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The aim of the JShSMC is to foster and promote the research activities on the area of medical science at any discipline. This journal provides accessible rooms for the researchers of Shaheed Suhrawardy Medical College and all researchers at anywhere in this country as well as the researchers of whole world.

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1. Title
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4. Structured Abstract
5. Key words
6. Introduction
7. Methodology
8. Results
9. Discussion
10. Conclusion
11. Acknowledgement
12. References
13. Tables
14. Figures

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Authors should report systematic reviews and meta-analyses in accordance with the **PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.** For Systematic Reviews, both abstract and text of the manuscript should be subdivided into the following sequential sections:

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These should contain title page, abstract (need not be structured) and key words. The text proper should be written under appropriate sub-headings. The total number of text words should not exceed 10000 and the total number of figures and tables should not be more than 7.

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   Vega KJ, Pina I, Krevsky B. Heart transplantation is associated with an increased risk for pancreatobiliary disease. Ann Intern Med 1996 Jun 1;124(11):980-3

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   Vega KJ, Pina I, Krevsky B. Heart transplantation is associated with an increased risk for pancreatobiliary disease. Ann Intern Med 1996;124: 980-3

   **More than six authors:**

   Parkin DM, Clayton D, Black RJ, Masuyer E, Friedl HP, Ivanov E, et al. Childhood leukaemia in Europe after Chernobyl: 5 year follow-up. Br J Cancer 1996;73:1006-12

2. **Organization as author**

   The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust 1996; 164: 282-4

3. **No author given**

   Anonymous. Cancer in South Africa [editorial]. S Afr Med J 1994;84:15

4. **Article not in English**

   (Note: NLM translates the title to English, encloses the translation in square brackets, and adds an abbreviated language designator.) Ryder TE, Haukeland EA, Solhaug JH. Bilateral infrapatellar seneruptur hostidligere frisk kvinne. Tidsskr Nor Laegeforen 1996;116:41-2.

5. **Volume with supplement**

   Shen HM, Zhang QF. Risk assessment of nickel carcinogenicity and occupational lung cancer. Environ Health Perspect 1994;102Suppl 1:275-82.

6. **Issue with supplement**

   Payne DK, Sullivan MD, Massie MJ. Women's psychological reactions to breast cancer. Semin Oncol 1996; 23(1 Suppl 2):89-97.

7. **Volume with part**

   Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in non-insulin dependent diabetes mellitus. Ann Clin Biochem 1995;32(Pt3):303-6.

8. **Issue with part**

   Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in ageing patients. N Z Med J 1994;107(986 Pt 1):377-8.

9. **Issue with no volume**

   Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop 1995;(320):110-4.

10. **No issue or volume**

    Browell DA, Lennard TW. Immuno-logic status of the cancer patient and the effects of blood transfusion on antitumor responses. Curr Opin Gen Surg 1993: 325-33.

11. **Pagination in Roman numerals**

    Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am 1995 Apr;9(2):xi-xii.

12. **Type of article indicated as needed**

    Enzensberger W, Fischer PA. Metronome in Parkinson's disease [letter]. Lancet 1996;347:1337.

    Clement J, De Bock R. Hematological complications of hantavirus nephro-pathy (HVN) [abstract]. Kidney Int 1992;42:1285.

13. **Article containing retraction**

    Garey CE, Schwarzman AL, Rise ML, Seyfried TN. Ceruloplasmin gene defect associated with epilepsy in EL mice [retraction of Garey CE, Schwarzman AL, Rise ML, Seyfried TN. In: Nat Genet 1994;6:426-31]. Nat Genet 1995;11:104.

**14. Article retracted**

Liou GI, Wang M, Matragoon S. Precocious IRBP gene expression during mouse development [retracted in Invest Ophthalmol Vis Sci 1994; 35:3127]. Invest Ophthalmol Vis Sci 1994;35:1083-8.

**15. Article with published erratum**

Hamlin JA, Kahn AM. Herniography in symptomatic patients following inguinal hernia repair [published erratum appears in West J Med 1995; 162:278]. West J Med 1995; 162: 28-31. Books and Other Monographs

*(Note: Previous Vancouver style incorrectly had a comma rather than a semicolon between the publisher and the date.)*

**16. Personal author(s)**

Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

**17. Editor(s), compiler(s) as author**

Norman IJ, Redfern SJ, editors. Mental health care for elderly people. New York: Churchill Livingstone; 1996.

**18. Organization as author and publisher**

Institute of Medicine (US). Looking at the future of the Medicaid program. Washington: The Institute; 1992.

**19. Chapter in a book**

Phillips SJ, Whisnant JP. Hypertension and stroke. In: Laragh JH, Brenner BM, editors. Hypertension: Pathophysiology, diagnosis, and management. 2nd ed. New York: Raven Press; 1995. p. 465-78.

**20. Conference proceedings**

Kimura J, Shibasaki H, editors. Recent advances in clinical neuro-physiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15-19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

**21. Conference paper**

Bengtsson S, Solheim BG. Enforce-ment of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Infor-matics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561-5

**22. Scientific or technical report Issued by funding/sponsoring agency:**

Smith P, Golladay K. Payment for durable medical equipment billed during skilled nursing facility stays. Final report. Dallas (TX): Dept. of Health and Human Services (US), Office of Evaluation and Inspections; 1994 Oct. Report No.: HHSIGOEI69200860.

**Issued by performing agency:**

Field MJ, Tranquada RE, Feasley JC, editors. Health services research: work force and educational issues. Washington: National Academy Press; 1995. Contract No.: AHCPR282942008. Sponsored by the Agency for Health Care Policy and Research.

**23. Dissertation/Thesis**

Kaplan SJ. Post-hospital home health care: the elderly's access and utilization [Dissertation/Thesis]. St. Louis (MO): Washington Univ.; 1995.

**24. Patent**

Larsen CE, Trip R, Johnson CR, in-ventors; Novoste Corporation, assignee. Methods for procedures re-lated to the electrophysiology of the heart. US patent 5,529,067. 1995 Jun 25. Other Published Material

**25. Newspaper article**

Lee G. Hospitalizations tied to ozone pollution: study estimates 50,000 admissions annually. The Washington Post 1996 Jun 21;Sect. A:3 (col. 5).

**26. Audiovisual material**

HIV+/AIDS: the facts and the future [videocassette]. St. Louis (MO): Mosby-Year Book; 1995.

**27. Legal material**

**Public law:** Preventive Health Amendments of 1993, Pub. L. No. 103-183, 107 Stat. 2226 (Dec. 14, 1993). Unenacted bill: Medical Records Confidentiality Act of 1995, S. 1360, 104th Cong., 1st Sess. (1995) Code of Federal Regulations: Informed Consent, 42 C.F.R. Sect. 441.257 (1995).

**Hearing:** Increased Drug Abuse: the Impact on the Nation's Emergency, Rooms: Hearings Before the Subcomm. On Human Resources and Intergovernmental Relations of the House Comm. On Government Operations, 103rd Cong., 1st Sess. (May 26, 1993).

**28. Map**

North Carolina. Tuberculosis rates per 100,000 population, 1990 [demo-graphic map]. Raleigh: North Carolina Dept. of Environment, Health, and Natural Resources, Div. of Epidemiology; 1991.

**29. Dictionary and similar references**

Stedman's medical dictionary. 26th ed. Baltimore: Williams & Wilkins; 1995. Apraxia; p. 119-20.

**30. Classical material**

The Winter's Tale: act 5, scene 1, lines 13-16. The complete works of William Shakespeare. London: Rex; 1973.

**31. In press**

(Note: NLM prefers "forthcoming" because not all items will be printed.)

Leshner AI. Molecular mechanisms of cocaine addiction. N Engl J Med. In press 1996.

**Electronic Material**

**32. Journal article in electronic format**

Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis [serial online] 1995 Jan-Mar [cited 1996 Jun 5]; 1(1):[24 screens].

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**Authorship and Responsibilities**

- Anyone who makes significant intellectual contribution must be given authorship.
- Every author must be involved in planning, implementation and analysis of the research study and its presentation in the form of the manuscript. In case some clarification is sought, they should be able to reply to the queries.
- Authors should be ready to take public responsibility for the content of the paper.
- All the authors in a manuscript are responsible for the technical information communicated. For this reason it is necessary that all authors must read and approve the final version of the manuscript before signing the consent and declaration form.

*Conflicts of interests if any, the details must be declared in a separate sheet.

# Perspective of Integrated Teaching

Integration means the coordination of different activities to ensure the harmonious functioning of the educational process.

Integration can be defined as the organization of teaching matters to interrelate or unify subjects frequently taught in separate academic courses or departments. In other words, it correlates various subjects to create interest, reduce fragmentation and enable students to learn a topic /subject effectively. In medical education integration between different disciplines and phases of academic years help students to connect concepts & experiences thus ensuring effective long-lasting learning. Integration may be described as horizontal integration and Vertical integration. Horizontal means Integration between the various disciplines within any one or each year of the course and vertical Integration depicts integration of disciplines taught in different phases of the course.

Curricular integration can be viewed as a ladder, with discipline-based teaching (isolation) at the bottom of the ladder and full integration (trans-disciplinary teaching) at the top. The first four steps emphasize the subjects or disciplines. The following seven steps emphasize integration across several disciplines. In the final step, the students take more responsibility for the integration.

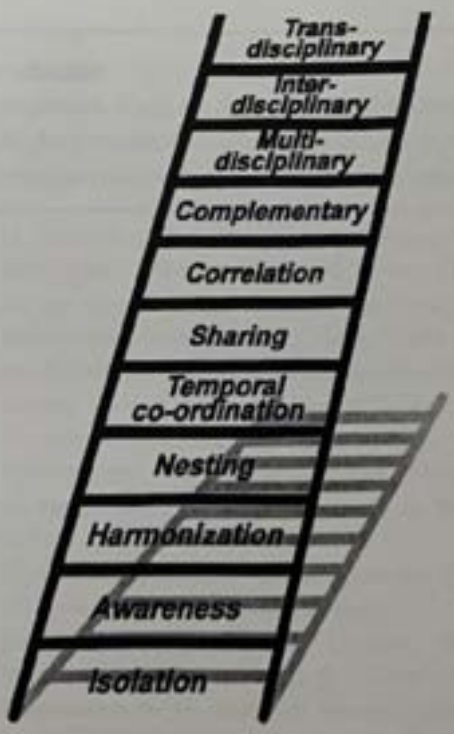


**Fig.-1:** *Integration Ladder by Harden*

It's a time-demanding method in medical education and has been incorporated in different countries of the world. In traditional discipline-based teaching, disciplines are taught separately, emphasizing basic sciences in the early years and clinical subjects in later years, On the contrary, integrated teaching causes blending/ combination of the disciplines from the very beginningto acquire knowledge, skill & attitude to address case management. Sequential and stepwise bridging of a topic involving teachers from different phases helps the students to get long-lasting knowledge and a better understanding of a topic along with developing good skills and attitude.

Various integrated medical curricula have been adopted by many medical schools all over the world to ensure a holistic approach rather than a fragmented one which in turn encourages meaningful learning in medical education.[1] Comparing effectiveness of integrated teaching with traditional teaching in the study revealed Ninety-four percent of Faculties agreed that integrated teaching was an effective mode of training. Ninety percent of faculties rated the program on a higher scale. Ninety-five percent students liked the concept of integrated teaching.[2] Medical educationists realized that there was a need for integrating basic and clinical medical sciencesand an integrated approach with strong clinical relevance captures students' attention and creates more excitement in learning.[3] Integrated curricula have been widely adopted, fuelled by dissatisfaction with the way basic sciences have been taught as individual disciplines with no clinical application and by growing recognition that traditional instructional modes no longer meet current demands for interdisciplinary inquiry and practice in medicine.[4,5]

A few studies reported program outcomes: students trained within an integrated curriculum made more accurate diagnoses than did students trained in a conventional curriculum.[6] Vertical integration between basic sciences and clinical medicine in problem-based learning curricula stimulated better understanding of biomedical principles than did conventional curricula[7], and a high degree of horizontal integration occurred in the early years, but more input from clinicians was needed throughout the curriculum to achieve vertical integration.[8]

There might be barriers to implementing integrated teaching but it's the need of time and should be followed by all medical colleges to ensure better outcomes for students as a medical doctor. A few drawbacks are different subject identity crisis, it requires inter-departmental planning, costly in comparison to discipline-based teaching. On the counterpart, Integrated teaching brings a higher level of objectives, minimizes repletion, avoids information overload, and makes learning effective. In Bangladesh medical colleges have started following integrated teaching according to the direction of Bangladesh Medical and Dental Council (BMDC) MBBS curriculum 2021. Integrated teaching involving different disciplines makes learning enjoyable, meaningful and ensures deeper learning rather than surface learning. To make learning student-friendly, gain knowledge, skill, and attitudes by students for effective patient management; thereby serving the community integrated teaching is the most demanding approach.

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## References

1. Yadav PP, Chaudhary M, Patel J, Shah A, Kantharia ND. Effectiveness of integrated teaching module in pharmacology among medical undergraduates. Int J App Basic Med Res 2016;6:215-9
2. Dubhashi, S. P., Dubhashi, R. S., &RajatSindwani, -. (2022). Integrated Teaching: the Need of the Hour. Bangladesh Journal of Medical Education, *13*(1), 79–86. https://doi.org/10.3329/bjme.v13i1.57509
3. Dandannavar VS. Effect of Integrated teaching versus conventional lecturing on MBBS phase I students. Recent Research in Science and Technology 2010;2(11):40-48.
4. M, Irby DM, Sullivan W, Ludmerer KM. American medical education: 100 years after the Flexner report. N Engl J Med 2006;355 (13):1339–44
5. Muller JH, Jain S, Loeser H, Teby DM. Lesson learnt about integrating a Medical School curriculum: Perceptions of students, faculty and curriculum leaders. Med Edu 2008;42:778-785
6. Schmidt HG, Machiels-Bongaerts M, Hermans H, ten Cate TJ, Venekamp R, Boshuizen HP. The development of diagnostic competence: comparison of a problem-based, an integrated, and a conventional medical curriculum Acad Med 1996;71: 658–64.
7. Dahle LO, Brynhildsen J, BehrbohmFallsberg M, Rundquist I, Hammar M. Pros and cons of vertical integration between clinical medicine and basic science within a problem-based undergraduate medical curriculum: examples and experiences from Linko¨ping, Sweden. Med Teach 2002;24 (3):280–5.
8. Davis MH, Harden RM. Planning and implementing an undergraduate medical curriculum; the lessons learned. Med Teach 2003;25 (6):596–608.

## Original Article

# Detection of Carbapenemase Genes by Molecular Method among Gram-Negative Bacilli Isolates from Tertiary Care Hospital in Dhaka, Bangladesh

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**Abstract**

***Background**: Imipenem resistance in Gram-negative bacilli is a global epidemic that is increasing day by day. To warn this global epidemic, identification and ongoing surveillance of carbapenem-resistant genes among Gram-negative bacilli needed.*

***Objectives**: This cross-sectional study was performed to detect the imipenem resistant genes among Gram-negative bacilli isolated from different samples in Dhaka medical college hospital.*

***Methods**: About 300 samples (wound swab, urine, endotracheal aspirate, blood, and sputum) were collected from July 2015 to June 2016. Among them, 204 isolates were Gram negative bacilli. Eighty imipenem resistant Gram-negative bacilli were isolated by disc diffusion method. Among them, carbapenem resistant genes (blaNDM-1, blaKPC, VIM, IMP) were detected by PCR.*

***Results**: A total 300 samples were analyzed. Out of 204 Gram negative bacilli,80 (39.21%) imipenem resistance was detected by the Disc Diffusion method. Out of 80 imipenem resistant organisms, 42 (52.5%) were positive for blaNDM-1, 6 (7.34%) were positive for blaKPC, 29 (36.25%) were positive for VIM. 13 (16.25%) were positive for IMP.*

***Conclusion**: This study illustrates the emergence of carbapenemase genes producing Gram negative bacilli isolates from patients. Close surveillance across all hospitals in Bangladesh is required.*

**Key Words:**
Carbapenemase, Drug Resistance,Genes, Gram-negative bacilli, Imipenem

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**Introduction:**

Carbapenem drugs are the most valuable drugs for treating multi-drug resistant Gram-negative bacteria (MDR-GNB) infections. However, there has been a significant growth of carbapenem-resistant organisms that cause severe damage to public health.[1,2] Carbapenem resistance is mainly owing to the expression of a carbapenemase enzyme, efflux pump, or porin loss. Among these, the most important and difficult mechanism is the production of the carbapenemase enzyme, because it is present on mobile genetic elements, which are easily transferable from one bacterium to another bacterium such as *Pseudomonas spp.*, *Acinetobacter spp.*, *Escherichia coli* (*E. coli*), and *Klebsiella spp.*, which the World Health Organization (WHO) has designated as high priority organismsin 2017.[3,4] The major carbapenemase genes are bla-*Klebsiella pneumonia*carbapenemase (blaKPC), bla-oxacillin hydrolyzing enzymes-48 (blaOXA-48), bla-New Delhi metallo-â-lactamase (blaNDM), bla-Verona integron-mediated metallo-â-lactamase (blaVIM), and bla-active on imipenem (blaIMP), which are present globally and cause nosocomial infections. Many researchers have

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studied various methods of carbapenem resistance detection including carbapenemases. [2,5,6]

In this current study, we want to detect carbapenem genes which are caused imipenem resistant among Gram negative bacilli in hospital in our country.

**Materials and methods:**

A total of 300 samples (wound swab, urine, endotracheal aspirate, blood, and sputum) were collected from July 2015 to June 2016 in Dhaka Medical College Hospital in a cross-sectional study. All the wound swab, urine, pus, and endotracheal aspirate samples were inoculated in blood agar and MacConkey agar media and incubated at $37^0$ Caerobically for 24 hours. Incubated plates were then examined for the presence of colonies of bacteria. 204-Gramnegative bacilli were isolated. Susceptibility to Imipenem of all isolates was done by Kirby Bauer modified disk diffusion technique using Muller Hinton agar plates, and zones of inhibition were interpreted according to CLSI guidelines (CLSI, 2015).Antibiotic disc imipenem (10ig) was used. The examinedclear zone of inhibition around the disc on the testorganisms were interpreted as resistant and sensitive. All strains were tested for antibiotic susceptibility by Disk Diffusion and were designated for Imipenem as susceptibleif the inhibition zone diameter was e"22 mm, intermediateif the inhibition zone diameter was 19–21 mm, and resistantif the inhibition zone diameter was d"18 mm, asrecommended by Clinical and Laboratory StandardInstitute (CLSI) (2015).[11] Carbapenemase genes such as *bla*NDM-1, *bla*KPC, *bla*IMP and *bla*VIM genes were detected by PCR using specific primers.

**Results:**

Of the total 300 samples, 204 (68%) gram negative bacteria were isolated. Out of 204 isolated Gram negative bacteria, 80 (39.21%) imipenem resistant strains were detected. Table I: Out of 80 imipenem resistant organisms, 42 (52.5%) were positive for *bla*NDM-1 detected by PCR. Of them, 10 (12.5%) were isolated from wound swab, 3 (3.75%) from urine, 25 (31.25%) from ETA, 2 (2.5%) from blood and 2 (2.5%) from sputum. Among 12 imipenem resistant *Esch.coli*, 6 (50%) were positive for *bla*NDM-1. Five (55.55%) of the 9 imipenem resistant *K.pneumoniae*, 3 (75%) of the 4 imipenem resistant *K.oxytoca*, 3 (50%) of the 6 imipenem resistant *Citrobacter freundii*, one (50%) of the 2 imipenem resistant *Enterobacter aerogenes*, 17 (86%) of the 20 imipenem resistant *Acinetobacter baumannii* and 7 (29.16%) of the 24 imipenem resistant *Pseudomonas aeruginosa* had NDM-1 encoding gene.

Table II: Out of 80 imipenem resistant Gram- negative bacteria, 6 (7.34%) were positive for *bla*KPC detected by PCR. Among 20 imipenem resistant *Acinetobacter baumannii*, 6 (30%) were positive for *bla*KPC. Among 36 imipenem resistant *Enterobacteriaceae*, 4 (11.11%) from wound, 2 (5.55%) from urine and 2 (5.55%) from ETA. Among 24 *Pseudomonas aeruginosa*, no KPC encoding gene was found.

**Table I**

Detection of NDM-1 gene by PCR among imipenem resistant Gram- negative organisms (N=80).

| Organism | Woundswab n (%) | Urine n (%) | ETA n (%) | Blood n (%) | Sputumn n (%) | Total n (%) |
|---|---|---|---|---|---|---|
| *Esch.coli*(N=12) | 2(16.67) | 1(8.33) | 3(25.00) | 0(0.00) | 0(0.00) | 6(50.00) |
| *K.pneumoniae*(N=9) | 2(22.22) | 0(0.00) | 1(11.11) | 1(11.11) | 1(11.11) | 5(55.55) |
| *K.oxytoca*(N=4) | 1(25.00) | 0(0.00) | 1(25.00) | 0(0.00) | 1(25.00) | 3(75.00) |
| *Citrobacter*(N=6) | 1(16.67) | 1(16.67) | 1(16.67) | 0(0.00) | 0(0.00) | 3(50.00) |
| *Enterobacter*(N=2) | 0(0.00) | 0(0.00) | 1(50.00) | 0(0.00) | 0(0.00) | 1(50.00) |
| *A .baumannii*(N=20) | 2(10.00) | 0(0.00) | 14(70.00) | 1(5.00) | 0(0.00) | 17(86.00) |
| *P. aeruginosa*(N=24) | 2(8.33) | 1(4.16) | 4(16.67) | 0(0.00) | 0(0.00) | 7(29.16) |
| Total | 10(12.50) | 3(3.75) | 25(31.25) | 2(2.50) | 2(2.50) | 42(52.50) |

N= Total number of bacteria,n= Total number of positive cases

**Table II**

*Detection of KPC gene by PCR among imipenem resistant Gram -negative bacteria (N= 80).*

| Organisms | Wound n (%) | Urine n (%) | ETA n (%) | Blood n (%) | Sputum n (%) | Total n (%) |
|---|---|---|---|---|---|---|
| *Enterobacteriaceae*(N=36) | 4(11.11) | 2(5.55) | 2(5.55) | 0(0.00) | 0(0.00) | 8(22.22) |
| *Acinetobacter baumannii* (N=20) | 0(0.00) | 0(0.00) | 6(30.00) | 0(0.00) | 0(0.00) | 6(30.00) |
| *Pseudomonas aeruginosa*(N=24) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| Total | 4(5.00) | 2(2.5) | 8(10.00) | 0(0.00) | 0(0.00) | 14(17.50) |

N= Total number of bacteria,n= Total number of positive cases

Table III: Out of 80 imipenem resistant organisms, 29 (36.25%) were positive for VIM detected by PCR. Of them, 14 (17.5%) were isolated from wound swab, 13 (16.25%) from ETA and 2 (2.5%) from blood. Among 12 imipenem resistant *Esch.coli*, 2 (16.67%) were positive for VIM. One (11.11%) of the 9 imipenem resistant *K.pneumoniae*, one (33.33%) of the 3 imipenem resistant *Proteus vulgaris*, 3 (42.86%) of the 7 imipenem resistant *Citrobacter freundii*, 13 (65%) of the 20 imipenem resistant *Acinetobacter baumannii* and 12 (50%) of the 24 imipenem resistant *Pseudomonas aeruginosa* had KPC encoding gene.

Table IV: Out of 80 imipenem resistant organisms, 13 (16.25%) were positive for IMP detected by PCR. Of them, 4 (5%) were isolated from wound swab, 2 (2.5%) from urine and 7 (8.75%) from ETA. Among 12 imipenem resistant *Esch. coli*, 3 (25%) were positive for IMP. Eight (40%) of the 20-imipenem resistant *Acinetobacter baumannii* and 2 (8.33%) of the 24-imipenem resistant *Peudomonas aeruginosa* had IMP encoding gene.

**Table III**

*Detection of VIM gene by PCR among imipenem resistant Gram -negative organisms (N= 80).*

| Organisms | Wound n (%) | Urine n (%) | ETA n (%) | Blood n (%) | Total n (%) |
|---|---|---|---|---|---|
| *Esch.coli*(N=12) | 1(11.11) | 0(0.00) | 0(0.00) | 0(0.00) | 2(16.67) |
| *K.pneumoniae*(N=9) | 2(25.00) | 0(0.00) | 0(0.00) | 0(0.00) | 1(11.11) |
| *K.oxytoca*(N=4) | 1(33.33) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *Proteus spp.*(N=3) | 1(33.33) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *A.baumannii*(N=20) | 3(15.00) | 0(0.00) | 8(40.00) | 1(10.00) | 13(65.00) |
| *P.aeruginosa*(N=24) | 7(29.16) | 0(0.00) | 45(20.83) | 0(0.00) | 11(45.83) |
| Total | 14(16.25) | 0(0.00) | 13(16.25) | 2(2.50) | 27(33.75) |

N= Total number of bacteria, n= Total number of positive cases

**Table IV**

*Detection of IMP gene by PCR among imipenem resistant Gram -negative organisms (N=80).*

| Organisms | Wound n (%) | Urine n (%) | ETA n (%) | Blood n (%) | Sputum n (%) | Total |
|---|---|---|---|---|---|---|
| *Esch.coli*(N=12) | 1(8.33) | 2(16.60) | 0(0.00) | 0(0.00) | 0(0.00) | 3(25.00) |
| *K.pneumoniae*(N=9) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *K.oxytoca*(N=4) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *Citrobacter freundii*(N=6) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *Enterobacter aerogenes* (N=2) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) | 0(0.00) |
| *Acinetobacter baumannii*(N=20) | 2(10.00) | 0(0.00) | 6(30.00) | 0(0.00) | 0(0.00) | 8(40.00) |
| *Pseudomonas aeruginosa* (N=24) | 1(4.16) | 0(0.00) | 1(4.16) | 0(0.00) | 0(0.00) | 2(8.33) |
| Total | 4(5.00) | 2(2.50) | 7(8.75) | 0(0.00) | 0(0.00) | 13(16.25) |

N= Total number of bacteria, n= Total number of positive cases

## Discussion

Antimicrobial resistance has become a major health issue with many clinical isolates showing limited or no susceptibility to currently available antimicrobials (Lim *et al.*, 2010). In this present study, out of 80 imipenem resistant Gram-negative bacilli, 52.5% were positive for NDM-1 gene. Of them, 12.5% were isolated from wound swab, 3.75% from urine, 31.25% from ETA, 2.5% from blood and 2.5% from sputum samples (Table 1). Previous study in DMCH by Khatun (2014), reported that 53.57% NDM-1 producers among the imipenem resistant Gram-negative bacilli. A previous study in Bangladesh, demonstrated that 3.5% NDM-1 producers among the imipenem resistant organisms (Islam *et al.*, 2011). In another study, Farzana *et al.* (2013) reported that 22.8% NDM-1 positive among the imipenem resistant Gram-negative bacteria in Bangladesh. The findings of the present study revealed that the prevalence of *bla*NDM-1 gene in Gram-negative bacteria is increasing in Bangladesh. The increasing percentage of this new resistance mechanism might be due to healthcare associated acquisition of *bla*NDM-1 in hospitalized patients worldwide including Bangladesh (Struelens*et al.*, 2010).

In the present study, out of 80 imipenem resistant Gram-negative bacteria, 17.5% were positive for *bla*KPC gene detected by PCR (Table 2). Previous study in DMCH by Khatun (2014) reported that 7.34% were positive for *bla*KPC detected by PCR, and all of them were only found in imipenem resistant *Acinetobactorbaumannii*. Another study in DMCH by Sattar (2016) reported that 21.62% were positive for *bla*KPC among imipenem resistant *Escherichia coli*, *Klebsiella pneumoniae* and *Klebsiella oxytoca*. The highest prevalence of KPC producing organisms to date were identified mostly in the United States, Israel and in Greece (Poirel*et al.*, 2010). In the present study, out of 36 imipenem resistant *Enterobacteriaceae*, 22.22% were positive for *bla*KPC gene. In contrast to the present findings, Shanmugam *et al.* (2013) in India reported that 67.4% isolates harbored *bla*KPC gene among imipenem resistant *Enterobacteriaceae*. This finding does not correlate to the present study because Shanmugam *et al.* (2013) observed KPC gene only in *Enterobacteriaceae*. The presence of this gene suggests the possibility of horizontal transmission, as this carbapenemase has been associated with mobile genetic element (transposons) which can be transferred from one bacterium to another (Gootz and Marra, 2008; Nass *et al.*, 2008).

Current study observed that 36.25% VIM producers among imipenem resistant Gram-negative bacilli detected by PCR. A study by Begum (2015) revealed 15% VIM producers among imipenem resistant Gram-negative bacteria. Another study in DMCH by Sattar (2016) reported 16.22% VIM producers among imipenem resistant *Escherichia coli*, *Klebsiella pneumoniae* and *Klebsiella oxytoca*. In the present study, 50% were VIM producers among imipenem resistant *Pseudomonas aeruginosa*. A study by Abedin (2016) in DMCH reported 46.87% VIM producers among imipenem resistant *Pseudomonas aeruginosa* which is close to the present findings. From Italy and Greece, 87.5% and 100% VIM-1 producers were identified respectively (Cornaglia*et al.*, 2000; Tsakris*et al.*, 2000). These findings were not in accordance with present findings because Cornaglia*et al.* (2000) and Tsakris*et al.* (2000) identified VIM-1 and all of them were only found in imipenem resistant *Pseudomonas aeruginosa* and most of the *Pseudomonas aeruginosa* isolated from ICU. But in the present study, VIM was detected in all the Gram-negative bacilli isolated from different wards of a tertiary care hospital. The reported prevalence of NDM-1 producing bacteria varies in different studies which might be due to geographical variations of such drug resistance pattern.

In the present study, out of 80 imipenem resistant Gram-negative bacilli, 16.25% were positive for IMP gene detected by PCR (Table4). A study by Begum (2015) in DMCH revealed 10% IMP producers among imipenem resistant Gram-negative bacteria which is close to the present findings. A recent study in DMCH by Sattar (2016) reported 13.51% IMP producers among imipenem resistant *Escherichia coli*, *Klebsiella pneumoniae* and *Klebsiella oxytoca*. In the present study, 8.33% were IMP producers among imipenem resistant *Pseudomonas aeruginosa*. In contrast to the present findings, 96.15% IMP producing *Pseudomonas aeruginosa* were reported from China where all the sputum samples were collected from ICU patients (Chao *et al.*, 2008).

## Conclusion:

Periodic review of the bacteriologicalprofile and antibiotic sensitivity pattern is highly essential.Antibiotic policy & infection control program should beincluded in every hospital to reduce this drug resistance. About 52.5% NDM-1 producer were detected among isolated carbapenemase producing Gram-negative bacilli. which are important in choosing empirical therapy, designing good antibiotic policies, updating local antibiotic guidelines for doctors, and in determining clinical treatment failure.

## References

1. Paveenkittiporn W, Lyman M, Biedron C, Chea N, Bunthi C, Kolwaite A, et al. Molecular epidemiology of carbapenem-resistant Enterobacterales in Thailand, 2016-2018. *Antimicrob Resist Infect Control* 2021; 10: 88.
2. Al-Ouqaili MTS, Al-Taei SA, Al-Najjar A.Molecular detection

of medically important carbapenemases genes expressed by Metallo-â-lactamase producer isolates of *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. *Asian Journal of Pharmaceutics* 2018; 12: S991–S1001.

3. Breijyeh Z, Jubeh B, Karaman R. Resistance of Gram-negative bacteria to current antibacterial agents and approaches to resolve it. *Molecules* 2020; 25: 1340.

4. Shugart A, Mahon G, Huang JY, Karlsson M, Valley A, Lasure M, et al.Carbapenemase production among less-common Enterobacterales genera: 10 US sites, 2018. *JAC Antimicrob Resist* 2021; 3: dlab137.

5. Sěkowska A, Bogiel T, Kaczmarek A. Evaluation of the usefulness of selected methods for the detection of carbapenemases in *Klebsiella* strains. *J Med Microbiol* 2020; 69: 792–796.

6. World Health Organization. WHO global priority list of antibiotic-resistant bacteria to guide research, discovery, and development of new antibiotics. [Updated 2017; 2021 Aug 16]

7. Bouganim R, Dykman L, Fakeh O, Motro Y, Oren R, Daniel C, et al. The clinical and molecular epidemiology of noncarbapenemase-producing carbapenem-resistant *Enterobacteriaceae*: A case-case-control matched analysis. *Open Forum Infect Dis* 2020; 7: ofaa299.

8. Gajdács M, Ábrók M, Lázár A, Jánvári L, Tóth Á, Terhes G, et al. Detection of VIM, NDM and OXA-48 producing carbapenem resistant Enterobacterales among clinical isolates in Southern Hungary. *Acta Microbiol Immunol Hung* 2020; 67: 209–215.

9. Arnold RS, Thom KA, et al. Emergence of *Klebsiella pneumoniae* carbapenemase producing bacteria. South Med J, 2011; 104 (1): 40-45.

10. 11.Clinical and Laboratory Standard Institute (CLSI). Performance standards for antimicrobial susceptibility testing. Twenty-third Informational Supplement. CLSI document M100-S22. Wayne, PA: CLSI; 2015.

11. 12. Islam MA, Talukdar PK, Hoque A, Huq M, Nabi A, Ahmed D, Talukder KA, Pietroni MA, Hays JP, Cravioto A, Endtz HP. Emergence of multidrug-resistant NDM-1-producing Gram-negative bacteria in Bangladesh. Eur J Clin Microbiol Infect Dis. 2012; 31(10): 2593-600.

12. Satter, S. ., Mahbub, H. ., &Shamsuzzaman, S.). blaNDM-1, blaKPC, blaOXA-181- as the major mediators of carbapenem resistance in carbapenemase producing Escherichia coli and Klebsiella species isolated from a tertiary care hospital in Bangladesh. *Bangladesh Journal of Medical Microbiology*, 2020*14*(2), 25–29

13. 13. Farzana R, Shamsuzzaman SM, Mamun KZ, Shears P. Antimicrobial susceptibility pattern of extended spectrum beta-lactamase producing gram-negative bacteria isolated from wound and urine in a tertiary care hospital, Dhaka City, Bangladesh. Southeast Asian J Trop Med Public Health, 2013; 44 (1): 96-03.

14. 14. Struelens MJ, Monnet DL, Magiorakos AP, Santos O'Connor F, Giesecke J, the European NDM-1 Survey Participants. New Delhi metallo-beta-lactamase 1-producing *Enterobacteriaceae:* emergence and response in Europe. Euro Surveill, 2010; 15 (46): pii 19716.

15. 15. Khatun R. Phenotype and genotype of ESBL and Carbapenemase producing bacterial isolates at DMCH. [M. Phil thesis]. DMC, 2014.

16. 16.Poirel L, Nordmann P. Emerging carbapenemase in gram negative aerobes. Clinical Microbiology and Infection, 2002; 8: 321-331.

17. 17. Shanmugam P, Meenakshisundaram J, Jayaraman P. $bla_{KPC}$gene detection in clinical isolates of carbapenems resistant Enterobacteriaceae in a tertiary care hospital. Journal of Clinical and Diagnostic Research, 2013; 7(12): 2736-2738.

18. 18. Gootz TD, Marra A. Acinetobacter baumannii an emerging multidrug-resistant threat, Expert Rev Anti Infect Ther, 2008; 6: 309-325.

19. 19. Nass T, Cuzon G, Villegas MV, Cartigue MF, Quinn JP, Nordmann P. Genetic structures at the origin of acquisition of the beta-lactamase *bla*KPC gene. Antimicrob Agents Chemother, 2008; 52: 1257-63.

20. 21. Abedin J.*In vitro* and *In vivo* evaluation of antibiotic combination against imipenem resistant *Pseudomonas aeruginosa* isolated from burn wounds of DMCH. [M. Phil, thesis]. DMC, 2016.

21. 22. Cornaglia G, Mazzariol A, Lauretti L, Rossolini GM, Fontana R. Hospital outbreak of carbapenem-resistant *Pseudomonas aeruginosa* producing VIM-1, a novel transferable metallo-beta-lactamase. Clin Infect Dis, 2000; 31 (5): 1119-25.

22. 22. Begum N, Shamsuzzaman SM. Emergence of carbapenemase-producing urinary isolates at a tertiary care hospital in Dhaka, Bangladesh, Tzu Chi Medical Journal, 2016; 1-5. http://dx.doi.org/10.1016/j.tcmj.2016.04.005.

23. 23. Chao Z, Xiao-Feng W, Dan-Hong S, Jin-Ping Y, Nan-Shan Z. Outbreak of *Pseudomonasaeruginosa* producing IMP-9-type metallo-beta-lactamase in Guangzhou, China. Int J Antimicrob Agents, 2008; 32 (4): 363-65.

24. 24. Tsakris A, Pournaras S, Woodford N, Palepou MF, Babini GS, Douboyas J, Livermore DM. Outbreak of Infections caused by *Pseudomonas aeruginosa* producing VIM-1 carbapenemase in Greece. J Clin Microbiol, 2000; 38 (3): 1290-92.

# Original Article

# Demography of Epistaxis at Tertiary Level Hospital

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**Abstract:**

***Background:*** *Epistaxis is a common otolaryngological emergency worldwide. Many of the population suffer from it in their lifetime. This study was conducted to describe demography of epistaxis among the patients who came to Pabna Medical College Hospital and Dhaka medical college hospital.*

***Objective:*** *To evaluate the frequency of epistaxis among populations of different groups of age, sex, habitat, and circadian variation.*

***Methods:*** *This cross sectional study was conducted among 100 patients who came with epistaxis at Pabna Medical College Hospital and Dhaka Medical College hospital of Bangladesh from January 2021 to December 2021.*

***Results:*** *Male was found to be affected more than female with male to female ratio of 3:1. Eighty percent of the patients were from 5th to 7th decade, 60% were from urban and 40% were from rural habitat. Regarding etiology and sex there were no significant differences between rural and urban habitats. Frequency of epistaxis showed circadian variation, 40% reported to the hospital in the evening, 35% in the morning, and remaining 25% at late night. The frequency (55%) of epistaxis was more from November to March.*

***Conclusion:*** *A high incidence in young adults was reported with the preponderance of male over female. The occurrence of epistaxis was strongly related to certain demographic factors. These are the age, sex, and habitats of the patient. This study supports the credibility of management procedure by finding some factors that make a difference the frequency of epistaxis.*

**Key Words:**
Demography, Epistaxis

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## Introduction:

Epistaxis, bleeding from nose, is common in ear nose and throat emergency and can be severe even fatal. The cause can be local or systemic illness. Epistaxis is classified as anterior or posterior on the basis of primary bleeding site. Hemorrhage is most commonly anterior, originating from nasal septum. A common source of anterior epistaxis is the Kiesselbach's plexus, an anastomotic network of vessels on the anterior portion of the nasal septum.[1]

Epistaxis occurs in up to 60% of general population at sometimes in their life time. About 6% of this people seek medical attention.[2] Usually it is spontaneous and stops by itself or may be controlled with home remedies. However at times it could be massive and may be fatal.[3, 4]

The etiology of epistaxis may be local or systemic. Inflammatory-infectious (rhinitis, rhino-sinusitis), traumatic(mucosal injury by nail, fracture nasal bones, nasal surgeries) anatomic (Septal deviation and perforation), foreign body, chemical and climatic agents, and nasal tumors (nasopharyngeal angiofibroma, nasal poliposis, inverted papilloma, carcinoma. Among the systemic causes the arterial hypertension is the most frequently associated clinical factor, blood dyscrasias, drugs (acetylsalicylic acid, anticoagulant, non steroidal anti-inflammatory), neoplasm etc. It is important to find the bleeding site and define its etiology (local or systemic) for offering best treatment. Severe epistaxis, associated to prevailing factor such as

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systemic arterial hypertension, and coagulopathy may need a surgical approach, refractory to conservative treatment such as cauterization and nasal splint[5]. Traumatic epistaxis is more common in younger individual(under age 15years) and is most often due to digital trauma , facial injury, or a foreign body in the nasal cavity.[6,7] Non traumatic epistaxis more characteristic of older patients (over age 50years) and may be due to organ failure, neoplastic conditions, inflammation or environmental factors (temperature, humidity, altitude)[7]. Epistaxis that occurs in children younger than 10 years usually is mild and originates in the anterior nose, whereas epistaxis that occurs in individuals older than 50 years is more likely to be severe and originate posteriorly[8]. Epistaxis and arterial hypertension are frequent in these population, but an association is still controversial, it occurs in patients with severe epistaxis and the pressure levels are higher when compared to other patients in emergency services.[9] In some studies the arterial hypertension would determine structural alterations of the nasal vessels similar to those verified in the cerebral circulation and retinal examination. The loss of the elastic layer and of contractile properties of the arteries in the elderly would explain a more severe bleeding than that of younger people with arterial hypertension: the dilation of the vessels would represent some degree of degeneration of the vessels wall that would favor bleeding. The association of epistaxis, hypertension and hypertrophy of the left ventricle would be a consequence of the long duration of hypertension.[10] The association with blood dyscrasia is more frequent with the use of non- hormonal anti inflammatory, drugs that alter the metabolism of the arachidonic acid and the function of the platelets which leads to bleeding. In hemophilia, Von Willebrand's disease and thrombo-cytopenia there occurs intermittent nasal bleeding due to the abnormal coagulation function; epistaxis is the most common symptom in approximately 60% of the patients with Von Willebrand's disease.[11] The nasal trauma (digital, fracture of nasal bones, trauma to skull bones) may cause epistaxis; the high prevalence in younger. The anticoagulants or anti platelets sometimes cause epistaxis. The initial otorhinolaryngological examination should be thorough with the aim of finding the bleeding point.[12] In geriatric age no significant difference between sex was reported, the ratio is close to 1:1.[13] The higher prevalence in younger male is most probably related to more exposure to trauma on account of active involvement in out-door activities eg. sports, traveling and inter- personal violence, whereas, in the older group vascular pathology and hypertension are responsible in the majority. Some authors portray epistaxis as a disease of the young and others have noted epistaxis to be more common in the elderly[15].

The results of this study will provide associated prevailing factors in patients with epistaxis.

**Objectives:**

1. Study was carried out with an objective to evaluate demography of epistaxis.

**Materials and Methods:**

Study design: This study was a cross- sectional observational study.

1. **Place of study:** The study was conducted at the Dept. of Otolaryngology and Head- Neck Surgery, Pabna Medical College Hospital, Pabna and Dhaka Medical College Hospital, Dhaka.

**Period of Study:** The study was carried out from January 2021 to December 2021.

1. **Sources of Materials:** All the Patients of epistaxis who were attended in the department of otolaryngology and Head- Neck Surgery, Pabna Medical College Hospital, Pabna and Dhaka Medical College. Dhaka during the study period constituted the study population.

**Sampling technique:** Purposive sampling technique was used for collecting samples. A total number of 100 patients with epistaxis were included consecutively in this study.

1. **Inclusion criteria:** All Patients of epistaxis who were attended in the department of otolaryngology and Head- Neck Surgery Pabna medical College Hospital, Pabna and Dhaka Medical College. Dhaka.

**Exclusion criteria:** Patients who are physically or mentally retarded and unwilling to comply with study protocol, epistaxis after surgery.

**Instrument:** Standard, predetermined data collection sheet.

**Data analysis:** Data was processed and analyzed using computer software SPSS (Statistical Package for Social Sciences).

**Data collection**: Data was collected through a structured questionnaire to collect the relevant information from the selected patient and clinical examination with certain investigations. In case of children, information was taken from patients/ guardians. One data sheet was used for each respondent for collection of data. The findings were recorded in the data sheet.

**Ethical consideration**: Proper explanation of the study was given to the parents. Written informed consent was taken. The right and heaths of the participants were safe guarded. The freedom of the participants was ensured and they were allowed to withdraw themselves from the study anytime they want. The confidentiality of subjects

and findings were ensured. The interest and benefits of the study was explained. The adequate facilities to manage any risk or adverse condition developed by the participants during the study were ensured.

**Results:**

**Table-I**

*Age distribution of patients (n=100)*

| Age (yrs) | No. of patients | Percentage (%) |
|---|---|---|
| 5-12 | 20 | 20 |
| 12-50 | 25 | 25 |
| 51-above | 55 | 55 |
| Total | 100 | 100.00 |

Majority of the patients in this study were in 5th decade (55%).

**Table-II**

*Geographic distribution of patients with epistaxis (n=100)*

| Sites | Frequency | % |
|---|---|---|
| Rural | 40 | 40 |
| Urban | 60 | 0 |
| Total | 100 | 100 |

Significantly incidence is more among urban population.)

**Table-III**

*Distribution of patient according to time of attendance. (n=100)*

| Site of bleeding | Frequency | % |
|---|---|---|
| Evening | 20 | 20 |
| Night | 15 | 15 |
| Late night | 25 | 25 |
| Morning | 40 | 40 |
| Total | 100 | 100 |

Majority of the patient were admitted in the evening and late night (50.%).

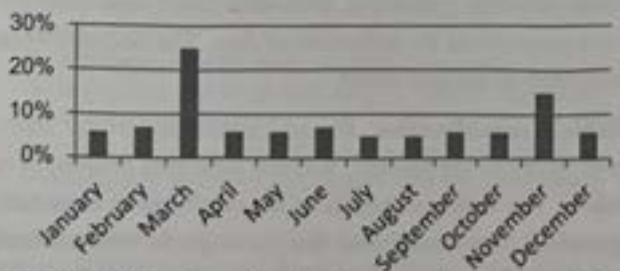


**Fig.-1:** Distribution of patients according to monthly admission)*(n=100)*

**Discussion:**

During the period under study, a total of 100 patients were studied. Male were affected more frequently than female in this study. There were 75 (75%) male and 25 (25%) females with a male female ratio of 3:1.In different studies, it was shown that epistaxis affected more male than female. In some studies where no significant sex difference exists.[18, 19]

In this study, age distribution varies widely, the youngest patient was 4 years of age and the oldest was 92 years old. Mean age of the patients in this series was 40 years, which is in accordance with other study 35.06 years.[17]. Majority of the patients in this study were in above 5th decade (55%) followed by 2nd to5th decade (25%) According to another study, the maximum number of patient were in 3rd decade (26.61)[12], followed by 4th and 2nd decade.[6] There is a pronounced bimodal distribution in the age of onset of epistaxis were reported from north America[19], and in this subcontinent.[20, 21] The study, Shaheen et al shows an increase frequency between the age of 15-25 years and later from 45 to 65 years with no evidence of sex predilection[22]. It is more common in children with upper respiratory tract allergy.[23] It is rare in children younger than two years and peak prevalence is in three to eight years age group.[24]

A literature in India reported most of their patients to be older than 40 years (63.64%) with a mean age of 47.8 years which correlates with other reports which showed that epistaxis is a geriatric problem.[12]The peak presentation is the sixth decade and most large case series reveal a slight male predominance.[25]

Among the 100 patients with epistaxis60 (60%) were urban habitat and 40 (40%) were rural habitat. Significantly more patients were from urban resident.

Regarding habitat there were no significant differences between urban and rural habitat. This may due to the difficulties in transportation in addition to that most patients from rural areas are managed by local health centers and not referred to the hospital especially if one remember that, in general nose bleed in the young person either are easy to treat or stop spontaneously.

The frequency of admission is greater in the autumn and winter month.[26] The seasonal variation correlates with fluctuation in environmental temperature and humidity.[27] A chronobiological rhythm is also observed at the circadian level where onset of bleeding and hospitalization show a biphasic pattern with peak in the morning and late evening.[28]

There was no mortality in this study.

**Limitation of the study:**

Considering significant outcome of the study, it had tried to overcome the limitations as far as possible. Beyond the scope, following limitations were encountered in the study.

1. Proper history was sometimes difficult to take.
2. Limitation of time and sample.

**Conclusion:**

Epistaxis is a common otolaryngological emergency and is often due to lesions within or around the nose and systemic conditions A high incidence in young adults was reported with preponderance of males over females. Occurrence of different types of epistaxis was strongly related with the certain demographic factors like age, sex and habitat of the patient and circadian and seasonal variation. This study support management of epistaxis by establishing different of demographic factor in different population.

**References:**


1. Teker AM, Korkut AY, Kahya V, Gedikli O, prospective randomized, controlled clinical trial of Ankaferd Blood stopper in patient with acute anterior epistaxis. Eur Arch otorhinolaryngol 2010;267:1377-81.
2. Gilyoma JM, Chalya PL, Etiological profile and treatment outcome of epistaxis at a tertiary care hospital in NorthwesternTanzania:a prospective review of 104 case, 2011;11(8):1-6.
3. Kucik CJ, Clelnney T. Managemnet of epistaxis, Summary for patients Am Fam Physician, 2005; 71 (2):305-12.
4. Chaiyasate S, Roongrotwattanasiri K, Foooanan S; Sumitsawan Y. Epistaxis in chiang Mai University Hospital. J Med Assoc Thai, 2005; 88 (9): 1282-
5. Thornton MA, Mahesh BN, Lang J: Posterior epistaxis Identfication of common Bleeding sites, Laringoscope , 2005, 115 (4): 588-90.
6. Pope LER, Hobbs CGL : Epistaxis: an update on current management. Postgrad Med J 2005, 81:309-14.
7. Pallin DJ, Chang Y, Mckay MP, Emond JA, Pelletier AJ, Camargo Ca: Epidemiology of epistaxis in US emergency departments 1992 to 2001 =, Ann Emerg Med 2005, 46+ :77-81.
8. Bernius M. Perlin D: Pediatric ear, nose and throat emergencies. Pediatrclin North Am 2006, 53: 195.
9. Herkner H, Havel c, Mullnelr Metal. Active epistaxis at ED presentation is associated with arterial hypertenssion: American Journal of Emergency Medicine .2002, 20(2): 92-94
10. LubiancaNeto JF, Fuchs FD, Facco SR et al. Is epistaxis evidence of end-organ damage in patients with hypertension? Larynbgoscope, 1999, 109 (7):111-115.
11. Dizdar O, Onal IK, Ozakin E et al. Research for bleeding tendency in Patients presenting with significant epistaxis; Blood coagulation and Fibrinolysis. 2007, 18 (1): 41-43.
12. 12. Varshney S, Saxena RK. Epistaxis : A retrospective crinical study. Indian Journal of Otolaryngology and Head- Neck Surgery, 2005;57(2): 125-29.
13. Tomkinson, A., Roblin, DG., Flanagan, p., Quine, SM., Backhouse, S., 1997, Patterns of hospital attendance withepistaxis in Rhinology, 1997, 35:129-32.
14. Hussain, G., Iqbal, M., Shah, SA., Said, M., SanaullahKhan, SA., Iqbal, M., Zaman, J., 2006, Evaluation of aetiology and efficacy of management protocol of epistaxis. J. Ayub Med. Coll. Abbottabad. 2006, Oct-Dec; 1 8(4):63-
15. Eziyil, JAE., Akinpelu, OV., Amusa, YB., Eziyi, AK., 2009, Epistaxis in Nigerians: A 3-year Experience. East Cent, Afr, J. Surg., 14(2):93-98.
16. Walker, TWM., Macfarlane, TV., McGarry, GW., 2007, The epidemiology and chronobiology of epistaxis: an investigation of Scottish hospital admissions 1995-2004. Clin, Otolaryngol 2007:32(5):361-5.
17. Arshad, M., Ahmed, Z., Ali, L., , Epistaxis: An experience with over 100 cases, Rawal, Med, J2007;32:142-145.
18. Santos, PM, Lepore, ML.Epistaxis in head and neck surgery.In Bailey BJ....Philadelphia, PA: Lippincott- Raven, 1998:513-529.
19. Culbertson MC, Manning SC. Epistaxis. In:BluestoneCD, Stool SE(Eds) Paediatric otolaryngology. W.B. Saunders Philadelphia. 1990;672-679.
20. Maqbool M, Ahmad I, Hameed A. Trauma:the most common cause of epitasis in children and young adults.Pakistan postgrad Med J 2000;11(4):127-8.
21. Hanif M, Rizwan M, RabbaniMZ, Chaudhry MA. Common cause of epitaxis - A Two years Experience at Rawalpinddi General Hospital, JSurg Pakistan 2001;6:2-3.
22. Shaheen OH(1967) 'Epistaxis in the Middle Aged and elderly'. Thesis for the degree of Master of surgery in the
24. Murray AB, Milner RA, Allergicrhinitis; A common cause of recurrence epistaxis in children, Annol of Allergy Asthma andimmunity, 1995;74:30-33.
25. Juselius H, Epistaxis; Aclinical study of 1724 patient. Journal of laryngology and otology 1974;88:317-27.
26. PadghamN, Epistaxis, ;anatomical and clinical correlates, journal of laryngology and otology1990;104:38-11.
27. NunezDA, McClymontLG, EvansRA.Epistaxis a study of the relationship with weatherclinical otolaryngology.1990;15: 49-.51
28. Danielide SV, Kontogianis N, Bartzoka SA, Low CJ, Skevas A. The influence of meteorological factors on the frequency of epistaxis. Clinical otology2002;27:84-8.
29. Menfrediani R, Portaluppi F, Salmi R,
30. Montini A, Gallerani M. Circadian variation in onset of epistaxis: Analysis of hospital admission. British medical journal 2000;321 ;1112.

## Original Article

# Efficacy of Mannitol in the Management of Cerebral Oedema in Hypoxic Ischemic Encephalopathy Stage-II following Perinatal Asphyxia in a Tertiary Level Hospital

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**Abstract**

***Background:*** *The use of mannitol in reducing cerebral edema in case of perinatal asphyxia in Hypoxic Ischemic Encephalopathy Stage-II is considerably contributing.*

***Objective:*** *To find out the efficacy of mannitol in reducing cerebral edema in Hypoxic Ischemic Encephalopathy Stage-II following perinatal asphyxia.*

***Methods:*** *It was a prospective observational study done in the paediatric department of Shaheed Suhrawardy Medical College Hospital, Dhaka from September 2016 to February 2017. According to inclusion criteria total 120 neonates were included in this study by purposive sampling. Among them, 60 neonates were selected as case ( treated with mannitol) and 60 were taken as control (treated without mannitol). Data were collected in a structured questionnaire.*

***Results****: During the study period a total of 120 patients were studied. In the study group (Group A), 78.33% were delivered by LUCS whereas in Group-B, the figure was 66.6%. The mean birth weight of neonates of these two groups were 1.9 + 0.76 kg and 1.73 + 0.89 kg respectively. PROM, APH, malpresentation, and multiple gestation were statistically significant risk factors in both groups (P=<0.05). About 79.67% neonates of group-A (with mannitol) and 70% of group-B (without mannitol) had radiological improvement following treatment revealing no statistically significant difference (P= >0.05).*

***Conclusion****: From the result of the present study, it can be concluded that there is no significant difference in the management of cerebral edema following perinatal asphyxia with HIE stage-II between the groups treated with mannitol and without mannitol.*

**Key Words:**
Perinatal asphyxia, HIE stage-II, Mannitol.

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## Introduction

The incidence of perinatal asphyxia varies considerably among different countries depending on their level of perinatal care. The World Health Organization (WHO) stated that four to nine million newborns develop perinatal asphyxia each year.[1]

HIE is a brain injury that prevents adequate blood flow to the infant's brain occurring as a result of a hypoxic-ischemic event during the prenatal, intrapartum or postnatal period.[2] By the age of 2 years, up to 60% of infants with HIE will die or have severe disabilities including mental retardation, epilepsy, and cerebral palsy (CP).[3] The incidence of HIE has not declined even with advances in obstetric care (i.e. fetal monitoring)aimed at preventing the hypoxic-ischemic event; thus much of the current neonatal research about HIE focuses on minimizing the extent of subsequent brain injury.[4]The treatment of HIE has two dimensions mainly. One is to control convulsion and the next one is to reduce cerebral edema and thus to reduce secondary brain injury. Anticonvulsant drugs are

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usually used to control seizure. If cerebral edema can be addressed as early as possible secondary brain injury can be minimized. So, steroid and osmotic agents like mannitol can be used.[5]

Mannitol is an osmotic agent and intravenous Mannitol is used to induce diuresis in clinical situations, such as cerebral oedema and acute renal failure.[6] As an osmotic diuretic, Mannitol is currently recommended for the treatment of cerebral oedema.[7] Continual assessment of neurologic status, including ICP monitoring, is required to assess the need for administration of hyperosmolar agents such as Mannitol. Renal function, daily fluid intake output, serum electrolytes, and serum and urine osmolality should be monitored while mannitol is being administered; for treatment of elevated intracranial pressure, serum osmolality should be maintained 310 to <320 mOsm/kg.[8] For systemic effect, Mannitol must be given parenterally. It is administered as intermittent bolus doses via central venous access. It has the potential to crystallize and if crystals are present, they have to be dissolved by warming infusion fluids and through a 5-micron in-line filter.[9]

In neonates with HIE, monitoring and evaluation, outcome prediction and response to the treatment are measured with a combination of a neurologic examination, MRI, and electroencephalography (EEG).[10] However, unstable neonates may not tolerate transport for an MRI of the brain or the length of the MRI scanning time. Moreover, hypothermia therapy may depress the amplitude-integrated EEG (aEEG) and thus limit the early predictive ability of aEEG. Cranial ultrasound (US) is the initial investigation of choice in suspected cases of neonatal HIE as it is in expensive, portable and imparts no radiation exposure. Cranial USG is highly sensitive for detecting intracranialhemorrhage, hydrocephalus, and cystic PVL. Increased resistive index (RI) of the middle cerebral artery (MCA)on Doppler sonography helps to identify severe HIE.[11]

**Methodology:**

This was a Prospective observational study conducted in paediatrics department of ShSMCH from September 2016 to February, 2017. According to inclusion criteria 120 patients were included in this study by purposive sampling. They were further divided into two groups; 60 in each group. Randomization was done by taking neonates presenting with inclusion criteria in the hospital in Saturday, Monday, Wednesday, 1st Friday and 3rd Friday as group- A (with mannitol). Neonates presenting with inclusion criteria in the hospital in Sun, Tuesday, Thursday, 2nd and 4th Friday were taken as group- B (without mannitol). group- A (with mannitol) patients received inj. phenobarbitone 20mg/kg/dose as 1st loading dose over 20 minutes followed by 10 mg/kg/dose over 10 minutes as 2nd loading dose (if convulsion not controlled by 1st loading dose) followed by 10 mg/kg/dose over 10 minutes as 3rd loading dose (if convulsion not controlled by 2nd loading dose) then 5 mg/kg/day - 12 hourly as maintenance dose as well as inj. mannitol 1 gm/kg/day once daily for 3 days where group B patients (without mannitol) received only inj. phenobarbitone with same dose schedule. If inj. phenobarbitone did not work effectively to control seizure, then phosphenytoin inj. was used in 30 mg/kg/dose over 30 minutes as loading dose then 5 mg/kg/day 12 hourly as maintenance dose in both groups. Ultrasonography of brain was done on admission to confirm the presence of cerebral oedema and a repeat ultrasonography of brain was done after 3 days of treatment to see its effect.

The data were collected by the active participation of the patient's interview by the preformed questionnaire. Data were processed and analyzed with the help of computer program SPSS ( Statistical Package for Social Sciences ) version 16. Quantitative data were presented as mean and standard deviation; and comparison between before and after was done by unpaired "t" test. Qualitative data were presented as frequency and percentage; and were compared by Chi square test if needed or Fisher exact test. Odd ratio (OR) with 95% confidence interval was calculated to determine significance of risk factors. A probability (P) value of <0.05 ( P <0.05 ) was considered statically significant.

**Results:**

During the study period, total 120 patients were studied. In study group, 78.33% delivered by LUCS whereas in group-B, the figure was 66.6%. The mean birth weight of neonates in group-A and group-B were 1.9 + 0.76 kg and 1.73 + 0.89 kg respectively. PROM, APH, malpresentation and multiple gestation were statistically significant risk factors in both groups (P=<0.05). Lethargy (48.33 VS 51.67), hypotonia (40 VS 35), weak reflex (61.67 VS 55), miosis (38.33 VS 41.67) and seizure (38.33 VS 41.61) are common presentation of group-A and group-B respectively and they were statistically non significant. About 79.67% neonates of group-A (with mannitol) and 70% of group-B (without mannitol) had radiological improvement following treatment. The treatment of both group revealed no statistically significant difference (P= >0.05).

**Table-I**

*Distribution of studied neonates by their antepartum and intrapartum risk factors for perinatal Asphyxia (n=120)*

| Risk factors | Study group (n=60) | Control Group (n=60) | P-value |
|---|---|---|---|
| PROM | 24(40) | 21(35) | >0.05$^{NS}$ |
| Prolonged labour | 29(48.33) | 31(51.67) | >0.05$^{NS}$ |
| APH | 7(11.67) | 11(18.33) | <0.05$^{S}$ |
| PE | 11(18.33) | 9(15) | >0.05$^{NS}$ |
| Eclampsia | 13(21.67) | 17(28.33) | >0.05$^{NS}$ |
| Malpresentation | 4(6.67) | 7(11.67) | <0.05$^{S}$ |
| Multiple gestation | 2(3.33) | 1(1.67) | <0.05$^{S}$ |

Table-I shows that antepartum hemorrhage (APH), malpresentation and multiple gestation were significantly more frequent (p=<0.05) among the studied newborns than those in control group.

**Table-II**

*Distribution of studied newborns (cases & controls) by their hospital outcome following treatment (n=120)*

| Outcome | Cases (with mannitol) (n=60) | Controls (without mannitol) (n=60) | P-value |
|---|---|---|---|
| Discharge | 43(72.3) | 47(77.29) | >0.05$^{NS}$ |
| DORB | 11(18.33) | 8(14.99) | >0.05$^{NS}$ |
| Referred to other hospital | 6(10.67) | 5(9.33) | >0.05$^{NS}$ |
| Hospital stay in days | 13 | 11 | >0.05$^{NS}$ |
| Death | 7(11.67) | 9(15) | >0.05$^{NS}$ |

Table-II reveals that hospital outcome following treatment were not statistically significant between the groups

**Table-III**

*Distribution of studied neonates by their radiological (USG of brain) outcome following treatment (with and without mannitol) (n=120)*

| Cerebral edema | Study group with mannitol (n=60) | Control Group without mannitol (n=60) | P-value |
|---|---|---|---|
| Present | 13(20.33) | 18(30) | 0.08$^{NS}$ |
| Absent | 47(79.67) | 42(70) | 0.39$^{NS}$ |

Table-III shows after giving mannitol, ultrasonography of brain revealed celebral edema in 20.3% of cases and 30% of control. The observed differences were not statistically significant.

**Discussion:**

In this study, important maternal risk factors encountered more frequently among the asphyxiated babies were APH (11.67% vs 18.33%), malpresentation (6.67% vs 11.67%) and multiple gestation (3.33% vs 1.67%) among the cases and controls. All the findings showed statistically significant difference (p=<0.05). These findings are consistent with many other studies. Malpresentation was found to be associated with increased risk in this study like that of Daga AS (Table-1).[12]

Here, lethargy (48.33% VS51.67%), hypotonia (40% VS 35%), weak moro reflex (61.67% VS 55%), miosis (38.33% VS 41.67%), seizure (38.33% VS 41.67%) and comatose (5% VS 1.67%) were the common clinical presentation among the cases and controls respectively.

Out of 60 in each group 20% of group A (with mannitol) and 30%of group B (without mannitol) had seizure following treatment. The clinical improvement of hypoxic-ischemic encephalopathy observed in 40% neonates of group A and 35% neonates of group B. In this study, 11.67% of group A (with mannitol) and 15% of group B (without mannitol) died during treatment (Table-2).

After treatment, radiological improvement occurred in 79.67% of group A (with mannitol) and 70% of group B (without mannitol). The difference were not statistically significant (Table-3).

As there was no significant difference between two groups (with or without mannitol) in the management of cerebral oedema in hypoxic-ischemic encephalopathy stage-II, it could not be inferred that treatment with mannitol is more effective than without mannitol.

**Conclusion**

From the result of the present study, it can be concluded that there is no significant difference in the management of cerebral edema following perinatal asphyxia with HIE stage-II between the groups treated with mannitol and without mannitol.

**Conflict of interest:** None

**Limitations of the study:** This is single blinded, single centered study, duration is short.

**Recommendations:** From the conclusion of this study it can be stated that use of mannitol is not recommended for better management of cerebral oedema in HIE-II following perinatal asphyxia.A multi centered double blinded study

in the divisional/ tertiary hospitals of whole Bangladesh with large sample size can reveal the real picture of mannitol action in HIE.

## References


1. Levene MI, Sands C, Grindulis H, Moore JR. Comparison of two methods of predicting outcome in perinatal asphyxia. Lancet. 1986; 1(8472): 67-9.
2. Long M, Brandon DH. Induced hypothermia for neonates with hypoxic-ischemic encephalopathy. Journal of Obstetrics Gynecology Neonatal Nursing. 2007; 36: 293–298.
3. Okereafor A, Allsop J, Counsell SJ, et al. Patterns of brain injury in neonates exposed to perinatal sentinel events. Pediatrics. 2008; 121: 906–914.
4. Shankaran S. Neonatal encephalopathy: treatment with hypothermia. J Neurotrauma. 2009; 26: 437–443.
5. Sayeder YE, Coherty J. Perinatal asphyxia; Manual of Neonatal Care. 3rd edition, 1991; 21: 393-410.
6. Current Diagnosis & Treatment in Pediatrics-19th Ed. 2009.
7. Marco D Sorani et al. Dose-response relationship of Mannitol and intracranial pressure: a meta analysis. J Neurosurg 108: 80-87, 2008.
8. *http://online.lexi.com.proxy-hs.researchport.umd.edu/crlsql/servlet/crlonline?siteid=2000 (accessed on 10th December 2016).*
9. Bangladesh Neonatal Forum for children, 2009. The essential resources for clinical use of medicine in children.
10. Robertson, C.M.; Perlman, M. Follow-up of the term infant after hypoxic-ischemic encephalopathy. Paediatric. Child. Health 2006; 11, 278–282.
11. Gerda van Wezel-Meijler. Cranial Ultrasonography: Advantages and Aims Part 1, Neonatal Cranial Ultrasonography, 1st edn. Berlin: Springer, 2007, 3-4.
12. Daga AS, Daga ER, Patole SK. Risk Assessment of Birth Asphyxia. J Trop Pediatr 1990; 36: 34-39.

## Original Article

# Outcome of Closed Reduction and Percutaneous Cross K-Wire Fixation of Supracondylar Fractures of Humerus in Children

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**Conflict of Interest:** None
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**Abstract:**

***Background***: *Supracondylar fractures of humerus are common skeletal injuries in paediatric age group in between 50-70% of elbow injuries. They are often associated with complications and are very notorious for neurovascular injuries between 5 to 9 years of age.*

***Objective***: *To evaluate the outcome of supracondylar fracture of humerus with closed reduction and percutaneous cross k-wires fixation.*

***Materials and method***: *A prospective study of 30 patients of Gartland type III fractures admitted in the orthopaedics department of 250 Bedded General Hospital, Tangail from January 2021 to December 2021.*

***Results:*** *Regarding FLYNN CRITERIA, there were 24 excellent, 3 good,2 fair and 1 poor results. Fair and poor results were due to poor compliance with follow up and postoperative rehabilitation. There were 4 cases with pin tract infection, 1 with elbow stiffness, and 1 with cubitus varus.*

***Conclusion***: *Closed reduction and percutaneous cross k-wire fixation is a very effective and minimally invasive way of treatment of displaced supracondylar fractures of humerus. Crossed K-wire biomechanically better way of the stability of fracture reduction.*

**Key Words:**
Supracondylar fractures, closed reduction, percutaneous k-wire fixation, Flynn Criteria, cross k wires.

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### Introduction:

Supracondylar fracture of humerus is very common skeletal injury in pediatric age group. It consists of 50 to 70% of elbow injuries.[1] This fracture is very potential for neurovascular injury between 5 to 9 years of age.[2] The most common mechanism of injury is fall on outstretched hand. About 70% of cases, non-dominant limb is commonly involved. Usually these fractures in younger children result due to falls sustained while playing, fall from stairs and missing a step while running and the falls are usually of high energy trauma to cause this type of fractures.[3,4] Supracondylar fracture of humerus are of two types, extension type which is most common type 95-98% and another flexion-type, rare type <5%. In extension type supracondylar fracture of humerus, distal fragment displaced posteriorly and proximal fragment lies anteriorly, the relative position of these fragments determines complications.[5,6,7] Gartland classified these fractures according to degree of displacement of distal humerus. Type I is undisplaced, type II is displaced but posterior cortex is intact and type III completely displaced, no contact between bone fragments.[8,9] The main complication related to supracondylar humeral fractures are limitation of elbow movements, malunion, compartment syndrome, neurovascular complication and myositis ossificans.[10] Various modalities of treatment for these fractures which include closed reduction and posterior slab, closed reduction and percutaneous cross k-wires fixation under C-arm guidance and open reduction and internal fixation. Swenson technique of cross k-wires fixation is being used today with excellent outcome.[11,12] In our country delayed presentation is much higher because of poverty, ignorance and time to reach tertiary level hospital. Type II supracondylar fractures in children are usually reduced by close reduction technique and Gartland Type III Supracondylar Fractures of humerus after closed reduction are stabilized with percutaneous k-wire fixation, however open reduction and internal fixation is recommended, especially when closed reduction is not achieved. Two k-

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wires inserted through medial and lateral cortex in the management of Gartland type III supracondylar fractures of humerus from 5 to 9 years of age. In our study Flynn criteria for reduction assessment was used.[13, 14]

**Method and Materials:**

This prospective descriptive study was carried out at orthopaedics department of 250 Bedded General Hospital, Tangail from January 2021 to December 2021. Thirty patients of Gartland type III close supracondylar fractures of humerus were included in this study. A written informed consent was obtained from all the patients or by their parents. Open fracture, associated neurovascular injury and history of previous elbow fracture were excluded from the study. After admission to orthopaedics ward of 250 Bedded General Hospital, Tangail detailed history and clinical examination, operative radiographs (Anterior-posterior and lateral views) were taken in each patient. Under general anesthesia, with and C-arm guidance fracture reduction was done by traction and counter traction followed by controlled flexion at elbow. After satisfactory C- arm reduction, fracture was stabilized with 2 cross k -wires (1.5 to 1.8 mm depending on age of the patient). First k- wire was introduced from lateral side and then on medial side, ulnar nerve was placed posteriorly behind medial epicondyle with the help of the thumb of one hand and k-wire was inserted. If the k-wires were in a good position in both views, the fracture was usually satisfactorily stable to allow the arm to be externally rotated to plan the lateral view. The wires are bending over and cut, being left percutaneous. After satisfactory k-wire fixation antiseptic dressing was done and posterior long arm slab support applied with elbow flexed at right angle. At the end of the procedure the radial pulse is examined. Patients were carefully observed for 24- 72 hours and then discharged from hospital. Regular follow up was done at 1 week, 3 weeks and 5 weeks. After 3 weeks posterior slab was removed and active exercise was started .K-wire removed at 4-5 weeks. Clinical assessment was done according to Flynn criteria and radiological examination was made by assessing the Baumann's angle in pre-operative and post operative X-rays. Final follow up was done after one year using Flynn criteria.

**Table-I**

*Showing Flynn Criteria*

| Results | Cosmetic factor-loss of of carrying angle (degree) | Functional factor -loss of motion (degree) |
|---|---|---|
| Excellent | 0-5 | 0-5 |
| Good | 6-10 | 6-10 |
| Fair | 11-15 | 11-15 |
| Poor | >15 | >15 |

**Figure 1 :** *Pre-operaive A-P and Lateral radiographes showing supracondylar fractures of Humerus.*

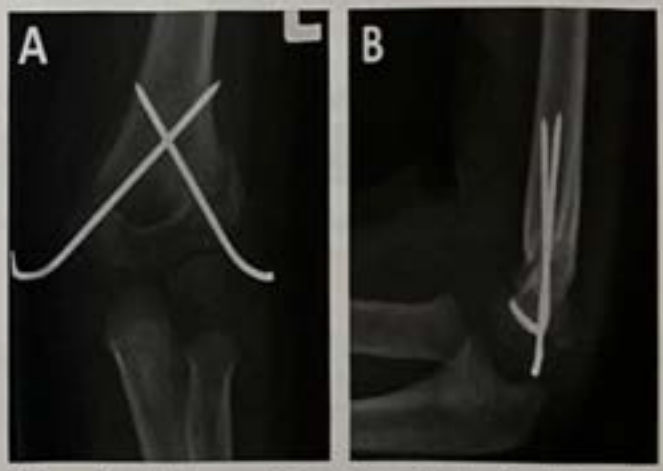


**Figure 2 :** *Post-operative A-P and lateral radiographs showing crossed k-wire fixation of supracondylar fractures of humerus.*

**Results:**

Among 30 studied patients, 18 were male and 12 were female and 28 patients were of extension type, 2 flexion type. 86.7% were anatomical reduction according to radiological assessment and 13.3% had posterior displacement. Left side was involved in 22 patients, 8 in right. Age was from 3 to 9 years with maximum patients in 5 to 8 years of age. As per Flynn criteria 24 were excellent, 3 good, 2 were fair and 1 remained poor (table-II). Results in our study were excellent in carrying angle and functional outcome with full range of motion. Two cases were graded fair due to poor compliance to follow up. During early course of follow-up 1 patient presented with elbow stiffness with restriction of elbow flexion and extension. 4 patients reported with pin tract infection, 1 Patient with Cubitus varus with late presentation (table - III). Union was achieved without any neurovascular complication.

**Table-II**

*Outcome characters among study group*

| | | No. | % |
|---|---|---|---|
| Flynn cosmetic | Excellent | 24 | 80.1 |
| | Good | 3 | 10 |
| | Fair | 2 | 6.6 |
| | Poor | 1 | 3.3 |
| Flynn function | Excellent | 24 | 80.1 |
| | Good | 3 | 10 |
| | Fair | 2 | 6.6 |
| | Poor | 1 | 3.3 |
| Radiological | Anatomical reduction | 26 | 86.7 |
| | Posterior displacement | 4 | 13.3 |

**Table-III**

*Complications among study group*

| Complication | No. | % |
|---|---|---|
| Vascular | 0/30 | 0.0% |
| Pin tract infection | 4/30 | 13.3% |
| Ulnar nerve injury | 0/30 | 0.0% |
| Cubitas varus | 1/30 | 3.3% |

**Discussion:**

Fractures around the elbow joint account for 10% of all pediatric orthopedic trauma, and supracondylar humeral fractures account for 60-70% of all elbow fractures. There are various treatment options for the supracondylar fractures of humerus in children including closed reduction and posterior long arm slab, percutaneous k-wire fixation or open reduction and k-wire fixation. Closed reduction and percutaneous k-wire fixation is widely accepted, has become the treatment of choice for displaced fractures. Success of treatment of displaced supracondylar fractures in children depends on achieving and maintaining anatomical reduction and stable fixation following clinical and radiographic union without complications. Our study focused on type III supracondylar fractures of humerus which are usually unstable with displacement and rotation which may leads to cubitus varus deformity. Extension type fractures were 28 with non-dominant limb predominantly involved, similar to study conducted by Cekanuska[15], due to reflex response of falling human body to protect dominate side. Percutaneous pining has been used for these fractures utilizing either parallel or crossed k-wires. Cross k-wires gives better stabilization and biomechanical advantage as well as parallel pins do not allow full extension at elbow during early followup.[13] We didn't encounter any loss of reduction during follow up, these cross k-wires provide strong stability and prevent the displacement after fracture reduction. The cross k-wires fixation included the placement of two ascending k-wires, one of them inserted through the lateral condyle and the other through the medial condyle. With this technique, the ulnar nerve could be injured by the medial k-wire as it is passed through the medial condyle. There is higher risk of nerve injury in close reduction and percutaneous pinning, with 0 to 5% incidence of iatrogenic ulnar nerve injury cause by medial pin. The rate of ulnar nerve injuries varies in different studies. Lyons et al.,[25] have reported this number as 6%, Royce et al.,[26] as 3%, Agus et al.,[27] as 58%. In our study we had no case of nerve injury, which is quite excellent than other studies.[16,17,18] We did not come across any feature suggestive of compartment syndrome. Ring D et al found two patients with compartment syndrome with closed reduction and cast immobilization.[19] In post-operative period, physiotherapy plays a significant role in increasing the range of motion of the elbow joint. Those patients who had fair results were having severe soft tissue injuries or repeated closed reduction. Cubitus varus deformity is the late complication of supracondylar fractures treatment. The deformity is due to coronal rotation, or medial displacement of the distal fragment of humerus[28]. Other concept is that varus deformity due to epiphyseal growth disturbance or rotation of the distal fragment of humerus.[29] Smith suggested that residual medial displacement after reduction is the most important factor in varus angulations[30]. This concept has become popular in understanding the consequence of alteration in carrying angle[31]. Our results match with Williamson DM et al who treated the supracondylar fracture by traction, reduction and percutaneous cross k-wires fixation [20] and also with Harrington P et al, who observed 83% good to or excellent results.[21] In our study 4 patients had superficial pin tract infection which resolved with antibiotics.[22,23,24] All patients with pin tract infection were coming from poor socioeconomic status with no care about posterior slab. Due to availability of C-arm and other facilities in our emergency operation theatre, our results are better than previous published studies from developing countries.

**Conclusion:**

Closed reduction and percutaneous cross k-wire fixation is a rapid, minimal invasive, safe method for treatment of unstable supracondylar fractures in pediatrics with less or minimal complication. Use of strict per operative criteria to obtain anatomical reduction and stable fixation minimizes the risk of complications.

## References:


1. Lins RE, Simovitch RW, Waters PM. Pediatric elbow trauma. Orthop Clin North Am 1999; 30:119
2. Herring JA, editor. Upper extremity injuries. In: Tachdjian's Pediatric Orthopaedics. 4th ed. Vol. 3. Philadelphia: W.B. Saunders;2008.
3. Kasser JR, Beaty JH. Supracondylar fractures of the distal humerus. In: Rockwood and Wilkins'.
4. Farnsworth CL, Silva PD, Mubarak SJ. Etiology of supracondylar humerus fractures. J Pediatr Orthop 1998; 18:38
5. Skaggs DL, Flynn JF: Supracondylar Fracture of the Distal Humerus. In: Beaty JH, Kasser JR, (editors) Rockwood and Wilkins Fractures in Children, 7th Edition Vol. 3. Philadelphia, Lippincott William and Wilkins; 2010. 487-531.
6. Fletcher N, Schiller JR, Sumeet G, et al. Increased severity of type III supracondylar humeral fractures in the preteen population. J Pediatr 2012; 32:567.
7. Bajwa G R. Evaluation of results of medical approach following operative treatment of supracondylar fractures in children: a study of 60 consecutive cases. J Pak Orthop Assoc 2009;21(1):1-5.
8. Gartland JJ. Management of supracondylar fracture of humorous in children. Surg: Gynecol Obstet 1959; 109:145-54.
9. Joes KG. Percutaneous pin fixation of fractures of the lower end of the humerus. Clin Orthop Relate Res 1967l 50L53-69. 1Shoaib M, Hussaian A, Kamran H, Ali J. Outcome of closed Reduction and casting in displaced Supracondylar Fraction of Humerus in children. J Ayub Med CollAbottabad 203; 15:23-5.
10. Dua A, Eachempati KK Malhotra Et all Chin J Traumatol 2011;14(1):14-19
11. Joes KG. Percutaneous pin fixation of fractures of the lower end of the humerus. Clin Orthop Relate Res 1967l 50L53-69.
12. Swenson AL. The treatment of supracondylar fractures of the humerus by Kirshner wire trans fixation. J Bone Joint Surg Am 1948;30 30(4):993-997
13. Flynn JC, Mattews JG, Beriot RL. BUCD pinning of displaced supracondylar fracture of humerus in children. J Bone Joint Surg 1974:56-A:263-72.
14. Iqbal J. Supracondylar Fracture of humerus in childrenAn experience of closed reduction and percutaneous pinning. Ann King Edward Med Coll Dec 2011;7(4):278-80
15. Cekanauskas E, Deglliute R, Kalesinsks RJ. Treatment of supracondylar fracture in children according to Gartland classification. medicina (Kaunas) 2003; 39:379 – 83
16. Gosens T Bongers K J. Neurovascular Complications and functional outcome in displaced supracondylar fracture of humerus in children. Injury. 2003; 34:267-73
17. Hakeem A, Khan UN Gul T, Closed reduction and percutaneous pinning with crossed K-wires in type III supracondylar fractures of the humerus in children. Pak J Surg 2010;26(1):10-12
18. Khan MS Sultan S, Ali MA, Khan A, Younis M. Comparison of percutaneous pinning with casting in supracondylar humeral fractures in children. J Ayub Med CollAbottabad 2005;17(2):203.
19. Ring D, Waters PM, Hotchkiss RN, Kasser JR. Pediatric floating elbow. J Pediatr Orthop. 2001; 21:456-59
20. Williamson DM, Cole WG. Treatment of ipsilateral supracondylar and forearm fractures in children. Injury. 1992; 23:159-61.
21. Harrington P, Sharif I, Fogarty EE, Dowing FE, Moore DP. Management of the floating elbow injury in children's Simultaneous ipsilateral fractures of the elbow and forearm. Arch Orthop Trauma Surg: 2000;120: 205-8.
22. Mostafavi HR, Spero C. Crossed pin fixation of displaced supracondylar humerus fractures in children. Clin Orthop 2000; 376:56-61.
23. Zamzam MM, Bakarman KA. Treatment of displaced supracondylar humeral fractures among children: Crossed versus lateral pinning. Injury (2008), doi:10.1016/Injury. 2008. 10029.
24. Gupta N, Kay Rm, Leitch K, et al. Effect of surgical delay on perioperative complications and need for open reduction in supracondylar humerus fractures in children. J Pediatric Orthop 2004;24(3):245-248
25. Ippolito E, Caterini R, Scola E. Supracondylar fractures of the humerus in children. Analysis at maturity of fifty-three patients treated conservatively. J Bone Joint Surg Am 1986; 68:333-44.
26. Royce RO, Dutkowsky JP, Kasser JR, Rand FR. Neurologic complications after K-wire fixation of Supracondylar humerus fractures in children. J Pediatr Orthop 1991; 11:191-4
27. Agus H, Kelenderer O, Kayali C. Closed reduction and percutaneous pinning results in children with Supracondylar humerus fractures. Acta Orthop Traumatol Turc 1999; 33:18-22
28. Kallio PE, Foster BK, Paterson DC. Difficult Supracondylar elbow fractures in children: Analysis of percutaneous pinning technique. J Pediatr Orthop 1992; 12:11-5
29. . Smith L. Deformity following Supracondylar fractures of the humerus. J Bone Joint Surg Am 1960;42:235-52
30. Smith L. Supracondylar fractures of the humerus treated by direct observation. Clin Orthop Relat Res 1967; 50:37-42Mann TS. Prognosis in supracondylar fractures. J Bone Joint Surg Br 1963; 45:516-22.
31. Mann TS. Prognosis in supracondylar fractures. J Bone Joint Surg B

## Original Article

# Comparison between Preoperative Overnight Fasting versus Oral Rehydration Solution (ORS) Administration Until Two Hours before Abdominal Surgery under General Anaesthesia

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**Abstract**

***Background:*** *Preoperative fasting is a major concern to protect the gastric aspiration which is very dangerous. However overnight fasting is uncomfortable and has many deleterious effects on the human body. In many countries fasting until 2 to 3 hours before surgery has been practiced but in Bangladesh, overnight fasting is still being practiced in routine cases.*

***Objectives:*** *The objective of this study was to compare the effectiveness between preoperative overnight fasting and oral rehydration solution administration until two hours before abdominal surgery under general anaesthesia.*

***Methods:*** *A total of 100 patients of ASA (American Society of Anesthesiologist) class I and II, age above 18 years, and BMI <30 kg/m$^2$ were scheduled for abdominal surgery under GA (General Anaesthesia) were included in this study. Then all patients were randomized into two groups as patients who were on overnight fasting for 10 hours (Group A-Controlled, n=50), patients who were on ORS until 2 hours before abdominal surgery (Group B-ORS, n=50). All patients had their last meal at 11 PM before the day of surgery. Patients in group A will not take anything orally or via any route, except their ongoing vital medications if present. Patients in group B received 500 ml of standard ORS in the early morning on the day of surgery after waking up from bed (from 05 AM to 06 AM) and another 500 ml until 2 hour before the surgery (06 AM to 07 AM). As the primary outcome gastric residual volume and gastric fluid pH in both group was measured immediately after anaesthesia induction. Several physiological measures (thirst and hunger, nausea/vomiting, cognitive function) were measured with the help of a preformed questionnaire.*

***Results:*** *Mean gastric residual volume immediately after induction was statistically significant ($p<0.05$) between the two groups. However the mean gastric fluid pH was statistically insignificant ($p>0.05$). The ORS group (Group B) became less thirsty before surgery ($P=0.001$). Postoperative nausea/vomiting (PONV) was less in group B ($P=0.029$) than in group A. The patient's recovery time was significantly less in the ORS group ($P=0.003$). Postoperative cognitive performance was better in group B ($P=0.001$).*

***Conclusions:*** *Oral rehydration solution administration until two hours before surgery is effective and can be considered routinely before abdominal surgery conducted under general anaesthesia except for delayed gastric emptying.*

**Key Words:**
Preoperative fasting, Oral Rehydration Solution, Gastric residual volume, Gastric fluid pH, PONV, Postoperative cognitive function

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**Introduction**

Aspiration of gastric contents is a major cause of morbidity and mortality during general anaesthesia.[1,2] The risk of mortality is up to 5% and it is involved in over 9% of all deaths related to anaesthesia.[3] The overall incidence in a mixed surgical population ranges between <0.1% and 19% depending on patient and surgical factors and it has not changed in the last few decades.[4] The presence of acidic stomach contents during anaesthesia induction is an important risk factor for it's occurrence. That's why for more than 100 years overnight fasting has been a widely recommended routine practice before elective surgery.

Although there is a controversy about the gastric residual volume which is considered critical, because this volume itself increases risk of aspiration. Studies have shown that healthy patients under fasting often have gastric residual volume near 1.5 ml kg-[1] without significantly increased risk for aspiration[5]. However this routine has been questioned lately, primarily because of fasting is uncomfortable for the patient, and strict fasting results in unnecessary problems with routine oral medication.[6,7]

In several studies free intake of water was allowed within 2-3 hours before surgery in both children and adults, where preoperative thirst and anxiety were reduced as compared with traditional overnight fasting.[8] Dehydration impairs working memory and increases anxiety, fatigability.[9] In studies with elderly patients, clear fluid intake until 2 hour before surgery did not cause problem.[10]

In studies with obese patients (BMI > 30 kg m-2 ), the gastric fluid volume in patients who received clear fluid until 2 hours before surgery was similar to that in fasting patients[11]. A study of obese pregnant women showed that the gastric fluid volume 1 hour after they drank 300 ml of water was the same as the volume when fasting before drinking water.[12]

Ingestion of clear fluids until 2 hours did not increase gastric contents or risk of aspiration before surgery.[8] Moreover intravascular volume deficits may be a factor in postoperative nausea/vomiting and perioperative fluid administration may reduce the incidence of adverse outcome without the expense or potential for side effect seen with pharmacologic approaches to this problem.[13,14]

Less attention has been paid to the fact that the preoperative fasting period also results in a marked alteration in body metabolism. Although strict fasting is usually set to begins at midnight, in clinical practice it often begins earlier resulting in more than 10 hours. It has long been known that even brief fasting results in a marked reduction in hepatic glycogen store and a change in metabolism.[15] Although overnight fasting is a part of human's normal diurnal rhythm, this change in the metabolic setting may not be ideal in preparing patient for surgical stress, especially who are diabetic or hypertensive.

Prolonged fasting may lead to several adverse effects including an increase in catabolic pathways, metabolic derangement and may aggravate insulin resistance.[16] On the other hand, reduction of the period of preoperative fasting limited insulin resistance, organic response to trauma, overall stress, and hence thereby improving patient recovery.[17]

Preoperative carbohydrate supplementation given intravenously in the form of glucose infusion as 5 mg $kg^{-1}min^{-1}$ overnight, instead of fasting resulted in 50% reduction in the development of postoperative insulin resistance in patients undergoing abdominal surgery.[18] For routine administration of carbohydrates before surgery, oral administration has several advantages over the intravenous route which can be used only if shown to be safe.

Normally gastric emptying of clear fluid is almost completed within two hours of ingestion. Solid food follows a zero order emptying kinetic, that is at a constant speed according the number of calories (about 200 kcal/hr). Clear liquids follow a dramatically different path, emptying quickly from the stomach, following a first order kinetics. Some liquids such as water and 0.9% saline have a very short half-life of about 10 minutes, and effectively only have a flush through the stomach.[19,20]

Various randomized controlled trials and meta-analysis have consistently documented that oral intake of water and other glucose or electrolytes rich clear fluids up to 2 hours before surgery does not increase gastric volume or acidity.[11] Even some studies have reported that gastric residual fluid volume was smaller in patients who received clear fluids until 2-3 hours before surgery.[21] Maltby et al. (2004) noted that on average about 25 ml of acidic gastric juice remained in the stomach after an overnight fast, with a possibility of reaching 200 ml; because the stomach continuously secrets up to 50 ml/hr of acidic fluid even in fasting patients.[11] Saliva production occurs at a rate of 0.4-1.0 ml/kg/hr, with endogenous gastric secretion in a similar production rate[22]. That's why preoperative oral fluid administration until two hours before routine surgery is nowadays an emerging practice in the world.

Enhanced recovery after surgery (ERAS) protocols include changes in the conventional preoperative fasting practices and are supported by evidence-based medicine that preoperative carbohydrates reduce surgical trauma and stress, promote early eating and activity of patients, and shorten the recovery time.[23] Current preoperative

guidelines of American Society of Anaesthesiologist recommend oral intake of clear liquids with or without carbohydrate [water, fruit juice without pulp, carbonated beverages, clear tea, black coffee] up to 2 hours before induction of general anaesthesia to prevent complication of hunger and dehydration such as discomfort and stressful anaesthesia.[24,25]

Interestingly these guidelines are not being followed in our hospital, because there are limited local evidence-based studies. All of these studies are on preoperative glucose administration, but no study was done on oral rehydration solution administration still now. Preoperative ORS administration may reduce all the negative effects of fasting. So in our hospital environment, this research work was designed to see the effectiveness and safety of oral rehydration solution administration until two hours before surgery.

**Materials and methods**

This randomized controlled trial was conducted in the General Surgery operation theatre under supervision of Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from September 2018 to March 2021. The ethical permission of the study was obtained from the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh (Registration No. BSMMU/2020/9191). Informed written consent form was signed by all the participants before enrollment. The study recruited patients selected for abdominal surgery under general anaesthesia following inclusion and exclusion criteria. The estimated sample size was 50 patients in each group which included 10% attrition for this study and total sample size was 100.

All patients who underwent elective abdominal surgery under general anaesthesia aging above 18 years, irrespective of gender with ASA class I & II and BMI (Body mass index) under 30 kg/m$^2$ were included in this study. Patients with history of gastrointestinal disease which impair gastric motility, history of earlier gastric surgery, diabetes mellitus or any disease involving the autonomic nervous system, gastroprokinetics (medications known to increase gastric emptying) users, patients who were on antiemetics & were receiving intravenous fluid, patients with bloody aspirate during suctioning via nasogastric tube and patients who refused to participate were excluded from this study.

The study was conducted in the general surgery unit of operation theatre in BSMMU under the department of Anaesthesia, Analgesia and Intensive Care Medicine. Following approval of the Institute of Review Board (IRB) and obtaining informed consent from the patients who fulfilling the inclusion and exclusion criteria, data was collected up to 6 months after IRB clearance. Total 100 patients were scheduled for abdominal surgery under general anaesthesia. Patients were divided randomly into two groups: Overnight fasting for 10 hours (Group A-Controlled, n=50), ORS until 2 hours before surgery (Group B-ORS, n=50). Randomization was done by a computer generated list. Patients in group B received 500 ml of standard ORS solution in the early morning after waking up from bed on the day of surgery(from 5 AM to 6 AM) and another 500 ml until two hour before surgery(6 AM to 7 AM). No pharmacologic premedication was given to any patient. Thirst and hunger were measured by questions in both group before induction of general anaesthesia.

A standard general anaesthesia was given to all patients of both group. Fentanyl was used as 1.5 mg/kg for analgesia, propofol was used as 2 mg/kg for intravenous induction of anaesthesia, and intubating dose of suxamethonium chloride was used as 2 mg/kg for short term muscle relaxation. Loading dose of vecuronium bromide as 0.1 mg/kg, then one fifth of the loading dose as intermittent doses for maintenance were used for further muscle relaxation. After induction of anaesthesia a multi-orifice 16-18 Fr nasogastric tube were introduced carefully via oral route into the stomach approximately about 45 to 65 cm from the level of the upper incisor tooth to umbilicus. Confirmation done by any aspiration of gastric content or by listening of noisy sound over the anterior abdomen while giving air into stomach.

Any failed or bloody aspirate was excluded from the study. Gastric aspirate was obtained by application of gentle negative pressure to the tube using 50 cc syringe. During aspiration, tube is manipulated in different positions (Semi supine and Semi right lateral position) and upper abdominal massage was given to maximize the volume of aspirate. The volume was measured using the gradual markings of the syringe, and gastric fluid pH was measured by using special universal pH measuring strip. Patients developing intra operative hypovolemia were resuscitated accordingly and were discarded from the study. Any extended surgery which was more than 3 hours was excluded from the study. At the end of surgery all patients were infiltrated of their abdominal incision with 10-20 ml of 0.25% bupivacaine and diclofenac suppository 50-100 mg

per rectally as analgesic. No antiemetic or no opioid was given to anyone. All anaesthetic vapour and gas were stopped. Patients started to breath in 100% oxygen. Muscle relaxation was antagonized with proper dose of neostigmine and atropine. Patients were extubated upon resumption of full spontaneous ventilation. Then all patients were asked for eye opening, mouth opening, tongue protrusion, head raising, hand gripping, deglutition and coughing to check the time needed for recovery from general anaesthesia. Patients were moved to post anaesthesia care unit where they were checked for cognitive performance with the help of digit span forward and backward test. Postoperative nausea/vomiting was found out by questions in recovery room up to 4 hours after surgery.

The primary outcome of this study was to measure GRV (gastric residual volume) and gastric fluid pH just after induction of anesthesia. Preoperative thirst and hunger just before induction of general anesthesia and postoperative nausea/vomiting, patient's cognitive performance and patient's recovery time were the secondary outcome.

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test was used to analyze the categorical variables like sex, ASA status. P values <0.05 was considered as statistically significant.

**Results:**

Total 100 patients were eligible and involved in the study. Eleven patients were excluded (11% dropout) from the study due to intraoperative hypovolemia (3 patients), extended surgical procedure (2 patients) and unable to confirm the nasogastric tube placement orally (4 patients) or bleeding during tube placement (2 patients). So, 46 patients in fasting group and 43 patients in ORS group were the remaining number of patients for analysis.

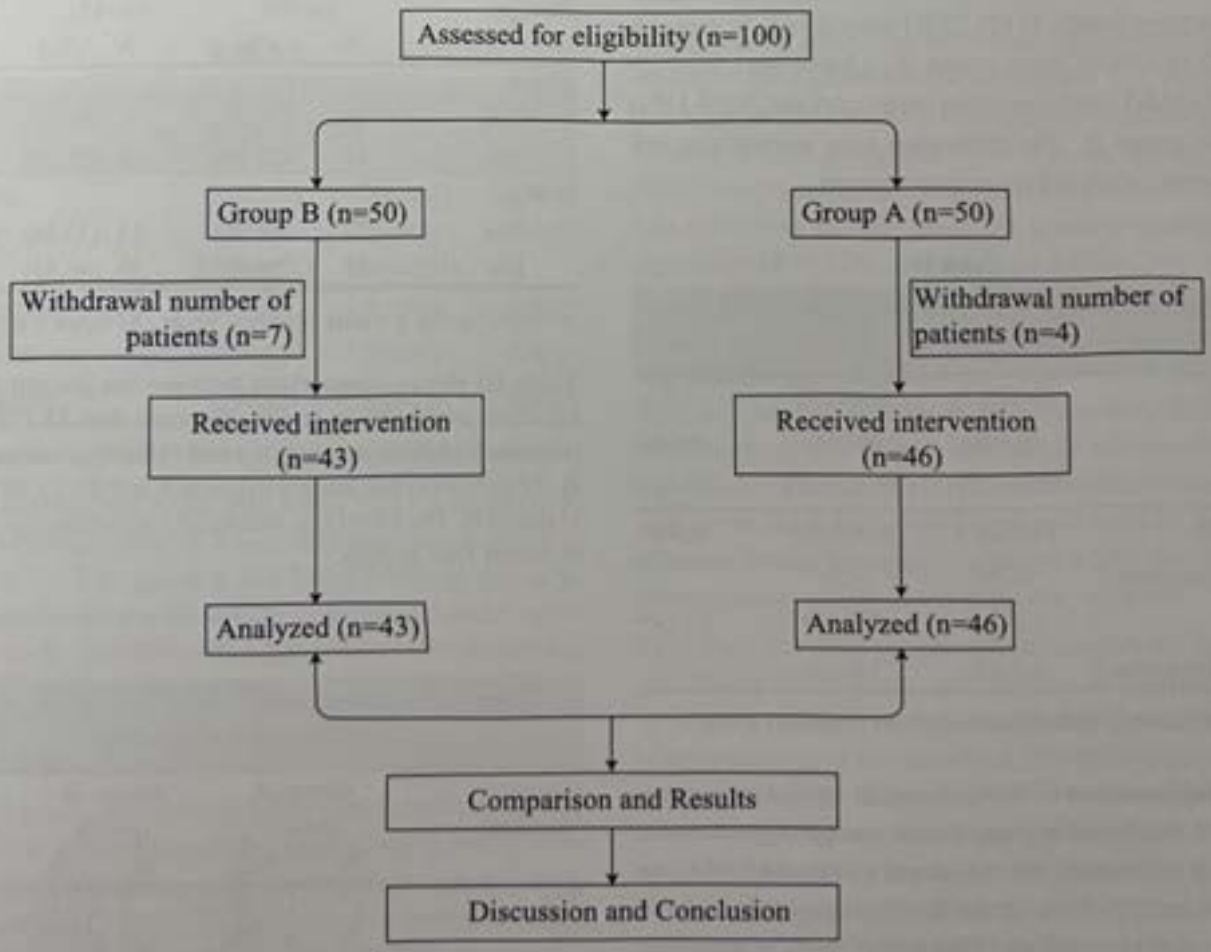


**Figure 1:** *CONSORT patient flow diagram*

**Table I**

*Comparison between the patient groups by demographic data and baseline characteristics*

| Variable | Group-A (n=46) Mean±SD | | Group-B (n=43) Mean±SD | | P value |
|---|---|---|---|---|---|
| Age (in years) | 42.9±11.8 | | 45.6±13.2 | | [a]0.309[ns] |
| BMI (kg/m$^2$) | 23.6±0.4 | | 23.8±0.6 | | [a]0.354[ns] |
| | n | % | N | % | |
| Gender | | | | | |
| Male | 13 | (28.26) | 14 | (32.55) | [b]0.641[ns] |
| Female | 33 | (71.73) | 29 | (67.44) | |
| ASA status | | | | | |
| Class I | 29 | (63.04) | 28 | (65.11) | [b]0.505[ns] |
| Class II | 17 | (36.95) | 15 | (34.88) | |

ns= not significant, [a]p value reached from unpaired t-test, [b]p reached from chi square test

Table I shows Comparison between the patient groups by demographic data and baseline characteristics, it was observed that mean age was found 42.9±11.8 years in group A and 45.6±13.2 years in group B. Mean BMI was found 23.6±0.4 kg/m$^2$ in group A and 23.8±0.6 kg/m$^2$ in group B. Almost three fourth 33 (71.73%) were female in group A and 29 (67.44%) were group B. Almost two third 29 (63.04%) ASA status were class I in group A and 28 (65.11%) were in group B. The difference were statistically not significant (>0.005) between two groups.

**Table II**

*Comparison between the patient groups by GRV and pH*

| Variable | Group-A (n=46) Mean±SD | Group-B (n=43) Mean±SD | P value |
|---|---|---|---|
| GRV(ml) | 54.6±21.9 | 31.4±13.9 | 0.001[s] |
| Range (min-max) | 16-98 | 8-53 | |
| pH | 2.1±1.1 | 2.0±0.9 | 0.138[ns] |
| Range (min-max) | 1.5-3.5 | 1.0-3.0 | |

s= significant, p value reached from unpaired t-test

Table II shows mean GRV was found 54.6±21.9 ml in group A and 31.4±13.9 ml in group B with a range from 16-98 ml and 8-53 ml respectively. Mean pH was found 2.1±1.1 in group A and 2.0±0.9 in group B with a range from 1.5-3.5 and 1.0-3.0 respectively. Mean GRV was statistically significant (p<0.005) between two groups.

**Table III**

*Comparison between the patient groups by thirst and hunger*

| Thirst and Hunger | Group-A (n=46) N | (%) | Group-B (n=43) N | (%) | P value |
|---|---|---|---|---|---|
| Thirst | | | | | |
| Yes | 33 | (71.73) | 8 | (18.60) | 0.001[s] |
| No | 13 | (28.26) | 35 | (81.39) | |
| Hunger | | | | | |
| Yes | 29 | (63.04) | 23 | (53.48) | 0.128[ns] |
| No | 17 | (36.95) | 20 | (46.51) | |

s= significant, p value reached from chi square test

Table III shows comparison between the patient groups by thirst and hunger, it was observed that 33 (71.73%) patients had thirst in group A and 8 (18.60%) had in group B. 29 (63.04%) had hunger in group A and 23(53.48%) had in group B. The Thirst was statistically significant (p<0.005) between two groups.

**Table IV**

*Comparison between the patient groups by post-operative nausea/vomiting*

| Nausea/ Vomiting | Group-A (n=46) N | (%) | Group-B (n=43) N | (%) | P value |
|---|---|---|---|---|---|
| Yes | 17 | (36.95) | 7 | (16.27) | 0.029[s] |
| No | 29 | (63.04) | 36 | (83.72) | |

s= significant, p value reached from chi square test

Table IV shows comparison between the patient groups by nausea/vomiting, it was observed that 17 (36.95%) patients had nausea/vomiting in group A and 7 (16.27%) had in group B. The difference was statistically significant ($p<0.05$) between two groups.

**Table V**

*Comparison between the groups by patient recovery time from general anesthesia*

| Patient recovery time (min) | Group-A (n=46) | | Group-B (n=43) | | P value |
|---|---|---|---|---|---|
| | N | (%) | N | (%) | |
| <10 | 09 | (19.56) | 16 | (37.20) | |
| 10-20 | 21 | (45.65) | 25 | (58.13) | 0.003[s] |
| >20 | 16 | (34.78) | 02 | (4.65) | |

s= significant, p value reached from chi square test

Table V shows comparison between the groups by patient recovery time from general anaesthesia, it was observed that majority 21 (45.65%) patients had 10-20 min in group A and 25 (58.13%) in group B. The difference was statistically significant ($p<0.05$) between two groups.

**Table VI**

*Comparison between the groups by digit span forward and backward test*

| Variable | Group-A (n=46) Mean±SD | Group-B (n=43) Mean±SD | P value |
|---|---|---|---|
| Forward test score | 3.7±1.3 | 4.6±0.4 | 0.001[s] |
| Backward test score | 2.7±2.3 | 3.8±1.2 | 0.001[s] |
| Total score | 6.4±3.6 | 8.4±1.6 | 0.001[s] |

s= significant, p value reached from unpaired t-test

Mean forward test score was found 3.7±1.3 in group A and 4.6±0.4 in group B. Mean backward test score was found 2.7±2.3 in group A and 3.8±1.2 was in group B. Mean total score was found 6.4±3.6 in group A and 8.4±1.6 in group B. The difference was statistically significant ($p<0.05$) between two groups.

## Discussion

In this study, the demographic characteristics of the patients in group A (controlled) and group B (ORS) were statistically indifferent in the context of age, gender, BMI, ASA status ($P>0.05$). So demographic variables didn't significantly alter the outcome of the study. Demographic characteristics of a similar study by Itou et al (2012) found BMI was significantly different between the groups, which was not clinically important; and others didn't differ significantly.[27]

The present study revealed, mean (SD) GRV immediately after anesthesia induction was 31.4 (13.9) ml in ORS group and 54.6 (21.9) ml in the fasting group ($P=0.001$).Mean (SD) gastric fluid pH was 2.0 (0.9) in ORS group and 2.1 (1.1) in fasting group ($P=0.138$). Carbohydrate rich clear drinks are known to increase gastric emptying, because their osmolality is low[28]. That's why GRV was less in ORS group than in fasting group. On the other hand, gastric fluid pH was not statistically significant between the groups although pH in the ORS group was slightly decreased, as glucose and electrolytes containing solution also stimulate gastric secretion. The observations were similar in other studies.[27]

If the gastric residual fluid volume is larger than 200 ml when anaesthesia is induced, the patient is at increased risk of vomiting and aspiration[29]. However in the present study no patient had a gastric volume more than 200 ml: the maximum volume was 53 ml in ORS group and 98 ml in the fasting group. Similar study by Itou et al. (2012) revealed maximum 60 ml in the ORS group and 155 ml in the fasting group.[27]

In the present study, we have found preoperative thirst among 18.60% patients in ORS group and 71.73% patients in fasting group ($P=0.001$). On the other hand, hunger was 53.48% in ORS group and 63.04% in the fasting group. Thirst was significantly lower in ORS group and hunger was also lower in ORS group but it was not statistically significant ($P=0.128$), because oral rehydration solution contain only 13.5 g/l glucose. A similar study on 252 elective surgery patients was done between carbohydrate drink and placebo groups, where they found the incidence of thirst and hunger were lower in carbohydrate drink than the placebo group.[30] Some authors say administration of higher concentration of glucose without electrolytes may exaggerate the dehydration via glucose induced diuresis, although during perioperative period a little electrolytes retention may occurs in the body due to stress.

This study revealed postoperative nausea/vomiting was 16.27% in ORS group and 36.95% in fasting group ($P=0.029$), which was statistically significant. Another study was done to see the effect of routine preoperative fasting in patients undergoing myomectomy. They have found that postoperative nausea/vomiting was lower in carbohydrate and placebo group than fasting group ($P=0.01$)[31]. Another randomized study found that the incidence of PONV was lower in the carbohydrate rich clear drink group than in the fasting group ($P<0.05$)[30].

They also demonstrated that allowing oral intake of clear fluids had some protective influence on postoperative nausea/vomiting (PONV), as dehydration is one of the major cause.

In this study, we observed patient's recovery time after general anesthesia which was shorter in ORS group than in fasting group. Most of the patients recovered within 10-20 minutes, (P=0.003). A single center cohort study done by Javier et al (2018) found more patients in the non-ERAS group than in the ERAS group developed delayed recovery (31.9% vs. 22.26%, p = 0.009).[32]

In addition we also observed patient's postoperative cognitive performance which was better in ORS group than in fasting group. P values were 0.001, 0.001, 0.001 in case of digit span forward, backward and total scores between the groups. No such related study during perioperative period was done previously, although there are some study to compare between dehydration and rehydration group. Most studies revealed that dehydration can impair cognitive performance (P<0.05).[26]

Total ORS intake in each patient was 1000 ml in this study and 812 ml in average in a similar study done by Itou et al.(2012)[27], which was more than it was expected (because empty stomach may initiate nausea during consumption of plane water) and indicates that oral rehydration solution is well tolerated. So, the present study demonstrates that oral rehydration solution until two hours before surgery is feasible and effective.

**Limitation of the study**

The study was conducted in a single center, so that the results may not reflect the entire population of the country.

Conclusion

The administration of oral rehydration solution until two hours before routine surgery is safe and effective. Preoperative ORS intake rather than overnight fasting reduces preoperative thirst/hunger, PONV and improves postoperative cognitive performance.

**Conflict of interest:** The authors declare that they have no competing interests

**References**


1. Ng A, Smith G. Gastroesophageal reflux and aspiration of gastric contents in anesthetic practice. Anesthesia & Analgesia 2001; 93(2): 494-513.
2. Metzner J, Posner KL, Lam MS, Domino KB. Closed claims' analysis. *Best* Practice & Research Clinical Anaesthesiology 2011; 25(2): 263-276.
3. Shime N, Ono A, Chihara E. Current status of pulmonary aspiration associated with general anaesthesia:a nationwide survey in Japan. Masui 2005; 54: 1177-85.
4. Van de Putte P, Perlas A. Ultrasound assessment of gastric content and volume. British Journal of Anaesthesia 2014; 113(1): 12-22.
5. Agarwal A, Chari P, Singh H. Fluid deprivation before operation: the effect of a small drink. Anaesthesia 1989; 44(8): 632-634.
6. Maltby JR, Lewis P, Martin A, Sutherland LR. Gastric fluid volume and pH in elective patients following unrestricted oral fluid until three hours before surgery. Canadian Journal of Anaesthesia 1991; 38(4): 425-429.
7. Miller M, Wishart HY, Nimmo WS. Gastric contents at induction of anaesthesia: is a 4-hour fast necessary? British Journal of Anaesthesia 1983; 55(12): 1185-1188.
8. Phillips S, Hutchinson S, Davidson T. Preoperative drinking does not affect gastric contents. British Journal of Anaesthesia 1993; 70(1): 6-9.
9. Ganio MS, Armstrong LE, Casa DJ. Mild dehydration impair cognitive performance and mood of men. Br.J.Nutri. 2011; 106: 1535-1543
10. Protic A, Turina D, Mataniæ D, Spanjol J, Zuvic-Butorac M, Sustic A. Effect of preoperative feeding on gastric emptying following spinal anesthesia: a randomized controlled trial. Wiener Klinische Wochenschrift 2010; 122(1): 50-53.
11. Maltby JR, Pytka S, Watson NC, Fick GH. Drinking 300 mL of clear fluid two hours before surgery has no effect on gastric fluid volume and pH in fasting and non-fasting obese patients. Canadian Journal of Anaesthesia 2004; 51(2): 111-115.
12. Wong CA, McCarthy RJ, Fitzgerald PC, Raikoff K, Avram MJ. Gastric emptying of water in obese pregnant women at term. Anesthesia & Analgesia 2007; 105(3): 751-755.
13. Yogendran S, Asokumar B, Cheng DC, Chung F. A prospective randomized double-blinded study of the effect of intravenous fluid therapy on adverse outcomes on outpatient surgery. Anesthesia & Analgesia 1995; 80(4): 682-686.
14. Cook R, Anderson S, Riseborough M, Blogg CE. Intravenous fluid load and recovery A double blind comparison in gynaecological patients who had day case laparoscopy. Anaesthesia 1990; 45(10): 826-830.
15. Marliss EB, Aoki TT, Unger RH.Glucagon levels and metabolic effects in fasting man. J Clin Invest 1970; 49: 2256-2270.
16. Yagci G, Can MF, Ozturk E, Dag B, Ozgurtas T, Cosar A, Tufan T. Effects of preoperative carbohydrate loading on glucose metabolism and gastric contents in patients undergoing moderate surgery: a randomized, controlled trial. Nutrition 2008; 24(3): 212-216.
17. Faria MS, de Aguilar-Nascimento JE, Pimenta OS, Alvarenga LC, Dock-Nascimento DB, Slhessarenko N. Preoperative fasting of 2 hours minimizes insulin resistance and organic response to trauma after video-cholecystectomy: a randomized, controlled, clinical trial. World journal of surgery 2009; 33(6): 1158-1164.
18. Ljungqvist O, Thorell A, Gutniak M, Häggmark T, Efendic S. Glucose infusion instead of preoperative fasting reduces postoperative insulin resistance. Journal of the American College of Surgeons 1994; 178(4): 329-336.
19. Erskine L, Hunt JN. The gastric emptying of small volumes given in quick succession. The Journal of physiology 1981; 313(1): 335-341.

20. Hunt JN. Mechanisms and disorders of gastric emptying. Annual review of medicine 1983; 34(1): 219-229.

21. Brady MC, Kinn S, Stuart P, Ness V. Preoperative fasting for adults to prevent perioperative complications. Cochrane database of systematic reviews 2003; 4: 20-28.

22. Splinter WM. From the journal archives: gastric fluid volume and pH in elective patients following unrestricted oral fluid until three hours before surgery. Canadian Journal of Anesthesia/Journal canadien d'anesthésie 2014; 61(12): 1126-1129.

23. Smith MD, McCall J, Plank L, Herbison GP, Soop M, Nygren J. Preoperative carbohydrate treatment for enhancing recovery after elective surgery. The Cochrane Database of Systematic Reviews 2014; 14: 8-14.

24. Lamb S, Close A, Bonnin C,, Ferrie S.'Nil By Mouth'–Are we starving our patients? The European e-Journal of Clinical Nutrition and Metabolism 2010; 5(2): e90-e92.

25. Smith I, Kranke P, Murat I, Smith A, O'Sullivan G, Søreide E, Spies C. Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. European Journal of Anaesthesiology 2011; 28(8): 556-569.

26. Na Zhang, Song M, Jian F, Guan S. Effects of Dehydration and Rehydration on Cognitive Performance and Mood among Male College Students in Cangzhou, China: A Self-Controlled Trial. Int J En 2019; 16: 11.

27. Itou K, Fukuyama T, Sasabuchi Y, Yasuda H., Suzuki N, Hinenoya H, Kim C, Sanui M, Taniguchi H, Miyao H, Seo N. Safety and efficacy of oral rehydration therapy until 2 h before surgery: a multicenter randomized controlled trial. Journal of anesthesia 2012; 26(1): 20-27.

28. Stuart PC. The evidence base behind modern fasting guidelines. Best Practice & Research Clinical Anaesthesiology 2006; 20(3): 457-469.

29. Ljungqvist O, Søreide E. Preoperative fasting. British Journal of Surgery 2003; 90(4): 400-406.

30. Hausel J, Nygren J, Lagerkranser M, Hellström PM, Hammarqvist F, Almström C, Lindh A, Thorell A, Ljungqvist O. A carbohydrate-rich drink reduces preoperative discomfort in elective surgery patients. Anesthesia & Analgesia 2001; 93(5): 1344-1350.

31. Ajuzieogu OV, Amucheazi AO, Nwagha UI, Ezike HA, Luka SK, Abam DS. Effect of routine preoperative fasting on residual gastric volume and acid in patients undergoing myomectomy. Nigerian journal of clinical practice 2016; 19(6): 816-820.

32. Javier RM, Maria L, Susana C. Enhanced recovery after surgery protocol versus conventional perioperative care in colorectal surgery. A single center cohort study. Brazilian Journal of Anaesthesiology 2018; 68: 358-368.

Original Article

# Correlation of FNAC with Histopathology in the Diagnosis of Differentiated Thyroid Carcinoma

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**Abstract**

***Background:*** *Fine-needle aspiration cytology (FNAC) is an important diagnostic tool for differentiating between neoplastic and non-neoplastic lesions of the thyroid. The current study was carried out to observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.*

***Methods:*** *This cross sectional observational study was conducted in the department of Pathology, Rajshahi Medical College (RMC), Bangladesh from January 2019 to December 2020. Clinically suspected and diagnosed by FNAC, a total of forty patients of differentiated thyroid carcinoma attending outpatient and inpatient department of Otolaryngology, RMCH were enrolled in this study. Biopsy material was examined for histopathological diagnosis.*

***Results:*** *In this study, out of forty cases, 35 were papillary and 5 were follicular carcinoma. Mean age was 25.48+9.70 years and Male: Female was 1:6. Among 40 cases of FNAC findings, 33 cases (82.5%) were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 5 cases were (12.5%) were follicular lesion and 01(2.5%) case was nodular goitre. Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 03(7.5%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings, none of them was nodular goitre. So, all FNAC findings were consistent with histopathological findings except nodular goitre which was diagnosed as classic papillary carcinoma in histopathology.*

***Conclusion:*** *FNAC is a safe and relatively accurate method for preoperative evaluation of thyroid malignancy before surgery. Therefore it is a reliable diagnostic test for evaluation of thyroid carcinoma.*

**Key Words:**
Differentiated thyroid carcinoma. FNAC, Histopathology

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## Introduction

Diseases of thyroid gland are very common in our country.[1] Problems with the thyroid gland include a variety of disorders that result in production of too less or excess thyroid hormone. There are many types of thyroid disease, each with their own symptoms. Among them, Hypothyroidism, Hyperthyroidism, Structural abnormalities, most commonly a goiter (enlargement of the thyroid gland) and Tumors which can be benign or malignant are notable.

Cancer of the thyroid gland is the most common endocrine malignancy and its incidence is increasing worldwide. Studies showed that about eighty percentages (80%) of thyroid tumors comprise well-differentiated carcinoma.[2] According to the WHO classification; differentiated thyroid carcinoma can be subdivided into papillary and follicular thyroid carcinoma. The histological differentiation is to be useful as papillary and follicular thyroid carcinoma differ in their biological behavior which may be reflected in a somewhat distinct therapeutic approach. Papillary and follicular thyroid carcinomas that

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usually carry an excellent prognosis while a minority progress to poorly differentiated carcinoma and, ultimately, to the highly aggressive and lethal undifferentiated carcinoma.[3]

Thyroid cancer causes a long term chronic disease. So, one of the challenges in thyroid cancer management is to provide the least invasive and most cost effective follow up which allows detection of recurrent or progressive disease. There are multiple modalities of diagnostic test for thyroid lesions like Ultrasonogram, thyroid scan, fine needle aspiration cytology (FNAC), thyroid function test etc.[1] FNAC is considered as the most common reliable test for the diagnosis of thyroid nodule or mass. FNAC is safe relatively simple and cost effective for evaluation of thyroid patients. This procedure provides a tool for detecting thyroid malignancies in an early stage, resulting in a better outcome of patients.[4] For Final diagnosis, morphological examination of thyroid lesions is essential for which FNAC and histopathological examination becomes mandatory tests.[5,6] It is useful for diagnosis of pathological lesions of multiple organs such as lymph nodes, breast, thyroid gland etc. Being superficial and easily accessible, thyroid is an ideal organ for FNAC procedure; it also helps in deciding the line of treatment and taking decision about the surgical procedure.[7] Histopathological examination of surgically resected thyroid lesions is also one of the accurate ways to diagnosis the pathology. So, the aim and objective of this study was to compare the results of FNAC and Histopathology in diagnosis of the commonest thyroid malignancy that is Differentiated Thyroid Carcinoma.

**Objectives:**

Primary: To observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.

Secondary: (a). To observe the demographic profile of the patients with differentiated Thyroid Carcinoma. (b). To find out the percentage of variants of differentiated thyroid Carcinoma among study population.

**Materials and methods**

This was a cross sectional observational study, conducted in the department of Pathology, in collaboration with the department of Otolaryngology, Rajshahi Medical College Hospital (RMCH), Rajshahi from January 2019 to December 2020. Clinically suspected and diagnosed by FNAC patients of differentiated thyroid carcinoma attending outpatient and inpatient department of Otolaryngology, RMCH and in private clinics who fulfill the inclusion criteria constituted the study population for the study. Sample size was 40 in number. Patients were selected by purposive sampling. Pre-designed data sheet was used for recording all relevant information's and laboratory results regarding patients. The data were recorded methodically and meticulously.

First the clinical information's regarding patients were recorded separately. FNAC was done before operation and data was recorded. After operation histological diagnosis was made based on H &E stain and histopathological reports were also recorded. The collected data was compiled in a master sheet. Data were analyzed by using SPSS-23 (Statistical Package for Social Science) software program of computer and where necessary manually. Mean and standard deviation were done for continuous data and percentage done for categorical data.

**Results:**

**Table I**

*Age and sex distribution of differentiated thyroid carcinoma patients (n=40)*

| Age groups (years) | Sex | | Total n (%) |
|---|---|---|---|
| | Male n (%) | Female n (%) | |
| <20 | 1(50%) | 1(50%) | 2(5%) |
| 20-40 | 4(11.1%) | 32 (88.8%) | 36(90%) |
| >40 | 0(00%) | 2(100%) | 2(5%) |
| Total | 5(12.5%) | 35(87.5%) | 40(100%) |

Mean + SD =25.48 +9.70 years

Among the 40 patients studied, the age ranged from 17 to 74 years. Mean age was 25.48+9.70 years. Majority of the patients were in the age group 20 to 40 years. 35 cases (87.5%) were female and 5(12.5%) cases were male.

**Table II**

*Age distribution of variants of differentiated thyroid Carcinoma patients (n=40).*

| Age group (years) | Papillary | Follicular |
|---|---|---|
| 15-30 | 33(82.5%) | 1(2.5%) |
| 31-45 | 1(2.5%) | 4(10.0%) |
| 46-74 | 1(2.5%) | 0(00.0%) |

Among the 40 cases, 33 cases (82.5%) of papillary carcinoma were in age range of 15-30 years, 1 case was in 31-45 years age range and another 1 case was in 46-74 years age group. Rest of the 5 cases of follicular carcinoma, 4 cases was in age range of 31 -45 years and another one was in 15-30 years age group.

**Table III**

*Sex distribution of papillary and follicular carcinoma patients (n=40).*

| Carcinoma Type | Cases | Male | Female | M:F Ratio |
|---|---|---|---|---|
| Papillary | 35 | 5 | 30 | 1:7 |
| Follicular | 5 | 0 | 5 | |
| Total | 40 | 5 | 35 | |

This table showed that out of 40 cases, papillary carcinoma was 35 and follicular carcinoma was 5. In papillary carcinoma, 30 cases were female and 5 cases were male. M: F ratio was 1:6. In follicular carcinoma all cases

**Table IV**

*FNAC findings of the study populations (n=40)*

| Findings | Numbers of cases n (%) |
|---|---|
| Papillary carcinoma (classic) | 33(82.5%) |
| Follicular variant of papillary carcinoma | 01(2.5%) |
| Follicular lesion/ Follicular carcinoma | 06(15%) |
| Total | 40(100%) |

Among 40 cases of FNAC findings, 33(82.5%) cases were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 6 cases (15%) were follicular lesion.

**Table V**

*Histopathological distribution of differentiated thyroid carcinoma patients (n=40)*

| Findings | Numbers of cases n (%) |
|---|---|
| Papillary carcinoma (classic) | 33(82.5%) |
| Follicular variant of papillary carcinoma | 01(2.5%) |
| Follicular lesion/ Follicular carcinoma | 05(12.5%) |
| Nodular goitre | 01(2.5%) |
| Total | 40(100%) |

Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 02(05%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings 01(2.5%) case was nodular goitre. So, all FNAC findings were consistent with histopathological findings except one case which was misdiagnosed as follicular carcinoma in FNAC but histopathology confirmed as goitre.

**Table VI**

*Correlation of FNAC with Histopathological Examination*

| | Histopathology | | Total |
|---|---|---|---|
| FNAC | Neoplastic | Non Neoplastic | |
| Neoplastic | 39 | 1 | 40 |
| Non neoplastic | 0 | 0 | 0 |
| Total | 39 | 1 | |

Sensitivity-100%, Accuracy – 97.5%.

**Discussion:**

Thyroid malignancy is estimated at about 1% of all malignancies. Eighty percentages (80%) of thyroid tumors comprise differentiated carcinoma. Differentiated thyroid carcinoma can be subdivided into papillary and follicular thyroid carcinoma.[8] Differentiated thyroid carcinoma has favorable prognosis but it can also be aggressive, leading to recurrent disease or death and needs lifelong monitoring. The present study was undertaken with the aim to observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.

Total 40 patients of differentiated thyroid carcinoma attending department of Otolaryngology, Rajshahi Medical College Hospital were included in this study. The age of patients ranged from 17 years to 74 years, maximum study subjects were in age group of 20-40 years and mean age was 25.48+9.70 years. Md. Nazmul Haque et al (2021) showed in their study that most were between 31-40 years age group. Mean age was 29.5 years. In another study from Bangladesh, Alam (2005) showed that mean age of papillary carcinoma patients was 32.98 years and age range was 12-68 years.[9] So the present study is consistent with others.

Among the 40 cases, 33 cases (82.5%) of papillary carcinoma were in age range of 15-30 years, 1 case was in 31-45 years age range and another 1 case was in 46-74 years age group. Rest of the 5 cases of follicular carcinoma, 4 cases was in age range of 31 -45 years and another one was in 15-30 years age group. Gimm O and Dralle H.showed that Papillary thyroid carcinoma comprises up to 80% of all thyroid malignancies. It occurs in all age groups but is most common in the 3rd to 5th decades. Follicular thyroid carcinoma represents approximately 10–20% of all thyroid malignancies. It occurs over a wide age range but is most common in the 5th and 6th decades.[8]

In this study, 35 cases (87.5%) were female and 5(12.5%) cases were male. So, Male: Female was 1:7. In papillary

carcinoma, 30 cases were female and 5 cases were male. M: F ratio was 1:6, which was supported by Alam (2005) (1:4.4).[9]

Among 40 cases of FNAC findings, 33(82.5%) cases were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 6 cases (15%) were follicular lesion. Haque MN et al (2021) showed that in their study, preoperative FNAC was done for 104 cases. Among them 34.62% were neoplastic among which 22 patients (21.15%) were papillary carcinoma, 10 patients (9.61%) were follicular neoplasms, 2(1.9%) medullary carcinoma, 2(1.9%) anaplastic carcinoma of thyroid. So, in the both studies, papillary malignancy is the highest finding in FNAC.

Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 02(05%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings 01(2.5%) case was nodular goitre. In the study of Haque MN et al (2021), among 36 cases of FNAC based diagnosed malignancy those underwent surgery and subsequent histopathological examinations revealed three (3) cases false negative. In 10 cases of follicular Neoplasm 2 cases were Non conclusive cytological diagnosis and 1 false cytological diagnosis of anaplastic carcinoma. No false negative found in papillary malignancy. In their study, one case of goitre is misdiagnosed as follicular carcinoma. So our findings are consistent with the finding of this study.

In our study, all FNAC findings were consistent with histopathological findings except one case which was misdiagnosed as follicular carcinoma in FNAC but histopathology confirmed as goitre. So, the validity of FNAC in this study revealed, Sensitivity was 100%, diagnostic accuracy was 97.5%. This accuracy is compared with that of Haque MN et al (91.35%),[1] altavillaetal (92.86%)[10] and Handu at al[11] grunt et al[12] found false negative rate of only 0.7% in 439 patients. Result of this study is almost similar to that of the international studies.

## Conclusion

FNAC is a safe and relatively accurate method for preoperative evaluation in thyroid malignancy before surgery. Therefore it is a reliable diagnostic test for evaluation of thyroid carcinoma. FNAC can help to exclude many unnecessary thyroid surgeries by screening benign lesions.

## References


1. Haque MN, Sakik MA, Bhuiyan MAR, Akhter MF, Khan SR, Sarker MZ et al., Correlation between FNAC and Histopathology in the Diagnosis of Thyroid Lesions. Bangladesh J Otorhinolaryngol 2021; 27(1): 81-85
2. Bellantone R, Lombardi CP, Boscherini M, Ferrante A, Raffaelli M, Rubino F, et al. Prognostic Factors in Differentiated Thyroid Carcinoma: A Multivariate Analysis of 234 Consecutive Patients. Journal of Surgical Oncology 1998;68:237–241
3. Eloy C, Ferreira L, Salgado C, Soares P, Sobrinho-Simões M. Poorly Differentiated and Undifferentiated Thyroid Carcinomas. Turk Patoloji Derg. 2015;31 Suppl 1:48-59. doi: 10.5146/tjpath.2015.01314. PMID: 26177317
4. Kang HW, NO H, Chung JH, Min YK, LEE MS, Yang JH, Kim KW 2004, Prevalence, clinical and ultra Sonographic Characteristics of thyroid Incidentalomas. Thyroid 2004; 14: 29- 33.
5. Gupta M,Gupta S, Gupta VB. Correlation of fine needle Aspiration Cytology with Histopathology in the diagnosis of solitary thyroid nodule. J thyroid Res 2010; 10: 51-61.
6. Linsk JA, Frazen S. Clinical Aspiration cytology 2ndedn,JB, Lippincott : Philadelphia, 1983; 1: 258-271.
7. Ali Rizvi SA, Hussais M, Khan S, Mohsin M 2005, Acomparative study of fine needle aspiration cytology versus non aspiration technique in thyroid lesion. 2005;4:273-276
8. Gimm O, Dralle H. Differentiated thyroid carcinoma. In: Holzheimer RG, Mannick JA, editors. Surgical Treatment: Evidence-Based and Problem-Oriented. Munich: Zuckschwerdt; 2001. Available from: https://www.ncbi.nlm.nih.gov/books/NBK6979/
9. Alam, A. M. (2005). Study on morphological variant of papillary carcinoma of thyroid (Thesis). Dhaka, Bangabandhu Sheikh Mujib Medical University, Dhaka
10. Altavilla JG (1997) Fine needle aspiration biopsy and diagnosis of thyroid cancer. 1997;98 : 53-56.
11. Handa U, Gurg S, Mohan H (2008) Role of Fine needle aspiration cytology in diagnosis and management of thyroid lesion. Indian J Pediatr2008;25(1): 13-17.
12. Linsk JA, Frazen S. Clinical Aspiration cytology 2ndedn,JB, Lippincott : Philadelphia, 1983; 1: 258-271.

## Original Article

# Comparison of the Diagnostic Accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) with Ultrasound and Computed Tomography (CT) in Evaluation of Patients with Obstructive Jaundice

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**Abstract**

***Background:*** *Obstructive jaundice patients need surgical intervention to overcome the biliary obstruction. For planning these complex interventions, the radiologist has to precisely assess the etiology, location, level, and extent of the disease.*

***Aim:*** *To compare the diagnostic benefit of Magnetic Resonance Cholangiopancreatography (MRCP) with Ultrasound and Computed Tomography (CT) in the evaluation of patients with obstructive jaundice taking histologic tests and anatomical findings after surgical intervention as gold standard.*

***Study Design:*** *This prospective study included 72 patients who were referred to DCIMCH radiology department with clinical features of biliary obstructive disease.*

*Materials and Methods: All patients were evaluated by Ultrasonography followed by Computed tomography (CT) and Magnetic Resonance Cholangiopancreatography (MRCP). The results were read by radiologists blinded to other imaging findings. The characteristic histopathological diagnosis / surgical findings (as applicable) were considered as gold standard.*

***Results:*** *Diagnostic accuracy of MRCP (98%) in the diagnosis of benign and malignant diseases was relatively high (98% and 98%) as compared to CT (82.86% and 91.43% in benign and malignant respectively) and USG (88% and 88%). In the diagnosis of benign diseases, MRCP was 100% sensitive compared to ultrasound (80.77%), which was more sensitive than CT scan (54.55%).In the diagnosis of malignant diseases, MRCP was more sensitive (95.83%) as compared to CT scan (91.67%), which was more sensitive than ultrasonography (79.17%).*

***Conclusion:*** *MRCP is the best imaging investigation in the pre-operative evaluation for obstructive jaundice patients.*

**Key Words:**
MRCP (Magnetic Resonance Cholangio Pancreatography), CT (Computed Tomography, USG (Ultrasonography)

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## Introduction

The biliary tract refers to the liver, gallbladder and bile ducts and how they work together to produce, store and secrete bile. Bile is secreted by the liver in small channels that join to form the common hepatic duct. Between meals, the secreted bile is stored in the gallbladder, where 80 to 90% of the water and electrolytes can be absorbed, leaving bile acids and cholesterol. During a meal, the smooth muscles of the wall of the gallbladder contract, causing the secretion of bile in the duodenum to eliminate waste stored in the bile and contribute to the absorption of fat and edible oils by solubilizing them with bile acids. Jaundice is caused by hyper bilirubinaemia that may be in conjugated or unconjugated form. Medical jaundice is when bilirubin level exceeds 34-35 imol / L or 2-3 mg /

dL.[1,2] Jaundice can be divided into two categories: obstructive (surgical) and non-obstructive (medical) jaundice.[3] Post hepatic jaundice is a type of jaundice whose cause lies in the biliary part of the hepatobiliary system. The main cause of post hepatic jaundice is extra hepatic biliary obstruction. Therefore, it is also known as obstructive jaundice.[1] Obstructive jaundice has high morbidity and mortality and is therefore a difficult condition for the surgeons.[4] After a series of biochemical liver function tests, radiological investigations are performed. Role of radiologist is not only confined to differentiate between obstructive or non-obstructive etiology but is to elaborate the exact anatomical site of obstruction, extent of the disease as well as the feasibility for interventional procedures. Only after accurate assessment of these factors, appropriate therapeutic option can be decided for further management.[5,6] US has been always considered the first choice technique in the study of biliary obstructive disease, due to its accessibility, speed, ease of performance and low cost.[7] Traditional Computed Tomography (CT) scan is usually considered more accurate than US for helping determine the specific cause and level of obstruction.[8] Both ultrasound and CT scan are regarded as safe and non-invasive procedures in evaluating the status of the biliary tract. Ultrasound is used as an initial modality to confirm or exclude duct obstruction, which it does with at least 90% accuracy.[9] The range of application of CT has been partially restricted by MRCP.[7] MRCP techniques have greatly evolved, providing high Radiology Section resolution images of the biliary tree with short exam duration, while remaining non invasive without contrast medium injection.[10]

**Aims and Objective**

This study was aimed to compare the diagnostic accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) with Ultrasound and Computed Tomography (CT) in evaluation of patients with obstructive jaundice taking histopathology and operative anatomical findings as gold standard.

**Materials and Methods**

Type of study was prospective observational study. The study has been conducted on 72 patients after approval from the institutional ethic committee starting from January 2019 to December 2021 at Dhaka Central International Medical College, Dhaka. All patients with clinically diagnosed obstructive jaundice were included in the study. Patients with contraindications to MRI, non-obstructive (prehepatic/hepatic) cause of jaundice and refusal to be part of our study were excluded from this study. Written informed consent was taken from all the subjects. A composite assessment of the patient's history, findings on physical examination, laboratory investigations conventional biochemical liver function tests like total serum bilirubin, serum alkaline phosphatase, AST, ALT levels, CA 19-9, serum albumin and globulin were noted. Initial USG evaluation was followed by Contrast enhanced Computed Tomography and MRI/ MRCP. Transabdominal ultrasonography was done using curvilinear probe on GE Logiq-e machine followed by CECT on a 40 Slice Philips Brilliance machine. MRCP was done in all patients on Philips Achieva 1.5 Tesla MRI scanner. For MRCP, patients were asked to come with 8-12 hours fasting to promote gall bladder distension, reduce fluid secretions in stomach and duodenum and reduce peristalsis. Using heavily T2 weighted images (at longer echo time (TE) ranging from 600-1200 ms) we aim to suppress the background signal so that only bile in biliary tract can show bright signal. Three most important sequences included axial T2 weighted scan from liver to ampullary region followed by T2 weighted 3D FSE sequence acquired in coronal oblique plane using respiratory triggering by tying bellows over abdomen. After this breath hold HASTE sequence was acquired in coronal plane. Maximum intensity projection (MIP) and thick slab images were also used for interpretation. USG, CECT and MRCP scans were interpreted by radiologists blinded to other imaging findings. All patients undergone operative procedure (open surgery or ERCP). We used histopathological findings after biopsy and operative anatomical findings as the gold standard.

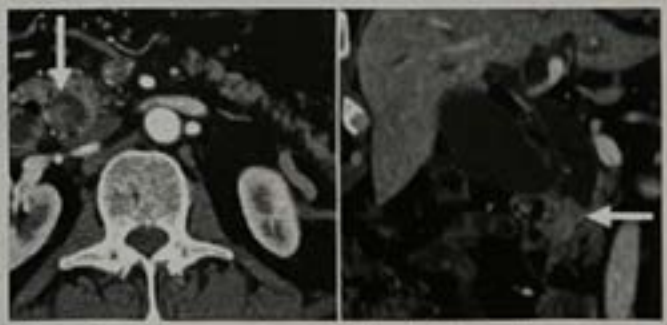

**Figure 1:** *CT image showing distal cholangiocarcinoma (Periampullary carcinoma)*

**Figure 2:** *MRCP showing carcinoma head of pancreas causing obstructive jaundice*

**Results and Observations:**

We included 72 patients in our study, 38 were male and 34 were female. They belonged to age group ranging from 3 years to 82 years. Benign cause was found in 32 cases (44%) and malignant cause was reported in 40 cases (56%). According to Table I, most frequent benign causes of obstructive jaundice were CBD stones and combined gall bladder and CBD stones. Benign strictures also contributed to 25% of benign causes. Cholangitis causing beaded blockade of biliary tract and anatomical variants were also encountered in this study.

**Table I**

*Benign causes of obstructive jaundice*

| Benign cause | Number of case | Percentage |
|---|---|---|
| CBD calculi | 8 | 25% |
| Gall stone with CBD stone | 8 | 25% |
| Benign stricture | 8 | 25% |
| Anatomic variant | 6 | 19% |
| Cholangitis | 2 | 6% |
| Total | 32 | 100% |

Among the malignant causes of obstructive jaundice, periampullary carcinoma (malignancy arising within 1 cm of ampulla of vater) were most commonly encountered.

**Table II**

*Malignant causes of obstructive jaundice*

| Malignant causes | Number of cases | Percentage |
|---|---|---|
| Periampullary carcinoma | 16 | 40% |
| Cholangiocarcinoma | 8 | 20% |
| Carcinoma gall bladder | 8 | 20% |
| Klatskin tumor | 4 | 10% |
| Carcinoma head/ body of pancreas | 2 | 5% |
| Lymphnode compression | 2 | 5% |
| Total | 40 | 100% |

Our study revealed that common cause of obstructive jaundice is malignant in older age groups whereas in younger and middle age, benign causes were found to be relatively more common (Table III).

Correlation of the findings in ultrasound, CT and MRI/ MRCP was done taking histopathology or cholangiography as gold standard to evaluate the diagnostic accuracy of each of these modalities (Table 4, 5, 6).

**Table III**

*Table showing distribution of Benign and Malignant Lesions with respect to age of patients*

| Age group | Benign cases | | Malignant cases | | Total cases |
|---|---|---|---|---|---|
| | Number | Percentage | Number | Percentage | |
| 0-20 | 2 | 50% | 2 | 50% | 4 |
| 21 - 40 | 10 | 83% | 2 | 17% | 12 |
| 41 – 60 | 16 | 47% | 18 | 53% | 34 |
| >60 | 4 | 18% | 18 | 82% | 22 |
| Total | 32 | | 40 | | 72 |

**Table IV**

*Table showing diagnosis by Helical CT scan and Histopathological diagnosis*

| | | Histopathological diagnosis | | | Significance |
|---|---|---|---|---|---|
| | | Benign | Malignant | | $X^2 = 24.89$ |
| CT finding | Benign | 28 (TP) | 2 (FP) | 30 | df = 1 |
| | Malignant | 4 (FN) | 38 (TN) | 42 | |
| | | 32 | 40 | 72 | P<0.00000101 |

**Table V**

*Table showing diagnosis by MRI/MRCP and Histopathological diagnosis*

| | | Histopathological diagnosis | | | Significance |
|---|---|---|---|---|---|
| | | Benign | Malignant | | $X^2 = 28.36$ |
| MRCP | Benign | 31 (TP) | 1 (FP) | 32 | df = 1 |
| | Malignant | 1 (FN) | 39 (TN) | 40 | |
| | | 32 | 40 | 72 | P<0.00000101 |

**Table VI**

*Table showing diagnosis by ultrasonography and Histopathological diagnosis*

| | | Histopathological diagnosis | | | Significance |
|---|---|---|---|---|---|
| | | Benign | Malignant | | $X^2 = 7.106$ |
| USG | Benign | 25 (TP) | 08 (FP) | 40 | df = 2 |
| | Malignant | 7 (FN) | 32 (TN) | 32 | |
| | | 32 | 40 | 72 | P<0.028 |

**Table VII**

*Table showing Comparison of diagnostic values of ultrasound, Helical CT and MRI/MRCP*

| | MRCP | CT scan | USG |
|---|---|---|---|
| Sensitivity | 96.8% | 87.5% | 78% |
| Specificity | 97.5% | 95% | 80% |
| Positive Predictive Value | 96.87% | 93.3% | 75% |
| Negative Predictive Value | 97.5% | 90.5% | 82% |
| Diagnostic Accuracy | 97.4% | 93.7% | 77% |

Our final comparison was done among all these 3 imaging modalities in terms of sensitivity, specificity, positive and negative predictive values and diagnostic accuracy (Table 7). Our study revealed that the diagnostic accuracy of MRCP is better than that of CT and USG which are 97.4%, 93.7% and 77 % respectively.

## Discussion

The opinion is broadly shared that US is the first choice option in the diagnosis of choledocholithiasis. Our results for US diagnostic accuracy, sensitivity and specificity are in accordance with those reported in literature. Boraschi et al., reported a specificity of over 90%.[11] In the literature, a sensitivity range of 20 to 80% is often documented[12]; these considerable differences in sensitivity among various case series are partially attributable to the impossibility of approaching the distal CBD and ampullary region in obese patients and patients with abdominal meteorism, as well as to the variability of the US technique applied. The high sensitivity in our study presumably derives from the use of dosed compression, and to THI, which allowed for better study of the distal tract of the CBD. As described by Ortega et al.[13], harmonic imaging, by improving contrast resolution, stresses the difference between the anechoicity of the duct lumen and the surrounding soft tissues. Todua et al.[14], has mentioned that for choledocholithiasis, CT is similar to ultrasound, with a sensitivity range of 23% to 85% and specificity of 97%. Present study showed similar results. MRCP diagnostic accuracy, sensitivity and specificity are comparable to those reported in the literature (Calvo et al.,[12] Huassein et al.[15], Boraschi et al.[11] Varghese et al.[16] where sensitivity, specificity and diagnostic accuracy respectively range between 81-100%, 84-100% and 90-96%. Study conducted by Al-Obaidi et al.[17] showed higher sensitivity (100%), specificity (98.5%), accuracy (98.7%) of MRI/MRCP for cases with benign stricture as compared to sensitivity of USG (44.4%) which is consistent with present study. Andersson M et al.[18] concluded in their study that MRI with MRCP was more accurate than CT in differentiating between malignant and benign lesions in patients with suspected periampullary tumors. This is consistent with present study where MRCP showed 100 % accuracy in diagnosing cases with periampullary carcinoma. The overall sensitivity was 66.67%, specificity was 100% and accuracy was 96% for cases with cholangiocarcinoma on ultrasound with a negative predictive value of 95.65%. The finding of our study approximate with findings by Hann et al.[19] who reported that ultrasonography detected 87% of Klatskin tumor. Verma et al.[20] demonstrated the sensitivity and specificity

of 85.3% and 88.4% on ultrasound, 84.6% and 94.2% on CT, 92.3% and 86% on MRCP for detecting the benign etiology of obstruction. Ferrari FS et al.[21] demonstrated similar findings for benign lesions in their study. The diagnostic accuracy, sensitivity and specificity of USG was 78.62%,16.67% 97.29%, of CT it was 92.59%, 92.3%. 92.85% and of MRCP was 93.13%,90%,94% respectively. Similar results were found in present study in which the overall sensitivity was 78%, specificity was 80% and accuracy was 77% for ultrasound. The sensitivity for CT is inconsistent with the study conducted by Verma et al.[20] This discrepancy could be because of the small subject size in our study. However the specificity demonstrated in their study was 94.2%, which is consistent with present findings. Verma et al. demonstrated the sensitivity and specificity of 88.4% and 85.3% on ultrasound, 94.2% and 85% on CT, 86% and 92% respectively for detecting the malignant etiology of obstruction. Ferrari FS et al., [21] demonstrated the diagnostic accuracy, sensitivity and specificity of USG 93.13%, 61.12%, 98.23% and 92.59%, 90.9%, 93.75% of CT and 93.13%, 90%, 94% of MRCP respectively. Similar results were found in present study in which the overall sensitivity was 78%, 87% and 96.8%; specificity was 80%, 95% and 97.5% and accuracy was 77%, 93.7% and 97.4% for ultrasound, CT scan and MRCP.

## Conclusion

Diagnostic accuracy of MRI/MRCP was found superior to ultrasonography and CT scan for diagnosis and assessment of obstructive jaundice. The accuracy of MRI/MRCP was significantly better for cases with benign etiology. Among the malignant causes, periampullary carcinoma was most common etiology. MRI/MRCP and contrast enhanced CT showed high diagnostic accuracy in such cases. Hence, MRCP is best and reliable imaging tool for obstructive jaundice patients.

## References


1. Abbas M, Shamshad T, Ashraf M, Javaid R. Jaundice: a basic review. Int J Res Med Sci. 2016;1313–9.
2. Fargo M V, Grogan SP, Saguil A. Evaluation of Jaundice in Adults. Am Fam Physician [Internet]. 2017;95(3):164–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28145671
3. Kharche AD, Jiwani AA, Vaidhya S, Jiwani MS, Banode PJ. Role of Magnetic Resonance Cholangiopancreatography in Cases of Obstructive Jaundice in Correlation with Ultrasonography. Int J Recent Surg Med Sci. 2016;2(2):70–84.
4. Kaushal L, Patil A, Ahirwar CP, Sharma K. Comparison of computed Tomography and ultrasonography in evaluating causes of obstructive jaundice. Int J Med Res Rev [Internet]. 2016;4(8):122–5. Available from: www.ijmrr.in
5. Kim U Kalnag, Joel J. Roslyn. Jaundice, Maingot's abdominal operations. Vol. I & II. 10thedition. Singapore: McGraw Hill. 2001;315-336, 1701-2031.
6. Honickman SP, Mueller PR, Witternberg J, Simeone JF, Ferrucci JT, Cronan JJ, et al. Ultrasound in obstructive jaundice: prospective evaluation of site and cause. Radiology. 1983 May;147:811-15. Hakansson K, Ekberg O, Hakansson HO, Leander P: MR and ultrasound in screening of patients with suspected biliary tract disease. Acta Radiol. 2002;43: 80-86.
7. Fleischmann D, Ringl H, Schofl R, Potzi R, Kontrus M, Henk C, et al. Three dimensional spiral CT cholangiography in patients with suspected obstructive biliary disease: comparison with endoscopic retrograde cholangiopancreatography. Radiology. 1996;198:861-8.
8. Gibson RN, Yeung E, Thompson LN, Carr DH, Benjamin IS, Blumgart LH, et al. Bile duct obstruction: Radiologic evaluation of level, cause, and tumour resectability. Radiology. 1986;160:43-7.
9. Zandrino F, Benzi L, Ferretti ML, et al. Multislice CT cholangiography without biliary contrast agent: technique and initial clinical re- sults in the assessment of patients with biliary obstruction. Eur Radiol. 2002;12:1155-61.
10. Reinhold C, Bret PM. MR cholangiopancreatography. Abdom Imaging. 1996;21:105-16.
11. Boraschi P, Neri E, Braccini G, et al. Choledocholithiasis: diagnostic ac- curacy of MR cholangiopancreatography. Three-year experience. Magn Reson Imaging. 1999; 17: 1245–53.
12. Calvo MM, Bujanda L, Calderon A, et al. Role of magnetic resonance cholangiopancreatography in patients with suspected choledocholithiasis. Mayo Clin Proc. 2002; 77: 422–28.
13. Ortega D, Burns PN, Hope Simpson D, Wilson SR. Tissue harmonic im- aging: is it a benefit for bile duct sonography? Am J Roentgenol. 2001; 176: 653–59.
14. Todua FI, Karmazanovskii GG, Vikhorev AV. Computerized tomography of the mechanical jaundice in the involvement of the distal region of the common bile duct. Vestn Roentgenol Radiol. 1991;2:15-22.
15. Hussein FM, Alsumait B, Aman S, et al. Diagnosis of choledocholithiasis and bile duct stenosis by magnetic resonance cholangiogram. Australas Radiol. 2002; 46: 41–46.
16. Varghese Liddell, et al. MRCP versus U\S in the detection of choledocholithiasis. Clinical radiology. 2000,55:25-35.
17. Safa Al-Obaidi, Mohammed RidhaAlwan Al-Hilli, Atheer Adnan Fadhel. The Role of Ultrasound and Magnetic Resonance Imaging in the Diagnosis of Obstructive Jaundice. The Iraqi Postgraduate Medical Journal. 2007;6(1):7-17.
18. Andersson M, Kostic S, Johansson M, Lundell L, Asztély M, Hellström M. MRI combined with MR cholangiopancreatography versus helical CT in the evaluation of patients with suspected periampullary tumors: a prospective comparative study. Acta Radiol. 2005 Feb;46(1):16-27.
19. Hann LE, Greatrex KV, Bach AM, Fong Y and Blumgart LH. Cholangio carcinoma at the hepatic hilus: sonographic findings. American Journal of Roentgenology. 1997;168: 985-89.
20. Verma SR, Sahai SB, Gupta PK, Munshi A, Verma SC & Goyal P. Obstructive Jaundice- Aetiological Spectrum, Clinical, Biochemical And Radiological Evaluation At A Tertiary Care Teaching Hospital. The Internet Journal of Tropical Medicine. 2011;7(2).
21. Francesco SF, Federica Fantozzi, Laura Tasciotti, Francesco Vigni, Francesca Scotto, Paolo Frasci. A comparative study in 131 patients with suspected biliary obstruction. Med Sci Monit. 2005; 11(3): 8-18.

## Original Article

# Correlation of Forced Vital Capacity and Peak Expiratory Flow Rate with Serum Estrogen and Progesterone Levels in Combined Oral Contraceptive Pill (COCP) User

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**Abstract:**

***Background:*** *Combined oral contraceptive pill (COCP) is the most commonly used contraceptive method in Bangladesh. This COCP has some effects on different organs including the lungs. So, there may be a relationship between forced vital capacity (FVC) and peak expiratory flow rate (PEFR) with serum estrogen and progesterone levels in combined oral contraceptive pill (COCP) users.*

***Objective:*** *To observe the relationship between FVC and PEFR with serum estrogen and progesterone levels in combined oral contraceptive pill users (COCP-U).*

***Methodology:*** *This cross sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College (SSMC), Dhaka between July 2017 and June 2018. A total of 30 apparently healthy young women, age ranged 20 to 30 years were included in this study, who were combined oral contraceptive pill users (COCP-U) for at least 6 months. Another 30 age and BMI matched combined oral contraceptive pill nonusers (COCP-NU) were also taken as control for comparison. FVC and PEFR of all the subjects were measured by using Digital Auto Spirometer (MINATO AS-507). Moreover, their serum estrogen and progesterone levels were done to observe their levels and also to observe the relationship between them if present. Statistical analysis was done by Independent 't' test and Pearson's Correlation Coefficient test.*

***Result****: Spirometric parameters like FVC and PEFR were significantly higher in COCP-U women than those of non user women. Moreover, the mean serum estrogen and progesterone levels were also significantly higher in COCP users in comparison to those of nonusers. Here, FVC showed positive and PEFR showed negative correlation with serum estrogen level and FVC showed negative, PEFR showed positive correlation with serum progesterone level in COCP users, though the relationships were statistically non-significant.*

***Conclusion:*** *The positive correlation of FVC and PEFR with serum estrogen and progesterone indicates that improvement of pulmonary function occurs in COCP-U due to its estrogen and progesterone contents,which may be by increasing the strength of the muscles along with decreased airway resistance.*

**Key Words:**
Forced vital capacity, Peak expiratory flow rate, Estrogen, Progesterone.

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**Introduction:**

Contraception means prevention of conception. Contraceptive methods are preventive methods to help women avoid unwanted pregnancies.[1] Bangladesh is one of the most crowded land on earth with a population of 156.8 million[2] in 143,998 km$^2$ area.[3] In Bangladesh the use of contraceptive methods was 3% in 1971.[4] The contraceptive prevalence rate (CPR) has increased eightfold over last four decades to 61.2%, in 2011.[5] In Bangladesh 61% of married women are using contraceptive methods. The most widely used method is combined oral

contraceptive pill (COCP). Among the different contraceptive methods, combined oral contraceptive pill (COCP) is about (27%).[5]

Combined oral contraceptive pill (COCP) contains levonorgestrel 150µ.gm and ethinylestradiol 30µ.gm. Levonorgestrel is a kind of progestogen. Ethinylestradiol is a synthetic form of estrogen.[6] Estrogen has effects on all systems of the body. It helps to prepare female body for reproduction, bone growth, increases protein deposition, body metabolism, causes sodium and water retention by the kidney tubules, it causes the skin to become more vascular, soft and smooth.[7] Oestrogen receptors are present in human respiratory muscles.[8,9] It influences surfactant production and alveologenesis.[10] Progesterone also has some important role in improvement of pulmonary function. Progesterone primarily increases ventilation during the luteal phase.[11] Furthermore, progesterone helps in smooth muscle relaxation and hyperventilation.[12] It has a significant bronchodilator effect.[13]

For assessment of pulmonary functions forced vital capacity (FVC) and peak expiratory flow rate (PEFR) are important parameters.[7]

Forced vital capacity (FVC) is a better indicator of respiratory muscle strength. Recently significant increase values of FVC have been found in women using COCP.[14, 15]

Furthermore, PEFR in COCP users[14] increases which may be due to decreased pulmonary airway resistance.[16] Some synthetic form of progesterone causes hyperventilatory changes in COCP users.[17] COCP can increase forced expiratory flow and volume from 6.5% to 15%.[18]

Different researchers in many countries observed the effect of COCP on pulmonary function of human being findings are not equivocal.

Prolong use of COCP may cause weight gain, thrombosis, headaches, breast tenderness etc.[6] Some studies regarding the effect of COCP on pulmonary function has been carried out in different countries with conflicting results.[14,19] However in our previous publication it has been shown that, there is an improvement of pulmonary function status (FVC, PEFR) in some women who used COCP for at least six months.[20] But the relationship between FVC and PEFR with serum estrogen and progesterone levels in these group of women were not shown in other study as well as in my previous study.[20] So this study has been designed to observe the correlation of FVC and PEFR with serum estrogen and progesterone levels in combined oral contraceptive pill (COCP) user.

**Methods :**

This cross sectional study was done in the Department of Physiology, Sir Salimullah Medical College (SSMC) from July 2017 to June 2018. Ethical permission was taken from the Institutional Ethics Committee (IEC) of SSMC. A total 30 apparently healthy women, combined oral contraceptive pill users (COCP-U) aged 20-30 years were taken as study group. They were belonged to lower socioeconomic status and were selected from Family Planning Unit of SSMC. Another 30 apparently healthy age, BMI and socioeconomic status matched combined oral contraceptive pill nonuser (COCP-NU) women were also included as control for comparison. They were selected from personal contact from different area of Dhaka city. Subjects having history of pulmonary diseases, diabetes mellitus, hypertension, angina, epilepsy, cancer, metabolic disorder, history of bleeding disorder were excluded from the study. After selection and proper counseling, the risk, benefit and procedure of the study were explained in details to each subject. They were asked to attend the Department of Physiology between 9.00 AM to 2.00 PM on the day of examination. Informed written consents were taken from them. All information about personal and medical were recorded in a pre-fixed questionnaire. After taking 5 minutes rest, for assessment of pulmonary function FVC and PEFR of all the subjects were measured by using Digital Auto Spirometer (MINATO AS-507). Then under aseptic precautions 5 ml of venous blood was collected from every subject for estimation of serum estrogen and progesterone levels. Estimation of serum estrogen and progesterone were done by chemiluminescent method[21] in Microbiology laboratory of Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag Dhaka. Data were analyzed by Independent sample 't' test and Pearson's Collection Coefficient test as applicable.

**Results :**

Anthropometric data is given in Table I. All the subjects were both age and BMI matched.

Percentage of predicted value of FVC and PEFR and serum estrogen and progesterone levels shown in Table II & Table III, respectively. It has been shown that, mean percentage of predicted values of FVC and PEFR were significantly ($p< 0.001$) higher in COCP-U, than those of COCP-NU. Again, serum estrogen ($p<0.001$) and progesterone ($p<0.05$) levels were significantly higher in COCP-U than those of COCP-NU.

However, in this study FVC showed positive correlation

with serum estrogen in COCP-U and negative correlation with serum progesterone in COCP-U. PEFR showed negative correlation with serum estrogen in COCP-U and positive correlation with serum progesterone in COCP-U, though the relationships were statistically non-significant (Figure 1, 2, 3, 4).

**Table I**

*Age and BMI in both groups (n=60)*

| Parameters | Group A (n=30) | Group B (n=30) |
|---|---|---|
| Age (years) | 24.57±1.8 | 25.87±2.71 |
| BMI (kg/m$^2$) | 21.35±1.77 | 21.40±1.92 |

Data are expressed as mean ± SD. Statistical analysis was done by independent sample t-test. Group A (Control): Combined oral contraceptive pill nonusers. Group B (Study): Combined oral contraceptive pill users n =Total number of the subject

**Table II**

*Percentage of predicted value of FVC and PEFR in both groups (n=60)*

| Parameters | Group A (n=30) | Group B (n=30) |
|---|---|---|
| FVC% | 82.53±3.64 | 92.23±2.50*** |
| PEFR% | 73.97±5.95 | 81.93±5.46*** |

Data are expressed as mean ± SD. Statistical analysis was done by independent sample t-test. Group A (Control): Combined oral contraceptive pill nonusers. Group B (Study): Combined oral contraceptive pill users *** = Significant at $p < 0.001$; n =Total number of the subject

**Table III**

*Serum estrogen and progesterone levels in both groups (n=60)*

| Parameter | Group A (n=30) | Group B (n=30) |
|---|---|---|
| Serum estrogen (pg/ml) | 47.04±6.72 | 59.52±10.42*** |
| Serum progesterone (ng/ml) | 2.37±0.66 | 3.32±2.34* |

Data are expressed as mean ± SD. Statistical analysis was done by independent sample t-test. Group A (Control): Combined oral contraceptive pill nonusers. Group B (Study): Combined oral contraceptive pill users (*** $p < 0.001$, * $p < 0.05$), n =Total number of the subject

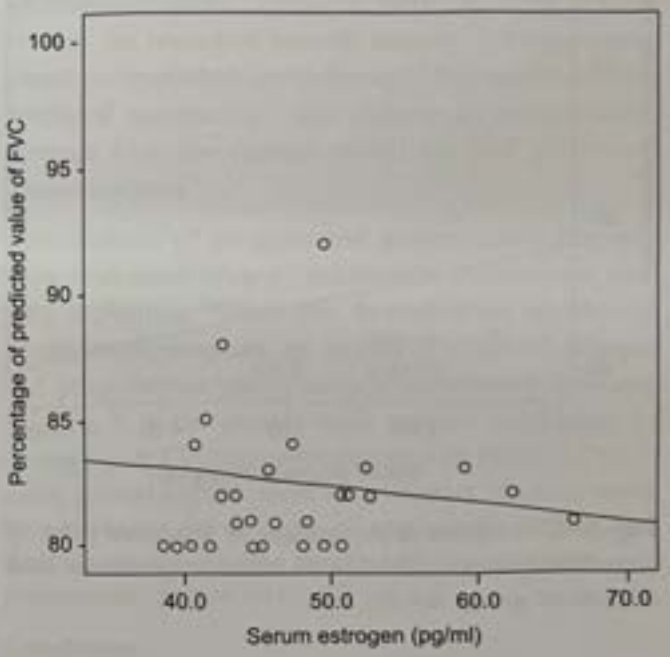


**Fig.-1:** *Correlation of percentage of predicted value of forced vital capacity (FVC) with serum estrogen level in control group (n=30)*

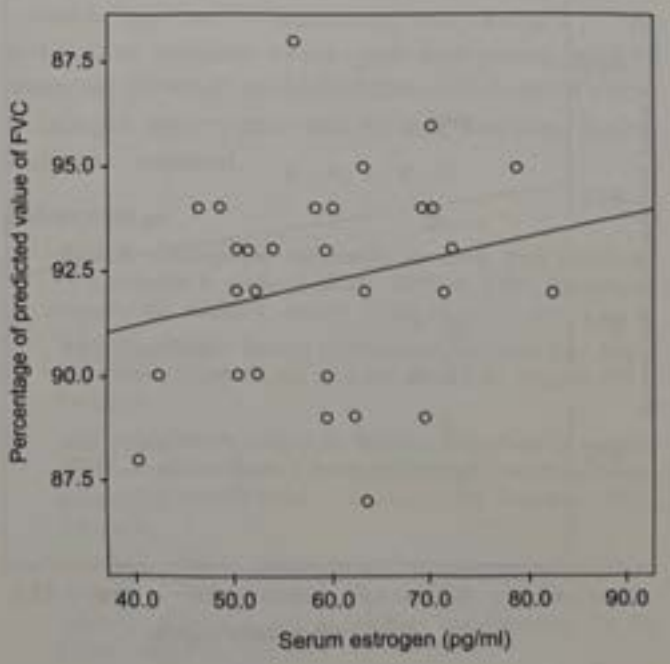


**Fig.-2 :** *Correlation of percentage of predicted value of forced vital capacity (FVC) with serum estrogen level in study group (COCP-U) (n=30)*

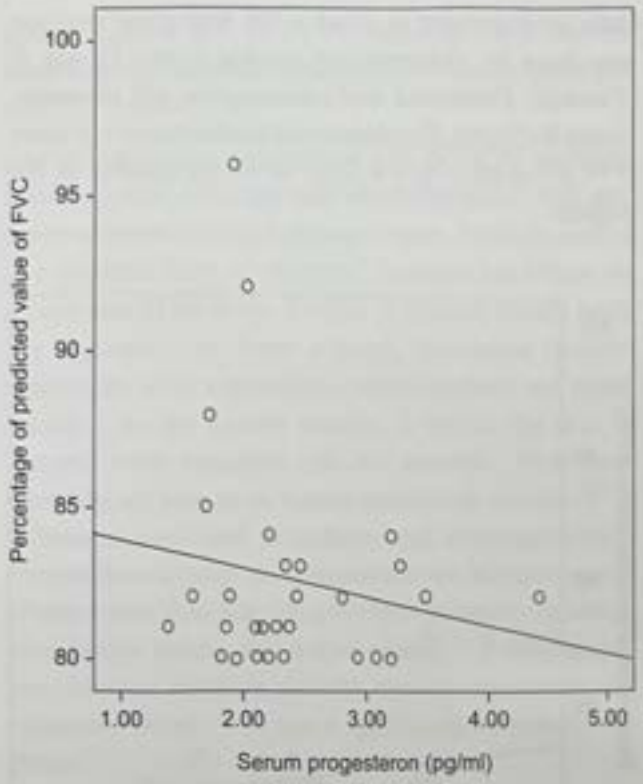


**Fig.-3:** *Correlation of percentage of predicted value of forced vital capacity (FVC) with serum progesterone level in control group (n=30)*

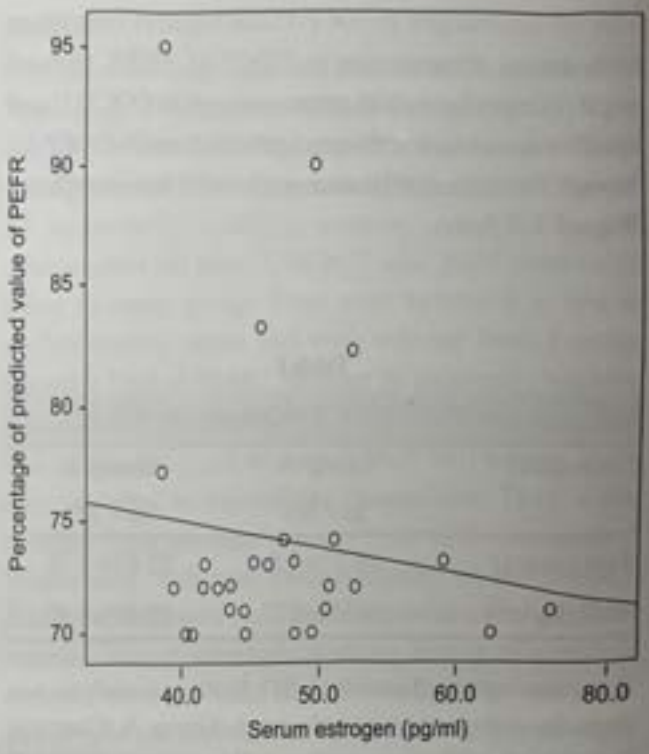


**Fig.-5:** *Correlation of percentage of predicted value of PEFR with serum estrogen level in control group (n=30)*

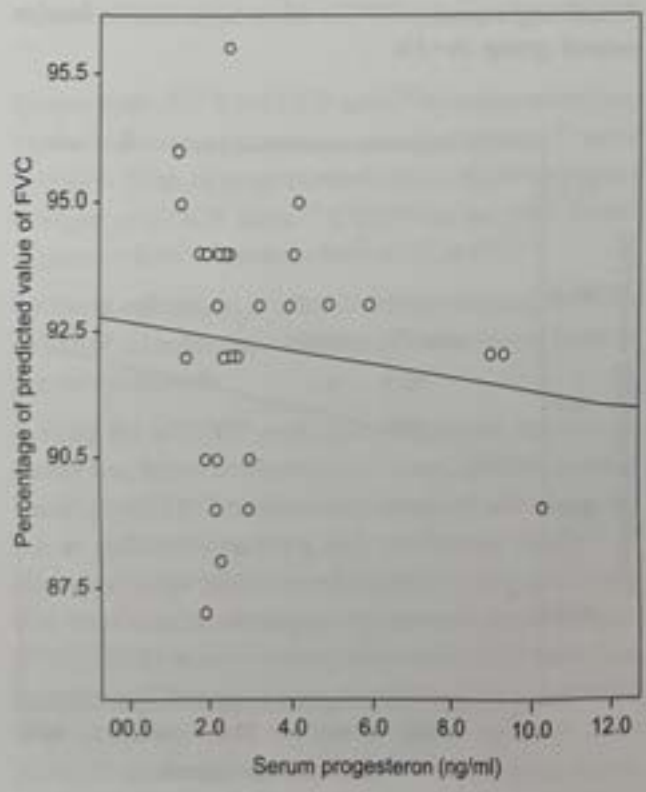


**Fig.-4:** *Correlation of percentage of predicted value of forced vital capacity (FVC) with serum progesterone level in study group (COCP-U) (n=30)*

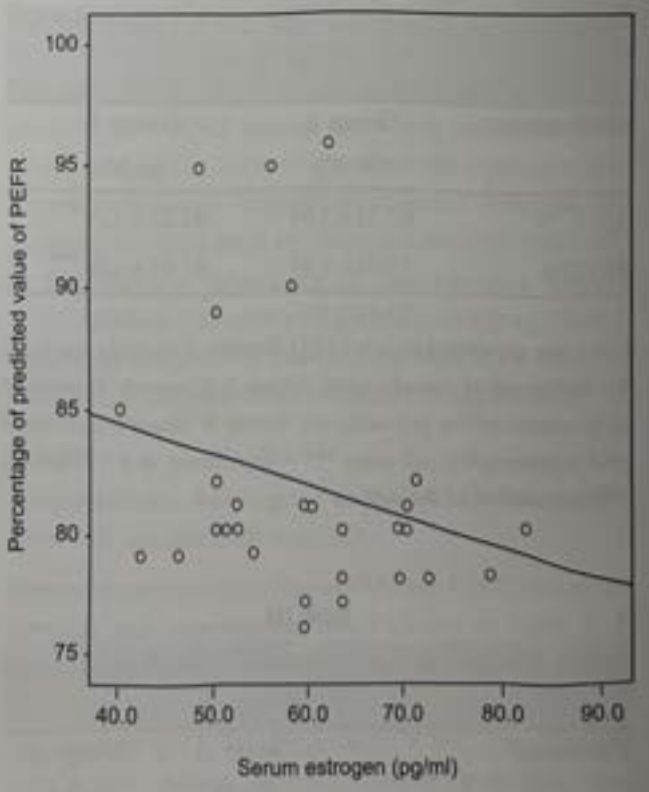


**Fig.-6:** *Correlation of percentage of predicted value of PEFR with serum estrogen level in study group (COCP-U) (n=30)*

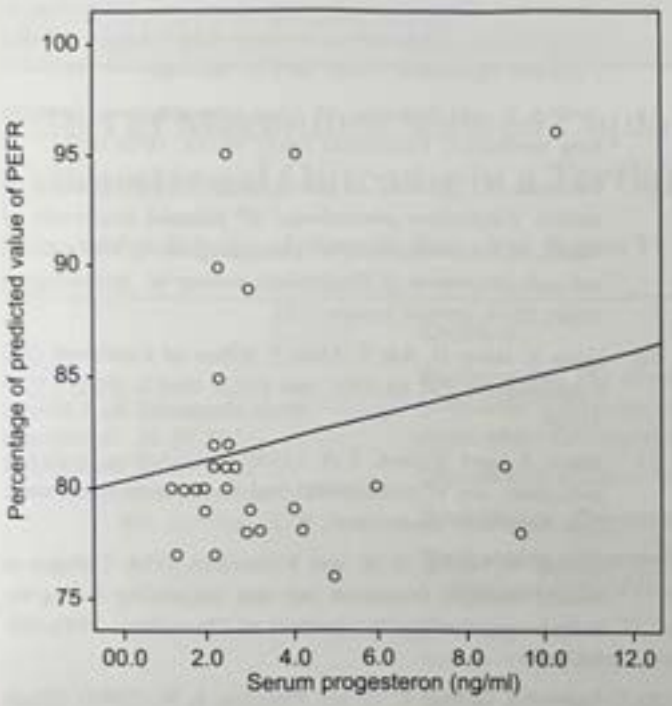


**Fig.-7:** *Correlation of percentage of predicted value of PEFR with serum progesterone level in study group (COCP-U) (n=30)*

**Discussion :**

The present study was undertaken to observe the relationship of FVC and PEFR with serum estrogen and progesterone levels in combined oral contraceptive (COCP) user. So, the pulmonary function status, like FVC and PEFR and hormonal status like serum estrogen and progesterone levels were measured in this group of women. All these pulmonary function parameters were also studied in apparently healthy age and BMI matched COCP-NU for comparison.

In this study, the value of pulmonary function parameters in healthy control group were within normal limit and were almost similar to that of various investigators from different countries.[14,16]

Here, mean percentage of predicted values of FVC and PEFR were significantly higher in COCP-U than those of COCP-NU. Serum estrogen and progesterone concentrations were significantly higher in COCP-U than those of COCP-NU.

Improvement of pulmonary function parameters were significantly higher in COCP-U than those of COCP-NU. There are some postulated mechanism regarding these changes in lung functions of COCP-U.

Beneficial effect in pulmonary function in COCP users may be due to the effect of estrogen on strengthening respiratory muscle.[14,22] Estrogen influences surfactant production and alveologenesis,[10] also helps to open small airways and decrease airway resistance.[18] Estrogen receptors were identified in the nuclei of connective tissue and smooth muscle cells of the lung. Estrogen increases adenyl cyclase activity which in turn results in potentiation of catecholamine induced bronchial relaxation and bronchial area widen.[23] Progesterone by activating $\hat{a}_2$ adrenergic receptors[24] reduces constriction of the airways, relaxes the bronchial smooth muscle.[13] Progesterone stimulates respiratory center through CNS steroid receptor mediated mechanism[25] and induces hyperventilation through both the central medullary and peripheral chemoreceptors.[11]

Combination of estrogen and progesterone improve musculoskeletal integrity and thereby increase the total lung capacities.[26] Estrogen increases the number of progesterone receptors, so combined effect of estrogen and progesterone synergistically increases pulmonary function.[27] In the present study positive correlation of estrogen with FVC and progesterone with PEFR in COCP users, proved improvement of pulmonary function occur by increasing the strength of respiratory muscle and decreasing the airway resistance for estrogen and progesterone present in COCP.

**Conclusion :**

From the result of this study it may be concluded that the positive correlation of FVC and PEFR with serum estrogen and progesterone in COCP users in comparison to that of COCP nonusers. This indicates, improvement of pulmonary function occurs due to its estrogen and progesterone contents, may be by increasing the strength of the respiratory muscles along with decreasing airway resistance. However, to elucidate the mechanism of action of estrogen and progesterone on lung function, further studies are essential.

**References :**

1. Park, K. Demography and family planning. Park's textbook of preventive & social medicine, 22nd ed. 1167, Premnagar, Nagpur Rd, Jabalpur, 482001 (INDIA), 2011; 472.
2. BBS (Bangladesh Bureau of Statistics).Available from:http:// www.bbs.gov.bd/ Home.aspx.(Accessed 25 August 2014) [online].
3. BGP (Bangladesh Geography Profile). [Accessed 30 October 2014]. Available from: // www.indexmundi.Com/Bangladesh/ geography-profile.html. (Accessed 30 October 2014) [online].
4. ICDDRB. (1998) Bangladesh's experiences with human resource development strategies in family planning service delivery: A critical look at the post and directions for the future. Paper no. 118.pp.1.
5. NIPORT (National Institute of Population Research and Training). Mitra and Associates and Marco International. Bangladesh Demographic and Health Survay. Dhaka and Calverton. 2011.

6. Bennett, P.N. and Brown, M. J. (2004) Clinical Pharmacology. 9th ed .Spain. Churchil Livingstone. 2004; 450,716,720.

7. Hall, J.E.Female physiology before pregnancy and female hormones, Textbook of Medical Physiology. 12th ed. Philadelpia. Elsevier India Private Limited. 2011; 989, 993, 999.

8. Wiik, A, Glenmark, B, Ekman, M, Esbjornsson, M, Johansson, O, Bodin, K, Enmark, E. and Jansson, E. Estrogen receptor beta is expressed in adult human skeletal muscle both at mRNA and protein level. Acta Physiol Scand.179 (4), 2003; 381-387.

9. Orozco-Levi, M. Structure and function of the respiratory muscles in patients with COPD: impairment or adaptation? Eur Respir J.2003; 46: 41-51.

10. Morani, A, Warner, M. and Gustafsson, J. A. (2008) Biological functions and clinical implications of estrogen receptors alpha and beta in epithelial tissues. Journal of Internal Medicine. 2008; 264 (2): 128-142.

11. Pai, R. S, Prazna, P. and Souza, U.J.A.D. A correlation study on blood pressure and lung function profiles during different phases of menstrual cycle among indian population. Thai Journal of Physiological Sciences.2004;17 (2): 30-34.

12. Dabhoiwala, S, Kathrotia, R, Patel, D, Dave, A, Joshi, A. and Oommen, E. (2012) Pulmonary functions in different phases of menstrual cycle and its relation with serum progesterone levels. NJIRM. 2012;3 (1): 39-42.

13. Roby, R, Richardson, R.H. and Shah, S. Progesterone as a bronchodilator. [online].[Accessed2009].Availablefrom: http://www.onlineallergycenter.com/ progesterone-as-a-bronchodilator.php

14. Shafiq, M, Sheikh, S.A. and Hassan, S. H. Combined oral contraceptive pills improve lung function variable. PAK J Physiol. 2012; 8 (1): 52-56.

15. Cevrioglu, A.S, Fidan, F, Unlu, M, Yilmazer, M, Orman, A, Fenkci, I.V. and Serteser, M.The effects of hormone therapy on pulmonary function tests in postmenopausal women. The European Menopause Journal. 2004; 49 (3): 221-227.

16. Kumar, P, Singh, S, Singh, U. and Verma, P. Oral contraceptive pills decrease pulmonary airway resistance. Indian Journal of Medical Sciences.2011; 65 (2): 64-68.

17. Resmi, S.S, Samual, E, Kesavachandran, C. and Shashidhar, S. Effect of oral contraceptives on respiratory function. Indian J physiol Pharmacol. 2002; 46 (3): 361-366.

18. Strinic, T. and Eterovic, D. Oral contraceptives improve lung mechanics. FertilSteril.2003; 79 (5): 1070-1073.

19. Fernando S. The role of estrogen in the pathogenesis of asthma. Conference proceedings: 4th biennial conference of South Asian association of physiologists (SAAP) & 3rd national convention of Bangladesh society of physiologists (BSP) 2014; invited lecture – 12.

20. Islam F, Jahan N, Ara T, Alam T. Effect of Combined Oral Contraceptive Pill on FVC and PEFR BMCJ 2020; 25(2): 21-24.

21. Muse, K. and Wilson, E.A. (1986) Monitoring ovulation indication: use of biochemical and biophysical parameters. *Sem Reproduct Endocrinol*, **4** (3), pp. 301-309.

22. Sarwar, R, Niclos, B. B. and Rutherford, O.M. Changes in muscle strength, relaxation rate and fatigability during the human menstrual cycle. Journal of Physiology. 1995;493: 267-272.

23. Foster,P.S, Goldie, R. G. and Paterson, J. W. (1983) Effects of steroids on ä-adrenoceptor-mediated relaxation of pig bronchus. Br. J. Pharmac.1983; 78: 441-445.

24. Nandhini, R. and Subhashini, A.S.Variation in the Pulmonary Functions with the Phases of the Menstrual Cycle in Adolescent Females. JCDR. 2006.

25. Gavali, M.Y, Gavali,Y.V, Gadkari, J.V. and Patil, K.B. Influence of menstrual cycle on lung functions in young healthy medical students. IJBMR. 2013; 2 (1): 30-34.

26. Carlson, C.L, Cushman, M, Enright, P.L, Cauley, J.A. and Newman, A.B. Hormone replacement therapy is associate with higher $FEV_1$ in elderly women. Am J Respir Crit Care Med.2001; 163(2): 423-428.

27. Cheryl, S. W, Daniel, M. and Clark, J. H.Characterization and estrogen stimulation of cytoplasmic progesterone receptor in the ovarian-dependent MXT-3590 mammary tumor line. Cancer Res.1979;39: 4098-4104.

# Original Article

# Effect of Meconium Stained Liquor on Mode of Delivery and Fetomaternal Outcome in a Tertiary Level Hospital

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**Abstract:**

***Background:*** *The appearance of meconium-stained liquor during labour is generally considered to be a sign of hypoxia and a predictor of poor fetal outcome.It is one of the clinical events where normal pregnancy can turn into a high risk one for the mother as well as for the foetus.*

***Objective:*** *To evaluate the obstetric outcome in meconium stained liquor during labour.*

***Study design:*** *Prospective comparative study.*

***Study setting and period:*** *Gynaecology and Obstetrics department of Sir Salimullah Medical College and Mitford Hospital (SSMC and MH), Dhaka,between January 2019 to June 2019.*

***Study population:*** *The study patients in labour with meconium stained amniotic fluid and women in labour but having clear amniotic fluid who admitted for delivery during study period.*

***Result:*** *A total of 75 cases were enrolled in the study as case and 75 cases were enrolled as control. The mean age was found 29.14±5.59 years in case group and 28.9±6.2 years in control group. Patients who received irregular ANC was 20(26.7%) and 25(33.3%) in case and control group respectively. Patients who did not receive ANC was 24(32.0%) in case group and 12(16.0%) in control group. Mean gestational age at delivery was found 38.87±1.4 weeks in case group and 38.75±1.6 weeks in control group. Primigravida was predominant in both groups. Caesarean deliveries were high (80.0%) in cases and it was much higher with thick meconium (74.7%) as compared to thin meconium (25.3%). APGAR scores in first minute and fifth minute were also low in cases. Birth asphyxia was found 20.0% in case group and 6.3% in control group. Meconium aspiration syndrome 25.0% and convulsion 3.8% developed only in cases. Neonatal ward admission was 22.0% in case group and 6.3% in control group. Neonatal mortality was higher 3.8% in cases than control 1.3%. Majority (6.65%) patients had post partum hemorrhage in case group and 3(4.0%) in control group.*

***Conclusion:*** *Meconium stained amniotic fluid were associated with higher rate of caesarian delivery, increased need for neonatal resuscitation, increased rate of birth asphyxia with hypoxic ischemic encephalopathy, meconium aspiration syndrome, hospital admission, and mortality. Electronic foetal monitoring, timely obstetrical intervention and neonatal care can reduce associated complications and improve foetal outcome.*

**Key Words:**
Meconium Stained Liquor, Mode of Delivery, Antenatal care, Fetomaternal outcome

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## Introduction

The appearance of meconium-stained liquor during labour is generally considered to be a sign of hypoxia and a predictor of poor fetal outcome.It is one of the clinical events where normal pregnancy can turn into a high risk one for the mother as well as for the foetus.[1]

Meconium is a dark green liquid normally passed by the newborn baby within the first 24 to 48 hours after birth. It consist of gastrointestinal secretion, mucous, pancreatic juice, cellular debris, amniotic fluid, swallowed vernix caseosa, lanugo and blood. Meconium is found in the foetal gastrointestinal tract as early as tenth week of gestation and is not expelled into amniotic fluid due to relative lack of strong peristalsis and good anal sphincter tone.Meconium passage is rare before 34 weeks of gestations and after 37 weeks its incidence increases steadily with increasing gestational age.[2]

Passage of meconium in utero with staining of the amniotic fluid occurs in 12% to 16% of all deliveries.[3-5] In healthy,

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well-oxygenated fetuses, meconium is cleared from the lungs by the normal physiological mechanism. It became detrimental to foetus if it is aspirated. Aspiration can occur in utero with foetal gasping or after birth with the first breaths of life.[6] Most of them can develop an effective breathing movement to signs of aspiration and persistent hypoxia.[7] Meconium stained amniotic fluid (MSAF) is known to be associated with several maternal and neonatal risk factors[8]. It is frequently seen in post term pregnancy or in growth restricted foetuses. Placental insufficiency, maternal hypertension, pre-eclampsia, oligohydroamnios or maternal drug abuse (tobacco or cocaine) also results in utero passage of meconium.[9]

Aspiration of meconium (Presence of meconium below the vocal cord) during intrauterine life may contribute to meconium aspiration syndrome (MAS), representing a leading cause of perinatal death. This finding occurs in 20% to 30% of all infants with meconium stained amniotic fluid[2] with around 12% mortality[3]. Of those neonates who develop MAS, thick MSAF has accounted for majority (73 to 87.6) of cases of MAS.[10] The incidence of admission to newborn intensive care unit with respiratory distress syndrome, meconium aspiration syndrome[11], neonatal asphyxia[12], foetal distress or foetal acidosis[13] were higher in pregnancies complicated by meconium stained liquor. Initial hypoxic events may cause the infant to have long-term neurological problems, including seizures, mental retardation and cerebral palsy.[14]

If meconium stained amniotic fluid (MSAF) is found, then continuous foetal heart rate monitoring is required for foetal well being.[15] In our country, most maternity centers do not have facilities for continuous FHR monitoring and facilities for foetal scalp blood sampling are not available even in tertiary care hospitals. Thus, in the absence of these facilities unnecessary increase in instrumental vaginal deliveries (IVDs) and caesarian section (CS) rate with increased maternal morbidity and mortality.

The present study was undertaken to evaluate the effect of clear liquor and meconium stained liquor on time and mode of delivery and neonatal morbidity and mortality associated with meconium stained amniotic fluid.

**Methodology:**

This Prospective comparative study carried out among patients who were in labour with meconium stained amniotic fluid and women in labour but having clear amniotic fluid who was admitted for delivery in the Department of Obstetrics and Gynaecology, Sir Salimullah Medical College and Mitford Hospital, Dhaka, from Jan'2019 to Jun'2019.

With the ethical approval from the Institutional Ethical Committee (IEC), patients were selected after taking their written consent. All the patients who are in 1st& 2nd stage labour having single foetus with cephalic presentation with gestational age 37 completed weeks to 42 weeks age. Patients presenting with light yellow to thick dark green colour liquor after spontaneous or artificial rupture of membrane but CTG was reactive , no indication for urgent delivery (e.g., loss of FHR variability and late deceleration). Pregnancy less than 37 weeks of gestational age with hypertension, breech presentation, diabetes mellitus and any fetal malformations are excluded from the study. The gestational age was determined by ascertaining 1st day of last menstrual period and USG dating. The sample size is calculated and targeted sample size was 150. Therefore a total 75 pregnant women with meconium stained liquor and 75 pregnant women with clear liquor in labor was enrolled in this study.

Non-probability/Purposive sampling was done from the study population. Patients were selected through short interview applying inclusion and exclusion criteria.The total cases of women having meconium stained liquor in Labor and matched control group having clear liquor in labour admitted for delivery in the Department of Obstetrics and Gynaecology, Sir Salimullah Medical College and Mitford Hospital was asked for proper history. Data was collected by face-to-face interview with the woman by using a pre-design questionnaire. The patients were carefully watched for progress of labour and were strictly monitored for FHR by intermittent auscultation and if necessary CTG. Where needed, augmentation with oxytocin was done. Delivery was expedited, when FHR abnormalities were detected by the safest possible method (IVD or CS). A neonatologist was present for all deliveries and attended to the babies. Those who needed observation were shifted to the intensive care unit as per the neonatologist's advice. Foetal outcomes like low Apgar score, low birth weight, birth asphyxia were evaluated and documented.

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean value was calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test with Yates correction was used to analyze the categorical variables, shown with cross tabulation. Student t-test was used for continuous variables. P values <0.05 was considered as statistically significant.

## Results

A total of 75 patients in labour with meconium stained amniotic fluid and 75 labour case with clear liquor was studied in the Department of Obstetrics and Gynecology in Sir Salimullah Medical College & Mitford Hospital, Dhaka during January 2013 to June 2013. Pregnancy less than 37 weeks of gestational age, hypertension, diabetes mellitus, with any fetal malformations and non-cooperative patients who refused to give consent for the participation in the study were excluded from the study.

Table I shows that majority 30(40.0%) patients were age belonged to 26-30 years in case group and 33(44.0%) patients were belonged to 26-30 years in control group. The mean age was found 29.14±5.59 years in case group and 28.9±6.2 years in control group. The difference was not statistically significant (p>0.05) between two groups.

**Table -I**

*Distribution of the study patients by age (n=150)*

| Age (year) | Case (n=75) | | Control (n=75) | | P |
|---|---|---|---|---|---|
| | n | % | N | % | value |
| ≤20 | 6 | 8.0 | 7 | 9.3 | |
| 21-25 | 27 | 36.0 | 20 | 26.7 | |
| 26-30 | 30 | 40.0 | 33 | 44.0 | |
| 31-35 | 9 | 12.0 | 13 | 17.3 | |
| >35 | 3 | 4.0 | 2 | 2.7 | |
| Mean±SD | 29.14 ±5.59 | | 28.9±6.2 | | 0.803 |
| Range (min-max) | (22 -40) | | 19-40 | | |

P value reached from unpaired t-test

**Table II**

*Distribution of the antenatal check-up of the study patients (n=150)*

| Antenatal check up | Case (n=75) | | Control (n=75) | | P |
|---|---|---|---|---|---|
| | n | % | n | % | value |
| Regular | 31 | 41.3 | 38 | 50.7 | |
| Irregular | 20 | 26.7 | 25 | 33.3 | 0.071[ns] |
| No ANC | 24 | 32.0 | 12 | 16.0 | |

P value reached from chi square test

Table 2: shows that patients received regular ANC was found 31(41.3%) in case group and 38(50.7%) in control group. Patients received irregular ANC was 20(26.7%) and 25(33.3%) in case and control group respectively. Patients received no ANC was 24(32.0%) in case group and 12(16.0%) in control group. The difference was not statistically significant (p>0.05) between two groups.

**Table III**

*Distribution of the study patients by gestational age at delivery (n=150)*

| | Case (n=75) Mean ±SD | Control (n=75) Mean ±SD | P value |
|---|---|---|---|
| Gestational age at delivery (weeks) | 38.87 ±1.4 | 39.75 ±1.6 | 0.625 |

P value reached from unpaired t-test

Table III : shows gestational age at the time of delivery were 37-42 weeks in both groups and their mean gestational age at delivery was found 38.87±1.4 weeks in case group and 39.75±1.6 weeks in control group. The difference was not statistically significant (p>0.05) between two groups.

**Table IV**

*Distribution of the study patients by gravida (n=150)*

| Gravida | Case(n=75) | | Control (n=75) | | P |
|---|---|---|---|---|---|
| | n | % | n | % | value |
| Primi | 41 | 54.7 | 44 | 58.7 | 0.621 |
| Multi | 34 | 45.3 | 31 | 41.3 | |

P value reached from chi square test

Table IV: shows that primigravid patients were found 41(54.7%) in case group and 44(58.7%) in control group. Multigravida patients were found 34(45.3%) in case group and 31(41.3%) in control group. The difference was not statistically significant (p>0.05) between two groups.

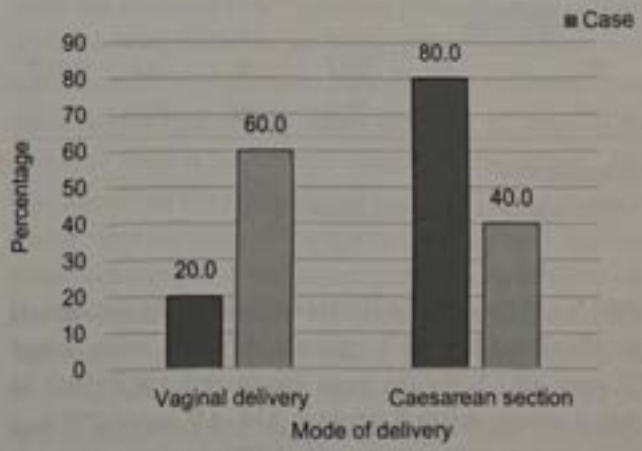


**Figure 1** *Bar diagram showing mode of delivery of the study patients*

Figure 1: shows mode of delivery of the study patients, it was observed that 20.0% patients had vaginal delivery in case group and 60.0% in control group. 80.0% patients had caesarean section in case group and 40.0% in control group.

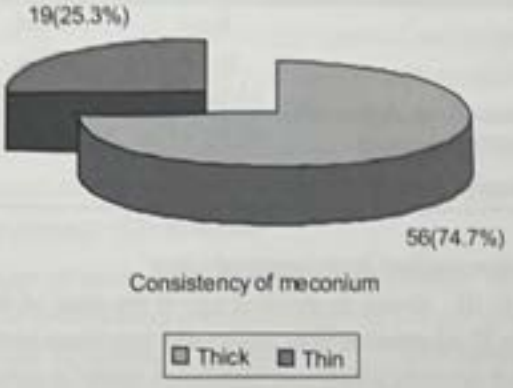


**Figure 2:** *Pie chart showing consistency of meconium in case group*

Figure 2: shows that more than one fourth (25.3%) patients had thin consistency of meconium and almost three fourth (74.7%) had thick consistency of meconium.

**Table V**

*Distribution of the study patients by APGAR score (n=150)*

| APGAR score | Case(n=75) | | Control (n=75) | | P |
|---|---|---|---|---|---|
| | n | % | N | % | value |
| APGAR at 1 min | | | | | |
| ≤7 | 40 | 53.3 | 15 | 20.0 | 0.001[s] |
| >7 | 35 | 46.7 | 60 | 80.0 | |
| APGAR at 5 min | | | | | |
| ≤7 | 17 | 22.7 | 6 | 8.0 | 0.012[s] |
| >7 | 58 | 77.3 | 69 | 92.0 | |

s=significant
P value reached from chi square test

Table V : shows APGAR score of the study patients, it was observed that at 1 minute APGAR score found d"7 was 40(53.3%) in case group and 15(20.0%) in control group. After 5 minutes APGAR score d"7 was 17(22.7%) in case group and 6(8.0%) in control group. The difference was statistically significant ($p<0.05$) between two groups.

**Table VI**

*Distribution of the study patients by neonatal outcome (n=150)*

| Neonatal outcome | Case(n=75) | | Control (n=75) | | P |
|---|---|---|---|---|---|
| | n | % | n | % | value |
| Neonatal complications | | | | | |
| Present | 40 | 53.3 | 6 | 8.0 | [a]0.001[s] |
| Absent | 35 | 46.7 | 69 | 92.0 | |
| *Nature of complications* | | | | | |
| Birth asphyxia | | | | | |
| Present | 15 | 20.0 | 5 | 6.3 | [a]0.016[s] |
| Absence | 60 | 80.0 | 70 | 93.7 | |
| Meconium AspirationSyndrome | | | | | |
| Present | 19 | 25.0 | 0 | 0 | [b]0.001[s] |
| Absence | 56 | 75.0 | 75 | 100.0 | |
| Convulsion | | | | | |
| Present | 3 | 3.8 | 0 | 0.0 | [b]0.122[ns] |
| Absence | 72 | 92.2 | 75 | 100.0 | |
| Mortality | 3 | 3.8 | 1 | 1.3 | |
| *Neonatal management* | | | | | |
| Oropharyngeal suction required | | | | | |
| Required | 51 | 68.0 | 16 | 21.0 | [a]0.001[s] |
| Non Required | 24 | 32.0 | 59 | 79.0 | |
| Neonatal ward admission | | | | | |
| Required | 17 | 22.0 | 5 | 6.3 | [a]0.005[s] |
| Non Required | 58 | 78.0 | 70 | 93.7 | |
| Intubation needed | | | | | |
| Required | 4 | 5.0 | 0 | 0.0 | [b]0.059[ns] |
| Non Required | 71 | 95.0 | 75 | 100.0 | |

s=significant; ns=not significant
[a]P value reached from chi square test
[b]P value reached from fisher's exact test

Table VI shows neonatal outcome, it was observed that neonatal complications was found 40(53.3%) in case group and 6(8.0%) in control group. Birth asphyxia was present 15(20.0%) in case group and 5(6.3%) in control group. Meconium Aspiration Syndrome was present 19(25.0%) in case group and not present in control group. Convulsion was present 3(3.8%) in case group and not present in control group. Mortality had 3(3.8%) in case group and 1(1.3%) in control group. Oropharyngeal suction required was 51(68.0%) in case group and 16(21.0%) in control

group. Neonatal ward admission was 17(22.0%) in case group and 5(6.3%) in control group. Intubation needed 4(5.0%) patients in case group and not need in control group. The difference was statistically significant ($p<0.05$) between two groups and not significant for convulsion and Intubation.

**Table VII**

*Distribution of the study patients by maternal outcome (n=150)*

| Maternal outcome | Case(n=75) n | % | Control (n=75) N | % | P value |
|---|---|---|---|---|---|
| Postpartum haemorrhage | 5 | 6.65 | 3 | 4.0 | |
| intrapartum/ postpartum/ Pyrexia | 3 | 4.0 | 2 | 2.65 | 0.973 |
| Wound infection | 4 | 5.3 | 2 | 2.65 | |

P value reached from chi square test

Table VII shows that 5 (6.65%) patients had postpartum haemorrhage in case group and 3(4.0%) in control group. Intrapartum/ postpartum/ Pyrexia was found 3 (4.0%) in case group and 2(2.65%) in control group. Wound infection was 4 (5.3%) in case group and 2(2.65%) in control group. The difference was not statistically significant ($p>0.05$) between two groups.

**Discussion:**

Meconium stained amniotic fluid (MSAF), is a commonly observed phenomenon and one of the major obstetric hazards. A fetal condition during labor is usually assessed by fetal heart rate and checking the presence of meconium in the amniotic fluid.[16,17] The detection of MSAF during labor often causes apprehension and anxiety for the patient as well as for the health provider as it is often considered an indication of fetal distress. The presence of thick meconium is associated with increased incidence of perinatal morbidity and mortality. This case control study was carried out with an aim to evaluate the maternal and immediate neonatal outcomes in meconium stained liquor during labour.

In this current study it was observed that most of the patients in case &control groups were 26 to 36 years. The mean age was found 29.14±5.59 years in case and 28.9±6.2 years in control group, which was almost similar between two groups. Similar mean age 29.92±3.41 years found in Kumariet al.[18] but Khatun[19] showed the mean age of the mother was 24.5±4.9 years in cases and 23.6±4.2 years in controls which is lower than present study. In this current study it was observed that primigravid patients were found 54.7% in case group and 58.7% in control group. Multigravida patients were found 45.3% in case group and 41.3% in control group, which were almost consistent between two groups. Kumariet al.[18] showed20% grand multiparous (parity >5) patients having meconium stained amniotic fluid. It was observed in the study that patients had gestational age at delivery 37-42 weeks in both groups and their mean gestational age at delivery was found 38.87±1.4 weeks in case group and 39.75±1.6 weeks in control group. The difference was not statistically significant ($p>0.05$) between two groups. In this study it was also found that rate of meconium staining in amniotic fluid increased with gestational age. Sunooet al[20] also found significant increased rate of meconium in amniotic fluid at 39 weeks. This can be explained by the presence of hormone motilin responsible for bowel peristalsis and defecation. It is secreted in increasing quantities by the fetus as gestational age advances and levels are highest in postdated gestations.[21] In this study it was observed that patients received irregular ANC was 26.7% and no ANC was 32% in case group and irregular ANC was 33.3% and no ANC was 32% in control group which shows No ANC was lower in case group. As all ANC receiving rate in our country still not reached the SDG goal so the difference was not statistically significant ($p>0.05$) between two groups in our study. Khatun[19] and Kumari (68%)[18] found very high association between antenatal checkup and amniotic stained liquor. Obstetricians is known to be more aggressive in labours with meconium stained amniotic fluid leading to higher caesarean section rate, which was 80% in our study. In contrast the caesarean section rate in the clear liquor group was 40%.Kumari[18] mentioned in their study that vaginal deliveries were successful 60% cases but Saunders et al[22] reported that caesarean sections were performed twice as frequently in subjects with meconium stained amniotic fluid, In spite of debate, most obstetricians feel unsafe about the state of fetus, if the amniotic fluid is meconium stained during labour. This has influenced the mode of delivery a lot. Even in places where other facilities of intrapartum monitoring like fetal blood sampling and cardiotocography are available, the rate of caesarian delivery are found to be increased. The "thickness" of meconium had a direct bearing on the neonatal outcome. Among the cases it was observed that rate of caesarean delivery was more in thick meconium (74.7%) compared to thin meconium which was highly significant. Similar observation were also made by Patil et al[23]and Khatun et al[19] and Mundhra(49.09%).[24]

APGAR scores have low predictive value of birth asphyxia and it is affected by other factors. But in places where facilities of acid base assessment of the newborn are not available, we might rely on the findings of APGAR scores and or WHO criteria for the diagnosis of birth asphyxia. In this series it was observed that at 1 minute APGAR score found ≤7 was 53.3%in case group and 20.0% in control group. After 5 minutes APGAR score ≤7 was 22.7% in case group and 8.0% in control group. APGAR score found ≤7 was significantly ($p<0.05$) higher in cases group at 1 minute and at 5 minutes. Khatunet al.[19] showedAPGAR scores in first minute and fifth minutes were also low in cases (6.8±1.2 and 8.3±1.1 respectively) in comparison to control. APGAR scores in fifth minute were significantly lower in cases. In another study Kumariet al.[18] and Sedaghatian et al.[8] found similar result in their study. Wiswell et al.[3] found significantly lower one minute APGAR scores in meconium stained neonate but not in five minutes. From this study it could not exclude some hypoxic insult increased with gestational age being responsible for the increased incidence of meconium stained amniotic fluid as it could not perform fetal blood sampling for blood gas analysis and suggesting that the condition was indicative of fetal compromise.

In this current study it was observed that neonatal complication was found 53.3% in case group and 68.0% in control group. Birth asphyxia was found 20.0% in cases group and 6.3% in control group, which is consistent with Khatun (12-9%)[19] and Gupta et al.[25]

Meconium aspiration syndrome (MAS) 25.0% and convulsion 3.8% in case group but not found in control group. Meconium aspiration syndrome was significantly ($p<0.05$) higher in cases group. Bhide et al[26] reported 22%, but Patilet al.[23] had reported 12.8% meconium aspiration syndrome. The incidence of MAS was very high in babies with low 1 minute Apgar scores inspite of repeated intratracheal suctioning to remove meconium which gives credence to the theory that meconium aspiration is predominantly an intrauterine event which occurs in response to continued fetal gasping in a hypoxic environment and tracheal suctioning at birth cannot completely eliminate development of MAS.[3]

In this current study it was observed that oropharyngeal suction required was 68.0% in case group and 21.0% in control group, which was significantly ($p<0.05$) higher in cases group. Requirement of oropharyngeal suction was significantly more in cases obtained by Khatunet al.[19]

In this current series it was observed that neonatal ward admission was 22.0% in cases and 6.3% in control group. Mortality was found 3.8% in cases and 1.3% in control group. Neonatal ward admission was significantly ($p<0.05$) higher in cases group. Admission in neonatal ward was more in cases and neonatal mortality was also high in cases than control obtained by Khatunet al[19] .In their study mortality rate was 3.75% in cases with thick meconium compared to 1.25% mortality in control. Gupta et al[25] found 4.9% mortality in meconium stained amniotic fluid group compared to 2.8% in control. It was also observed that meconium in conjunction with an abnormal heart tracing was associated with increased perinatal morbidities and mortality.[27]

In this present study it was observed that, 6.65% patients had post-partum haemorrhage in case group and 4.0% in control group. Wound infection was 5.3% in case group and 2.65% in control group. There were no maternal deaths or any serious complication like uterine hypertonicty, maternal sepsis, DIC, amniotic fluid embolism or uterine rupture.

**Limitations of the study:** The study population was small and selected from referral hospital in Dhaka city, so that the results of the study may not be reflect the exact picture of the country

## Conclusion

Based on our study we concluded that meconium stained amniotic fluid is associated with higher rate of cesarean delivery, neonatal resuscitation, birth asphyxia, meconium aspiration syndrome, neonatal hospital admission and mortality. It is also associated with adverse maternal outcome such as postpartum haemorrhage and intra or postpartum pyrexia. As it is a small study and we hope our study encourage others to undertake large multicenter study and give us actual picture of meconium stained liquor. But electronic foetal monitoring, timely obstetrical intervention and neonatal care can reduce associated complications and improve foetal outcome.

## References:


1. Ahanya, S.N., Lakshmanan, J., Morgan,B.L and Ross, M.G. 2005. Meconium passage in utero: mechanisms, consequences, and management. ObstetGynecolSurv.60, (1), pp. 45-56; quiz 73-4.
2. Wiswell TE, Bent RC. Meconium staining and the meconium aspiration syndrome, unresolved issues. In pediatric clinics of North America updates on Neonatology 1993; 40:955-981.
3. Wiswell TE, Henley MA. Intratracheal suctioning, systemic infection and the meconium aspiration syndrome. Pediatrics 1992; 89: 203-06.
4. Cleary GM, Wiswell TE. Meconium-stained amniotic fluid and the meconium aspiration syndrome - An update. Pediatr Clin North Am 1998; 45: 511-29.
5. Maymon E, Chaim W, Furman B, Ghezzi F, ShohamVardi I,

Mazor M. Meconium stained amniotic fluid in very low risk pregnancies at term gestation. Eur J Obstet Gynecol Reprod Biol 1998; 80: 169-73.

6. Kligner MC, Kruse J. Meconium aspiration syndrome: Pathophysiology and prevention. J Am Board Fam Pract 1999; 12: 450-66.

7. Keenan W, Recommendations for management of the child born through meconium stained amniotic fluid. Pediatrics 2004;113:133-134

8. Sedaghatian MR, Othman L, Rashid N, Ramachandran P, Bener AB. An 8 year study of meconium Stained amniotic fluid in different Ethnic groups. Kuwait medical journal 2004; 36:266-269

9. Steer PJ, Danielian P. Fetal distress in labour. In: James OK, Steer PJ, Weiner CP, Gonick B (eds). High risk pregnancy 2nd ed. New York WB Saunders Company 2000; pp 1135-40.

10. Rissi EM, Philipson EH, William TG. Meconium aspiration syndrome: intrapartum and neonatal attributes. Am J ObstetGynecol 1989;161: 1106-10.

11. Pi PX, Zhu FF, Huang J. [Meconium stained amniotic fluid and intraamniotic infection]. Hunan Yi Ke Da XueBao 2003; 28: 648-50.

12. Connolly TP. Meconium stained amniotic fluid (MSF). Am J ObstetGynecol 2004; 191: 2175-6.

13. Goffinet F, Fraser W, Marcoux S, Breart G, Moutquin JM, Daris M. Early amniotomy increases the frequency of fetal heart rate abnormalities. Amniotomy Study Group. Br J Obstet Gynaecol 1997; 104: 548-53.

14. Gregory GA, Gooding CA, Phibbs RH, Tooley WH. Meconium aspiration in infants: a prospective study. J Pediatr 1974; 85:848 –852

15. Miller FC, Sacks DA, Yeh SY, Paul RH, Schirfin BS, Martin CB Jr, et al. Significance of meconium staining during labor. Am J Obstet Gynecol 1975; 122: 573-80

16. Nice, intrapartum guideline 55, London : national institute for health and clinical excellence 2007.

17. Gee H. Routine intrapartum care: an over view. In Luesley DM, Barker PN. Obstetrics and gynecology: an evidence based test for MRCOG, 2nd edition. Hodder Arnold 2010:287-295.

18. Kumari, R., Srichand P, Devrajani BR, Shah SZA, Devrajani T, Bibi I, Kumar R. Foetal outcome in patients with Meconium Stained Liquor.JPMA 62: 474; 2012

19. Khatun HA, Arzu J, Haque E, Kamal MA, Al Mamun MA, Khan MFH. Fetal Outcome in Deliveries with Meconium Stained Liquor. Bangladesh J Child Health, 2009; 33 (2): 41-45.

20. Sunoo CS, Kosasa TB, Nakayama RT, Hale RW. The incidence of meconium aspiration in Hawaii. Hawaii Med J 1993; 52: 290-93. 13.

21. Benirschke K, Kaufmann P. Pathology of the human placenta. New York: Springer-Verlag; 2000

22. Saunders K. Should be worry about meconium? A controlled study of neonatal outcome. Trop Doct 2002; 32: 7-10.

23. Patil KP, Swamy MK, Samatha K. A one year cross sectional study of management practices of meconium stained amniotic fluid and perinatal outcome. Obstet Gynecol India 2006; 56: 128- 30.

24. Mundhra R and Agarwal M. Fetal Outcome in Meconium Stained Deliveries. Journal of Clinical and Diagnostic Research. 2013; 7(12): 2874-2876.

25. Gupta V, Bhatia BD, Mishra OP. Meconium stained amniotic fluid: Antenatal intrapartum and neonatal attributes. Indian Pediatr 1996; 33: 29397.

26. Bhide SS, Shendurnikar N, Aiyer S, Baxi SR. Neonatal outcome after meconium stained amniotic fluid. J Obstet Gynaecol India. 1994;48:933-5. 10

27. Committee on Obstetric Practice, American College of Obstetricians and Gynecologists. ACOG Committee Opinion No. 379: Management of delivery of a newborn with meconium-stained amniotic fluid. Obstet Gynecol 2007; 110:739.

## Original Article

# Stress of the COVID-19 and its Consequences on Irritable Bowel Syndrome Patients in A Selected Tertiary Level Hospital in Bangladesh

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**Abstract**

***Background:*** *The COVID-19 pandemic represents a multiple stress. Stress can worsen the symptoms of (IBS) patients.*

***Aims & Objective:*** *The aim of the study was to assess the stress of COVID-19 and its impact on IBS patients during the pandemic situation among the Bangladeshi population.*

***Methods:*** *Thiscross-sectionalstudywas conducted among the self-reported previously diagnosed IBS patients aged 18 years and above, irrespective of sex, in the Gastroenterology department of Shaheed Suhrawardy Medical College Hospital. Data was collected by a structured questionnaire which included the patient's socio-demographic,clinical symptoms of IBS, personal habits, co morbidities, self-reported stress due to COVID-19, and its effect on the symptoms of IBS.*

***Results:*** *The study respondents consisted of 210 IBS patients, among them 71.90% were male and 28.10% were female. The majority of the study population(43.0%) belonged to age group of 31-40 years and mean age 35.12 ± 11.55years. Most of the respondents (91.9%) reported stress due to the COVID-19 pandemic.The most commonly reported causes of stress were fear of a family member being infected with the virus (94.8%), followed by fear of self-infection (90.5%), and death due to COVID-19 infection (68.1%). Most of the stressed respondents (72.9%) reported that stress usually exagge rates IBS symptoms. Almost 25.7% of the subjects consulted a physician for stress aggravation of the symptoms, 21.0% used sedatives due to stress,and 21.0% modified IBS medications due to stress. Moreover,36.2% of the participants reported hampered daily activities dueto IBS symptoms exacerbation.*

***Conclusion:*** *The study revealed that most of the IBS patients had been suffering fromstressduring the COVID-19 pandemic situation. IBS patients should be advised to participate in mental health education programs to adjust to the current pandemic COVID-19 situation.*

**Key Words:**
Coronavirus (COVID-19),Pandemic, IBS, Stress, Bangladesh

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**Introduction:**

Coronavirus disease (COVID-19) pandemic represents a various spectrum of stress and had a negative effect on mental health. However, till date, prospective studies are few. This pandemic situation causes major life-threatening stress due to fear of serious illness or death for oneself and for family members.[1] In addition, it is necessary to determine what factors will mediate the stress response to the pandemic. It is observed that epidemics pose a threat to mental health.[2] Therefore, two recent literature reviews revealed that COVID-19 had a persistent negative impact on mental health, with 16-18% of participants showing symptoms of anxiety and depression in a study which was conducted in a German-speaking sample.[3-4] Preliminary evidence suggests that women, young people and people with poor sleep quality are at increased risk of mental health problems.[5-6] Another issue is that the depression and anxiety could potentially induce Irritable Bowel Syndrome (IBS).[7]

IBS is a familiar bowel disorder that has a significant medical burden and negative effects on the quality of life of patients. It is a gastrointestinal condition with variable signs and symptoms. The common symptoms are abdominal pain, cramps or bloating, diarrhea or constipation, and mucus in the stool.[8-9]Irritable bowel syndrome (IBS) affects 7% to 21% of the general population. The prevalence of IBS was 24.4% in the first community-based survey applying Rome-II criteria in rural Bangladesh and 7.7% in first urban community study in Bangladesh.[10-11] This is a chronic disease that will greatly reduce quality of life and work efficiency. IBS is not a single disease, but a group of symptoms caused by multiple pathologies. Factors that are important for the development of IBS are changes in the gut microbiome, gut permeability, gut immune function, motility, visceral sensation, brain-gut interaction, and psychosocial status.The disease may be caused by intestinal infection or life stress events.[12-14]

Studies reveals that the fear and anxiety during any pandemic era, enhance the symptoms of pre-existing psychological problems.[15]As psychological status has a great impact on the symptoms of IBS and Covid-19 pandemic increases the stress, assessing the effects IBS during and after of covid-19 is essential. But there is scarcity of literature regarding the issue. In fact, there was no published data about the covid-19 pandemic stress and its effect on IBS symptoms in our country. So this study was conducted toassess theCOVID 19 pandemic stress and its consequences on irritable bowel syndrome patientsin Bangladesh.

**Methodology:**

It was a cross-sectional observational study, carried out in the Department of Gastroenterology, Shaheed Suhrawardy Medical College Hospital Dhaka, from January 2021 to December 2021. Previously diagnosed self-reporting IBS patent's aged 18 years or above irrespective of sex and who gave consent were enrolled in this study. Purposive sampling was used for data collection. Sample size was 210 for this study. A structured questionnaire was used as data collection instrument. The English version of the questionnaire was translated into native language Bangla. It was subsequently translated back to English for review to resolve any discrepancies in language.

The data were collected by doctors and trained personnel, who received appropriate training before data collection. During the COVID-19 pandemic, appropriate personal protection measures were taken for data collectors and interviewees. After introducing themselves and informing the purpose of the interview, the data were collected from the self-reported IBS patients.

All the relevant collected data was compiled on a master table first and then statistical analysis of the results was obtained by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-22) (SPSS Inc, Chicago, IL, USA). The result was presented in tables, figures, diagrams. Qualitative data was expressed as frequency and percentage and quantitative data was expressed as mean and standard deviation.p value less than 0.05 was regarded as statically significant and 95% confidence intervals were computed using a logistic regression model.

Prior to the commencement of this study, the research protocol was approved by the Ethical review committee of Ministry of Science and Technology. Verbal consent was taken from all respondents before conducting the interview.

**Results**

In this study, the study population consisted of 210 respondents, among them, 71.90% male and 28.10% female. The majority (43.0%) of the study population belonged to age group of 31-40 years and the mean age of them 35.12 ± 11.55 years. The male to female ratio in percentage was 2.56:1. Nearly 81.9% of the sample population was married, among them 80.1% was male and 86.4% was female. In regards to the occupation of the respondent's majority was from non-government employee (22.9%) followed by 22.4% from Business and15.7% from Housewife, 13.8% from Government employee and the rest constituted others occupations like students, driver, agri-laborers, industrial worker, others etc. With respect to the educational background 17.6% graduate and above, 14.3% primary education completed, 31.9% Secondary education completed, 16.7% Higher Secondary education completed, and 19.5% are illiterate. Most of the study population are Muslims (94.2%), Hindu (4.8%) and the rest are Christian (1.0%). More than 35% of the respondents reported to earn a monthly income of above Tk. 20,000. The above discussions reflected that the objective on socio-demographic background was adequately addressed in this study (Table-I).

**Table-I**

*Demographic details of the respondents (n=210)*

| | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Age | | | |
| 21 - 30 | 66 (43.7) | 20 (33.9) | 14 (11.6) |
| 31 - 40 | 59 (39.1) | 23 (39.0) | 52 (43.0) |
| 41 - 50 | 12 (7.9) | 10 (16.9) | 26 (21.5) |
| >50 | 14 (9.3) | 6 (10.2) | 18 (14.9) |
| Mean ± SD | 33.91 ± 10.55 | 38.23 ± 13.37 | 35.12 ± 11.55 |
| Marital status | | | |
| Married | 121 (80.1) | 51 (86.4) | 172 (81.9) |
| Unmarried | 30 (19.9) | 8 (13.6) | 38 (18.1) |
| Education | | | |
| No formal education | 21 (13.9) | 20 (33.9) | 41 (19.5) |
| Primary school | 17 (11.3) | 13 (22.0) | 30 (14.3) |
| Secondary school | 53 (35.1) | 14 (23.7) | 67 (31.9) |
| Pre-University | 30 (19.9) | 5 (8.5) | 35 (16.7) |
| Tertiary-Undergraduate/Postgraduate degree | 30 (19.9) | 7 (11.9) | 37 (17.6) |
| Occupation | | | |
| Government employee | 23 (15.2) | 6 (10.2) | 29 (13.8) |
| Non-government employee | 46 (30.5) | 2 (3.4) | 48 (22.9) |
| Student | 18 (11.9) | 3 (5.1) | 21 (10.0) |
| Business | 44 (29.1) | 3 (5.1) | 47 (22.4) |
| Agriculture worker | 7 (4.6) | 0 (0.0) | 7 (3.3) |
| Industrial worker | 7 (4.6) | 5 (8.5) | 12 (5.7) |
| Driver | 5 (3.3) | 0 (0.0) | 5 (2.4) |
| Homemaker/housewife | 0 (0.0) | 33 (55.9) | 33 (15.7) |
| Others | 1 (0.7) | 7 (11.9) | 8 (3.8) |
| Religion | | | |
| Islam | 143 (94.7) | 55 (93.2) | 198 (94.2) |
| Hindu | 6 (4.0) | 4 (6.8) | 10 (4.8) |
| Christian | 2 (1.3) | 0 (0.0) | 2 (1.0) |
| Monthly family income | | | |
| <10,000 | 46 (30.5) | 33 (55.9) | 79 (37.6) |
| 10,000-20,000 | 42 (27.8) | 15 (25.4) | 57 (27.1) |
| 20,000> | 63 (41.7) | 11 (18.6) | 74 (35.2) |

The most common IBS symptoms reported by respondent were abdominal pain (69.5%), Gas with abdominal distension (56.7%), diarrhea (54.3%) Constipation (21.0%) and Alternate constipation with Diarrhea (35.7%) (Table-2).

**Table-II**

*Clinical presentation of IBS Patient* ***(n=210)***

| Clinical presentation | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Constipation | 23 (15.2) | 21 (35.6) | 44 (21.0) |
| Diarrhea | 79 (52.3) | 35 (59.3) | 114 (54.3) |
| Alternate constipation with Diarrhea | 66 (43.7) | 9 (15.3) | 75 (35.7) |
| Undifferentiated type | 15 (9.9) | 3 (5.1) | 18 (8.6) |
| Abdominal pain | 107 (70.9) | 39 (66.1) | 146 (69.5) |
| Vomiting | 16 (10.6) | 9 (15.3) | 25 (11.9) |
| Gas with abdominal distension | 86 (57.0) | 33 (55.9) | 119 (56.7) |

Regarding awareness and perceptions about symptoms of covid-19, it was revealed thata total of 199 (94.8%) respondents were aware of the COVID-19 pandemic. The most commonly identiûed clinical symptoms of COVID-19 infection were fever (92.4%), cough (89.0%), Dyspnea (74.8%), Diarrhea (33.3%), and Sore throat (38.6%). 118 (56.2%) knew someone infected with a COVID-19. Among the respondents 54 (25.7%) were aware that COVID- 19 might have GIT symptoms, of which loss of appetite was the most reported (52.4%) followed by sore throat (38.6%) and diarrhea (33.3%). About 35 (16.7%) of the respondents had reported that they could differentiate COVID-19 GIT symptoms from those of IBS (Table-III).

In this study, about 91.9% of the respondents stressed dueto the pandemic situation. The most commonly reported causes of stresswere fear of a family member being infected with virus (94.8%),followedbyfearofself-infection(90.5%),anddeathduetoCOVID-19 infection (68.1%). Most of the stressed respondents (72.9%) reported that stress usually exaggerates IBS symptoms. Almost 25.7% of the subjects consulted physician for stress aggravation of the symptoms, 21.0% used sedatives due to stress, and 21.0% modiûed IBS medications due to the stress. Moreover, 36.2% of the participants reported impaired daily activities due to symptoms exacerbation (Table-IV).

**Table-III**

*Respondents' Perception about COVID-19 Symptoms (n=210)*

| | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Know about COVID-19 pandemic | 140 (92.7) | 59 (100.0) | 199 (94.8) |
| Aware of COVID-19 symptoms | | | |
| - Fever | 140 (92.7) | 54 (91.5) | 194 (92.4) |
| - Cough | 133 (88.1) | 54 (91.5) | 187 (89.0) |
| - Dyspnea | 118 (78.1) | 39 (66.1) | 157 (74.8) |
| - Diarrhea | 50 (33.1) | 20 (33.9) | 70 (33.3) |
| - Nausea | 30(19.9) | 17(28.8) | 47(22.4) |
| - Vomitting | 30(19.9) | 11(18.6) | 41(19.5) |
| - Sore throat | 54 (35.8) | 27 (45.8) | 81 (38.6) |
| - Loss of appetite | 83 (55.0) | 27 (45.8) | 110 (52.4) |
| - Previously infected with COVID-19 | 35 (23.2) | 15 (25.4) | 50 23.8) |
| - Know any COVID-19 case | 77 (51.0) | 41 (69.5) | 118 (56.2) |
| - COVID-19 infection had GIT symptoms | 43 (28.5) | 11(18.6) | 54(25.7) |
| - Can differentiate COVID-19 symptoms with IBS | 28 (18.5) | 7(11.9) | 35(16.7) |

**Table-IV**

*Stress related to COVID-19 pandemic and its effects on IBS(n=210).*

| | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Stress due to COVID -19 pandemic and related procedures | 134 (88.7) | 59 (100.0) | 193 (91.9) |
| Causes of Stress | | | |
| - Afraid of infection in family member | 140 (92.7) | 59 (100.0) | 199 (94.8) |
| - Afraid of being infected | 131 (86.8) | 59 (100.0) | 190 (90.5) |
| - Afraid of loss of income source | 108 (71.5) | 38 (64.4) | 146 (69.5) |
| - Afraid of dying due to the virus | 95 (62.9) | 48 (81.4) | 143 (68.1) |
| - Stress exaggerated IBS symptoms | 114 (75.5) | 39 (66.1) | 153 (72.9) |
| Consulted doctor due to stress | 44 (29.1) | 10 (16.9) | 54 (25.7) |
| Used sedatives due to stress | 34 (22.5) | 10 (16.9) | 44 (21.0) |
| Exaggerated symptoms after daily activities | 52 (34.4) | 24 (40.7) | 76 (36.2) |
| Modified IBS medication due to stress | 34 (22.5) | 10 (16.9) | 44 (21.0) |

Regarding the factors related to stress of covid-19, it was found that, most of the factors were notsigniûcantly related to stress (ρ>.05). However; smoking with IBS symptoms were significantly associated with stress (p<0.001) (Table-V).

**Table-V**

*Elements related to stress of COVID-19 pandemic in IBS patients (n=210)*

| | Stressed due to COVID-19 pandemic | | p-value |
|---|---|---|---|
| | Yes n (%) | No n (%) | |
| Age | | | |
| ≤30 | 71 (41.3) | 15 (39.5) | 0.838 |
| >30 | 101 (58.7) | 23 (60.5) | |
| Mean ± SD | 34.98 ± 11.36 | 35.78 ± 12.51 | 0.698 |
| Gender | | | |
| Male | 120 (69.8) | 31 (81.6) | 0.143 |
| Female | 52 (30.2) | 7 (18.4) | |
| Marital status | | | |
| Married | 140 (81.4) | 32 (84.2) | 0.683 |
| Unmarried | 32 (18.6) | 6 (15.8) | |
| Education | | | |
| No formal education | 32 (18.6) | 9 (23.7) | 0.157 |
| Primary school | 29 (16.9) | 1 (2.6) | |
| Secondary school | 56 (32.6) | 11 (28.9) | |
| Pre-University | 26 (15.1) | 9 (23.7) | |
| Tertiary-Undergraduate/Postgraduate degree | 29 (16.9) | 8 (21.1) | |
| Monthly family income | | | |
| <10,000 | 68 (39.5) | 11 (28.9) | 0.472 |
| 10,000-20,000 | 45 (26.2) | 12 (31.6) | |
| 20,000> | 59 (34.3) | 15 (39.5) | |
| Duration of IBS | | | |
| <1 year | 45 (26.2) | 8 (21.1) | 0.322 |
| 1-2 year | 14 (8.1) | 6 (15.8) | |
| > 2 year | 113 (65.7) | 24 (63.2) | |
| Smoking | | | |
| Smoker | 24 (14.0) | 16 (42.1) | <0.001 |
| Ex-smoker | 16 (9.3) | 3 (7.9) | |
| Non-smoker | 132 (76.7) | 19 (50.0) | |
| Can differentiate COVID 19 symptoms from IBS | 30 (17.4) | 5 (13.2) | 0.521 |
| Having COVID-19 | 163 (94.8) | 34 (89.5) | 0.259 |

**Discussion**

This global health threat is associated with adverse effects on mental health. In Bangladesh, the First COVID-19 case was declared in Dhaka City on 8 March, 2020[16]which created mental stress in the population. This study was conducted to assess the COVID-19 pandemic stress and stress related consequences on patients with IBS among Bangladeshi population.

In this study, 71.90% were male and 28.10% were female. The majority (43%) of the study population belonged to the age group of 31-40 years. The male to female ratio was 2.56:1. The striking result of the study showed that almost all the respondents (91.9%) were stressed due to the COVID-19 pandemic. During global outbreak, the burden of mental health issues is greater than the percentage of people affected by COVID-19 infection.[17,18]

The study revealed that afraid of infection in family member (94.8%) and fear of being infected by self (90.5%) were the most commonly reported sources of stress. Also, about 56.2% of participants knew a case of COVID-19 and 23.8% of respondents contracted the infection. Studies revealed that fear from COVID-19 infection can create stress and deteriorate mental health problem.[19,20] Fear of contact of COVID-19 resulting sickness, suffering economic losses, helplessness, isolation from relatives, and stigma are the most commonly reported sources of negative mental health issues in the literature review.[3, 21]

Our study demonstrated signiûcant impacts of COVID-19 pandemic related stress on IBS patients. More than 72% of the stressed respondents had usual or sometimes aggravation of IBS symptoms, especially abdominal pain (69.5%) and Gas with abdominal distension (56.7%), stated that the aggravation of symptoms affected their daily life activities. Other participants (21%) reported taking sedatives to minimize the stress. The impact of stress on IBS patients is an important issue that should be considered by both physicians and patients. One review about the psychosocial determinants of IBS published in 2013,[22] reports a significant increase in stressor scores just before progression from IBS non-patient to IBS patient.

IBS symptoms could worsen with daily stress[23,24] and patients having IBS report more stressful events in their lifetime compared to healthy controls.[25] There is strong evidence about the role of usual stressors of life besides the COVID-19 pandemic in patients of IBS. A significant correlation can also be observed between the severity of IBS and its comorbid psychiatric disorders, especially depression and anxiety[26,27]. More and more clinical and experimental evidence revealed that IBS is a combination of irritable bowel and irritable brain. Clinical and experimental studies revealed that mental stresses have significant impact on intestinal sensitivity, motility, secretion and permeability, and the implicit mechanism has a close correlation with mucosal immune activation, alterations in central nervous system, peripheral neurons and gastrointestinal microbiota.

It is obvious that, sub-optimal mental health disorders are frequently occurring during the Coronavirus pandemic.[3]The direct association between the reported COVID-19 stress and exacerbation of symptoms among IBS patient in the present study may be high owing to the lack of complete information regarding the nature of the disease, its full clinical presentation, and consequences. Despite the strong effect of COVID-19 related stress on the respondents' IBS symptoms, only 25.7% consulted their doctors, which might be the cause of fear of being infected by contact with others in the clinic.[28]Also, difûculty access to their physicians due to curfews and restriction of movements could be a reason for this low consultation rate.[29] In the present study, the inability to differentiate between IBS symptoms and COVID-19 symptoms was a signiûcant factor for COVID-19 pandemic stress. People Confused between chronic disease symptoms, including IBS, and suspected COVID-19 symptoms are at a greater risk of mental health problems.[30]

Other important factor associated with COVID-19 stress in IBS patients, revealed by our study, is the preexistence of other chronic diseases and personal habit. IBS Patients with smoking habit is significantly vulnerable to stress in the study ($p<0.001$). People with preexisting chronic morbidity may be associated with the risk of progression to severe disease.[31,32] During public health emergencies, clinicians and healthcare provider should be given emphasis beside IBS care on the mental health of patients.[33]

## Conclusion

In conclusion, our study revealed that the most of IBS patients had been suffering from stress during the COVID-19 pandemic situation, which aggravated their clinical symptoms and affected their daily life activities. The impact of COVID-19 and its pandemic stress on IBS patients is an important issue that should be taken into consideration by both physicians and patients. IBS patients should be registered in supportive mental health education programs to adjust with stressors, including the current pandemic COVID-19 situation.

## References


1. A.S. Sameer et al.Assessment of mental health and various coping strategies among general population living under imposed COVID-lockdown across world: a cross-sectional study. Ethics Med Public Health (2020).
2. Mak IW, Chu CM, Pan PC, Yiu MG, Ho SC, Chan VL. Risk factors for chronic post-traumatic stress disorder (PTSD) in SARS survivors. Gen Hosp Psychiatry. 2010 Nov-Dec; 32(6):590–8.
3. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. Asian J Psychiatr. 2020 Apr; 52:102066.
4. Vindegaard N, Benros ME. COVID-19 pandemic and mental health consequences: systematic review of the current evidence. Brain Behav Immun. 2020.
5. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: gender differences matter. Psychiatry Res. 2020 May;287:112921.
6. Huang Y, Zhao N. Mental health burden for the public affected by the COVID-19 outbreak in China: who will be the high-risk group? Psychol Health Med. 2020.
7. Yan-Yan Dong , Xiu-Li Zuo, Chang-Qing Li, Yan-Bo Yu, Qiu-Jie Zhao, Yan-Qing Li. Prevalence of irritable bowel syndrome in Chinese college and university students assessed using Rome III criteria. World J Gastroenterol. 2010 Sep 7;16(33):4221-4226.

8. Klem F, Wadhwa A, Prokop LJ, et al. Prevalence, risk factors, and outcomes of irritable bowel syndrome after infectious enteritis: a systematic review and meta-analysis. Gastroenterology 2017; 152: 1042–54.
9. Canavan C, West J, Card T. The epidemiology of irritable bowel syndrome. Clin Epidemiol 2014; 6:71.
10. Masud MA, Hasan M, Khan AK. Irritable bowel syndrome in a rural community in Bangladesh: Prevalence, symptom pattern, and health care seeking behaviour. Am J Gastroenterol. 2001;96:1547–52
11. IrinPerveen, Mahmud Hasan, Mohammed A. Masud, Mohammed M. R. Bhuiyan, and Mohammed M. Rahman. Irritable Bowel Syndrome in a Bangladeshi Urban Community: Prevalence and Health Care Seeking Pattern. Saudi J Gastroenterol. Oct 2009; 15(4): 239–243.
12. El-Matary W, Spray C, Sandhu B. Irritable bowel syndrome: the commonest cause of recurrent abdominal pain in children. Eur J Pediatr 2004; 163:584–8.
13. Camilleri M. Peripheral mechanisms in irritable bowel syndrome. N Engl J Med 2013; 368:578.
14. Whitehead WE, Palsson O, Jones KR. Systematic review of the comorbidity of irritable bowel syndrome with other disorders: what are the causes and implications? Gastroenterology 2002; 122: 1140–56.
15. Shigemura J, Ursano RJ, Morganstein JC, et al. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. Psychiatry ClinNeurosci 2020; 74:281.
16. Reuters. (2020). Bangladesh confirms its first three cases of coronavirus. https://www.reuters.com/article/us-healthcoronavirus-bangladesh-idUSKBN20V0FS [Accessed May 30, 2020].
17. Ornell F, Schuch JB, Sordi AO, et al. Pandemic fear" and COVID-19: mental health burden and strategies. Braz J Psychiatry 2020;42:232–5.
18. Reardon S. Ebola's mental-health wounds linger in Africa: health-care workers struggle to help people who have been traumatized by the epidemic. Nature 2015;519:13–5.
19. Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Public Health 2020;17:1729.
20. Park S-C, Park YC. Mental health care measures in response to the 2019 novel coronavirus outbreak in Korea. Psychiatry investigation 2020;17:85.
21. Rodríguez-Rey R, Garrido-Hernansaiz H, Collado S. Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain. Front Psychol 2020;11:11.
22. Surdea-Blaga T, Băban A, Dumitrascu DL. Psychosocial determinants of irritable bowel syndrome. *World J Gastroenterol* 2012; 18: 616-626.
23. Blanchard EB, Lackner JM, Jaccard J, et al. The role of stress in symptom exacerbation among IBS patients. J Psychosom Res 2008;64:119–28.
24. Levy RL, Cain KC, Jarrett M, et al. The relationship between daily life stress and gastrointestinal symptoms in women with irritable bowel syndrome. J Behav Med 1997;20:177–93.
25. Whitehead WE, Crowell MD, Robinson J, et al. Effects of stressful life events on bowel symptoms: subjects with irritable bowel syndrome compared with subjects without bowel dysfunction. Gut 1992;33: 825–30.
26. O'Malley D, Quigley EM, Dinan TG, Cryan JF. Do interactions between stress and immune responses lead to symptom exacerbations in irritable bowel syndrome? *Brain Behav Immun* 2011; 25: 1333-1341.
27. Singh P, Agnihotri A, Pathak MK, Shirazi A, Tiwari RP, Sreenivas V, Sagar R, Makharia GK. Psychiatric, somatic and other functional gastrointestinal disorders in patients with irritable bowel syndrome at a tertiary care center. *J NeurogastroenterolMotil*2012; 18: 324-331.
28. Lazzerini M, Barbi E, Apicella A, et al. Delayed access or provision of care in Italy resulting from fear of COVID-19. Lancet Child Adolesc Health 2020;4:e10–1.
29. Tashkandi E, Zeeneldin A, AlAbdulwahab A, et al. Virtual management of patients with cancer during the COVID-19 pandemic: web-based questionnaire study. J Med Internet Res 2020;22:e19691.
30. Nguyen HC, Nguyen MH, Do BN, et al. People with suspected COVID-19 symptoms were more likely depressed and had lower health-related quality of life: the potential benefit of health literacy. J Clin Med 2020;9:965.
31. Dayal D. We urgently need guidelines for managing COVID-19 in children with comorbidities. ActaPaediatrica 2020.
32. Silva CA, Queiroz LB, Fonseca CdB, et al. Spotlight for healthy adolescents and adolescents with preexisting chronic diseases during the COVID-19 pandemic. Clinics 2020;75.
33. Hao X, Zhou D, Li Z, et al. Severe psychological distress among patients with epilepsy during the COVID-19 outbreak in southwest China. Epilepsia 2020.

## Original Article

# Assessing Vitamin D Levels and Demographic Profiles of Adult Outdoor Patients: A Descriptive Cross-sectional Study in a District Medical College Hospital of Bangladesh

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**Abstract**

***Background:*** *Vitamin D deficiency is a highly prevalent nutritional deficiency in Bangladesh. While the majority of the research has been done in the large metropolitan area, few studies have been conducted at the district level. Furthermore, little information has been discovered about the demographics of people with vitamin D deficiency. Thus, this study aimed to identify the district-level demographics of those who suffer from vitamin D insufficiency.*

***Methods:*** *A descriptive cross-sectional study was conducted among 197 participants attending medicine outdoors at Sheikh Hasina Medical College Hospital, Tangail, Bangladesh. Detailed interview on socio-demographic and lifestyle factors and anthropometric measurement was conducted. Serum vitamin D level was estimated by chemiluminescent immunoassay. Data were analyzed by SPSS 22.0.*

***Results:*** *About 46.2% of respondents had insufficient and 36.5% had deficient vitamin D levels. Serum vitamin D level was 22.68 ng/ml ± 7.83. Females (84.92%) had hypovitaminosis D more than males (78.87%) which was statistically significant. BMI, occupation, and monthly income had no significant role in different vitamin D status groups. Among females, wearing Burka had a significant relationship with low vitamin D levels.*

***Conclusion:*** *Females are more prone to suffer from low vitamin D levels especially those who had less sun exposure due to choice of clothing. Prophylactic supplements of vitamin D may be considered in this group.*

**Key Words:**
Vitamin D, Demographic study, Bangladesh.

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**Introduction:**

Vitamin D deficiency is an under-recognized epidemic throughout the world, and over one billion people globally have insufficient or deficient vitamin D levels.[1] Vitamin D is a pro-hormone and having sufficient plasma vitamin D levels is considered a marker of "good" health. The major source of vitamin D in the body is skin biosynthesis from exposure to sunshine. On average, at least 80% of the total vitamin D in the body is generated in the skin.[2] Diet is another source of vitamin D, but few foods contain large amounts of vitamin D, except for some fatty fish and a few animal-derived foods, like dairy, fat, and eggs.[3]

Apart from the well-established role of vitamin D in maintaining good skeletal health (including osteoporosis, fractures, calcium, phosphorous, and bone metabolism), vitamin D deficiency is also associated with increased risk of obesity, diabetes, cardiovascular disorders (CVDs), autoimmune-, infectious-, and neuro-degenerative diseases including Alzheimer's and Parkinson's disease.[4,5]

Vitamin D deficiency is highly prevalent in Bangladesh ranging from 21 to 75 % for infants, children, and adolescents, 38 to 100 percent for premenopausal women, 66 to 94.2 % for pregnant women, 6 to 91.3 % for adult men, and 82 to 95.8 % for postmenopausal women.[6] Important underlying factors related to this silent epidemic

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include dark skin color, homebound and sedentariness, insufficient sunlight exposure, atmospheric pollution, clothing style, obesity, body weight/body mass index (BMI), old age, chronic disease, use of sunscreen and no supplementation.[6]

Bangladesh is located near the equatorial region and the climate in South Asian countries is sunny throughout the year, thereby creating ample possibilities of exposure to sunlight. However, due to the dark skin pigmentation, people living in Indian subcontinents require double the amount of UVB exposure to produce the same amount of vitamin D as compared to white Europeans.[7] The present study was done to assess serum Vitamin D levels among outdoor patients in a district medical college hospital in Bangladesh and to analyze the association of demographic factors with vitamin D levels.

**Materials and Methods:**

This was a descriptive cross-sectional study which was conducted at Sheikh Hasina Medical College Hospital, Tangail between Jamuary 2021 to December 2021.

**Research question:** Is there any relation of vitamin D deficiency with demographic profile among Bangladeshi people?

**Objectives:**

**General objectives**: To assess vitamin D levels and demographic profiles of adult outdoor patients.

**Specific objectives**:

1. To measure vitamin D levels among adult population.
2. To observe the demographic profiles of adult outdoor patients.
3. To find out any relation of vitamin D deficiency with demographic profile among adult population.

**Study population:** The participants were recruited after considering inclusion and exclusion criteria. Inclusion criteria were patients who attended the OPD of the medicine department and aged 18-85 years. Exclusion criteria were patients who already diagnosed with a case of rickets or hypocalcemia or any other abnormality involving liver or renal function after reviewing previous documents and examinations as these might affect vitamin D, calcium, and phosphate metabolism.

Sample size: By using single proportion formula taking the prevalence of hypovitaminosis D as 86% in Bangladesh,[8] sample size was estimated as follows-

$N = \frac{z^2 pq}{2}$, where N= desired sample size, Z=reflects the Standard score; we used 95 % confidence interval (CI) so the value of Z is 1.96, P= proportion of prevalence (86% was taken from the previous studies), D= margin of error between the sample and population, 5% marginal error was admitted.

$$\text{So , } n = \frac{z^2 pq}{2} = n = \frac{1.96x\ .96x\ .86x\ (1-0.86)}{0.05x\ .05} = 185$$

However 197 participants were finally selected after inclusion and exclusion criteria for better precision.

**Data collection**: A pretested structured questionnaire was administered to each subject to obtain information on socio-demographic profiles such as name, age, gender, educational qualification, present occupation, monthly income of the family personnel, food habits, and lifestyle factors.

**Measurement of Vitamin D:** After obtaining informed written consent, three milliliters of venous blood were withdrawn from the median cubital vein of individuals. The serum separation was carried out within 2 hours after collection by centrifugation at 2100 rpm for 7 min. Serum 25(OH) D levels were estimated by chemiluminescent immunoassay (chemiluminescence). The values were documented in ng/ml. Serum 25(OH)D was categorized as deficient (<20 ng/ml), insufficient (21 - 29 ng/ml), and sufficient (30 - 100 ng/ml).

**Statistical analysis**: Data were categorized and analyzed using SPSS for Windows version 22.0. Descriptive statistics were performed for age, gender, socioeconomic factors, food habits, and lifestyle factors.

**Ethical consideration:**

This study was approved by the ethical review committee of Sheikh Hasina Medical College, Tangail, Bangladesh. Privacy and anonymity of the participants were maintained. Informed written consent were taken from every participants.

**Results:**

A total of 197 persons were selected for the study after inclusion and exclusion criteria. Respondents were divided into three groups on the basis of serum Vitamin D level:

Group-1: deficient as <20 ng/ml,

Group-2: insufficient as 21 - 29 ng/ml and

Group 3: sufficient as 30 - 100 ng/ml.

Findings of the study are being showed in tables and figures:

**Normality of the dataset**

The normal distribution of the continuous variables was checked first before comparing the means among three groups of patients. Then according to the result, parametric and non-parametric tests were selected for comparing the means of the three groups.

**Table I**

*Normality test of continuous variable*

| Tests of Normality | Kolmogorov-Smirnov | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| Age | .080 | 88 | 0.200 |
| BMI | .080 | 88 | 0.200 |
| Vitamin D level | .084 | 88 | 0.168 |

This table shows that age, BMI and vitamin D level was in normal distribution.

The figure 1: Shows the serum vitamin D status among respondents.

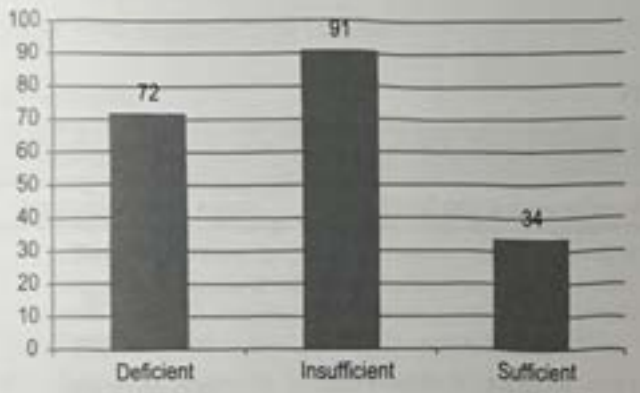


**Figure 1:** *Vitamin D status among respondents*

Figure 2: Illustrates that the serum vitamin D level was as low as 4.5 ng/ml to as high as 58.80 ng/ml. Mean serum vitamin D level was 22.68 ng/ml ± 7.83.

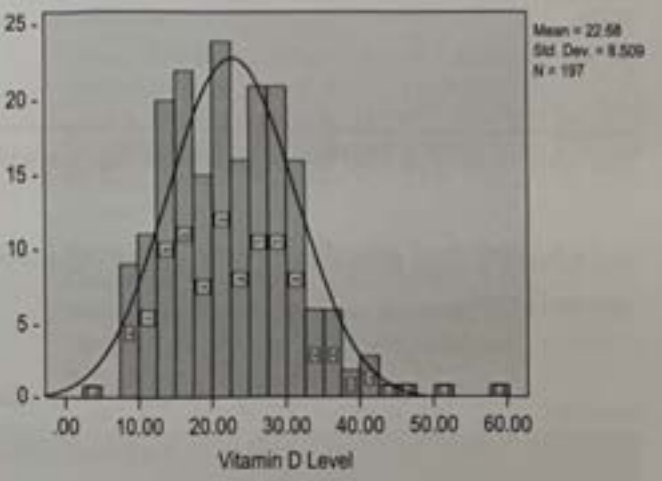


**Figure 2:** *Serum vitamin D level among the respondents*

The following table shows different characteristics of study population in relation to vitamin D status.

**Table II**

*Demographic characteristics of study population in relation to vitamin D status*

| Characteristics | | Serum vitamin D status | | | P value |
|---|---|---|---|---|---|
| | | Deficient (n=72) | Insufficient(n=91) | Normal(n=34) | |
| Gender | Male (n=71) | 22 | 34 | 15 | <0.001 |
| | Female (n=126) | 50 | 57 | 19 | |
| Educational status | Illiterate(n=11) | 4 | 5 | 2 | 0.184 |
| | Primary(n=21) | 7 | 11 | 3 | |
| | SSC(n=52) | 17 | 24 | 11 | |
| | e"HSC(n=113) | 44 | 51 | 18 | |
| Occupation | Housewife(n-103) | 47 | 46 | 10 | 0.213 |
| | Service(n=28) | 11 | 12 | 5 | |
| | Student(n=13) | 2 | 4 | 7 | |
| | Businessman(n=24) | 6 | 14 | 4 | |
| | Agriculture(n=6) | 2 | 1 | 3 | |
| | Others(n=23) | 4 | 14 | 5 | |
| Resident | Urban(n=108) | 39 | 50 | 19 | 0.371 |
| | Rural(n=89) | 33 | 41 | 15 | |
| Monthly income (Taka) | <10,000(n=39) | 18 | 5 | 6 | 0.073 |
| | 10,000-25,000(n=104) | 38 | 46 | 20 | |
| | >25,000(n=54) | 16 | 30 | 8 | |

**Table III**

*BMI and vitamin D level among the respondents*

| BMI | Serum Vitamin D level (ng/ml)(Mean ± SD) | P value |
|---|---|---|
| 18-24 | 26.76 ± 5.47 | 0.147 |
| 25-29 | 22.43 ± 5.69 | |
| >30 | 21.17 ± 4.23 | |

This table shows that BMI has no significant relation with vitamin D level.

The following table shows the significance of various personal and eating behaviors among female influencing low vitamin D level.

**Table IV**

*ANOVA result of personal and eating behaviors among female having low vitamin D level*

| Description | P Value | Results with alpha level | Status of Significance |
|---|---|---|---|
| Milk consumption (200 mL) | .072 | >0.05 | insignificant |
| Burka | .011 | <0.05 | Significant |
| Egg consumption | .414 | >0.05 | insignificant |
| Fish consumption | .941 | >0.05 | insignificant |
| Time spent under the sun | .161 | >0.05 | insignificant |
| Calcium tablet | .246 | >0.05 | insignificant |

Data shows that Burka has significant correlation for Vitamin D deficiency and insufficiency (Table II)

**Discussion:**

In this study, data were distributed normally as shown in Table 1. Most of the respondents had inadequate Vitamin D levels (36.5% had deficient and 46.2% had insufficient) which was consistent with the results found by Islam et al. They found that 86% had hypovitaminosis D (61.4% had a deficiency and 24.1% had insufficiency).[8] But the prevalence rate of deficiency was more than expected in this study. The cause may be homebound due to the lockdown during covid pandemic period. In this study mean serum vitamin D level was 22.68 ng/ml (± 11.34). The study done in Bangladesh by Islam AKMM et al. showed mean Vitamin D level was 21.66 (+/- 18.63) ng/ml which is nearly similar to this study.[8] We found more females had hypovitaminosis D than males which was statistically significant. Islam et al. also found females had more vitamin D deficit than males though that was not statistically significant.[8] The significant difference found in this study might be due to the more conservative society in this district than in Dhaka city. There were no significant differences in different vitamin D status groups in terms of education, occupation, and monthly income. Though urban residents had more hypovitaminosis D, this was not statistically significant. Kumar et al. found a significant difference in Vitamin D levels between urban and rural residents.[9] In a study, it was observed that in comparison with urban residents, large metro residents were 49% more likely, while rural residents were 20% more likely, to be vitamin D deficient.[10] Though in this study mean serum Vitamin D level was found low in overweight and obese persons, it was not statistically significant. It is similar to Bindayel et al. they found that BMI had no significant relationship with vitamin D level.[11] A significant correlation between wearing the Burka outside of the home and vitamin D levels was seen during a study of dietary and personal habits among females with low vitamin D levels. Several studies have found similar results that the risk of vitamin D deficiency is higher in veiled women.[12-15] Food habits like egg, fish, milk, and calcium tablet intake were found to have no significant relationship with vitamin D level.

**Limitation**: As the study was done during covid pandemic when the mobility of people was restricted, more respondents could not be included. Moreover, respondents were reluctant to provide sufficient time for detailed information. Funding was also an issue as this study was done by self-finance.

**Conclusion:**

The prevalence of vitamin D deficiency and insufficiency among adults in Bangladesh is high especially in women even at the district level. The study recommended that vitamin D supplementation and awareness about this pandemic in Bangladeshi adults should be taken into account by the government. Future studies also needed to address this issue furthermore.

**Financial support and sponsorship**

None

**Conflicts of interest**

There were no conflicts of interest.

**References:**

1. Naeem Z. Vitamin d deficiency- an ignored epidemic. *Int J Health Sci (Qassim)*. 2010 Jan;4(1):V-VI. PMID: 21475519; PMCID: PMC3068797.
2. Nikolac Gabaj, Nora & Unic, Adriana & Miler, Marijana & Pavicic, Tomislav & Culej, Jelena & Bolanèa, Ivan & Maheèiæ, Davorka & Milevoj Kopèinoviæ, Lara & Vrtaric, Alen. (2020). In sickness and in health: pivotal role of vitamin D. *Biochemia Medica*. 30. 10.11613/BM.2020.020501.
3. Schmid A, Walther B. Natural vitamin D content in animal products. *Adv Nutr*. 2013 Jul 1;4(4):453-62. doi: 10.3945/an.113.003780. PMID: 23858093; PMCID: PMC3941824
4. Autier P, et al. Vitamin D status and ill health: a systematic review. *Lancet Diabetes Endocrinol*. 2014;2(1):76–89
5. Theodoratou E, et al. Vitamin D and multiple health outcomes: umbrella review of systematic reviews and meta-analyses of observational studies and randomised trials. *BMJ*. 2014; 348: g2035.
6. Islam MZ, Bhuiyan NH, Akhtaruzzaman M, Allardt CL, Fogelholm M. Vitamin D deficiency in Bangladesh: A review of prevalence, causes and recommendations for mitigation. *Asia Pac J Clin Nutr*. 2022;31(2):167-180. doi: 10.6133/apjcn.202206_31(2).0002.
7. Sanghera DK, Sapkota BR, Aston CE, Blackett PR. Vitamin D Status, Gender Differences, and Cardiometabolic Health Disparities. *Ann Nutr Metab*. 2017;70(2):79-87. doi: 10.1159/000458765.
8. Islam, A.K.K.M., Hasan, M. N., Rahman, K. M., Asaduzzaman, M., Rahim, M. A., Zaman, S., Islam, M. R., Jesmin, H., & Yeasmin, L. (2019). Vitamin D status in Bangladeshi subjects: a laboratory based study. *BIRDEM Medical Journal*, 9(3), 202–206. https://doi.org/10.3329/birdem.v9i3.43081
9. Kumar, K. J., Chavan, A., Shushma, K., & Murthy, S. (2017). Comparison of Vitamin D Status Between Urban and Rural South Indian Mothers and Their Newborns. *Journal of Nepal Paediatric Society*, *36*(3), 243–249. https://doi.org/10.3126/jnps.v36i3.15156
10. Bailey, B.A., Manning, T. and Peiris, A.N. (2012), The Impact of Living in Rural and Urban Areas: Vitamin D and Medical Costs in Veterans. *The Journal of Rural Health*, 28: 356-363. https://doi.org/10.1111/j.1748-0361.2012.00407.x
11. Bindayel, I.A. Effect of age and body mass index on vitamin D level in children with asthma in Riyadh. *Sci Rep* **11**, 11522 (2021). https://doi.org/10.1038/s41598-021-91108-3
12. McDonnell, S. L., French, C. B., & Heaney, R. P. (2014). Quantifying the food sources of basal vitamin d input. *The Journal of steroid biochemistry and molecular biology*, *144*, 149-151.
13. Sonbaty MR, Abdul-Ghaffar NU. Vitamin D deficiency in veiled Kuwaiti women. *Eur J Clin Nutr*. 1996;50:315–18.
14. Meddeb N, Sahli H, Chahed M, Abdelmoula J, Feki M, Salah H, et al. Vitamin D deficiency in Tunisia. *Osteoporos Int*. 2005;16:180–3.
15. Guzel R, Kozanoglu E, Guler-Uysal F, Soyupak S, Sarpel T. Vitamin D status and bone mineral density of veiled and unveiled Turkish women. J Womens *Health Gend Based Med*. 2001;10:765–70

## Original Article

# Socio-demographic Profile of the Causes of Death due to Organophosphorus Poisoning - A Retrospective Study

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**Abstract**

***Background:*** *Poisoning is a global issue occurring all over the world involving people of all ages and genders, from all ethnic and economic groups. It is estimated, there are 1 to 5 million cases of Organophosphorus poisoning per year worldwide with approximately 300,000 deaths.*

***Aim of the study:*** *To assess the demographic pattern of death due to organophosphorus poisoning with respect to age, sex, occupation, education, and socioeconomic status.*

***Materials and Methods:*** *A retrospective study was conducted by the Department of Forensic Medicine & Toxicology, Sheikh Hasina Medical College, Tangail, from January 2020 to December 2020.*

***Result and discussion:*** *85 (20.68%) were due to poisoning, out of those poisoning cases 77 (90.58%) were due to organophosphorus compound poisoning. The incidence was higher in females (51.94%) than in males. 90.00% of the victims in our study were married females, and 63.64% of cases were below Secondary education. Among the male deaths 83.78% were from rural areas, and female rural deaths were 82.50%. Housewife (38.9%) were the major victims.*

***Conclusion:*** *Illiteracy, Poverty, Cheap availability of organophosphorus compounds, lack of employment, and stressful lifestyle were the common reasons behind suicidal poisoning. Health education of farmers, other agricultural laborers and young people about the toxic and detrimental effects of organophosphorus compounds will help in preventing suicidal and accidental poisoning to some extent.*

**Key Words:**
Organophosphorus Poisoning

[J Shaheed Suhrawardy Med Coll 2022; 14(1): 62-64]
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## Introduction

Poisoning is defined as the exposure of an individual to a substance that can cause symptoms and signs of organ dysfunction leading to injury or death. Death due to organophosphorus poisoning is an important public health issue. This is a global problem with maximum cases reported from developing countries like Bangladesh. Agricultural Pesticide poisoning is a global problem with at least 250,000-370,000 People getting affected each year[1].

Bangladesh is an agricultural country there is widespread use of pesticides because of their easy availability. Pesticides are now the common method of suicide worldwide[2]. Organophosphorus compound accounts for about 80% of pesticide-related hospital admissions[3]. The case of fatality of organophosphorus poisoning is 5-20% in developing countries in Asia.[4]

According to the World Health Organization (WHO), the incidence of pesticide poisoning is estimated between 1 and 5 million victims with 300,000 lethal cases annually (World Health Organization and Food and Agriculture Organization of the United Nations, 2006). Organophosphates affect the nervous system by disrupting the coenzyme that regulates acetylcholine, a neurotransmitter. Most organophosphates are insecticides as they were developed during the early 19th century, but their effects on insects, which are similar to their effects on humans, were discovered in 1932. Some are very poisonous.

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The objective of the present study was: To investigate the socio-demographic profile of the causes of death due to organophosphorus poisoning examined at autopsy in a tertiary care hospital morgue.

**Materials and Method**

This retrospective autopsy survey was conducted by the Department of Forensic Medicine, Sheikh Hasina Medical College, Tangail from January 2020 to December 2020. All autopsies were performed in the Department. Eighty-five (20.68%) were attributed to lethal intoxication. Among them, seventy-seven (90.58%) were resulted from organophosphate poisoning. The age group was 14 years to 70 years. Male 37 (48.05%) and Female 40 (51.94%), history of poisoning, manner of death, and type of exposure were recorded from autopsy findings in standard formats; meticulous autopsy findings of all the cases were noted. The clinical analysis reports of the viscera were also scrutinized to confirm the diagnosis of organophosphorus poisoning.

This study was approved by the ethics committee of Sheikh Hasina Medical College, Tangail.

**Result**

Between January 2020 to December 2020, 411 autopsies were conducted. During the study period 85 (20.68%) were due to poisoning, out of those poisoning cases 77 (90.58%) were due to organophosphorus compound poisoning. The age group of 14-70 years was most commonly involved. 48.05% of victims were male, while 51.94% were Female (Fig-1)

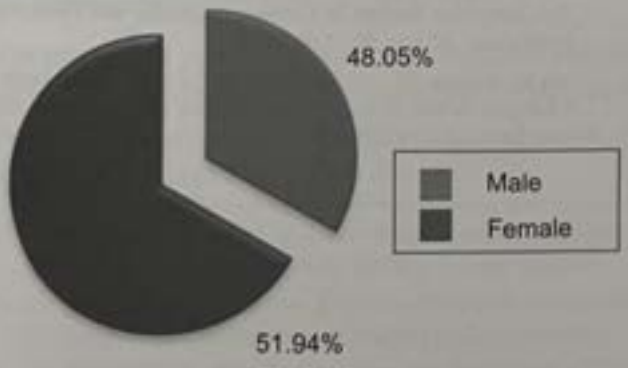


**Fig-1:** *Gender distribution among the victims*

It was found in the present study that organophosphorus poisoning constituted 90.58% of all unnatural deaths (77 out of 85)

As per distribution for age out of 77 organophosphorus poisoning cases (n-77), 37 (48.05%) were male and 40 (51.94%) were female in the age 14-70 yrs.

As per the distribution of marital status, males 89.18% and females 90.00% and according to educational status, out of 77; 49 (63.64%) were below secondary education and 28 (36.36%) had completed secondary school education. Graduates the incidence is less.

As per distribution of occupational status out of 77 organophosphorus poisonings; housewives 30 (38.96%), Unemployed 10 (12.98%), Businessmen 13 (16.88%), students 12 (15.58%) service holders 4 (5.19%); Farmer 8(10.38%).

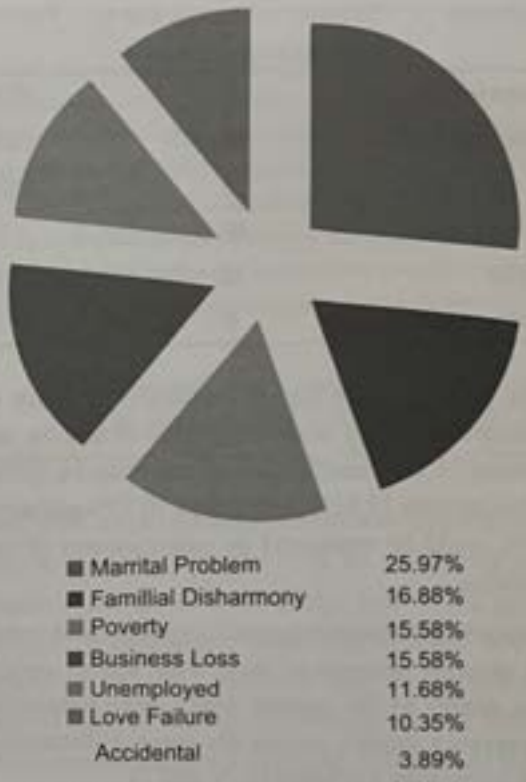


**Fig-2:** *Distribution of causes of death*

As per distribution of causes of death due to organophosphorus poisoning; Marital disharmony 20 (25.97%), Familial dispute 13 (16.88%), poverty 12 (15.58%), Business loss 12 (15.58%), Unemployed 9 (11.68%), Love affairs 8 (10.38%), Accidental 3 (3.89%). (Fig-2)

**Discussions**

In the present investigation of total 411 unnatural deaths autopsied during the study period 85 cases were due to poisoning (20.68%), and out of those poisoning cases 77 were due to organophosphorus amounting to 90.58% of poisoning deaths.

In the present study, organophosphorus poisoning deaths were higher at 51.94% in females than in male deaths 48.05%. Among the male deaths, 83.78% from rural & 16.21% were from urban areas. Among the female deaths, rural deaths were about 82.50% & urban deaths were 17.50%. An increased farming activity like spraying of pesticides contributed to a maximum number of poisoning cases in all areas.

In this study, married male 89.18% and female married were 90.00% deaths due to organophosphorus poisoning.

Illiteracy or less education or below secondary 63.60%. Less availability of immediate treatment may be the cause of such poisoning death.

In this study deaths due to organophosphorus poisoning in occupational distribution.

**Table-I**

| Occupation | Number of deaths due to organophosphorus | Percentage |
|---|---|---|
| Housewife | 30 | 38.96% |
| Unemployment | 10 | 12.98% |
| Business loss | 13 | 16.88% |
| Service holder | 04 | 5.19% |
| Student | 12 | 15.58% |
| Farmer | 8 | 10.38% |

In the present study higher incidence of death due to organophosphorus poisoning was found in marital problems 25.97% and familial disharmony 16.88% group victims, poverty 15.58%, love failure 10.35% and accidental 3.89% could be explained as major causes of suicidal poisoning.

Organophosphorus compounds were the most commonly used poisons because of their wide use in agriculture. Thus, results of the present study were consistent with the previous studies, except for some differences in the kinds of poisons preferred (5, 6, and 7).

The common autopsy findings were cyanosis in the lips, the fingertips and the nose. All the internal organs were congested in 100% of cases.

Dissection revealed congestion of time mucous membrane of the stomach with scattered submucosal petechial hemorrhages.

## Conclusion

Illiteracy, Poverty, Cheap and easy availability of the organophosphorus compounds lack of employment and stressful lifestyle were the common reasons behind suicidal poisoning. Health education of farmers and young people about the toxic detrimental effects of organophosphorus compounds will help prevent suicidal and accidental poisoning to some extent.

This study shows that a large proportion of pesticide poisoning deaths are preventable. Prevention is, on the one side by restricting the availability of pesticides and on the other side by promulgating more vigorous legislation concerning the manufacturing marketing and use of these products.

## References


1. Aggrawal Anil. Essentials of Forensic Medicine & Toxicology. Avichal Publications Company, New Delhi, 2014 pp 129-132.
2. Bertolote IM. Fleischonann A, Butchart A et al. sucide, Sucide atlempts and pesticides: a major hidden public health problem. Bull World Health Organ 2006; 84: 260
3. Eddleston M. Patterns and Problems of deliberate self-poisoning in the developing world. Jmed 2000; 93:715-31
4. Walker BR. College NR, Ralston SH et al. Poisoning: Organophosphorus insecticide and nerve agent. Devidson's principle of medicine. Reed Elsevier India Private limited. 2014; 9:220-22
5. Singh D, Dewan I. Pandey AN, Tyagis S. pecfum of Unnatural fatalities in the Chandigarh zone of north. Westindia - a 25 year autopsy study from a tertiary care hospitals. J Clin Forensic Med 2003; 10: 145-52
6. Singh, Dalbir MD. Jit MS. Tyagi. seema Changing trends in acute poisoning in Chandigarh zone - A 25-year autopsy experience from a tertiary care hospital in northern India. The American Journal of Forensic Medicine and Pathology 1999 June; 20 (2): 203-210.
7. Vij K, Shurma BR. Harish D. Poisoning in Northern India - Changing trends causes and prevention thereof. Med. Sci. Law 2002; 42(3): 251-257.

## Case Report

# Acute Pancreatitis: Association with Primary Hyperparathyroidism: A Case Report

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**Key Words:**
Primary hyperparathyroidism, pancreatitis, scintigraphy, parathyroid surgery

**Abstract**

*Association between primary hyperparathyroidism and acute pancreatitis is very rare. We report a case of a 45-year-old female presented with acute pancreatitis. Primary hyperparathyroidism was diagnosed after that episode of pancreatitis. She had no additional risk factor for pancreatitis. It's been 10 months after her successful parathyroid surgery, there has been no recurrence of abdominal pain and her serum calcium is within normal limits. The purpose of reporting this specific case is that this pathology is uncommon in occurrence and indicates the importance of keeping in mind about all the causes of pancreatitis before declaring it as idiopathic.*

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### Introduction

PHPT is defined as hypercalcemia in the presence of an unsuppressed and therefore relatively, or absolutely, elevated PTH level. Patients are typically identified incidentally with an elevated total calcium or following routine assessment of bone densitometry (DEXA scan). Most patients will, however, have some vague constitutional symptoms, such as fatigue, muscle weakness, depression, or some mild memory impairment on questioning.

The presence of kidney stones remains the most common clinical manifestation of symptomatic PHPT. PHPT may present with pancreatitis, although it is rarely seen in patients with milder forms of the disease.[1]

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Patients with hyperparathyroidism and hypercalcemia present with an increased risk of suffering acute pancreatitis, about 10 times above that of the general population. Nevertheless, pancreatic disease is a rare complication in these patients (approximately 2%). Elevated serum calcium levels associated with different mutations in several genes could be responsible for this predisposition in some patients with hyperparathyroidism. In this respect some studies have been already carried out with the SPINK1 (serine protease inhibitor Kazal type 1), CFTR (cystic fibrosis transmembrane conductance regulator), and CASR (calcium-sensing receptor) genes.[2]

Some patients suffer from 2 or more attacks of pancreatitis before a diagnosis of PHPT is made.[3]

We present a patient who was admitted for acute pancreatitis then diagnosed as having PHPT thereafter.

### Case report

A 45-year-old female was first admitted to a district hospital with severe abdominal pain. There she was treated conservatively. After 2 days when her symptoms didn't subside then she was referred to our institute. She was clinically suspected to have acute pancreatitis. She had elevated serum amylase and serum lipase level. On CT scan of whole abdomen, she had enlarged pancreas with Irregular outline.

**Fig.-1:** *CT scan of whole abdomen showing enlarged pancreas with irregular outline*

As a part of severity scoring of acute pancreatitis, she serum calcium level was advised. It showed calcium- 12.59 mmol /li (raised) (8.5-10.30 ). The serum calcium at the upper limit of normal gave clue that she may have any hypercalcemic disorder. Then serum parathyroid hormone and phosphate level was done which showed PTH1255.9pg/ml (raised) (15-65) , Inorganic phosphate-1.5 mg/dl (low) (2.5-5).

**Ultrasonography of neck** revealed one small hypoechoic area measured about 5 x 4.5 mm in size seen in right lobe of thyroid gland, suggestive of enlarged left sided parathyroid gland (parathyroid adenoma).

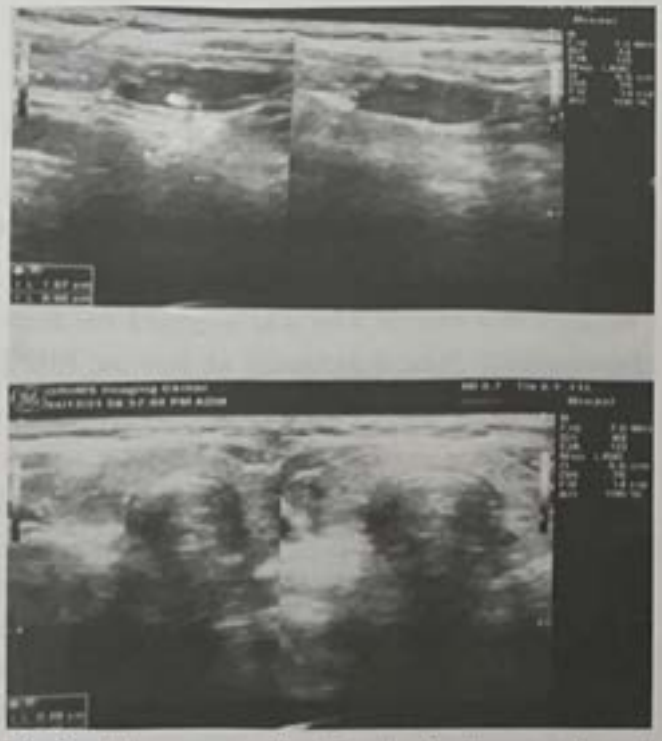

**Fig.-2:** *Ultrasonography of neck showing parathyroid adenoma*

**Parathyroid scintigraphy**

Early static image shows thyroid gland is normal in position, right lobe is mildly enlarged in size. The focal area of increased radiotracer concentration is seen in the lower pole of left lobe with homogenous radiotracer concentration in rest of thyroid gland. Delayed static image shows persistent focal activity in above mentioned site with partial washout of tracer from rest of thyroid gland.

SPECT-CT Image shows, focal area of increased radiotracer concentration in lower pole of left lobe at the level of c6-c7 vertebrae in left paratracheal region impression -scan is positive for parathyroid adenoma/hyperplasia in the left lobe of thyroid gland.

**Fig.-3:** *Parathyroid scintigraphy showing left parathyroid adenoma*

**Fig 4:** *SPECT image of parathyroid gland*

She denied any history of bone pains, bone fractures, neuropsychiatric symptoms, or muscle weakness.

Parathyroid adenoma was removed. Histopathology report showed compatible with parathyroid adenoma.

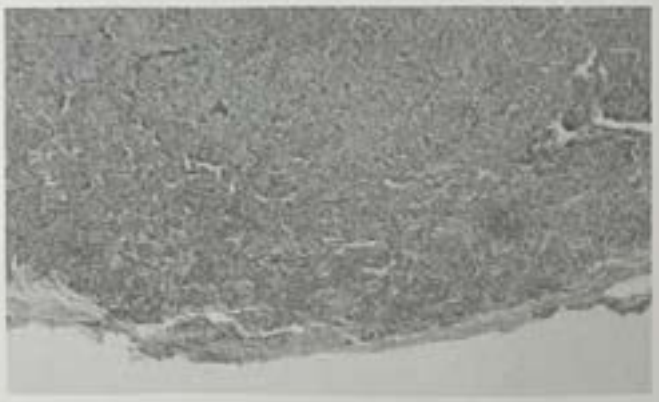

**Fig.-5:** *Section shows parathyroid adenoma, partly covered by capsule (H&E *80)*

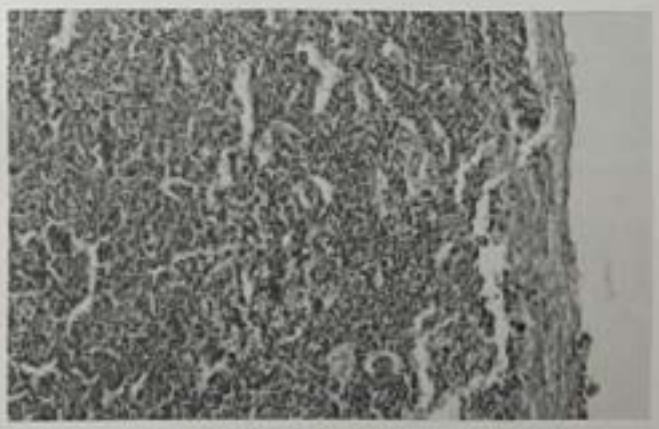

**Fig.-6:** *Parathyroid adenoma H&E*120*

The postoperative period was uneventful. Ten months after successful parathyroid surgery, there has been no recurrence of abdominal pain and his serum calcium is within the normal range. His current biochemical parameters are serum calcium 8.6mg/dL; iPTH 19.7 pg/mL.

## Discussion

The association between pancreatitis and PHPT is controversial. The first report of PHPT associated with pancreatic lithiasis was published in 1947.[4] But several studies have suggested a causal association between pancreatitis and PHPT.[5] The Mayo Clinic experience between 1950 and 1975 found that out of 1153 patients with PHPT, only 17 (1.5%) had coexisting pancreatitis, and alternative explanations for pancreatitis were found for several patients.[6]

Some patients suffer from 2 or more attacks of pancreatitis before a diagnosis of PHPT is made. In a study from India, pancreatitis was associated in 6 of 87 patients (6.8%) with PHPT. Pancreatitis was the presenting symptom in 5 patients. All patients with a past history of pancreatitis had suffered two or more attacks.[7]

There are 2 mechanisms of hypercalcemia-induced pancreatitis. Hypercalcemia can lead to de novo activation of trypsinogen to trypsin, resulting in autodigestion of the pancreas and subsequent pancreatitis. Another explanation is that hypercalcemia leads to the formation of pancreatic calculi, ductal obstruction, and subsequent attacks of acute or chronic pancreatitis.[8]

In our patient serum calcium level was done as a part of assessing severity in her first episode of acute attack. This helped in diagnosis of the cause as well. In a way it prevented further attack also if it were undiagnosed.

## References


1. Short Practice of Surgery Bailey & Love's 27th EDITION
2. https://www.banglajol.info/index.php/FMCJ/article/view/30879/20816
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079873/
4. Martin L, Canseco JD. Pancreatic calculosis. *JAMA*. 1947; 135:1055. [PubMed] [Google Scholar]
5. Jacob JJ, John M, Thomas N, Chacko A, Cherian R, Selvan B, et al. Does Hyperparathyroidism cause pancreatitis.A south Indian experience and a review of published work? *ANZ J Surg*. 2006;76:740–4. [PubMed] [Google Scholar]
6. Bess MA, Edis AJ, van Heerden JA. Hyperparathyroidism and pancreatitis: Chance or a causal association? *JAMA*. 1980;243:246–7. [PubMed] [Google Scholar]
7. Agarwal A, George RK, Gupta SK, Mishra SK. *Indian J Gastroenterol*. 2003;22:224–5. [PubMed] [Google Scholar]
8. Jacob JJ, John M, Thomas N, Chacko A, Cherian R, Selvan B, et al. Does Hyperparathyroidism cause pancreatitis.A south Indian experience and a review of published work? *ANZ J Surg*. 2006;76:740–4. [PubMed] [Google Scholar]
9. https://pubmed.ncbi.nlm.nih.gov/32253728/

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