epidemic of TB Strategy' in Sustainable Development Goal (SDG) by 2030. The targets for 2030 are a 90% reduction in the number of TB deaths and an 80% reduction in the TB incidence rate compared with levels in 2015.⁵ Bangladesh remains among the top eight nations, accounting for nearly 67% of the all-

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encompassing TB burden.⁶ Multiple national reports from Bangladesh revealed that pediatric cases under 15 years of TB were below 5% of total cases between 2015 and 2019.⁷ Though the country has appreciable initiative regarding pediatric TB control but still has a long way to go to reach the SDG-3 goal.⁸

Poor case detection in childhood TB is a result of multifaceted problems like low quality sample collection, pauci-bacillary nature of the disease in young children and lack of mycobacterial culture facilities.⁹ The infected and diseased children, if not appropriately identified and treated, create a pool from which as much as 50% of total future adult cases can arise.¹⁰ Studies from Bangladesh and neighbouring countries have reported epidemiology and clinical manifestation of pediatric TB.¹¹⁻¹⁴ Clinical presentation of pediatric TB varies among regions due to epidemiological situation and HIV burden in the host country.¹⁵ Furthermore, the diagnosis of pediatric TB also varies depending on available resources in the countries.¹⁶

Epidemiological and clinical profile of pediatric TB cases from different regions of Bangladesh is still less documented. Therefore, this study evaluated the clinical spectrum of TB in children under the age of 12 years with clinical suspicion attending the pediatric OPD of a tertiary care hospital in Chattogram, Bangladesh.

Materials and methods

This study was conducted in the pediatric OPD of Chittagong Medical College Hospital, Chattogram, a public tertiary level teaching hospital, from September 2021 to August 2022. The study protocol was approved by the Ethical Review Committee of Chittagong Medical College and written informed consent was taken from the parents or accompanying relatives of the patients. Consecutive children less than 12 years with any of the symptom criteria of TB or having lump in neck/ axilla/ groin with or without history of close contact with TB patient were included in the study. The children who were already diagnosed as TB in this hospital or elsewhere or getting anti-TB drugs and whose caregiver didn't give consent were excluded. This was an observational study conducted for a pre-specified one year period and hence the statistical methods for sample size determination and randomization was not applied. Demographic and clinical information were collected by interviewing the guardians and examining the children using a structured case record form. Then the children were investigated

with Complete Blood Count (CBC) chest X-ray and Mantoux Test (MT). Other investigations like sputum / gastric lavage for GeneXpert, stool ultra assay, FNAC/ biopsy of lymph node were given according to clinician's judgement. Finally, patients were diagnosed as PTB / EPTB /Clinically diagnosed TB or cases other than TB as per the National Guidelines for the Management of Tuberculosis in Children.¹⁷

Data were analyzed by Statistical Package for Social Science (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). Categorical data were expressed as counts and percentages, while continuous data were expressed as median and Interquartile Ranges (IQR). Differences between categorical data were analyzed using the Chi-square or Fisher's exact tests. The Mann-Whitney U-test analyzed differences between continuous data. All statistical tests were two tailed and $p < 0.05$ was considered statistically significant.

Results

A total of 265 children with clinical suspicion of TB were evaluated during the study period. Out of them, 26 (9.8%) were diagnosed as TB [10 (38.5%) had PTB, 13 (50%) had EPTB and 3 (11.5%) had clinically diagnosed TB]. Among the EPTB cases, 84.6% (n=11) were diagnosed as lymph nodal TB, 7.7% (n=1) as pleural TB, and 7.7% (n=1) as tubercular choroiditis. There was female preponderance among TB children (53.8%) and the median age was 7 (2-9) years. Table I shows that both TB and non-TB cases were similar in terms of their age, sex and residential location. Fever and lump in neck/ armpit/ groin were more common in TB cases whereas persistent cough was significantly predominant in non-TB cases. Significantly higher number of TB cases provided positive close contact history within past 12 months.

Table I Demographic and clinical characteristics of the TB and non-TB cases

Characteristics	TB cases (n=26)		Non-TB cases (n=239)		p value*
	n	%	n	%	
Age groups <1 year	2	7.7	10	4.2	0.791
1-5 years	8	30.8	91	38.1	
6-10 years	12	46.2	105	43.9	
>10 years	4	15.1	33	13.8	
Sex					0.141
Male	12	46.2	146	61.1	
Female	14	53.8	93	38.9	

Characteristics	TB cases (n=26)		Non-TB cases (n=239)		p value*
	n	%	n	%	
Residence					
Rural	10	38.5	82	34.3	
Urban	16	61.5	157	65.7	0.673
Persistent cough	10	38.5	141	59.0	0.045
Fever (>2 wks)	14	53.8	67	28.0	0.007
Weight loss/ Failure to weight gain	15	57.7	112	46.9	0.294
Fatigue / Reduced playfulness/ decreased activity	12	5.0	3	11.5	0.172
Lump in neck/ armpit/ groin	12	46.2	49	20.5	0.003
H/O close contact within past 12 months	14	65.4	30	12.6	<0.001

*Chi-square test.

FNAC of lymph node was done in 11 TB cases and more than 90% (n=10) had Granulomatous inflammation. Among non-TB cases more than three-quarters (n=14) had chronic nonspecific lymphadenitis. Abnormal chest x-ray was found significantly more in TB cases (p<0.05). Pneumonitis (30.8%) and consolidation (11.5%) were the two common chest x-ray findings among TB cases. Table II shows that, most of the laboratory parameters were similar between TB and non-TB cases. Positive Mantoux test and abnormal chest X-ray, though significantly higher in TB cases, were not so infrequent among Non-TB cases.

Table II Laboratory profile of TB and non-TB cases

Variables	TB cases (n=26)	Non-TB cases (n=239)	p value
Hemoglobin, gm/dl	11.12±1.26	11.81±1.46	0.063*
ESR, mm in 1 st hr	20.00 (13.25-48.75)	19.00 (10.00-35.00)	0.341†
Platelet count ×10 ⁹ /L	368.90±123.97	343.25±96.84	0.271*
WBC count ×10 ⁹ /L	9.25 (7.18-12.75)	8.80 (7.10-11.10)	0.471†
Neutrophil %	47.35±15.22	49.51±14.36	0.522*
Lymphocyte %	43.35±13.63	40.45±13.03	0.345*
Positive Mantoux test	19 (73.1)	34 (14.2)	<0.001‡
Abnormal chest x-ray	16 (61.5)	83 (29.3)	<0.001‡

Data were expressed as mean±SD or median (Interquartile range), †Mann-Whitney U test, *Independent sample t test, ‡Chi-square test.

Table III shows that PTB cases were younger than the EPTB cases but the difference failed to reach statistical significance. Gender and residence were found similar in both groups. Regarding presenting features, lump in neck/ armpit/ groin was more common in EPTB cases whereas persistent cough was significantly predominant in PTB cases. Significantly higher number of PTB cases provided positive close contact history within past 12 months.

Table III Demographic and clinical characteristics of the PTB and EPTB cases

Characteristics	PTB cases (n=10)	EPTB cases (n=13)	p value
Age, Years	4.5 (1.4-7.5)	8.0 (5.5-10.5)	0.077†
Sex			
Male	6 (60.0)	5 (38.5)	0.305*
Female	4 (40.0)	8 (61.5)	
Residence			
Rural	4 (40.0)	5 (38.5)	
Urban	6 (60.0)	8 (61.5)	0.940*
Persistent cough	7 (70.0)	2 (15.4)	0.008*
Fever (>2 wks)	5 (50.0)	6 (46.2)	0.998*
Weight loss/ Failure to weight gain	6 (60.0)	6 (46.2)	0.510*
Fatigue / Reduced playfulness/ decreased activity	1 (10.0)	0 (0)	0.435**
Lump in neck/ armpit/ groin	1 (10.0)	11 (84.6)	0.001
H/O close contact within past 12 months	9 (90.0)	5 (38.5)	0.012

Data were expressed as either median (Interquartile range) or count (Percentage), †Mann-Whitney U test, *Chi-square test, **Fisher's exact test.

Positive Mantoux test and abnormal chest X-ray was noticed in all PTB cases and 46.2% of EPTB cases (p<0.05). Table IV shows that, among different hematological parameters, only median lymphocyte percentage was significantly higher in PTB case (p<0.05).

Table IV Laboratory profile of the PTB and EPTB cases

Variables	PTB cases (n=10)	EPTB cases (n=13)	p value
Hemoglobin, gm/dl	11.1 (9.6-12.0)	11.4 (10.3-12.3)	0.715†
ESR, mm in 1 st hr	20.0 (10.0-21.0)	39.0 (12.8-80.0)	0.312†
Platelet count ×10 ⁹ /L	391 (300-562)	355 (267-444)	0.416†
Leukocyte count ×10 ⁹ /L	8.9 (6.8-9.8)	9.5 (8.1-13.8)	0.270†
Neutrophil %	38.0 (34.0-44.0)	55.5 (38.0-62.0)	0.055†
Lymphocyte %	53.0 (51.0-58.0)	41.5 (30.8-52.0)	0.019
Positive Mantoux test	10 (100.0)	6 (46.2)	0.007‡
Abnormal chest x-ray	10 (100.0)	6 (46.2)	0.007‡

Data were expressed as either median (Interquartile range) or count (Percentage), †Mann-Whitney U test, ‡Chi-square test.

Discussion

In this study, EPTB constituted half (50%) of all cases of TB, which supports a recent study from Mainland China, that found around 46% of children having EPTB or combined TB.¹⁸ Previous studies from Dhaka Shishu Hospital and 250 Bedded TB Hospital, Shyamoli, Dhaka showed that overall pediatric EPTB patients were 67.03% and 72%, respectively.^{10,11} A plausible explanation for the differences from the present study is that both previous studies were conducted at capital city of Bangladesh which had relatively better TB related medical diagnosis. Thus, these hospitals might diagnose and treat more EPTB patients, compared with other centres. However, the results of present as well as previous studies from Bangladesh indicate that, EPTB constitute the major burden of pediatric TB in Bangladesh.

In the present study, out of 13 EPTB cases 11 were lymph node TB which is consistent with the study of Haque et al. who reported that 60% of the EPTB cases were TB lymphadenitis.¹¹ In contrast, in the study of Sultana et al. EPTB was predominantly meningeal (27.8%).¹⁰ A study from India found that the Pleural TB was the most common form of EPTB followed by lymph node TB, study from Nepal found that common EPTB sites were lymph nodes and gastrointestinal system, study from China reported that in children meningeal TB was the commonest EPTB, and study from Turkey reported lymph node TB as the most common form of EPTB.^{13,14,18,19} The present study was carried out in an outpatient facility which may cause the difference in results from those conducted in indoor facilities.

In the present study we compared the TB and non-TB cases to identify important clinical and laboratory parameters to differentiate between these two. We found that, presence of fever more than two weeks, positive contact history, positive Mantoux test, and abnormalities in chest X-ray were the factors associated with TB cases. These information would help the physicians during evaluating a suspected pediatric TB cases in our setting.

After comparing the PTB and EPTB cases we found that persistent cough was more common in PTB cases and significantly higher number of PTB cases provided positive close contact history within past 12 months. Contact history is essential for diagnosing TB in children since most of the children acquire TB from adults. The incidence of contact history varies between 16% and 40% in different studies.¹¹⁻¹⁴ In our study, the contact history was present in 90% and 38.5% of children

with PTB and EPTB, respectively. The radiological findings in pediatric TB are variable. Abnormal chest X-ray was present in all patients of PTB. Other authors also reported a similar observation.¹³ The radiological abnormalities were also detected in 46.2% of the patients with EPTB.

The median hemoglobin level was slightly low in the present study and lymphocyte percentage was significantly elevated in PTB compared to EPTB. However, ESR was mildly elevated in both PTB and EPTB. A study from India to assess hematological parameters in TB also showed anemia and leukocytosis.¹³ ESR is a non-specific test and depends on several factors. In a study from Qatar, authors reported normal ESR (<10 mm/h) in one-third of children and elevated ESR (≥ 10 mm/h) in two-third of children at the time of diagnosis.²⁰ The hemoglobin level, total leukocyte count, and other marker of inflammation varies in TB and may not be considered diagnostic for any form of TB. Diagnosis of pediatric TB was not systematic and mostly based on a combination of epidemiological and clinical suspicion supported by results of various investigations in other low-resource setting.¹⁴

Limitation

The study's strength is that it is one of the few studies from Bangladesh that compared clinical and laboratory profiles of PTB and EPTB children. Our study results would help in better understanding childhood PTB and EPTB clinical features and have potential to increase diagnostic yield. The limitations of our study include the small sample size and single center nature, which limits its ability to identify risk factors for PTB and EPTB. Microbiological diagnosis was not possible in most of the cases.

Conclusion

PTB and EPTB both are prevalent in children and the commonest EPTB site is lymph node. Therefore, the clinicians should keep a high index of suspicion for possibility of TB among children so that diagnosis and treatment of TB would not be delayed. This short duration study involved a small number of patients.

Recommendation

Further large scale multi-center study is recommended to delineate the risk factors of PTB and EPTB in the country.

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Near Miss Maternal Morbidity: A Case Report

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Abstract

Background: Maternal Near Miss (MNM) refers to a seriously ill pregnant or recently delivered woman who would have died but survived by luck or better obstetric care. Reviews of such situations are viewed as a less risky strategy by the service provider to improve maternal health care. This will allow us to take advantage of possibilities to prevent the deaths of mothers who may meet a similar fate.

Case Presentation: We present a case of a 35-year-old woman attended at Chattagram International Medical College on 22nd January 2022, who had intractable bleeding following cesarean delivery at 38 weeks gestation and was found to have complete placenta previa with placenta percreta invading the urinary bladder. Intraoperative blood loss was managed by massive blood transfusion, hysterectomy, and damage control surgery. Postoperatively, the patient developed acute kidney injury and septicemia, but with a multidisciplinary collaboration, the patient was withstood and happily discharged on the 19th postoperative day.

Conclusion: Hemorrhages and hypertension disorders are the prime causes of MNM. Early diagnosis and adequate management of MNM cases can reduce the rates of morbidity.

Key words: Bladder invasion; Damage control surgery; Maternal near miss, Placenta percreta.

Introduction

During the last two decades, there has been a substantial and worldwide reduction in maternal

mortality.¹ As maternal deaths have dropped significantly over the past two decades, the measurement of maternal morbidity is crucial to the ongoing elaboration of the post-2015 Sustainable Development Goals (SDGs). Studying MNM, women who nearly died but survived a complication during pregnancy, childbirth or postpartum, is increasingly recognized as a valuable means to examine the quality of obstetric care.² Obstetric haemorrhage associated with placenta percreta is one of the leading underlying causes of MNM.³

Placenta percreta is a condition in which the placenta abnormally penetrates entirely through the myometrium and into the uterine serosa. Placenta percreta is a potentially fatal condition and the mortality rate is correlated to the extent of involvement of surrounding structures.⁴ When Placenta percreta is complicated by bladder invasion, mortality rates have been estimated as high as 9.5% and 24% for mother and child, respectively.⁵ Knowledge of this condition and expectant management is vital, as the incidence is rising- an estimated 50-fold increase in the last 50 years attributed to the increased frequency of Caesarean deliveries.⁵ Inexperience of personnel providing treatment is the most frequently identified problem in maternal deaths associated with the placenta percreta.⁶ We present a case of placenta percreta diagnosed incidentally during cesarean section with massive blood loss and need a hysterectomy and damaged control surgery.

Case Presentation

Mrs X, 35 years, Para 3+0, housewife, was admitted Chattagram International Medical College on 22nd January 2022 with 38 weeks of pregnancy for elective caesarean section due to previous history of one caesarean section. Her all-antenatal investigations were found normal. The last ultrasonography report revealed 36 weeks of single alive pregnancy, location of the placenta was in the upper segment. With due consent, keeping 1 donor ready, a caesarean section started by spinal anaesthesia and diagnosed as a case of central

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placenta previa. A healthy baby was born by as usual incision. During placental delivery, it was revealed that the placenta invaded the myometrium, parametrium and urinary bladder. Intractable bleeding started, the patient underwent hypovolemic shock and spinal anaesthesia was converted into general anaesthesia.

Despite all measures, bleeding was not controlled and a hysterectomy was performed. Nevertheless, bleeding from the bladder wall could not be secured as colossal neo-vascularisation occurred. The patient was in shock and cardiac arrest developed, which was reversed by two cycles of CPR. After informing the professional body and patient party, a damage control surgery was done by packing three mops in the bladder base, which was removed 40 hours later. In the meantime, 12 blood and three fresh frozen plasma units were transfused in the ICU setting.

Following mop removal, the abdomen was closed by a drain tube, and the fat and skin layer was kept open for delayed secondary closure. The patient was extubated on 3rd postoperative day but developed acute kidney injury. Her creatinine level was 3.75 mg/dl, reached up to 4.3 mg/dl and alanine transaminase was 900IU/L. Ultrasonography revealed hepatomegaly, moderate ascites and renal parenchymal disease. A multidisciplinary team was involved. The daily dressing was done. On 9th POD, she developed septicemia, managed by Inj. Piperacillin, Tazobactam and multidisciplinary team approach. Her delayed secondary closure was done on the 13th POD. The patient was happily discharged on the 19th POD.

Discussion

We describe a case of placenta percreta accidentally detected during the intrapartum period that required 16 units of blood to be transfused, damage control surgery to stop bleeding, and 20-day hospitalization. Although the exact cause of placenta percreta is unknown, it is associated with several clinical situations such as previous cesarean delivery, placenta previa, grand multiparity, previous uterine curettage, and previously treated Asherman syndrome.⁷ The key particularity of our case is the existence of one previous cesarean section. The management of placenta percreta can be challenging as the average blood loss during delivery is 3 liter or more in 90% patients.⁸ Forty percent of the patients need >10 transfusions and it has a 7% maternal mortality rate. Refractory hematuria is present in 25% patients due to bladder invasion by placenta percreta.^{9,10}

Abdominopelvic packing has become a valuable strategy for damage control in women with postpartum haemorrhage associated with cesarean delivery and hysterectomy.^{11,12} The American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine guidelines note that packing can help achieve patient stabilization and product replacement in the setting of acute uncontrolled hemorrhage.¹³ It should be used as a last resort, because of the possible complications that may follow it. Although several packing materials have been used for pelvic tamponade,¹⁴ three mops achieved hemostasis in our patient. In general, 24 hours is adequate to achieve optimal clotting and hemostasis. Although the optimal time to remove packs used for general surgery cases has been suggested as between days 2 and 3 postoperatively, pack was removed after 40 hours in our patient.¹⁵ We wished to avoid further complications, and hemostasis had been achieved. Though our patient developed AKI and septicemia in the postoperative period, fortunately, she escaped from other serious complications associated with placenta percreta, like DIC, blood clots in the bladder, lactation failure, fistulas, ovarian loss, ileus, and recurrent bladder perforations.¹⁶ The complications were managed by multidisciplinary collaboration. In our case, successful management was possible because of prompt management by an expert team. This case illustrates the importance of early diagnosis of placental location, invasion and preparation for surgery at an adequately resourced hospital. Our patient survived because she was managed in a tertiary-level academic hospital by a multi-disciplinary team of experts.

Conclusion

Maternal mortality is just the “tip of iceberg” has broad base to the iceberg is maternal morbidity, which remains unrecorded throughout the decades. Near miss cases occur more often than maternal death in recent years. Experience and adequate surgical techniques can prevent maternal death associated with accidentally diagnosed morbid adhesion of placenta.

Disclosure

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Spinal Anesthesia with Sedation for Herniotomy in a 3-Year-Old Child

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Abstract

Background: Spinal anesthesia is a regional anesthesia which is preferable for surgeries mainly for lower abdomen and lower limbs. Spinal anesthesia in children is well tolerated & shows good stability in systolic, diastolic and mean arterial pressure due to absence of arterial hypotension secondary to sympathetic blockade as observed in adult and prevent the hazards of general anesthesia.

Case Presentation: A 3 years 1 months old boy weighting 10 kg came to CIMCH Anesthesia Department on 10th July 2023 for preanesthetic checkup for inguinal herniotomy for uncomplicated right sided inguinal hernia. After preoperative assessment we describe the parents about the mode of anesthesia as well as risk and benefit of both spinal and general anesthesia. After taking written informed consent from the parents, herniotomy was performed under spinal anesthesia with sedation. The perioperative as well as postoperative period was uneventful and patient was discharged on the same day of surgery without any further complications.

Conclusion: Spinal anesthesia with sedation can be a viable option for herniotomy surgery in children. It is well tolerated and minimizing the

risks associated with general anesthesia in children.

Key words: Herniotomy; Sedation; Spinal anesthesia.

Introduction

Spinal Anesthesia (SA) is a part of regional anesthesia used for sub umbilical and lower limb surgeries.¹ The first spinal anesthesia in children had been practiced by Bier in the nineteenth century (1898) then by Bainbridge (1901) and Gray (1909).^{1,2} Due to considerable improvements of General Anesthesia (GA) in the middle of twentieth century, this regional anesthesia did not become part of routine practice until the 1980's when regional anesthesia increased in popularity.² The particular advantage suggested for SA in children was the avoidance of General Anesthesia (GA) in those at risk of post operative apnea.³ Several studies demonstrated that SA had a particular role in high-risk for merpreterm neonates undergoing inguinal herniotomy.⁴ This case report describes the management of a 3-year-old child who underwent herniotomy surgery under spinal anesthesia with sedation. The objective of this report is to share our experience and outcomes with this approach.

Case Presentation

A 3 years 1 month old boy came to Anesthesia Department, Chattagram International Medical College Hospital on 10th July 2023 with a diagnosis of an uncomplicated right inguinal hernia. The medical history was unremarkable, with no known allergies or previous adverse reactions to anesthesia. Preoperative assessment confirmed the patient's general good health and readiness for surgery.

The technique explained fully to the parents, with a description of risks and benefits. A full blood count including platelet count, Blood for grouping and Rhtyping, Bidding time, clotting time and chest X-ray performed preoperatively. The child was fasted for 6 hours for milk and 2 hours for clear liquid.

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After obtaining informed consent from the parents, the child was brought to the operating room. Standard American Society of Anesthesiologists (ASA) monitors were applied, including heart rate, respiratory rate, continuous oxygen saturation monitoring, non-invasive blood pressure measurement and electrocardiography.

American Society of Anesthesiologists (ASA) monitors were applied, including heart rate, respiratory rate, continuous oxygen saturation monitoring, non-invasive blood pressure measurement and electrocardiography.

The following steps were taken for spinal anesthesia

- i) After establishment of intravenous access, the baby was preloaded with crystalloid solution (Ringer lactate) 10ml/kg.
- ii) Inj. ketamine 10 mg with Inj. midazolam 0.3 mg and Inj. atropine 0.1mg was administered intravenously for comfort and relaxation for lumbar puncture.
- iii) The child was placed in the lateral decubitus position with flexion of the spine.
- iv) The lower lumbar interspace (L4-L5) was chosen for the spinal injection.
- v) A 27-gauge spinal needle was used via midline approach
- vi) After getting free flow of Cerebrospinal Fluid (CSF) 4mg hyperbaric bupivacaine (0.5%) was injected in the subarachnoid space.
- vii) The child was then positioned supine.

After 10 min of SAB Sensory level was assessed by lack of response to firm skin pinch to the dermatomal level shows the peak sensory level was at T10 and Bromage score was 3 shows inability to raise leg, flex knee or ankle, move toes (Complete motor block). Surgery was allowed to start and there was no response to surgical stimuli.

The child remained calm and cooperative throughout the procedure. There were no signs of discomfort or distress. The surgical team performed the herniotomy without complications. Intraoperative vital signs remained stable.

Following surgery, the child was transferred to the Post-Anesthesia Care Unit (PACU) for monitoring and recovery. The patient's sensory and motor function gradually returned and he was able to move his lower limbs within 2 hours. Pain management was provided with paracetamol suppository (125mg).

The child was discharged home on the same day and followed up in the outpatient clinic for routine

postoperative care. There were no postoperative complications and the patient's parents reported satisfaction with the anesthetic management.

Discussion

This case report highlights the successful application of this technique in a 3-year-old child, emphasizing the importance of careful patient selection, appropriate dosing and vigilant intraoperative monitoring.

In developed countries, like the United States, SA has been included since 1977, with 262 SA, on less than 1-year patients, in 15 years.⁵ In Europe, 400 to 500 SA are performed annually (18% in preterm and 5% newborns).^{6,7} In India, in a 1-year period study, 102 children (From 6 months to 14 years) received spinal anesthesia for sub umbilical and lower limb surgeries.⁸ However, the use of spinal anesthesia especially in "precarious" or "difficult" situations is attractive because it requires fewer perioperative resources.⁹ Spinal anesthesia is primarily indicated in patients with high risk for general anesthesia (= Respiratory complications or postoperative apnea because of pulmonary disease or prematurity).^{1,10,11,12} Because it reduced risk of airway complications. It is a safe alternative when tracheal intubation should be avoided (Due to bronchopulmonary dysplasia or respiratory diseases).^{1,13} It is the gold standard for lower abdominal and lower limb surgeries under 90 min duration.^{1,2,10,14} In this case sedation was administered intravenously for comfort and relaxation of the patient during lumbar puncture and surgery. The spinal puncture was performed in first attempt in lateral position with flexion of the spine at the level of lumbar interspace (L4-L5) with a 27-gauge spinal needle via midline approach. This midline approach is commonly used in SA in small children, in lateral or seated position.^{8,12,15} After getting free flow of Cerebrospinal Fluid (CSF) 4 mg of hyperbaric bupivacaine (0.5%) was injected in the subarachnoid space. Hyperbaric bupivacaine (0.5%) is mostly used in a dose from 0.3 to 1 mg/kg.^{1,8,12,16} The heart rates were stable throughout the perioperative period. Spinal anesthesia allows remarkable cardiovascular stability and can avoid bradycardia with minimum cardiac complications.^{2,11,7} It also causes less apnea, desaturation, requiring less postoperative respiratory assistance than GA, ventilation and oxygenation are not generally compromised, even in patients at high risk.^{11,17,18}

Conclusion

Spinal anesthesia with sedation can be a viable option for herniotomy surgery in preschool-aged

children, providing adequate surgical conditions and postoperative pain relief while minimizing the risks associated with general anesthesia. This case report adds to the growing body of evidence supporting the use of regional anesthesia in pediatric patients and further research in this area is warranted.

Disclosure

All the authors declared no competing interests.

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We would like to take this opportunity to thank you for the effort and expertise that you contribute to reviewing, without which it would be impossible to maintain the standards of Chattagram International Medical College journal.

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