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Chattagram International Dental College (CIDC) started its historical and memorable journey in the 2013 year. CIDC is the only Private Dental College in Chattogram which is smoothly running under the guidance of Chittagong Medical University.

CIDC is approved by the Government of the Peoples Republic of Bangladesh and is recognised by the Bangladesh Medical and Dental Council (BMDC). CIDC is representing pioneer and exemplary academic and clinical oriented research institute of Bangladesh. About 65 Dental students completed their graduation from CIDC per annum.

Chattagram International Dental College commenced to publish a peer reviewed Journal from 1st January 2018 which is recognized by BMDC and having International Standard Serial Number (ISSN) 2707-2185. The journal intend to publish article of authors from any part of the globe, but has a special interest in publishing research articles of authors from Bangladesh and of relevance to developing countries. It interested in Editorial, Original (Research) articles, Special articles, Review articles, Short Communications, Case report and letters on new findings of Medical Science.

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

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Competing Interests

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

The Impact of E-cigarette on Human Organ

Shahiqul Jabbar^{1*}

E-cigarettes are battery operated devices that contain a cartridge or refillable tank of liquid, when heated, the liquid becomes an inhalable aerosol liquid particles suspended in a vapor. The aerosol often contains nicotine flavorings and other chemicals. Other vapeliqids containing Cannabidiol (CBD) or Tetrahydro-Cannabinol (THC) are also available in certain states or in unregulated cartridges. E-cigarettes do not contain tobacco, nor do they contain the tars and cancer causing chemicals found in traditional cigarettes. While the full health effects of E-cigarettes have not been determined, preliminary research suggests they are much less harmful than traditional cigarettes through not harmless.

Since its invention in the early 2000 s by Hon Lik, the use of E-cigarettes has increased rapidly worldwide, with a high prevalence particularly in the US and UK.^{1,2} Indeed, E-cigarettes have received great attention due to their supposed safety and potential alternative to conventional cigarettes smoking.³ While studies indicate that E-cigarettes deliver lower concentrations of toxic compounds than combustible cigarettes, the associated health risks of E-cigarettes exposure are still a matter of ongoing studies.⁴

The lung is the primary target organ of E-cigarettes exposure and can cause acute and long-term respiratory outcomes.^{5,6} Other effects of E-cigarettes include nausea, vomiting, mouth irritation, headache, impacts on memory and attention, hypertension, inflammation and oxidative stress.⁷⁻¹⁰ The effects of E-cigarettes exposure, especially chronic exposure on human health are not well known yet. Recent reports suggest that E-cigarettes can be useful to reduce or quit smoking, more in particular, traditional heated tobacco. For instance, a recent Cochrane review indicated that E-cigarettes are more useful to quit smoking than traditional Nicotine Replacement Therapies (NRT).¹¹ However, a recent European Respiratory Society task force indicated that the long-term effects of E-cigarettes

are largely unknown, therefore, it is still unclear whether using E-cigarettes is a safer alternative to conventional cigarette and according to current knowledge, its adverse health effects cannot be ruled out.¹²

Bottom line of E-cigarettes

- E-cigarettes have the potential to benefit adults who smoke and who are not pregnant if used as a complete substitute for regular cigarettes and other smoked tobacco products.
- E-cigarettes are not safe for youth, young adults, pregnant adults, as well as adults who do products.
- While E-cigarettes have the potential to benefit some people and harm others, scientists still have a lot to learn about whether E-cigarettes are effective in helping adults quit smoking.
- If it have never smoked or used other tobacco products or E-cigarettes, don't start.

Compared to combustible cigarettes, E-cigarettes cause fewer adverse effects on health. In addition, a wide variation in E-cigarettes products and a lack of standardized testing methods make it challenging to evaluate the existing data. E-cigarettes may be a useful tool for smoking cessation.

Finally the vapping industry is rapidly increasing worldwide, therefore, the standard of the products including ingredients criteria, chemical composition and manufacturing quality need to be developed and monitored by regulatory bodies. Additional research can help understand long-term health effects.

References

1. R. Grana, N. Benowitz, S.A. Glantz. Background paper on e-cigarettes (Electronic nicotine delivery systems). 2013.
2. G.L. Wilson, J. Keenan, S. Grogan, L. Porcellato, S. Powell, I. Gee. An investigation of factors encouraging and deterring EC use: A thematic analysis of accounts from UK adults. *Psychol Health*. 2021; 1-17.
3. J. Huang, R. Kornfield, S.L. Emery. 100 million views of electronic cigarette YouTube videos and counting: Quantification, content evaluation and engagement levels of videos. *J Med Internet Res*.2016; 18. Article e4265.
4. H. McRobbie, A. Phillips, M.L. Goniewicz, K.M. Smith, O. Knight-West, D. Przulj, P. Hajek. Effects of switching to electronic cigarettes with and without concurrent smoking on exposure to nicotine, carbon monoxide, and acrolein. *Cancer Prev Res (Phila Pa)*. 2015;8: 873-878.

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5. A.D. Flouris, M.S. Chorti, K.P. Poulianiti, A.Z. Jamurtas, K. Kostikas, M.N. Tzatzarakis, A. Wallace Hayes, A.M. Tsatsakis, Y. Koutedakis. Acute impact of active and passive electronic cigarette smoking on serum cotinine and lung function. *Inhal Toxicol.* 2013;25:91-101.
6. A. Tzortzi, M. Kapetanstrataki, V. Evangelopoulou, P. Behraki.s A systematic literature review of e-cigarette-related illness and injury: Not just for the respirologist. *Int J Environ Res Public Health.* 2020;17: 2248.
7. J.H. Cho. The association between electronic-cigarette use and self-reported oral symptoms including cracked or broken teeth and tongue and/or inside-cheek pain among adolescents: A cross-sectional study. *Plos One.* 2017;12.
8. J. Gerloff, I.K. Sundar, R. Freter, E.R. Sekera, A.E. Friedman, R. Robinson, T. Pagano, I. Rahman. Inflammatory response and barrier dysfunction by different e-cigarette flavoring chemicals identified by gas chromatography-mass spectrometry in e-liquids and e-vapors on human lung epithelial cells and fibroblasts. *Appl Vitro Toxicol.* 2017; 3 :28-40.
9. R. Goel, E. Durand, N. Trushin, B. Prokopczyk, J. Foulds, R.J. Elias, J.P. Richie. Highly reactive free radicals in electronic cigarette aerosols. *Chem Res Toxicol.* 2015;28: 1675-1677.
10. R. Seiler-Ramadas, I. Sandner, S. Haider, I. Grabovac, T.E. Dorner. Health effects of electronic cigarette. (e-cigarette) use on organ systems and its implications for public health. *Wien Klin Wochenschr.* 2021;133: 1020-1027.
11. J. Hartmann-Boyce, N. Lindson, A.R. Butler, H. McRobbie, C. Bullen, R. Begh, A. Theodoulou, C. Notley, N.A. Rigotti, T. Turner, T.R. Fanshawe, P. Hajek. Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev.* 2022.
12. R. Bals, J. Boyd, S. Esposito, R. Foronjy, P.S. Hiemstra, C.A. Jiménez-Ruiz, P. Katsaounou, A. Lindberg, C. Metz, W. Schober. Electronic cigarettes:A task force report from the European Respiratory Society. *Eur Respir J.* 2019;53.

Pulp Sensibility Test Results in Pulpal Anesthetic Success and Supplementary Needed Individual

Md. Abu Saeed Ibn Harun^{1*} Md. Shahedur Rahman Hera²

Abstract

Background: Pulp sensibility test is performed to help evaluate the condition of pulp. When pain exaggerated, prolonged in pulp sensibility and clinically symptomatic, the pulp is diagnosed as irreversible pulpitis. It is very much difficult to achieved optimal level of anesthesia in irreversible pulpitis. The purpose of this clinical study was to evaluate the pulpal sensibility test results in pulpal anesthetic success and supplementary needed individual.

Materials and methods: This was a prospective observational study. 128 patients with positive pulpal sensibility test were enrolled in this study. The results of pulpal sensibility test were posted into preformed data sheet. All patients were anesthetized with 2% lidocaine 1:80000 adrenaline. The efficacy of local anesthesia was evaluated by repeated sensibility test after patient feel soft tissue numbness. All patients were divided into two groups named successful anesthesia and supplement necessary.

Results: Pulp sensibility in cold test and Electric Pulp Test (EPT) were significantly more ($p=0.008$) in supplement necessary groups (7.01 ± 2.19 and 5.35 ± 1.84) than successful anesthesia (5.79 ± 2.84 & 4.27 ± 2.10). Duration of Pain history, Pain persists after cold test (17 ± 7.4), Response in EPT (5.35 ± 1.84), Response persists in EPT (10.14 ± 6.62), EPT current pass (36.76 ± 15.77) in supplement necessary group were strongly significant difference from anesthesia success group. In success anesthesia group duration of pain, pain persists after cold test, response in EPT, Response persists in EPT, EPT current pass were 13.47 ± 10.45 , 4.27 ± 2.10 , 6.45 ± 5.09 and 28.63 ± 18.59 respectively.

Conclusion: A clear interpretation from this study could be made that increase the intensity and lingering of pulp sensibility test results have been effect on supplementary anesthesia necessary decision.

Key words

Anesthesia; Cold test; Electrical Pulp test; Irreversible pulpitis; Pulp sensibility.

Introduction

Pulp sensibility tests are performed to help evaluate the condition of pulp. Sometimes these tests have been described as vitality tests. Although vitality means the capability to live, grow, or develop, sensibility means the ability to receive feelings.^{1,2} The outcome of the sensibility test is the result of the interaction between the given stimulus and the patient's reaction to it, which is to assess the pulp's sensory response.^{3,4}

Pulp sensibility tests are essentially qualitative sensory manifestations used to extrapolate and estimate the vitality and state of pulp health. Pulpitis is present when there is an exaggerated response that produces pain.⁴ This finding

partly explains the pain associated with pulpitis and how much the pulp reacts to stimulus. On the other hand, local anesthesia acts as a depression of excitation in nerve endings or an inhibition of the conduction process in peripheral nerves.⁵

Local anesthesia is the most commonly used for pain control during restorative and endodontic treatment. Pupal anesthesia can be very difficult, failure during dental treatment has been reported to be roughly 14% (1 in 7 people), 47 to 91% for mandibular teeth.^{6,7} Therefore, clinicians are considering supplementary local anesthesia as an adjunctive procedure to improve painfree restorative and endodontic treatment.

There are lots of causes for failure of anesthesia, like improper delivery, inappropriate type and amount of anesthetic, presence of infection, unusual patient anatomy, patient anxiety, or a combination of any of these factors.⁸ Obtaining anesthesia for teeth with symptoms can be more difficult than for teeth without symptoms. Patients with normal or asymptomatic teeth did not experience pain during endodontic treatment, whereas patients with irreversible pulpitis felt pain 27% of the time.⁹

Supplemental anesthetic procedures may be necessary for adequate pulpal anesthesia during painless restorative and endodontic procedures. It is a vulnerable issue in a tailored-based treatment plan, especially in anesthetic procedures, for those who are candidates for supplement injection. Some researchers found that the cold test could

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be a valuable and accurate method for predicting the potential for pulpal anesthesia.¹⁰ Moreover, pulpal sensibility test results depend on histological pulpal conditions.¹¹ The purpose of this clinical study was to evaluate the results of the pulpal sensibility test in terms of pulpal anesthetic success and supplementary needs.

Materials and methods

The Institutional Review Board (IRB) of Chattagram International Medical College granted ethical approval for this prospective observational study (no. CIMC/IRB/01/21-02). The study included 128 people who visited the Department of Conservative Dentistry and Endodontics, Chattagram International Dental College and Hospital from February 2021 to January 2022 with pulpal pain and a positive pulpal sensibility test. The patient who failed the pulp sensibility test or failed to respond appropriately to trauma within the last six months because they took NSAIDs overnight was not included in the study. In the following procedures, clinical data were gathered from patients using predesigned data sheet. One examiner handled all of the clinical examinations and investigations.

Clinical Pain Intensity: The patient's reported pulpal pain score was assessed using a visual analog scale (Pain intensity, a 0–10 numeric scale taking into account the time period average of the previous 24 hours).

Pulp Sensibility Test (Cold Test): A pre-made data sheet was used to record the duration and severity of pulpal discomfort following cold stimulation of diseased teeth. On a cotton pellet, Endofrost (Coltene, USA) was sprayed before being applied to the midfacial surface of the affected tooth and the opposite healthy tooth. A 0–10 visual analog scale was used to measure the severity of pulpal discomfort, with 0 denoting "no pain at all" and 10 denoting the "worst pain imaginable." Using a digital stopwatch, the length of pulpal discomfort following stimulus removal was measured and patients were explicitly told to indicate when the pain entirely subsided.

Pulp Sensibility Test (Electric Pulse Test): The tooth surface was isolated before the test and dried using cotton rolls. An electrical pulp tester with readouts from 0 to 80 units was used to conduct the electric test. The electrode was treated with toothpaste as a conducting medium. The probe was positioned on the buccal surface's incisal third, and the unit of current was raised. On the first occurrence of a sensation, the patient was instructed to raise his hand. A 0–10 visual analog scale was used to rate the intensity of the palpable sensation right after the removal of the stimulus. A digital timer was used to time how long the pulpal sensation persisted after the stimulus was removed, and patients were told to report when it vanished entirely.

Anesthetic Procedures: Inferior Alveolar Nerve Block (IANB), Mental Nerve Block (MNB) was used for mandibular teeth. For maxillary teeth, the anterior superior alveolar nerve, middle superior alveolar nerve and

posterior superior alveolar nerve were infiltrated using 1.8 ml of 2% lidocaine hydrochloride with 1:80000 adrenaline (Saptodont). Mandibular teeth were anesthetized with Inferior Alveolar nerve or and mental nerve blocks. Using a 27-gauge long needle, the local anesthetic solution was injected gradually over 20 seconds. After five minutes, all patients were initially questioned about the potential for lip numbness in cases of IANB and numbness surrounding the infiltrated area in cases of maxillary teeth. All patients had their local anesthetic effectiveness assessed after 10 to 15 minutes.

The Efficacy of Local Anesthesia: The repeated pulp sensibility test was used to evaluate the effectiveness of local anesthetic on the impacted tooth. According to the effectiveness of local anesthesia, all patients were separated into two groups: those who had successful anesthesia and those who needed replenishment.

Statistical analysis was performed GraphPad Prism 9 version 9.5.1 (528). Unpaired t test between successful anesthesia and supplement necessary groups with setting a p-Value of 0.05 to denote that a difference was statistically significant.

Results

The results of this study showed that 34.38% (n = 44) patients had successful anesthesia and 65.62% (n = 84) patients needed supplement injections (Figure 1). Among those, 52% were female and 48% were male in the anesthetic success group, and 48% were female and 52% were male in the supplement necessary group. (Table I).

The mean age of the anesthetic success group was 32.18 ± 8.11 and the necessary supplement group was 38.83 ± 13.4 , which was a significant difference ($p = 0.0031$, 95% CI = -11.01 to -2.28) from each group (Table I and Figure 2). The mean level of severity of pulpal pain (Table I and Figure 1) was 6.27 ± 1.89 and 6.80 ± 1.68 in the anesthetic success group and the supplement necessary group, respectively. Those were statistically non-significant ($p = 0.107$, 95% CI = -1.176 to 0.116). The days of pain suffering was 41.80 ± 60.13 in supplement necessary group those was strongly significant difference ($p=0.0009$; 95% CI -49.61 to -13.04) from anesthetic success group that was 10.47 ± 15.69 .

The pain score in the cold test was 7.01 ± 2.19 and 5.79 ± 2.84 in the supplement necessary group and anesthesia success, respectively. This was a strongly significant difference from each other ($p = 0.0080$, 95% CI = -2.115 to -0.324). Pain persists after withdrawal of the cold stimulus in the anesthesia success group at 13.47 ± 10.45 sec. and 17 ± 7.4 in the supplement necessary group, which were statistically significant ($p = 0.028$, 95% CI = -6.683 to -3.761). Response to EPT in anesthesia success was 4.27 ± 2.10 and 5.35 ± 1.84 in the supplement necessary group. Response to EPT showed a strongly significant difference ($p = 0.0031$, 95% CI = -1.791 to -0.368) between each group. Response persisted after EPT 6.45 ± 5.09 in the

anesthesia success group and 10.14 ± 6.62 in the supplement necessary group, those were strongly significant differences ($p = 0.0016$, 95% CI = -5.951 to -1.428). EPT current unit was 36.76 ± 15.77 in the supplement necessary group and 28.63 ± 18.59 in the anesthesia success group, with statistically significant differences from each group ($p = 0.01$; 95% CI = -14.311 to -1.948). (Table II and Figure 1).

Table I Description of included patient in study

	Female %	Male %	Age	Pain Score	Pain Duration
Anaesthesia Success 34.38% (n= 44)	52%	48%	32.18 ± 8.11	6.27 ± 1.89	10.47 ± 15.69
Supplement necessary 65.62% (n=84)	48%	52%	38.83 ± 13.4	6.80 ± 1.68	41.80 ± 60.13
p value			$p 0.0031$	$p 0.107$	$p 0.0009$
95% CI			-11.01 to -2.28	-1.176 to 0.116	-49.61 to -13.04

Table II Pulp sensibility test in Anesthetic success and supplement anesthetic individual

	Pain in cold test	Pain Persist after cold test (Second)	Response in EPT	Response Persist in EPT	EPT current pass
Anaesthesia Success 34.38% (n= 44)	5.79 ± 2.84	13.47 ± 10.45	4.27 ± 2.10	6.45 ± 5.09	28.63 ± 18.59
Supplement necessary 65.62% (n=84)	7.01 ± 2.19	17 ± 7.4	5.35 ± 1.84	10.14 ± 6.62	36.76 ± 15.77
p value	$p 0.0080$	$p 0.028$	$p 0.0031$	$p 0.0016$	$p 0.0104$
95% CI	-2.115 to -0.324	-6.683 to -3.761	-1.791 to -0.368	-5.9516 to -1.428	-14.311 to -1.948

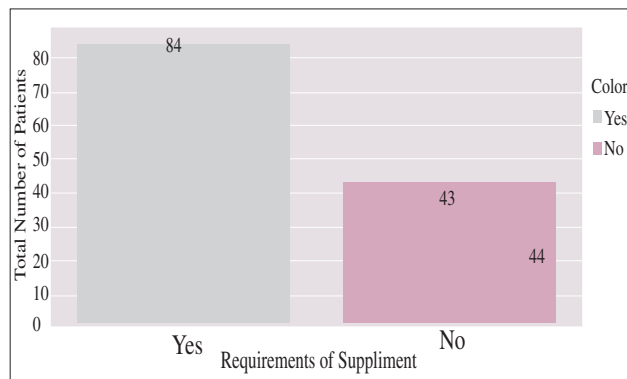


Figure 1 Requirement of Supplementary anesthesia during endodontic treatment

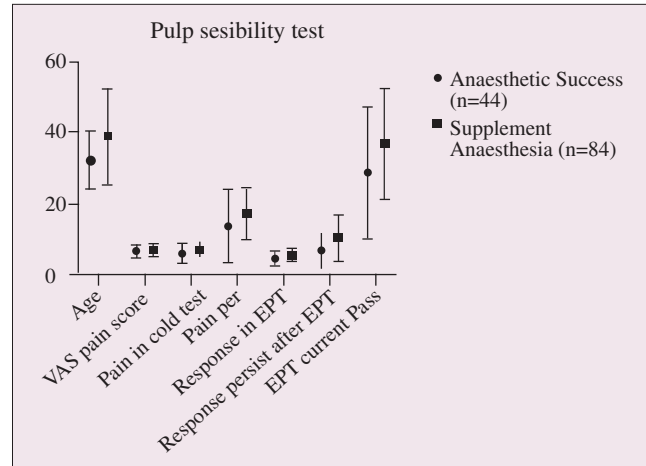


Figure 2 Volcano float showed the distribution of pulp sensibility test results in successful primary anesthesia and supplementary anesthesia cases

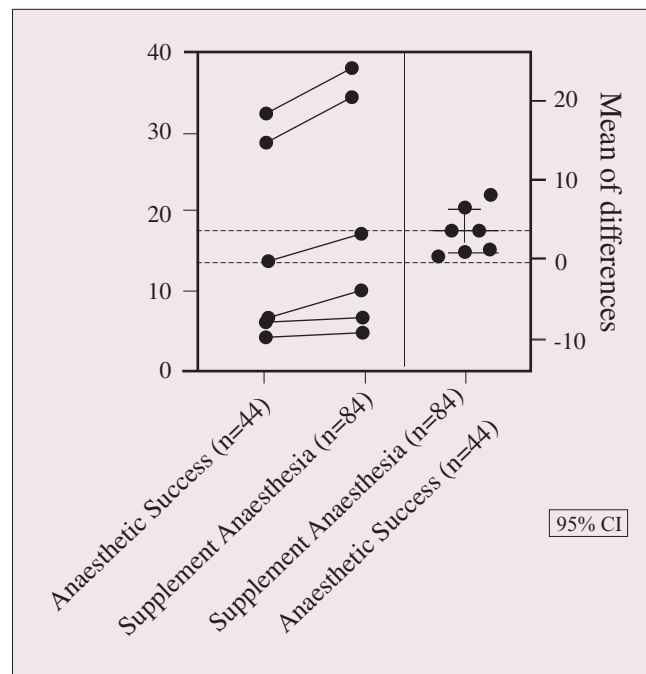


Figure 3 Volcano float showing the mean difference and 95% CI in primary anesthetic success and supplemental anesthesia necessary cases

Discussion

The ability of pain control during restorative and endodontics treatment is the most important desire of patients. Moreover, endodontic treatment often has a compromised reputation because of a perceived association with extreme pain many patients to anxious before and during procedure. 34.38% patients had successful anesthesia; 65.62% patients needed supplement injection in this study. Previous study showed that Inferior Alveolar nerve Block was success in 28% for the first molar, 25% for the second molar and 39% for the premolar.¹² The success of local anesthesia was slightly higher than

previous due to maxillary teeth were also included in this study. It has been more difficult when mandibular teeth were attempted to anesthetize specially in irreversible pulpitis condition.¹³

Irreversible pulpitis is diagnosed by the responses pulp to sensibility test. When pain exaggerated, prolonged in pulp sensibility test and clinically symptomatic, the pulp status is irreversible inflamed.¹⁴ Our results showed Pain score was 6.27 ± 1.89 and 6.80 ± 1.68 in anesthesia success groups and supplement necessary group respectively. Patients were clinically symptomatic in both groups. In cold test, pain score was more in supplement necessary group (7.01 ± 2.19) than anesthetic success group (5.79 ± 2.84) those are strongly significant difference. Pain also persists after cold significantly more in supplement necessary group (17 ± 7.4) than anesthetic success group (13.47 ± 10.45). These results revealed that pulp was irreversibly damaged in both groups. Histological analysis also revealed in another study that persist and severe pain in cold test was correlated with irreversible pulpitis.¹²

In Pulp TRPM8 and TRPA1 are identified thermos responsive TRP channel offers a mechanism by which cold thermal stimulation might directly initiate nerve activity.¹⁵ Recently TRPC5 a cold sensor was markedly increased in inflamed pulp.¹⁶ Vascular expression of TRPV1 in pulp of carious teeth was associated to severity of pain.¹⁷ TRPV1 could be sensitized by inflammatory mediators like cytokines, aggravate the inflammatory response and microglia activation.¹⁸ Central sensitization and mechanical allodynia with pulpal and peri radicular pathosis being associated with age, intensity, and duration of preoperative pain.¹⁹ Local anesthesia was not satisfactory to complete reduction of mechanical allodynia in teeth with irreversible pulpitis.²⁰ In this presented study was also found that the significant differences of age and history of pain duration in between groups.

EPT have been used in pulp sensibility test assesses the sensory nerve fibers in pulp dentinal complex. The results of electric pulp tester are evaluated as either positive or negative. It seems quite straight forward decision in assessment of pulp response electrical stimuli. We evaluate the intensity of response of EPT in pulp by VAS scale and evaluate the lingering of response of EPT's level of stimuli on sensory neuron of pulp. The intensity of EPT responses in supplement necessary group was strongly significant difference from anesthetic success groups also significantly more linger. More electrical stimuli were necessary to stimulate the pulp in supplement necessary group. In early 1933, EPT pulp sensibility tested in 130 teeth and after the test pulp was extirpated and directly examined. Very interesting finding from this classical study was normal pulp in histology responded normally, Inflammatory pulp was responded in low current stimuli, and pathological pulp was responded to high current.²¹

The lower anesthetic success in symptomatic irreversible pulpitis is probably related to the following: lower pain threshold level, lower the excitability threshold of some nociceptors, tetrodotoxin-resistant class of sodium channels resistant to LA.^{22,23} There was significant more pulpal response to cold stimuli and EPT electric stimuli for supplement necessary group in our study.

Cold test and EPT used as a pulp sensibility test in this study. Because Endo Ice used as cold test has been provide more accuracy to exhibited pulpal response. Moreover, EPT has been shown less accuracy than cold test.²⁴ Patient self-reported history of diabetics, preoperative pain, and severity with characteristic of pain were associated with more anesthetic failures.²⁵ Studies specially relating to medical history like diabetics, hypertension and cardiac problem with pulp sensibility test was lacking, providing an opportunity for future investigation.

Conclusion

A clear interpretation from this study could be made that increase the intensity and lingering of pulp sensibility test results have been effect on supplementary anesthesia necessary decision.

Disclosure

The authors declared no competing interest.

Reference

1. Dictionary of cancer terms, "Vitality", in National Cancer Institute Dictionaries. <http://www.cancer.gov/publications/dictionaries/cancer-terms/def/vitality>. (Accessed April 2023.)
2. Dictionary, "Sensibility", in Merriam Webster. <https://www.merriam-webster.com/dictionary/sensibility>.
3. Levin L G. Pulp and Peri radicular testing. *J of Endodontic*. 2013; 39: S13- S19.
4. Eugene Chen and Paul V. Abbott. Dental Pulp Testing: A review. *International Journal of Dentistry*. 2009;12: 365785.
5. Covino BG, Vassallo HG. Local Anesthetic: Mechanisms of action and clinical use. New York: Grune & Stratton.1976.
6. Kaufman E, Weinstein P, Milgrom P. Difficulties in achieving anesthesia. *J Am Dent Assoc*. 1984; 108: 205-207.
7. Malamed S F. Local anesthetics: Dentistry's most important drugs. *J Am Dent Assoc*. 1994; 125: 1571.
8. Grace W. Hasiao-Wu, Srinivas M Susarla and Robert R White. Use of the cold test as a measure of pulpal anesthesia during endodontic therapy: A randomized, blinded, placebo-controlled clinical trial. *J Endod*. 2007; 33(4):406-410.
9. Dreven L J, Reader AL, Beck M, Meyers WJ, Weaver J. An evaluation of an electric pulp tester as a measure of analgesic in human vital teeth. *J Endod*. 1987; 13 (5): 233-238.

10. Mohamed El Sayed, Kamis Gaballah. "Postanesthetic Cold Sensibility test as an indicator for the Efficacy of Inferior Alveolar Nerve Block in Patients with symptomatic Irreversible Pulpitis of mandibular molars."Postanesthetic Cold Sensibility Test as an Indicator for the ...") International Journal of Dentistry. 2021; 2021: 1-11.
<https://doi.org/10.1155/2021/9913221>.
11. Mandana Naseri, Akber Khayat, Sara Zamaheni, Shiva Shojaean. "Correlation between histological status of the pulp and its response to sensibility tests." ("Relationship between the difference in electric pulp test values and ...") Iranian Endodontic Journal. 2017; 12(1):20-24.
Doi: 10.22037/iej.2017.04
12. Sara Fowler, Melissa Drum, Al Reader, and Mike Beck. Anesthetic success of an inferior Alveolar Nerve Block and Supplemental Articaine Buccal Infiltration for Molar and Premolar in Patients with symptomatic irreversible pulpitis. ("Anesthetic Success of an Inferior Alveolar Nerve Block and Supplemental ...") J Endod. 2016; 42(3):390-392.
13. Nelly Badr, Johan Aps. Efficacy of dental local anesthetics: A review. J Dent Anesth Pain Med. 2018;18(6):319-332.
14. Paul V. Abbott. In: Ilan Rotstein and John I Ingle editors. Examination and Diagnosis of pulp, root canal and periapical/ periradicular conditions. 7thedition. Raleigh: North Carolina. 2019;215-267.
15. Lisa T. Alvarada, Griffin M. Perry, Kenneth M. Hargreaves, and Michael A. Henry. "TRPM8 axonal expression is decreased in painful human teeth with irreversible pulpitis and cold hyperalgesia. J Endod.2007; 33(10): 1167-1171.
16. Leura Bernal, Pamela Sotelo-Hitschfeld, Christine König et al. Odontoblast TRPC5 channels signal cold pain in teeth.Sci.Adv. 2021;7: eabf5567.
17. Morgan C R, Rodd H D, Clayton N, Davis J B, and Boissonade F M. Vanilloid receptor 1 expression in human tooth pulp in relation to caries and pain. J Orofacial Pain. 2005; 19: 248-260.
18. Wei-Lin Kong, Yuan- Yuan Peng, Bi-Wen Peng. Modulation of neuroinflammation: Role and therapeutic potential of TRPV1 in the neuro-immuno axis. Brain, Behavior, and Immunity. 2017; 64: 354-366.
19. Ahmed A Alelyani, Pardis S Azar, Asma A. Khan, Vanessa Chrepa, Anibal Diogenes. Quantitative Assessment of mechanical allodynia and central sensitization in endodontic patients. J Endod.2020; 46(12): 1841-1848.
20. Asma A. Khan, Christopher B. Owatz, William G. Schinder, Scott A. Schwartz, Karl Keiser, Kenneth M. Hargreaves. Measurement of mechanical allodynia and local anesthetic efficacy in patients with irreversible pulpitis and acute periradicular periodontitis. J Endod. 2007; 33(7): 796-799.
21. Reiss HL, Furedi A. Significance of the pulp test as revealed in a microscopic study of the pulps of 130 teeth. Dental Cosmos 1933; 75: 272-283.
22. Modaresi J, Dianat O, Soluti A. Effect of pulp inflammation on nerve impulse quality with or without anesthesia. J Endod. 2008;34:438-441.
23. Roy M, Narahshi T. Differential properties of tetrodotoxin-sensitive and tetrodotoxin-resistant sodium channels in rat dorsal root ganglion neurons. J Neurosci. 1992; 12: 2104-2111.
24. James J. Jespersen, John Hellstein, Anne Williamson, William T Johnson. Evaluation of Dental Pulp sensibility test in a clinical setting. J Endod. 2014; 40(3): 351-354.
25. Dustin Weitz, Ronald Ordinola-Zapata, Scott B McClanahan et al. Preoperative factors associated with anesthesia failure for patients undergoing nonsurgical root canal therapy: A national Dental practice Based research network study. J Endod. 2021;47: 1875-1882.
<https://doi.org/10.1016/j.joen.2021>.

Effects of Intermaxillary Fixation on the Nutritional Status of the Patients Sustaining Maxillofacial Fracture

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Abstract

Background: Maxillofacial fractures are usually treated with closed reduction and intermaxillary fixation where the duration varies from two weeks to six weeks. Numerous studies have shown that using intermaxillary fixation as a mode of treatment leads to nutritional deficiency among patients leading to poor wound healing. However, as to the best of our knowledge, no such study has been carried in Bangladesh. The aim of this dissertation was to find out the nutritional status of patients with intermaxillary fixation sustaining maxillofacial fractures.

Materials and methods: This cross sectional observational study involved 33 patients from a tertiary level hospital who underwent intermaxillary fixation for a duration of four weeks. The patients' body weight, body mass index, biceps skin fold thickness, triceps skin fold thickness and serum albumin level were recorded before and after intermaxillary fixation.

Results: The mean age of the patients was 28.82 ± 11.06 years. There was a male predominance compared to females (7.3:1) and majority of the patients were employed (75.8%). The mean difference in weight, body mass index, biceps skin fold thickness and triceps skin fold thickness before and after completing intermaxillary fixation was statistically significant (1.59 ± 1.08 kgs, $p < 0.01$, 0.57 ± 0.38 kg/m², $p = 0.02$, 0.26 ± 0.47 mm, $p = 0.02$; 0.65 ± 0.61 mm, $p < 0.001$). However, the mean difference in serum albumin before and after treatment was not statistically significant ($p = 0.285$).

Conclusion: The results of our study concludes that the nutritional status of a patient is impaired after intermaxillary fixation. So patients must be supplemented with nutrients during their treatment period.

Key words

BSFT; Intermaxillary fixation; Maxillofacial fracture; S.Albumin; TSFT.

Introduction

Maxillofacial fractures occurs commonly from accidents particularly motor vehicle accidents with other causes such as interpersonal violence, fall from height, animal bites and sports accidents.^{1,2,3} Commonly involved age group is young adults aged 0 to 10 years, males comprise of majority of the patient population and mandible fracture is most common site as reported in different studies.⁴

These injuries can be treated in two ways-one of them is Open Reduction and Internal Fixation (ORIF) where the fractured parts are opened by surgical incision and then reduced and fixed by different means like plates, screws and wires; another option is closed reduction with the use of Maxillo-Mandibular Fixation (MMF) or Intermaxillary Fixation (IMF), where the fractured segments are immobilized adjacent to each other and this procedure results in the reunion of the separated segments.^{5,6} Despite the fact that IMF may result in some complications like malunion, non-union, malnutrition and periodontal inflammation, it is the most widely used technique when indicated, 6 specially in settings where health care facility is limited in respect to population burden. Duration of IMF depends on the type and location of the fracture, health condition of the patient and some other factors, but it usually spans from two to six weeks.^{7,8} IMF hampers normal nutritional intake of the patients in the early post-operative period leading to water, protein and fat loss.^{9,10} Nutritional status and healing process of the body have close relation, which have been found in many studies.^{9,11-14} Some of them rationalizes the idea that IMF could possibly effect the healing process, which would lead to impaired bone repair and ultimately to a deteriorated functional recovery. Some studies have demonstrated how IMF reduces body weight and other indexes like BMI.^{10,15,16} Malnutrition is associated with different signs and symptoms like losing more than 10% of body weight, neurologic changes, changes in skin, volume change of subcutaneous fat, hair loss, reduction of serum proteins and lipid factors, loss of muscle mass, etc.^{17,18} Because

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nutritional habits are different in every region and society, it is necessary to evaluate the effects of IMF on people in each region to find the best way to face it .

Considering this background, this study is designed to explore how IMF effects on the various anthropometric measurements which are markers for malnutrition.

Closed reduction and Intermaxillary fixation is an established treatment for jaw fracture patients. However, its effect on the nutritional status of patients has not been clearly established. To the best of our knowledge, there is no such study done in our country that examined the effects of IMF on anthropometric measurements which are the markers of malnutrition. This approach would help maxillofacial surgeons in their clinical decision making process whether to manage a jaw fracture by closed reduction or open reduction based on the patients existing health status. Also a better nutritional supplement can be planned from the results of this study. The results of this study could be used in future as a reference to show the patients the possible general health outcome after IMF.

Materials and methods

This was a cross sectional observational study held in the Department of Oral & Maxillofacial Surgery, Dental Unit of Chittagong Medical College Hospital, Chattogram, from June 2021 to November 2021. The research protocol gained ethical clearance from the ethical review board of Chittagong Medical College and the completed research was accepted by BCPS.

Thirty-three (33) patients were taken as samples, from the indoor and Outpatient Department, who were presented with simple, non-displaced mandibular condyle, symphysis, para-symphysis, and body fracture, and chose closed reduction and IMF as treatment options. Exclusion criteria were -Patients with uncontrolled diabetes and other immunosuppressive status, Pre-existing bowel diseases (e.g. Chron's diseases, IBS, etc.) malabsorption syndrome, Patients undergoing ORIF with short periods of IMF and refusal from patients or their legal relatives to participate.

The patient's demographic data were recorded along with the pre-IMF BMI, Triceps Skin Fold Thickness (TSFT) Biceps Skin Fold Thickness (BSFT) and Serum Albumin (SA) level. BMI was calculated by dividing patients' weight in kilograms, which were taken by a standard weight machine, by the square of measured height in meters. A skinfold thickness caliper was used for measuring BSFT and TSFT. Serum Albumin (SA) level tests were done from renowned biochemical laboratories.

Erich arch bars were fixed in the jaws of those patients followed by IMF which were done by latex elastic bands. Patients were provided with a standard nutrition chart and feeding and cleaning instructions.

After four weeks of IMF, the patient's weight, BSFT, TSFT and serum albumin were measured again. A standardized structured data collection sheet was used to collect

necessary information on the study subject. Data were screened and checked for any missing values and discrepancies. Data were analyzed using Statistical Package for Social Sciences version 23 software. Continuous variables were statistically described in terms of mean and standard deviations (\pm SD). Paired t-tests were done to compare the changes in the variable.

The result was considered significant if the p-value was ≤ 0.05 .

Results

The mean age of the patients was 28.82 ± 11.06 years. There was a male predominance compared to females (7.3:1) and majority of the patients were employed (75.8%). Most of the patient's (84.8%) pre-treatment BMI falls in the normal range. The mean difference in weight, body mass index, biceps skin fold thickness and triceps skin fold thickness before and after completing intermaxillary fixation was statistically significant (1.59 ± 1.08 kgs, $p < 0.01$, 0.57 ± 0.38 kg/m², $p = 0.02$, 0.26 ± 0.47 mm, $p = 0.02$, 0.65 ± 0.61 mm, $p < 0.001$). However, the mean difference in serum albumin before and after treatment was not statistically significant ($p = 0.285$).

Table I Pre and post IMF differences of BMI, Weight, BSFT, TSFT, Serum Albumin, their mean difference with SD and p-value.

Pre-IMF and post-IMF Difference in variables	Mean difference \pm SD	p value
BMI	0.57 ± 0.38	<0.01
Weight	1.59 ± 1.08	<0.001
BSFT	0.26 ± 0.47	0.002
TSFT	0.65 ± 0.62	<0.001
S. Albumin	0.03 ± 0.31	0.29

Discussion

Maxillomandibular fractures, if simple and non-displaced, could be treated with intermaxillary fixation in clinical settings. Despite some common complications, they are cost-effective and easy to use among patients in low-resourced healthcare facilities. The duration of their treatment depends on the type of injury and may range from two to six weeks.

The mean age of the present study group was 28.82 ± 11.06 years, with a minimum age of 13 years and a maximum age of 60 years. The majority of the patients were between the 20 to 39 age range (60%). The male predominance was greater as evidenced by the male: female ratio of 7.3: 1. Most of the patients were employed (75.8%), with eight patients being unemployed (24.2%). Findings are in accordance with a study of Yazdani, where the authors reported a mean age of 28 years among 60 patients, with a larger number of males (36) compared to females (24).¹⁶ Similarly, the study conducted by Yamamoto, examined 40 patients whose mean age was 25 years. These findings of the previous studies are similar to the present study.¹⁹

In the present study, majority of the patients' body mass index prior to intermaxillary fixation was in the normal range (84.8%). Three people fell in the underweight range (9.1%) and two of them were in the overweight category (6.1%). The mean BMI was 21.56 ± 2.61 . After four weeks of intermaxillary fixation, the number of people in the underweight category increased to six (18.2%), while the patients in the overweight category remained constant. The mean decreased to 20.99 ± 2.63 . The difference in mean of BMI is 0.57 which is statistically significant ($p < 0.001$). Yazdani also reported similar findings, where they observed a significant reduction in the mean BMI of 0.58 which was statistically significant ($p=0.0341$).¹⁶ Comparably, another study found significant decrease in BMI among their patients after six weeks of IMF treatment ($p<0.01$).²⁰

In the present study, the mean difference in weight before and after IMF was 1.59 ± 1.08 kgs which was statistically significant ($p < 0.01$). The patients lost a significant amount of weight after they were given IMF. Similar findings have been reported in published literature. Yamamoto found that their patients lost significant weight after two weeks of surgery (3.9%).¹⁹ Worrall reported significant weight reduction (4.5 kgs) in the IMF group six weeks post-operative.¹⁰ Also, Cawood in his case series of 100 patients found that the non-IMF group lost less weight (Mean 3 kgs) compared to the IMF group (mean 5 kgs) and regained the lost weight more quickly within four weeks.²¹ Yazdani also reported a significant weight loss of about 2.64 kgs among the participants ($p 0.025$).¹⁶ Hinoi in his study of 59 patients found significant weight loss among both group of patients treated surgically and conservatively.²²

In the present study, the mean difference in Biceps Skin Fold (BSF) thickness and Triceps Skin Fold (TSF) thickness was 0.26 ± 0.47 mm and 0.65 ± 0.61 mm respectively. These differences were statistically significant with a $p = 0.02$ for BSF and $p < 0.01$ for TSF thickness. Previous studies that measured the same clinical outcomes described similar findings. Yazdani found an average BSF decrease of 0.54 mm which was statistically significant ($p = 0.009$).¹⁶ Also, a significant reduction in TSF of 0.7mm was also stated ($p = 0.011$). Another study of 32 patients reported statistically significant decrease in the mean thickness of BSF and TSF ($p < 0.01$).²³ In a study conducted by Worrall the results shows similar patterns of significant reduction.¹⁰

In the present study, the mean reduction of serum albumin pre and post IMF was 0.03 ± 0.31 g/dL, which was not statistically significant ($p=0.285$). This result is in contradiction to previous published studies as most of them showed significant reductions. Studies revealed statistically significant decrease in serum albumin levels after IMF treatment.^{22,23} The difference in results could be due to heterogenous patient populations and treatment regimens, as well as varying methods of analysing data statistically.

Limitation

The present study has the following limitations. These should be kept in mind while deciding on the implications of the findings of the study.

- The sample size was relatively small.
- It was a single-center study.

Conclusion

The results of our study conclude that intermaxillary fixation for a prolonged period could cause weight loss owing to muscle and fat loss, despite following a standard nutritional chart. Adding nutritional supplements may lessen the effects.

Recommendation

Additional rigorously conducted prospective randomized trials with large sample sizes, full reporting of outcomes and double blinding of assessors are required. Increased transparency is needed if the sample cohort of patients is reported in different studies and avoidance of multiple publications is strongly recommended. Also, multiple centers could be included in further studies.

Disclosure

All the authors declared no competing interest.

References

1. Shahim FN, Cameron P, McNeil JJ. Maxillofacial trauma in major trauma patients. *Australian Dental Journal*. 2006 Sep;51(3):225-230.
2. Yazdani J, Talesh KT, Motamedi MH, Khorshidi R, Fekri S, Hajmohammadi S. Mandibular angle fractures: Comparison of one miniplate vs. two miniplates. *Trauma monthly*. 2013;18(1):17.
3. Samieirad S, Aboutorabzade MR, Tohidi E, Shaban B, Khalife H, Hashemipour MA, Salami HR. Maxillofacial fracture epidemiology and treatment plans in the Northeast of Iran: A retrospective study. *Medicina oral, patologia oral y cirugiabucal*. 2017;22(5):e616.
4. Erol B, Tanrikulu R, Görgün B. Maxillofacial fractures. Analysis of demographic distribution and treatment in 2901 patients (25-year experience). *Journal of Cranio-Maxillofacial Surgery*. 2004;32(5):308-313.
5. Andreasen JO, Storgård Jensen S, Kofod T, Schwartz O, Hillerup S. Open or closed repositioning of mandibular fractures: Is there a difference in healing outcome? A systematic review. *Dental Traumatology*. 2008 Feb;24(1):17-21.
6. Marciani RD, Haley JV, Kohn MW. Patient compliance: A factor in facial trauma repair. *Oral surgery, oral medicine, oral pathology*. 1990;70(4):428-430.
7. Cohen SR, Leonard DK, Markowitz BL, Manson PN. Acrylic splints for dental alignment in complex facial injuries. *Annals of plastic surgery*. 1993;31(5):406-412.

8. Eckelt U, Schneider M, Erasmus F, Gerlach KL, Kuhlisch E, Loukota R, Rasse M, Schubert J, Terheyden H. Open versus closed treatment of fractures of the mandibular condylar process—A prospective randomized multi-centre study. *Journal of Cranio-Maxillofacial Surgery*. 2006 Jul 1;34(5):306-314.
9. Marsh DR, Li G. The biology of fracture healing: Optimising outcome. *British medical bulletin*. 1999;55(4):856-869.
10. Worrall SF. Changes in weight and body composition after orthognathic surgery and jaw fractures: A comparison of miniplates and intermaxillary fixation. *British Journal of Oral and Maxillofacial Surgery*. 1994;32(5):289-292.
11. Ondrey FG, Hom DB. Effects of nutrition on wound healing. *Otolaryngology—Head and Neck Surgery*. 1994;110(6):557-559.
12. Temple WJ, Voitek AJ, Snelling CF, Crispin JS. Effect of nutrition, diet and suture material on long term wound healing. *Annals of Surgery*. 1975;182(2):93.
13. Guo CB, Ma DQ, Zhang KH, Hu XH. Relation between nutritional state and postoperative complications in patients with oral and maxillofacial malignancy. *British Journal of Oral and Maxillofacial Surgery*. 2007;45(6):467-470.
14. Arinzon Z, Peisakh A, Berner YN. Evaluation of the benefits of enteral nutrition in long-term care elderly patients. *Journal of the American Medical Directors Association*. 2008;9(9):657-662.
15. Harju E, Pernu H. Weight changes after jaw fixation due to sagittal split ramus osteotomy for correction of prognathous. *Resuscitation*. 1984;12(3):187-191.
16. Yazdani J, Hajizadeh S, Ghavimi MA, Gargari BP, Nourizadeh A, Kananizadeh Y. Evaluation of changes in anthropometric indexes due to intermaxillary fixation following facial fractures. *Journal of dental research, dental clinics, dental prospects*. 2016;10(4):247.
17. Shephard BC, Townsend GC, Goss AN. The oral effects of prolonged intermaxillary fixation by interdental eyelet wiring. *International journal of oral surgery*. 1982;11(5):292-298.
18. Grant JP, Custer PB, Thurlow J. Current techniques of nutritional assessment. *Surgical Clinics of North America*. 1981;61(3):437-463.
19. Yamamoto K, Matsusue Y, Horita S, Murakami K, Sugiura T, Kirita T. Maxillofacial fractures associated with interpersonal violence. *Journal of Craniofacial Surgery*. 2019;30(4):e312-315.
20. Christensen BJ, Chapple AG, King BJ. How much weight loss can be expected after treating mandibular fractures?. *Journal of Oral and Maxillofacial Surgery*. 2019;77(4):777-782.
21. Cawood JJ. Small plate osteosynthesis of mandibular fractures. *British Journal of Oral and Maxillofacial Surgery*. 1985;23(2):77-91.
22. Hino S, Yamada M, Iijima Y, Ohmuro M, Araki R, Kaneko T, Odaka A, Iizuka T, Horie N. Change of body composition, physical strength, and nutritional status of patients with mandibular fractures. *Journal of Cranio-Maxillofacial Surgery*. 2021;49(4):292-297.
23. Sheet W, Hassouni MK. Changes in body weight, serum (Sodium, Potassium) and serum albumin after intermaxillary fixation in traumatized and obese patients (Comparative Study). *Al-Rafidain Dental Journal*. 2012;12(1):52-56.

The Prevalence of Musculoskeletal Pain among Garments Workers in Dhaka City, Bangladesh

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Abstract

Background: Ready-made garments have achieved the massive national and international currency by exporting their garments product over the past three decades in Bangladesh. These increase the work load among the garments workers which may enhance the sufferings of the people by the musculoskeletal pain. To explore the prevalence of musculoskeletal pain among garments workers.

Materials and methods: The descriptive type of cross sectional study was conducted among the garments workers in the selected garments of the Dhaka city with a sample of 336. Study periods were 12 months duration from January to December 2019 and purposive sampling were used to collect the data.

Results: The study revealed that 65.8% of the respondents age group was (18-27) years old with the mean age 25.64 ± 5.410 years. 52.70% of the respondents were male and rest of them were female. 97.3% of the participants were lower middle class and only 2.7% of the participants were upper middle class where mean income was 10221.10 ± 3583.124 BDT. 33.6% of the respondents were suffering musculoskeletal pain where neck pain was 15%, back pain was 6%, waist pain was 26.5%, knee pain was 16%, ankle pain was 22%, toes pain was 4%, shoulder pain was 4.5%, elbow pain was 2%, wrist pain was 3.5% and fingers pain was 0.5%. The current study reveals that there was statistically significant ($p < 0.031$) relationship between working hours and having musculoskeletal pain.

Conclusion: A very good number of garments workers reported MS pain most often wrist, ankle and neck in their working times.

Key words

Musculoskeletal pain; Prevalence; Garments workers.

Introduction

Musculoskeletal pain is the most prevalent occupational illness in both developed and developing nations. Workers in both industrialized and developing nations have been known to experience musculoskeletal disorders as a major health issue.¹ Small-scale industry growth is a major focus in developing nations. WHO estimates that over a billion people work in small-scale industries globally.² Among industrial employees, musculoskeletal pain is the most prevalent musculoskeletal disorder. In the majority of the industrialized world, it is the main factor limiting activity,

contributing to work absences and lost output and endangering function. Mental illness has a negative impact on one's quality of life and causes significant direct and indirect expenses to the health, social, and economic systems.³ Major psychosocial factors associated with MS pain include employment dissatisfaction, workplace stress, and time constraints. The most expensive type of work disability is caused by musculoskeletal disorders, which also significantly worsen the physical, mental, and social well-being and productivity of the industrial work force.⁴ The nature of the work activities, the amount, length, and frequency of workloads, as well as psychosocial factors, may all have an impact on work-related musculoskeletal disorders.⁵ Although Bangladesh's garment industries have only recently been developed, they have quickly emerged as one of the nation's most important and profitable industries. The majority of the workforce in the apparel industry is female. Over 90% of the workforce in these fields was female. Musculoskeletal disorders are linked to physically demanding labor, awkward postures, and repetitive tasks in Bangladeshi garment factories.⁶ Low Back pain is mostly common musculoskeletal pain among industrial employees. Musculoskeletal pain is a leading factor in activity restriction and has a negative impact on the economy that have significant direct and indirect impacts on the physical, social, and economic systems.⁷ To explore the prevalence of musculoskeletal pain among garments workers.

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Materials and methods

It was a descriptive cross sectional study conducted among the garments workers at Afiya Knitwear Ltd, Durgapur, Ashulia, Savar Dhaka, Bangladesh. Study period were 12 month duration from January to December 2019. Total 336 garments workers both male and female were selected for the study. A pretested, Semi-structured questionnaire was used to collect the data. Purposive sampling technique was used and data were collected through face to face interview. The questionnaire was developed to obtain information on the respondents about the following factors like socio demographic information and work related information and musculoskeletal pain related information. Socio-economic status of Bangladesh was classified by world bank 2011 that classified as lower class (≤ 5360), lower middle class (5361-21270), upper middle class (21271-65761) and upper class (≥ 65762). The required information was collected from the respondents after obtaining their due consent. Data were summarized by using the descriptive statistics of mean, standard deviation and percentages. Pearson's Chi-square analysis was used to determine the association between musculoskeletal pain and age and Working hours of the respondents. The significant level was set at 0.05. The data analyses were carried out by using statistical Package for Social Science (SPSS 26 version). Before conduct the study, necessary permission was obtained from the said garments.

Results

The Table I reveals that the mean ages of the respondents were 25.64 ± 5.410 years, where 65.8% of the respondents were between (18-27) years, (31.0%) were between (28-36) years, only 3.3% were the above 36 years.

Table I Distribution of respondents by socio demographic characteristic (n=336)

Variables	Number (n)	Percent (%)
Age (In Years)		
18-27 years	221	65.8
28-36 years	104	31.0
>36 years	11	3.3
Mean Age's		25.64 ± 5.410
Sex		
Male	176	52.40
Female	159	47.60
Marital status		
Married	243	72.3
Unmarried	90	26.8
Separation	2	0.6
Divorced	1	0.3
BMI		
Under weight (<18.5)	42	12.5
Healthy weight (18.5-24.9)	257	76.5
Over weight (25-29.9)	30	8.9
Obese (>29.9)	7	2.1

Variables	Number (n)	Percent (%)
Mean BMI		22.304 ± 11.3305
Family members		
1-4	244	72.6
5-8	88	26.2
>8	4	1.2
Educational level		
Graduation	26	7.7
HSC	58	17.3
SSC	47	14
JSC	101	31.1
PSC	104	31
Monthly income		
5360 Taka (Lower Class)	0	0
5361-21270 Taka (Lower Middle Class)	327	97.3
21271-65761 Taka (Upper Middle Class)	9	2.7
65762 Taka (Upper class)	0	0
Mean Monthly income		10221.10 ± 3583.124

The Table I also shows that 52.40% garments workers were male and 47.60% were female in which 72.3% were married, 26.8% were unmarried, 0.6% of the respondents were separated and rest of the 0.3% were divorced. 76.5% of the respondents BMI were Healthy weight (18.5-24.9) where mean BMI was 22.304 ± 11.3305 . That Table shows that most of the respondents (72.6%) had family member 1-4 followed by 26.2% had family member 5-8 and only 1.2% had family member >9 garments worker respectively. Regarding educational level of the respondents, most of them (31%) were completed primary level (PSC) followed by 31% in JSC pass, 14% in SSC pass, 17.3% in HSC pass and 7.7% in Bachelor. 97.3% of the participants were lower middle class and only 2.7% of the participants were upper middle class where mean income was 10221.10 ± 3583.124 BDT.

Table II Distribution of respondents based on work related factors (n=336)

Variables	Number (n)	Percent (%)
Regular working hours		
8-10	283	84.2
11-13	48	14.3
14-16	5	1.5
Mean		8.68 ± 1.520
Sitting position at work (Hours)		
0-5	154	45.8
6-10	176	52.4
11-15	6	1.8
Mean		4.93 ± 3.645

Variables	Number (n)	Percent (%)
Standing position at work (Hours)		
0-4	181	53.9
5-8	135	40.2
9-12	19	5.7
>12	1	0.3
Mean	3.76±3.902	
Heavy weight lifting		
Yes	8	2.4
No	328	97.6
Transportation process		
Auto bike	2	0.6%
Office bus	16	4.8%
Local bus	22	6.5%
Rickshaw	3	0.9%
By walking	293	87.2%

Table II shows that 84.2% of the respondent's working hours were (8-10) hours, 14.3% were (11-13) hours and 1.5% were (14-16) hours where mean working hours was 8.68 ± 1.520 . 45.8% of the respondent's sitting position at work were (0-5) hours, 52.4% were (6-10) hours and 1.8% were (11-15) hours where mean sitting position at work was 4.93 ± 3.645 . 53.9% of the respondent's standing position at work were (0-4) hours, 40.2% were (5-8) hours, 5.7% were (9-12) hours and 0.3% were >12 hours where mean standing position at work was 3.76 ± 3.902 . Table shows that only 2.4% of the respondents were carried heavy weight and 97.6% were not carried heavy weight. Table shows that 87.2% of the respondents were going to their work place by walking, 0.9% by rickshaw, 6.5% by local bus, 4.8% by office bus and only 0.6% by auto bike.

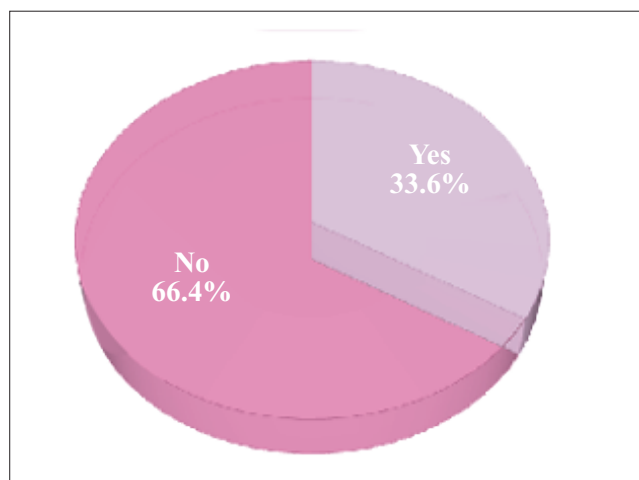


Figure 1 Distribution of respondents by prevalence of musculoskeletal pain (n=336)

The current study found, the prevalence of musculoskeletal pain among garments workers was 33.6% as shown in Figure 1.

Table III Distribution of respondents by involving body part of musculoskeletal pain (n=113) multiple response

Variables	Number (n)	Percent (%)
	Body Parts	
Neck	31	15.0%
Back	12	5.8%
Worse	54	26.2%
Knee	31	15%
Ankle	47	22.8%
Shoulder	7	3.4%
Elbow	12	5.8%
Wrist	4	1.9%
Finger	7	3.4%
Toes	1	0.5%

Table III shows that mostly affected body part by musculoskeletal pain among garments workers was worse pain (26.5%) including other affected areas were neck (15%), back (6%), knee (16%), ankle (22%), toes (4%), shoulders (4.5%), elbows (2%), wrists (3.5%) and fingers (0.5%).

Table IV Distribution of respondents by involving nature of musculoskeletal pain (n=113)

Variables	Number (n)	Percent (%)
Types of pain (Continuous/Intermittent)		
Continuous pain	2	1.76
Intermittent pain	111	98.24
Types of pain (Radiating/Not)		
Radiating Pain	35	30.98
Upper limb up to elbow	1	0.89
Upper limb below elbow	4	3.54
Lower limb up to knee	11	9.74
Lower limb below to knee	19	16.82
No referred pain / Local pain	78	69.02
Severity of pain		
No pain	1	0.9
Mild pain	86	76.1
Moderate pain	24	21.2
Severe pain	2	1.8
Very Severe Pain	0	0
Worse Pain possible	0	0

Table IV illustrates that only 2 respondent's pains were continuous among 113 respondents and radiating pain were 30.98% and Non-radiating pain 69.02%. 76.1% of the respondents were suffering mild pain among those having musculoskeletal pain (n=113), 0.9% were no pain, 21.2% were moderate pain and 1.8% were severe pain at working place.

Table V Association between working hours of participants and musculoskeletal pain

Working hours	Musculoskeletal pain		Total	Chi-test	
	Yes (%)	No (%)		Chi- value	p -value
8-10 hours	88 (31.10%)	195 (68.90%)	283 (100%)	5.575	0.031
11-13 hours	22 (45.84%)	26 (54.16%)	48 (100%)		
14-16 hours	3 (60%)	2 (40%)	5 (100%)		
Total	113	223	336		

A chi-Square test for independence with $\alpha=0.5$ was used to assess whether working hours related to having musculoskeletal pain. The Chi-Square test was statistically significant ($p<0.031$) that indicate relationship between working hours and having musculoskeletal pain.

Discussion

The principal purpose of the study is to explore the prevalence of the study is to explore the prevalence of musculoskeletal pain among garments workers. The current study found a moderate prevalence that was 33.6% of MSK pain where worse (Back) and ankle were the most common site of musculoskeletal pain was reported by the participants. This finding is not similar to the following survey, this survey shows that the prevalence of MSK is 61.71% and the commonly affected body parts are shoulder, lower back, neck and knee.⁸

It was revealed that the mean age of the respondents was 25.64 ± 5.410 years where 65.8% of the respondent's age group was between (18-27) years. Other study in India shows that 68% of the respondents belonged to 25-35 years of age group.⁹ The current study found that 52.40% garments workers were male where a massive number of respondents (72.3%) were married. Another study of Bangladesh revealed that 45.8% of the respondents were male and 54.1% were female where 60.8% of the respondents were unmarried.¹⁰ Regarding BMI of the respondents, 76.5% of the respondents BMI were healthy weight/normal (18.5-24.9) where mean BMI was 22.304 ± 11.3305 . Similar type of study conducted in Cambodia, found that 63.4% of the respondent's BMI are normal whereas the mean Body Mass Index 20.9 ± 2.88 .¹¹ Concerning family members of the respondents, 72.6% of the respondents had 1-4 members in their family. Nearly similar type of study conducted in Tamil Nadu in the year of 2016 & found that 78.9% belonged to a nuclear family.¹² According to educational level of the respondents, most of respondents were completed PSC and JSC. In case of the level of education, Average schooling age was 6.84 years and the survey showed that massive number of worker's education level was low for these reason, their working efficiency and capacity were also low.¹³ As regards the monthly family income of the participant's, the current study found that massive numbers of the participants (97.3%) were lower middle class and

only 2.7% of the participants were upper middle class where mean income was 10221.10 ± 3583.124 BDT. This finding nearly similar to the following study, these study shows that majority (88.0%) of the respondents have monthly income above 5000.00 taka whereas the mean monthly income was 7206 ± 2104 taka.¹⁴

In respect of working hours of the respondents, 84.2% of the respondent's working hours were (8-10) hours where mean working hours was 8.68 ± 1.520 . About half of the respondent's sitting positions at work were (6-10) hours where mean sitting position at work was 4.93 ± 3.645 . 53.9% of the respondent's standing position at work were (0-4) hours where mean standing position at work was 3.76 ± 3.902 . The study is no similar to the following study that showed One-fourth of the respondent's total working hours was regular working hours (8 hours) and Three-fourth of the respondents worked for expended hours (>8 hours).¹⁵ The current study reveals that there was statistically significant ($p<0.031$) relationship between working hours and having musculoskeletal pain. These findings are nearly similar to the following study showed that participants with extended working hours were significantly more likely to report an MSD in the previous month ($p\text{-value} < 0.001$).¹⁵ This study shows that a massive number (87.2%) of the respondents were going to their work place by walking. Other study of Sri Lanka revealed that nearly all (98.9%) arrived at work via the company bus.¹⁶ Regarding severity of musculoskeletal pain, about three-fourth of the respondents were suffering mild pain at working place. In other study in Bangladesh, Severity of pain among 88 respondents', most of the respondents were suffering from moderate pain.¹⁷

Conclusion

Study revealed that garments workers were suffering different types of musculoskeletal pain whereas mostly affected body parts were neck, back, knee, ankle, toes, shoulders, elbows, wrists & fingers. These musculoskeletal pain were associated with working posture, working duration and faulty working environment.

Recommendations

- Rising awareness among the garments worker about musculoskeletal pain, which is related to different faulty posture.
- Government and garments authority can arrange groups or individualized counseling for preventive strategy of musculoskeletal pain.

Disclosure

All the authors declared no competing interest.

Reference

1. Bayzid B, Kamrujjaman M, Hossain A, Musa AM. Prevalence and determinant factors OF musculoskeletal pain among female ready-made garment workers residing IN northern Dhaka City: a cross-sectional study. Prevalence. 2019;3(2):345-358.

2. Bandyopadhyay L, Baur B, Basu G, Haldar A. (). Musculoskeletal and Other Health Problems in Workers of Small Scale Garment Industry - An Experience from An Urban Slum, Kolkata. *IOSR Journal of Dental and Medical Sciences*. 2012; 2: 23-28.
3. Bindra S, Sinha AGK, Benjamin A. Prevalence and risk factors of low back pain in garment industry workers of North India. *International Journal of Current Research*. 2017; 9 (02):46837-46845.
4. Hossain MD, Aftab A, Al Imam MH, Mahmud I, Chowdhury IA, Kabir RI, Sarker M. Prevalence of work related musculoskeletal disorders (WMSDs) and ergonomic risk assessment among readymade garment workers of Bangladesh: A cross sectional study. *PloS one*. 2018;13(7):e0200122.
5. Wang PC, Rempel DM, Harrison RJ, Chan J, Ritz BR. Work-organisational and personal factors associated with upper body musculoskeletal disorders among sewing machine operators. *Occupational and environmental medicine*. 2007;64(12):806-813.
6. Akter S, Rahman MM, Mandal S, Nahar N. Musculoskeletal symptoms and physical risk factors among automobile mechanics in Dhaka, Bangladesh. *South East Asia Journal of Public Health*. 2016;6(1):8-13.
7. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. *Bulletin of the world health organization*. 2003;81(9):646-656.
8. Haq SA, Shazzad N, Ahmed S, Al-Qadir AZ, Shahin A. AB1157 prevalence of musculoskeletal disorders among garment industry workers in Bangladesh. *Annals of the Rheumatic Diseases*. 2017;76: 1460.
9. Tiwari RR, Pathak MC, Zodpey SP. Low back pain among textile workers. *Indian J Occup Environ Med*. 2003;7(1):27-29.
10. Ahmad SA, Sayed MH, Khan MH, Faruquee M, Yasmin N, Hossain Z, Sarwar AF. Musculoskeletal disorders and ergonomic factors among the Garment Workers. *J Prev Soc Med*. 2007;26(2):97-110.
11. Van L, Chaiear N, Sumananont C, Kannarath C. Prevalence of musculoskeletal symptoms among garment workers in Kandal province, Cambodia. *Journal of occupational health*. 2016;58(1):107-117.
12. Ravichandran SP, Shah PB, Lakshminarayanan K, Ravichandran AP. Musculoskeletal problems among workers in a garment industry, at Tirupur, Tamil Nadu. *Indian Journal of Community Health*. 2016;28(3):269-274.
13. Sikdar MM, Sarkar MS, Sadeka S. Socio-economic conditions of the female garment workers in the capital city of Bangladesh. *International Journal of Humanities and Social Science*. 2014;4(3):173-179.
14. Jahan N, Das M, Mondal R, Paul S, Saha T, Akhtar R, Khan MA, Banik PC. Prevalence of musculoskeletal disorders among the Bangladeshi garments workers. *SMU medical journal*. 2015;2(1):102-103.
15. Nabi MH, Kongtip P, Woskie S, Nankongnab N, Sujirarat D, Chantanakul S. Factors associated with musculoskeletal disorders among female readymade garment workers in Bangladesh: A comparative study between OSH compliant and non-compliant factories. *Risk management and healthcare policy*. 2021:1119-1127.
16. Lombardo SR, Vijitha de Silva P, Lipscomb HJ, Østbye T. Musculoskeletal symptoms among female garment factory workers in Sri Lanka. *International journal of occupational and environmental health*. 2012;18(3):210-219.
17. Khan AR, Khan MJ. Musculoskeletal symptoms among female garments worker: Working environment. *J Exerc Sports Orthopedics*. 2018;5(2):1-7.

Surgical Outcome of Phaco-Trabeculectomy and Only Phacoemulsification in Case of Primary Angle Closure Glaucoma (PACG) with Cataract : A Comparative Study

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Abstract

Background: In Primary Angle Closure Glaucoma (PACG) physical or degenerative changes in the trabecular meshwork resulting from irido-trabecular contact that leads to high intraocular pressure and consecutive glaucomatous optic neuropathy. Surgical treatment of PACG with cataract is cataract extraction with or without trabeculectomy. Phacotrabeculectomy revealed similar results to only phacoemulsification in Primary Angle-Closure Glaucoma (PACG) with cataract in terms of Intraocular Pressure (IOP) lowering, visual acuity, visual field change, glaucoma medications and success rates. Rather releasable sutures may have reduced the risk of hypotony. complications are more common in phacotrabeculectomy. To compare the surgical outcome of Phaco-trabeculectomy and only Phacoemulsification in case of primary angle closure glaucoma with cataract

Materials and methods: This Quasi experimental study was performed on patient's of PACG with cataract attending in the Department of Glaucoma, NIO & H. Total sixty patient's were selected according to inclusion and exclusion criteria by convenient sampling. Thirtypatient's were selected who has undergone for only phacoemulsification (Group A) and more thirty patient's were selected who undergone for phaco-trabeculectomy (Group B). Pre and post- operative IOP, number of IOP-lowering drugs, Best Corrected Visual Acuity (BCVA) angle grading, Vertical Cup-to Disc Ratio (VCDR) and visual field were documented for the study eye. The VCDR was taken to be the longest vertical cup diameter divided by the longest vertical disc diameter. Patients were scheduled for follow up at 1 day, 7 days, 1 month and 3 months. Data were collected by a structured pretested questionnaire and analysis was done with the help of SPSS (Statistical Package for Social Science) version-26. Different statistical methods were applied for data analysis. p value <0.05 was considered as significant. Results were presented in appropriate tables and figures. Ethical approval was taken from ethical review committee of NIO&H.

Results: In this study, the mean age was 66.7±8.63 and 68.9±8.23 in Phacoemulsification (Group A) and Phaco-trabeculectomy (Group B). There were 15(60.0%) male and 10(40.0%) female in Group A. In Group B male were 18(72.0%) and female were 7(28.0%). Post operative BCVA in group A on D1, D7, 1 month and 3 month's later were 0.64±0.24, 0.48±0.27, 0.38±0.28, 0.32±0.31 and in group B were 0.68±0.29, 0.56±0.30, 0.48±0.29 and 0.45±0.29. There was significant improvement in BCVA in both groups at postoperative 1 month and 3 months compared to preoperative levels in both groups (p>0.05). Mean IOP of group A at D1, D7, 1 month and 3 month's later were 13.92±4.37, 14.72±3.41 & 14.20±3.34, 14.42±3.92 and in group B were 14.12±3.55, 12.56±3.31, 12.32±3.13 7 and 11.80±2.99. Mean vertical CD ratio was 0.60±0.13 in group A and 0.59±0.13 in group B at postoperative day 1. At 1 month this ratio was 0.62±0.11 in Group A and 0.61±0.11 in Group B. At 3 month this ratio was 0.64±0.12 in Group A and 0.62±0.12 in Group B. Postoperative complication, the shallow anterior chamber was found in 1(3.3%) and 6(20.0%) cases in group A and group B respectively. One (3.3%) patient had endophthalmitis in Phaco-trabeculectomy group. Malignant glaucoma was noted 1(3.3%) in group B. post operative uveitis was found in 1 (3.3%) in group A.

Conclusion: Phaco-trabeculectomy and Phacoemulsification exhibit similar IOP reduction, visual outcome and visual field stability in a patient of PACG with cataract. Success rate is almost equal in both group but complication's are higher in Phaco-trabeculectomy group.

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Key words

Phacoemulsification; Phaco-trabeculectomy; Primary Angle- Closure Glaucoma (PACG).

Introduction

The World Health Organization ranks glaucoma as the second most common cause of blindness after cataract, and as the leading cause of irreversible blindness.¹ The global prevalence of glaucoma was estimated to increase from 64.3 million in 2013 to 76 million in year 2020 and 111.8 million in year 2040.² In Asia, the prevalence of glaucoma was estimated to rise to 59.5 million (16% increment) in year 2020 and to 80.9 million (58% increment) in year 2030.³

PACG is characterized by narrow anterior segment structure with advancing age, the lens assumes greater thickness, a greater curve of its anterior surface, and the zonules loosen. These factors cause increasing shallowness of the anterior chamber and iridolenticular contact. The outflow pathway blocked and therefore Intraocular Pressure (IOP) continuously increases. If things go on like this, there will be damage to the optic nerve and loss of visual field. Additionally, because the prevalence increases with age, a considerable number of PACG patients associated with cataract are in need of treatment.⁴

The main mechanism of angle closure in these patients is pupillary block, which is predisposed to by shallow anterior chambers and narrow angles that become narrower with the age-related increase in lens thickness. Axial Anterior Chamber Depth (ACD) at onset of disease on average 1 mm shorter than in normal eyes.⁵

The role of lens extraction in angle closure and angle-closure glaucoma has been well-established.⁶ Surgical removal of the lens, whether clear or cataractous, has been shown to deepen the anterior chamber, widen the angle, improve outflow facility and reduce intraocular pressure (IOP) fluctuations in angle-closure patients.^{7,8,9}

Various studies reported that, only Phacoemulsification had resulted in greater opening of drainage angle and greater deepening of anterior chamber than combined phaco-trabeculectomy in PACG eyes with cataract-patient.^{10,11}

Glaucoma is a multifactorial degenerative optic neuropathy. Lens thickness, anterior chamber depth plays important role in developing PACG. Phacoemulsification or phaco-trabeculectomy have usually been documented for the patient's of PACG with cataract. The study will more accurately reveal the surgical outcome of phaco-trabeculectomy and only phacoemulsification in case of PACG with cataract. The aim of this study is to compare the surgical outcome of combined Phaco-trabeculectomy and only Phacoemulsification in case of PACG with cataract in Department of Glaucoma, National Institute of Ophthalmology (NIO&H), Dhaka.

Materials and methods

It is a Quasi experimental study done at Department of Glaucoma, National Institute of Ophthalmology and Hospital (NIO&H) Dhaka from September 2021 to March 2022. All patients having primary angle closure glaucoma with cataract attending the Department of Glaucoma, NIO&H. All patients having primary angle closure glaucoma with cataract attending the hospital.

Sample size for each group is 26. Total sample size was 52 considering exclusion and inclusion criteria.

Before commencing the study, this article was approved by the ERC, NIO&H, Dhaka.

Results

Table I Age distribution of the study subjects (n=60)

Age group (Years)	Group (n=30)	Group (n=30)	p-value
50-59	4(13.3%)	3(10.0%)	
60-69	16(53.3%)	17(56.7%)	
70-79	8(26.7%)	7(23.3%)	
80-89	2(6.7%)	3(10.0%)	
Total	30(100.0%)	30(100.0%)	
Mean±SD	66.7±8.63	68.9±8.23	0.379 ^{NS}

Group A: Phacoemulsification.

Group B: Phaco-trabeculectomy.

Figures in the brackets denote corresponding %.

Statistical analysis was done by Student's t-test to compare between groups.

Table II Comparison of postoperative BCVA of the two treatment groups (n=60)

Postoperative BCVA (LogMAR)	Group A (n=30) Mean±SD	Group B (n=30) Mean±SD	p-value
Postoperative Day 1	0.64±0.24	0.68±0.29	0.632 ^{NS}
Postoperative Day 7	0.48±0.27	0.56±0.30	0.319 ^{NS}
Postoperative Month 1	0.38±0.28	0.48±0.29	0.220 ^{NS}
Postoperative Month 3	0.32±0.31	0.45±0.29	0.116 ^{NS}
Paired t-test Preoperative vs postoperative 1 months	<0.001 ^S	<0.001 ^S	
Preoperative vs postoperative 3 months	<0.001 ^S	<0.001 ^S	

Data were presented as mean ±SD.

S= Significant, NS = Not Significant.

Statistical analysis was done by Student's t-test to compare between groups.

Table III Comparison of postoperative mean IOP mmHg between the study groups (n=60)

Follow up period of IOP	Group A (n=30) Mean±SD	Group B (n=30) Mean±SD	p-value
Postoperative after 1 day	13.92±4.37	14.12±3.55	0.863 ^{NS}
Postoperative after 7day	14.72±3.41	12.56±3.31	0.032 ^S
Postoperative after 1 months	14.20±3.34	12.32±3.13	0.041 ^S
Postoperative after 3 months	14.24±3.92	11.80±2.99	0.022 ^S

Data were presented as mean ±SD.

Statistical analysis was done by Student's t-test to compare between groups.

Table IV Comparison of postoperative IOP lowering drugs between two groups (n=60)

	Group A (n=30) Mean±SD	Group B (n=30) Mean±SD	p-value
IOP lowering drugs	2.21±0.81	2.43±0.74	0.276 ^{NS}

Data were presented as mean ±SD.

Statistical analysis was done by Student's t-test to compare between groups.

Table V Distribution of the patients by postoperative angle closure between two groups (n=60)

Angle closure	Group A (n=30) Mean±SD	Group B (n=30) Mean±SD	p-value
Closed	3(10.0%)	0(0.0%)	0.076 ^{NS}
Open	27(90.0%)	30(100.0%)	
Total	30(100.0%)	30(100.0%)	

Data were presented as frequency and percentage.

Statistical analysis was done by Chi-square test.

Table VI Comparison of complications seen in study subjects (n=60)

Complications	Group A (n=30)	Group B (n=30)	p-value
Shallow or flat anterior chamber	1(3.3%)	6(20.0%)	0.107
Malignant glaucoma	0(0.0%)	1(3.3%)	0.313
Endophthalmitis	0(0.0%)	1(3.3%)	0.313
Post operative uveitis	1(3.3%)	0(0.0%)	0.313

Figures in the parentheses denote corresponding %.

Statistical analysis was done by Chi-square test.

Discussion

This quasi experimental study conducted in the Department of Glaucoma, National Institute of Ophthalmology and Hospital, Dhaka. Total 60 patients were selected according to inclusion and exclusion criteria by convenient sampling. 30 patients were selected who undergone for only phacoemulsification (Group A) and more 30 patients were selected who undergone for phaco-trabeculectomy (Group B). The age range of patients was 50-89 years. It was 16(53.3%) in Phacoemulsification group and 17(56.7%) in Phaco-trabeculectomy Group. No significant difference of gender between two groups regarding age and sex ($p>0.05$). A study reported no statistically significant differences between the 2 treatment groups in age, sex ratio, or laterality of recruited patients.¹² In this study, comparing the surgical outcome of Phaco-Trabeculectomy (PT) with Phacoemulsification in medically controlled PACG with cataract. All the preoperative characteristics were similar in the two groups.

The mean IOP was 24.64 ± 3.25 mmHg in Phacoemulsification Group and 25.20 ± 3.27 mmHg Phaco-trabeculectomy group. Preoperative mean VA was 0.82 ± 0.27 in Phacoemulsification group and 0.92 ± 0.10 in Phaco-trabeculectomy group. Mean number of IOP lowering drugs 1.84 ± 0.75 in Phacoemulsification group and 1.80 ± 0.65 Phaco-trabeculectomy group. Preoperative mean VCDR was 0.62 ± 0.11 in Phacoemulsification group and 0.63 ± 0.11 in Phaco-trabeculectomy group. No significant difference of preoperative events between two groups ($p>0.05$). In agreement with the study reported there were no statistically significant differences between the 2 treatment groups in the preoperative IOP, number of preoperative topical IOP lowering drugs used, preoperative BCVA, preoperative vertical cup-disc ratio.¹² Another study reported despite these baseline differences, the postoperative IOP and medications were similar in the two groups. Close to 30% eyes in Phaco-trabeculectomy group and 36% eyes in Phaco group needed medications in the postoperative period.¹³

In present study showed that, difference in mean BCVA (Converted into LogMAR) of the two treatment groups were not statistically significant at postoperative day 1, day 7, month 1 and after 3 months ($p>0.05$). There was significant improvement in VA in both groups at postoperative 1 month and 3 months compared to preoperative levels in both groups. A study reported that significant improvement in VA in both groups at 1 month compared to preoperative levels.¹³ However, what is noteworthy is the more rapid visual recovery in the Phacoemulsification group ($p = 0.02$) compared to the Phaco-trabeculectomy. Better visual acuity and rapid visual recovery would favor Phacoemulsification to Phaco-trabeculectomy in medically controlled PACG eyes. At final follow up the difference was not significant. Concordance this reported, the pre- and post-operative BCVA (Converted into LogMAR) of the two treatment groups were not statistically significant between the two groups. 18 patients (75 %) in phaco-trab group and 20 patients (80%) in phaco group had improved VA on Snellen's chart.¹⁴ Another study reported in the phacoemulsification group, the mean LogMAR BCVA ± 1 SD changed from 0.78 ± 0.51 (Range, 0.40 to 3.00) before surgery to 0.74 ± 0.77 (range, 0.10 to 3.00) at the 5th year ($p = 0.92$). In the phaco-trabeculectomy group, the mean LogMAR BCVA changed from 0.72 ± 0.34 (Range, 0.40 to 2.00) before surgery to 0.80 ± 0.91 (Range, 0.18 to 3.00) at the 5th year ($p = 0.41$).¹⁵

In present study showed that, the difference of mean IOP between group A and GroupB at the 1st postoperative day was not significant ($p=0.54$). But the differences was found highly significant in the subsequent follow up (7th day $p=0.32$, 1st month $p=0.41$, 3rd month $p=0.22$). In a meta-analysis, evaluated long-term IOP control following Phacoemulsification in medically controlled primary angle closure glaucoma.¹⁶ They reported IOP reduction by 30%

and decrease in glaucoma medications by 58% among 495 chronic PACG patients from 12 studies over 16 months follow up.¹⁵ The IOP control was similar in both groups except at 1 and 3 months, when 7 eyes in PT group with hypotony were removed from analysis, the IOP drop was not different.¹⁶ Moreover, combined surgery was associated with more postoperative complications.¹⁶ Long term follow up of these cohorts (Medically controlled and uncontrolled PACG eyes) reported higher rate of complications in PACG patients undergoing PT compared to Phaco (26.2 vs. 8.1%, respectively). There was no difference in the two groups in the visual acuity or glaucoma progression during the 2 year follow up.¹⁶

The present study showed, comparisons of mean vertical CD ratio at the postoperative follow-ups. Mean vertical CD ratio was 0.60 ± 0.13 in Phacoemulsification group and 0.59 ± 0.13 in Phaco-trabeculectomy group at postoperative day 1. After 7th day this ratio was same in Group A but slight change in Group B 0.60 ± 0.15 . At 1 month this ratio was 0.62 ± 0.11 in Group A and 0.61 ± 0.11 in Group B. At 3 month this ratio was 0.64 ± 0.12 in Group A and 0.62 ± 0.12 in Group B. None of these differences were statistically significant. A study reported the mean preoperative cup-to-disk ratio were similar in the two groups ($p = 0.57$).¹⁷

The present study showed, there were no statistically significant differences between the two treatment groups by using post operative mean IOP lowering drugs. A study reported no statistically significant differences between the two groups in the preoperative BCVA, preoperative IOP, number of preoperative topical IOP lowering drugs used, preoperative vertical cup-disc ratio, pattern standard deviation in automated perimetry, and proportion of eyes with previous acute angle-closure attack.¹⁷

In the phacoemulsification group, angle of anterior chamber closed in 10% cases and 27(90.0%) cases were open. In phaco-trabeculectomy group, angle of anterior chamber were open in all cases. No significant difference of angle of anterior chamber was found between two groups ($p=0.076$). Similar findings were reported.¹⁷

Concordance this study reported intraoperative complications were not associated with progression in glaucomatous optic neuropathy or with progression in glaucomatous visual field loss ($p=0.97$).¹⁸

In present study showed that, among the postoperative complications, the shallow anterior chamber, endophthalmitis and malignant glaucoma were found in 6(20.0%), 1(3.3%) and 1(3.3%) cases in Phaco-trabeculectomy group respectively. Shallow anterior chamber, post operative uveitis in 1(3.1%), 1(3.1%) cases in Phacoemulsification group. No significant difference were found between two groups regarding postoperative complications ($p>0.05$). A study reported one eye (2.44%) had malignant glaucoma in the second week of follow-up after phacotrabeulectomy surgery and reported that no intraoperative complications, one eye presented with postoperative malignant glaucoma 2 months after

Phacotrabeulectomy.¹⁹ This eye resolved with topical cycloplegics, aqueous suppressants and laser hyaloidotomy and needed one anti glaucoma medication's for IOP control. The reported incidence of IOP spike post cataract surgery in PACG eyes ranges from 6 to 21%.²⁰ The phacoemulsification group required a subsequent trabeculectomy to control the IOP, meaning that PACG eyes were salvaged from a possibly unnecessary trabeculectomy with all the added risks, cost, and effect on the quality of life, by undergoing the less invasive phacoemulsification.

Limitation

Short duration of study period, small sample size and single centered study.

Conclusion

Phaco-trabeculectomy and only phacoemulsification exhibit similar IOP reduction, visual outcome and visual field stability. Success rate is almost equal in both group but complication's are more in phaco-trabeculectomy.

Recommendations

Further study should be done in multiple centers involving larger population to draw universal conclusion. Risk benefit ratio of each approach must be individualized based on severity of disease.

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Disclosure

All the authors declared no competing interest.

References

1. Quigley HA Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. *Br J Ophthalmol.* 2006; 90(3): 262-267.
2. Tham Y, Li X, Wong T, et al. Global prevalence of glaucoma and projections of glaucoma burden through 2040. *Ophthalmology.* 2014; 121: 2081-2090.
3. Chan E, Li X, Tham Y-C, et al. Glaucoma in Asia: Regional prevalence variations and future projections. *Br J Ophthalmol.* 2016; 100(1):78-85.
4. Wang Fand Wu ZH. Phacoemulsification versus combined phacotrabeulectomy in the treatment of primary angle-closure glaucoma with cataract: A Meta-analysis. *Int J Ophthalmol.* 2016; 9(4):597-603.
5. Tornquist R. Chamber depth in primary acute glaucoma. *Br J Ophthalmol.* 1956; 40: 421-429.
6. Tarongoy P, Ho C, Walt D. Angle-closure glaucoma: The role of the lens in the pathogenesis, prevention and treatment. *Surv Ophthalmol.* 2009; 54: 21-25.
7. Liu C, Cheng CY, Wu CW, et al. Factors predicting intraocular pressure control after phacoemulsification in angle-closure glaucoma. *Arch Ophthalmol.* 2006; 124: 1390-1394.

8. Meyer M, Savitt M, Kopitas E. The effect of phacoemulsification on aqueous outflow facility. *Ophthalmology*. 1997; 104:1221–1227.
9. Azuara Blanco A, Burr J, Cochran C, et al. The effectiveness of early lens extraction with intraocular lens implantation for the treatment of primary angle-closure glaucoma (EAGLE): A randomized controlled trial. *Lancet*. 2016; 388:1389–1397.
10. El Sayed YM, Elhusseiny AM, Albalkini, A S, El Sheikh, R H and Osman, MA Mitomycin C-Augment Phacotrabeculectomy Versus Phacoemulsification in Primary Angle-closure Glaucoma: A Randomized Controlled Study. *J Glaucoma*. 2019; 28:911– 15.
11. Tham CC, Kwong YY, Leung DY, et al. Phacoemulsification vs phacotrabeculectomy in chronic angle-closure glaucoma with cataract. *Arch Ophthalmol*. 2010; 128:303–311.
12. Wang N, Ouyang J, Zhou W, Lai M., Ye T, Zeng M, Chen J. Multiple patterns of angle closure mechanisms in primary angle closure glaucoma in Chinese. *Article in chinese*. 2000; 36(1), 46-51.
13. Wang M, Fang M, Bai YJ, Zhang WZ, Lin MK, Liu BQ, Hao YT, Ling YL, Zhuo YH, Ge J. Comparison of combined phacotrabeculectomy with trabeculectomy only in the treatment of primary angle-closure glaucoma. *Chinese medical journal*. 2012;125(08):1429-1433.
14. Rhiu S, Hong S, Seong GJ, Kim CY. Phacoemulsification alone versus phacoemulsification combined with trabeculectomy for primary angle-closure glaucoma. *Yonsei medical journal*. 2010;51(5):781-783.
15. Hansapinyo L, Choy BN, Lai JS, Tham CC. Phacoemulsification versus phacotrabeculectomy in primary angle-closure glaucoma with cataract: Long-term clinical outcomes. *Journal of Glaucoma*. 2020;29(1):15-23.
16. Paul C, Sengupta S, Paul A. Comparison of phacoemulsification versus phacotrabeculectomy in the treatment of patients with chronic angle closure glaucoma and concomitant cataract. *Journal of Clinical Ophthalmology and Research*. 2014;2(2):93.
17. Chelerkar V, Parekh P, Kalyani VK, Deshpande CM, Khandekar R. Comparative clinical study of medically controlled nonsevere chronic primary angle-closure glaucoma with coexisting cataract surgically managed by phacoemulsification as against combined phacotrabeculectomy. *Middle East African Journal of Ophthalmology*. 2018;25(3-4):119.
18. Hou X, Hu D, Cui Z, Zhou J, Cai L, Wang Y. Small-incision phacotrabeculectomy versus phacoemulsification in refractory acute primary angle closure with cataract. *BMC ophthalmology*. 2015;15(1):1-6.
19. Senthil S, Rao HL, Choudhari N, Garudadri C. Phacoemulsification versus Phacotrabeculectomy in Medically Controlled Primary Angle Closure Glaucoma with Cataract in an Indian Cohort: A randomized controlled trial. *International Ophthalmology*. 2022;42(1):35-45.
20. Chen PP, Lin SC, Junk AK, Radhakrishnan S, Singh K, Chen TC. The effect of phacoemulsification on intraocular pressure in glaucoma patients: A report by the American academy of ophthalmology. 2015;122(7):1294–1307.

Functional Outcome of Surgical Management of Metacarpal Fracture in Adults

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Abstract

Background: Fractures of bones of the hand is one of the commonest fractures in humans. These fractures constitute approximately 10% of all fractures and account for 30-40% of all fractures in hand. Too often these fractures are treated as minor injuries and major disability results. MCP joint stiffness which ultimately results in functional impairment. Purpose of this study is to evaluate the functional outcomes of metacarpal fractures using surgical fixation.

Materials and methods: This was a prospective hospital based clinical trial and was conducted in the Department of Orthopedic Surgery of CMCH for a period of one year. 29 patients were enrolled. Patients were followed up for 24 weeks and overall outcome was measured according to TAM score suggested by the American Society for Surgery of Hand criteria. Analysis was done using computer software SPSS version 25. Depending on the overall functional outcome patients was grouped as having excellent to good outcome and fair to poor outcome. To determine the factors associated with poor outcome qualitative variables was analyzed by Chi-square test and continuous variables were analyzed by t-test between groups. p value was considered as statistically significant when it is less than 0.05 and confidence interval was set at 95% level.

Results: In this study, out of 29 patients, all were male and most of them (35%) were service holder and 31% were worker. Single bone was involved in maximum (75.9%), 2 bones were involved in 17.2% and 3 bones were involved in 6.9% patients. Functional outcome at the final follow-up most of the patients 25 (92.6%) had excellent outcome, good outcome was in only 02 (7.4%) patients.

Conclusion: Surgical stabilization of metacarpal fractures of the hand with K-wire, mini plates and screws are safe methods and can be performed with minimal complications.

Key words

K-wires; MCP joints; Metacarpal fractures.

Introduction

Human hand is a specialized structure interacting with the environment and is especially sensitive to functional impairment.¹ The human hand represents a 'revolution in evolution'. Fractures of the metacarpal bones of the hand constitutes approximately 10% of all fractures visits to the hospital following trauma Metacarpal fractures account for 30-40% of all fractures in hand.²

The metacarpals represent the most proximal long bones of the hand, the four finger metacarpals are concave on the palmar aspect. All together, they form a transverse arch supporting the palm. The index and middle finger metacarpals are fixed relative to the carpus, while the ring and small finger metacarpals are mobile with a flexion-extension arc of motion of 15–25° at the Carpometacarpal (CMC) joint. The metacarpal head is cam-shaped, and articulates with the base of the proximal phalanx as a condylar joint that permits flexion, extension, and radial and ulnar motion.³

The metacarpal head forms a condyloid joint with the proximal phalanx. In extension, the collateral ligaments are lax and thus the joints may deviate radially and ulnarly. In flexion, the cam structure puts the collateral ligaments under tension which stabilizes the joint allowing minimal motion to radial and ulnar directed forces. The volar plate resists hyperextension and provides stability to the Metacarpophalangeal (MCP) joint, while the intermetacarpal ligament stabilizes the fingers, minimizing proximal migration and rotation of the fractured bone.

Thirty to forty percentages of all fractures in the hand occur in the metacarpal. Border metacarpals (1st and 5th) are more commonly involved, the base being more commonly involved in the former and neck in the latter. Diaphyseal fractures are common in non-border

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metacarpals. So any skeletal injury in the hand is likely to alter the function.⁴ Complications like malunion, persistent dorsal apex angulation or rotational deformity, MCP joint stiffness which ultimately results in functional impairment.⁵

Though large number of metacarpal fractures can be treated conservatively i.e. close reduction and cast immobilization. But cast immobilization is not very effective in maintenance of reduction and requires prolong immobilization.⁶ Numerous indications for operative treatment include mal-rotation, angulation, longitudinally shortening, multiple fractures and fractures with associated soft tissue injuries or bone loss. The goal of management of metacarpal fractures is to achieve bone healing and recovery of motion simultaneously, not consecutively. Many factors other than accurate reduction and fixation affect the recovery of good mobility.⁷ These include delicate handling of tissues, preservation of gliding planes for tendons, prevention of infection and early and appropriate physiotherapy. Fracture healing in the hand is not isolated goal rather the functional result is of paramount importance.⁸

The primary goals of treatment are to achieve acceptable alignment, stable reduction, strong bony union, and unrestricted motion. The general indications for the operative management of metacarpal fractures are unstable fractures, irreducible fractures, open fractures, fractures with segmental bony loss, multiple fractures, fractures associated with significant soft-tissue injury, rotational deformity, and angulation, intra articular fracture. Surgical stabilization is expected to restore anatomical reduction and its maintenance with added advantage of early mobilization.

In some recent studies good outcome was observed by surgical fixation of metacarpal fractures.⁹ Various methods of surgical fixation include lag screw alone, plate and screws percutaneous Kirschner wires external fixator, depending upon fracture type, site and configuration.^{9,10}

Although large number of metacarpal fractures can be treated conservatively i.e. close reduction and cast immobilization. In some recent studies good outcome was observed by surgical fixation of metacarpal fractures. Various methods of surgical fixation include lag screw alone, plate and screws, percutaneous Kirschner wires, external fixator depending upon fracture type, site and configuration.¹¹ So the aim of the study is to evaluate the functional outcome of definitive surgical fixation of metacarpal fractures in adults

Materials and methods

It was a prospective hospital based clinical trial done at Department of Orthopaedic & Traumatology, Chittagong Medical College Hospital from February 2019 to January 2020. All adult patients underwent surgery for metacarpal fractures. Consecutive sampling method was followed as per inclusion and exclusion criteria.

The protocol was approved by the Ethical Review Committee, Chittagong Medical College, Chattogram, Bangladesh.

Final sample size was 66. Due to time constraints, total 29 patients were included in the study.

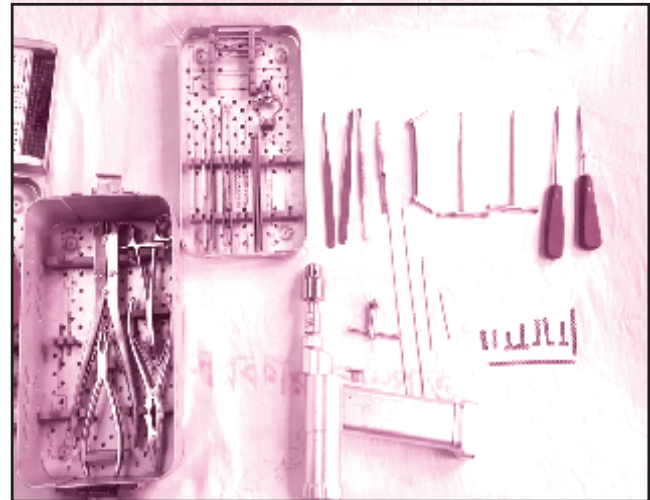
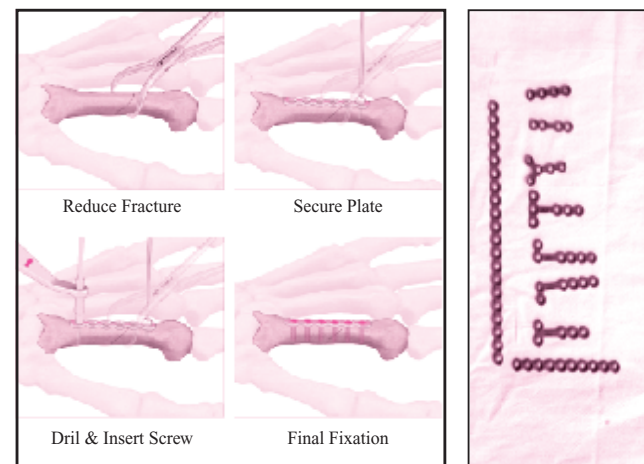


Image 1 Instruments used for fixation of metacarpal fractures



(a)

(b)

Image 2 (a) Procedure of fixation of metacarpal fracture with mini plate (b) (Trimed. inc. 2018)

Results

In this study, a patient >18 years of age undergoing surgery for metacarpal fractures was the study sample. Total 29 samples were included in the study. In this study, total four follow up were done after 6 weeks, 12 weeks and 24 weeks and there was one drop out of patient at 2nd follow-up and another one drop out of patient at 3rd follow-up during the study period. The overall functional outcomes were categorized according to TAM score suggested by the American Society for surgery of Hand (Freeland 2000) criteria as excellent, good, fair and poor.

Table I Distribution of the patients by their age (n=29)

Age (Years)	Frequency	Percentage (%)
18-40	26	89.7%
41-60	01	03.4%
> 60	02	06.9%
Total	29	100%
Mean ± SD	33.14 ± 11.895	
Range	18-70 years	

Most of the study population (89.7%) was in 18-40 years of age group. The mean age of the patients was 33.14 ± 11.895 years (Range: 18-70 years).

Table II Injury description and number of metacarpal bone involvement of the patients (n=29)

Variables		n (%)
Mechanism of injury	RTA	09 (31%)
	Machinery injury	08 (27.6%)
	Assault	09 (31%)
	Others	03 (10.3%)
Side of injury	Right	16 (55.2%)
	Left	13 (44.8%)
Type of injury	Transverse	15 (51.7%)
	Oblique	12 (41.4%)
	Spiral	01 (3.4%)
	Both transverse & oblique	01 (3.4%)
Number of metacarpal bone involvement	1	22 (75.9%)
	2	05 (17.2%)
	3	02 (6.9%)

Table III Post-operative complications (n=29)

Complications	n (%)	Total
Soft tissue Infection		
Yes	02 (6.9%)	29 (100%)
No	27 (93.1%)	
Deep seated infection		
Yes	0 (0%)	29 (100%)
No	29 (100%)	
Delayed-union		
Yes	0 (0%)	29 (100%)
No	29 (100%)	
Non-union/Implant failure		
Yes	01 (3.4%)	29 (100%)
No	28 (96.6%)	
Malunion/Malrotation		
Yes	0 (0%)	29 (100%)
No	29 (100%)	

Above table shows, out of 29 patients, soft tissue infection was in 02 (6.9%) patients and only 01 (3.4%) patient had Implant failure.

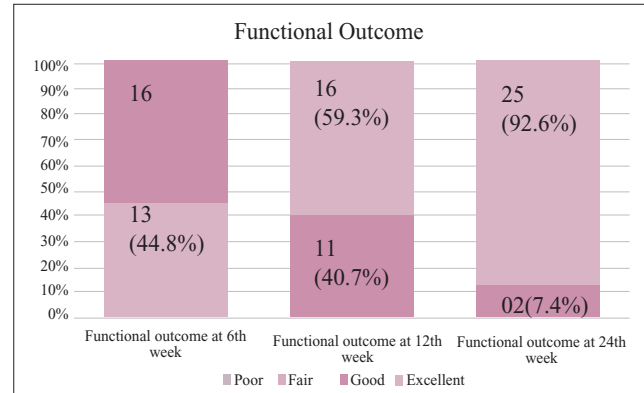


Figure 1 Functional outcome at 6th week (n= 29), 12th week (n= 27) and 24th week (n= 27)

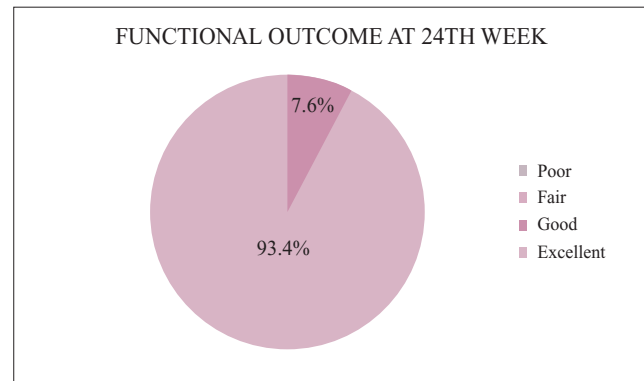


Figure 2 Functional outcome at 24th week (n= 27)

Table IV Univariate analysis of factors associated with outcome

Variables	Functional outcome		p value
	Good	Excellent	
Age (In years)			0.779#
	39.00 ± 22.627	33.20 ± 11.690	(ns)
Method of fixation			
K-wire	0 (0%)	07 (100%)	
Mini plate	01 (5.3%)	18 (94.7%)	0.001*
K-wire & Lag screw	01 (100%)	0 (0%)	(hs)
Total	02 (7.4%)	25 (92.6%)	
Implant Failure			
Yes	01 (100%)	0 (0%)	
No	01 (3.8%)	25 (96.2%)	<0.001*
Total	02 (7.4%)	25 (92.6%)	(vhs)

- p value derived from Chi-square test* and t-test#.
- ns= non-significant, hs= highly significant and vhs= very highly significant.

Table IV shows the univariate association of age, method of fixation and implant failure to final outcome status.

Discussion

Metacarpal fractures are among the most common fractures. The majority of metacarpal shaft fractures can be treated conservatively. There are numerous indications for operative treatment and various fixation techniques.¹³ Functional outcomes depend on appropriate treatment and early range of motion whenever possible.¹⁴

In this study, a patient >18 years of age undergoing surgery for metacarpal fractures was the study sample. Total 29 samples were included in the study. In this study, total three follow up were done after 6 weeks, 12 weeks and 24 weeks and there was one drop out of patient at 2nd follow-up and another one drop out of patient at 3rd follow-up during the study period. The overall functional outcomes were categorized according to TAM score suggested by the American Society for surgery of Hand criteria as excellent, good, fair and poor.¹⁵

In this present study, most of the study population (89.7%) was in 18-40 years of age group. The mean age of the patients was 33.14 ± 11.895 years (Range: 18-70 years) (Table I). Incidence of fracture was observed maximum between 20-50 years.¹⁶ Another study showed that, among 30 patients, there were 24 male and 6 female patients in their study.²¹ Another study found, out of the 15 patients, 12(80%) were male and 3(20%) were females.¹⁷

In the present study, out of 29 cases, in case of number of metacarpal bone involvement, 1 bone was involved in maximum (75.9%), 2 bone were involved in 17.2% and 3 bone were involved in 6.9% patients (Table II). Similar result was found in the study where majority of the patients had only a single digit involvement (55.88%).¹⁸ Twenty-two patients had only a single digit involvement while two digits were involved in six patients and three digits in three patients.¹⁹

Present study shows, 19 (65.5%) patient's time for operation after injury was 1-5 days and 02 (6.9%) patient's time for operation after injury was >10 days. Average mean \pm SD time for operation after injury were 4.79 ± 3.353 days. This present study shows, in case of method of fixation, maximum (65.5%) patient's fixation were done by mini plate, 31% were by K-wire and 3.4% were by both K-wire & lag screw (Table III). Four different techniques of fracture fixation were used, depending upon the fracture type, site and configuration. Most of the patients were treated by Open reduction and internal fixation with plates and screws (47%) followed by fixation with screws and kirschner wire.

Concerning complications, out of 29 patients, soft tissue infection was in 02 (6.9%) patients and only 01 (3.4%) patient had Implant failure. No patients had deep infection, delayed-union and malunion.²⁰ This result corresponds with a study reported that two patients presented superficial infection at the site of K-wire insertion improved with oral antibiotic for 1 week and serial daily dressings, one patient united with 15° angulation of the 5th metacarpal without any functional affection or extension

lag. No other complications reported. In another study showed that, a total of 12 minor complications were observed in 10 patients out of a total of 25. No major complication was noticed.²¹ Finger stiffness was the most commonly observed complication, accounting for 3 fractures (8.82%), Deformity was observed in 6% of all fractures, while soft tissue infection, pain on passive movements of joints, aseptic loosening of k wires, and pin tract infection in 2.94% each.

Regarding union time at fracture site, out of 29 patients, 14 (48.3%) patients needed 6 weeks for radiological union and 03 (10.3%) patient needed 8 weeks. Mean \pm SD time for radiological union was 6.55 ± 0.736 weeks. Range of time taken for radiological union was 5-8 weeks. Similarly, in another study showed, bony union achieved at an average of 6.8 weeks.²²

According to TAM score suggested by the American Society for surgery of Hand criteria patients were categorized into four subdivisions- excellent, good, fair and poor.^{23,24} In this study at 6th week follow-up, 16 (55.2%) patients had good and 13 (44.8%) patients had fair outcome, at 12th week follow-up, 16 (59.3%) patients had excellent outcome and at 24th week final follow-up, excellent outcome was in 25 (92.6%) patients. Similar result was reported, 21 patients (70%) had excellent result, 6 patients (20%) with good results, and remaining 3 patients (10%) had fair result.^{25,26}

Functional outcome at 24th week final follow-up, associated method of fixation and implant failure had greater chance of having good functional outcome from their counterpart. Method of fixation and post-operative implant failure showed statistical significance according to p value.

Limitation

It's a single centered study. No blinding was done. Sample size not representing whole country scenario. Sample was taken consecutively. So there may be chance of bias which can influence the results.

Conclusion

Surgical stabilization of metacarpal fractures of the hand seems to give good functional outcome. Closed or minimally invasive fixation with K-wire, mini plates and screws are safe methods and can be performed with minimal complications. Radiological union time and complication associated with these procedures were minimum.

Recommendations

Accurate method of fixation, early surgical management and early mobilization is needed for less complication. Large sample size may give more precise conclusion. A multicenter study could be commenced to interpret such results better.

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Disclosure

All the authors declared no competing interest.

References

1. Diaz-Garcia R, Waljee JF. Current management of metacarpal fractures. *Hand clinics*. 2013;29(4):507-518.
2. Kamath JB, Naik DM, Bansal A. Current concepts in managing fractures of metacarpal and phalanges. *Indian Journal of Plastic Surgery*. 2011;44(02):203-211.
3. Chin SH, Vedder NB. MOC-PS (SM) CME Article: Metacarpal Fractures. *Plastic and reconstructive surgery*. 2008;121(1S):1-3.
4. Minami A, An KN, Cooney III WP, Linscheid RL, Chao EY. Ligamentous structures of the metacarpophalangeal joint: A quantitative anatomic study. *Journal of orthopaedic research*. 1983;1(4):361-368.
5. Edmunds JO. Traumatic dislocations and instability of the trapeziometacarpal joint of the thumb. *Hand Clinics*. 2006;22(3):365-392.
6. Adams JE, Miller T, Rizzo M. The biomechanics of fixation techniques for hand fractures. *Hand Clinics*. 2013;29(4):493-500.
7. Rhee SH, Lee SK, Lee SL, Kim J, Baek GH, Lee YH. Prospective multicenter trial of modified retrograde percutaneous intramedullary Kirschner wire fixation for displaced metacarpal neck and shaft fractures. *Plastic and reconstructive surgery*. 2012;129(3):694-703.
8. Barton, N. J. Fractures and joint injuries of hand. In: Wilson JN editor. *Watson – Jones fractures and joints injures*. 6th edn Vo. II Churchill Livingstone Pvt. Ltd, New Delhi. 1996;739-788.
9. Gupta R, Singh R, Siwach RC, Sangwan SS, Magu NK, Diwan R. Evaluation of surgical stabilization of metacarpal and phalangeal fractures of hand. *Indian Journal of Orthopaedics*. 2007;41(3):224.
10. Gupta R, Kumar K. A prospective study to analyse various methods of surgical fixation of metacarpal & phalangeal fractures. *International Journal of Orthopaedics*. 2018;4(2):658-663.
11. Venkatesh R, Kerakkanavar S. Functional outcome of closed metacarpal shaft fractures managed by low-profile miniplate osteosynthesis: A prospective clinical study. *Journal of Orthopaedics and Spine*. 2017;5(2).
12. Javali V. Metacarpal shaft fracture fixation with intramedullary k-wire: Surgical and clinical outcomes. *International Journal of Orthopaedics*. 2017;3(2):222-225.
13. Deshmukh G, Rocha S, Shyam A, Sancheti P. Surgical and Functional Outcome of Metacarpal fracture. *J Med thesis*. 2014;2(1):7-10.
14. Orbay JL, Indriago I, Gonzalez E, Badia A, Khouri R. Percutaneous fixation of metacarpal fractures. *Operative Techniques in Plastic and Reconstructive Surgery*. 2002;9(4):138-142.
15. Tan JS, Foo AT, Chew WC, Teoh LC. Articularly placed interfragmentary screw fixation of difficult condylar fractures of the hand. *The Journal of hand surgery*. 2011;36(4):604-609.
16. Hastings H, Cohen MS. Screw Fixation of the Diaphysis of the Metacarpals. IN *Techniques in Hand Surgery*, Ed. WF Blair, Williams and Wilkins, Philadelphia. 1996:246-254.
17. Dumont C, Fuchs M, Burchardt H, Appelt D, Bohr S, Stürmer KM. Clinical results of absorbable plates for displaced metacarpal fractures. *The Journal of hand surgery*. 2007;32(4):491-496.
18. Jahss SA. Fractures of the metacarpals: a new method of reduction and immobilization. *JBJS*. 1938;20(1):178-186.
19. ten Berg PW, Ring D. Patients lost to follow-up after metacarpal fractures. *The Journal of hand surgery*. 2012;37(1):42-46.
20. Kelsch G, Ulrich C. Intramedullary k-wire fixation of metacarpal fractures. *Archives of orthopaedic and trauma surgery*. 2004;124:523-526.
21. Wong TC, Ip FK, Yeung SH. Comparison between percutaneous transverse fixation and intramedullary K-wires in treating closed fractures of the metacarpal neck of the little finger. *Journal of Hand Surgery*. 2006;31(1):61-65.
22. Rhee PC, Becker HA, Rizzo M. Update on the treatment of metacarpal fractures. *Current Orthopaedic Practice*. 2012;23(4):289-295.
23. Henry MH. Fractures of the proximal phalanx and metacarpals in the hand: preferred methods of stabilization. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 2008;16(10):586-595.
24. Bushnell BD, Draeger RW, Crosby CG, Bynum DK. Management of intra-articular metacarpal base fractures of the second through fifth metacarpals. *The Journal of hand surgery*. 2008;33(4):573-583.
25. Crichlow TP, Hoskinson J. Avulsion Fracture of the Index Metacarpal Base: Three Case Report. *Journal of Hand Surgery*. 1988;13(2):212-214.
26. Freeland AE. Outcome determinants. *Hand fractures-Repair, Reconstruction and Rehabilitation*. Philadelphia: Churchill Livingstone. 2000:11-13.

Exploring the Impact of Retraction Paste on Gingival Tissue in Fixed Prosthodontics Impressions

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Abstract

Background: Among the diverse gingival retraction systems on the market, a recently introduced cordless paste system represents a relatively new addition to this category. This system offers a simpler approach to achieve optimal retraction while ensuring excellent control of hemorrhage. Assessing the effectiveness of a paste retraction system in terms of ease of use, hemorrhage control, and the extent of vertical gingival retraction.

Materials and methods: This was a comparative study conducted at BSMMU, Dhaka from January 2009 to December 2010. Forty participants were chosen for full veneer restoration, involving the preparation of multiple abutment teeth. Following the abutment teeth preparation, flexible scales were utilized to gauge sulcus depth both before and after retraction. The medicated retraction cord technique was applied to one abutment tooth, while the paste retraction system was utilized on the other. The ease of placement and hemorrhage scores were subjectively evaluated.

Results: This study shows the average duration for the paste retraction technique was 45.13. For all participants, the paste retraction technique was comparatively more straight forward. The mean hemorrhage score with the paste retraction technique was 0.05, and the average vertical gingival retraction measured with this technique was 0.36 mm.

Conclusion: Considering the constraints of this study, the paste retraction system necessitates less time for application, is simpler to position, and ensures effective control of hemorrhage. Nevertheless, it is associated with an elevated degree of vertical retraction compared to other techniques.

Key words

Gingival retraction; Hemostatic solution; Impact; Paste retraction system; Retraction cord.

Introduction

Successful completion of the procedure is contingent upon two key factors: proper moisture control and effective gingival management, including appropriate gingival retraction. Currently, three primary methods are employed for soft tissue retraction (Sulcus widening): i) Mechanical ii) Chemo-mechanical iii) electrosurgical. The chemo-mechanical technique stands out as the most commonly utilized. It is crucial to emphasize that while aiming for a well-hemostatic opening of the gingival margin, care must be taken not to traumatize the highly sensitive gingival tissue excessively, as this could lead to prolonged retraction. A healing process involving maltreated

epithelium may result in an exposed crown margin during the insertion of the final tooth restoration or may contribute to periodontal disease.¹⁻³

The primary goal of gingival retraction is to enable access for the impression material beyond the abutment margins, creating sufficient space for the material to attain the necessary thickness. The tear resistance of the impression material is influenced by its thickness. It is essential to perform gingival retraction before taking the impression to expose the prepared tooth surfaces. Impressions with inadequate sulcular width are associated with higher occurrences of voids, tearing of impression materials, and a decrease in marginal accuracy. At times, gingival retraction becomes necessary to facilitate the completion of tooth preparation or the cementation of laboratory-manufactured restorations. Numerous studies have explored the various materials and methods employed for gingival retraction. The success of fixed prosthodontic restorations is significantly reliant on the long-term health and stability of the surrounding periodontal structures.^{2,3,4,5}

Complete veneer preparations frequently necessitate subgingival margins due to factors such as caries, existing restorations, esthetic considerations, or the requirement for added retention.^{3,4,5} In such cases, it is crucial to obtain an impression that precisely captures the prepared cervical finish lines, allowing for the creation of precise dies on which the restorations can be crafted. However, clinicians often encounter challenges as the cervical finish lines they capture may be insufficient.⁵

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Effective isolation becomes imperative due to the impression materials' limited capacity to displace soft tissues, fluids, or debris. Gingival displacement procedures facilitate the flow of impression material apical to the subgingival finish line, exposing it along with the adjacent area. These procedures contribute to straightforward instrumentation, clear visualization, and the creation of a high-quality impression.⁵ The end result is a prosthesis characterized by excellent marginal fidelity and a well-defined emergence profile.⁵

Revealing the gingival margins before taking an impression can pose a considerable challenge for dentists. This challenge is compounded by factors such as variations in sulcular depth, the distensibility of gingival tissues, the degree of gingival inflammation, the level of margin placement, and the potential for tissue laceration.^{2,4,6}

Various clinical approaches exist for achieving sufficient gingival retraction, with the mechanico-chemical method being the most commonly employed.^{3,6,7} This method involves using a retraction cord that is impregnated or soaked in various chemicals. However, there is a scarcity of clinically comparative assessments of gingival retraction systems, primarily due to the absence of consensus on evaluation criteria.^{4,7} Assessing clinical efficiency proves challenging due to the lack of suitable measuring tools, leaving the choice of the optimal gingival retraction system as an ongoing dilemma for operators.⁷

Among the diverse gingival retraction systems on the market, a cordless paste system is a relatively recent addition to this field.^{6,8} This system is positioned as offering effective retraction and outstanding control of hemorrhage.⁸ To date, there have been limited studies specifically comparing this retraction system with the commonly used medicated retraction cords. Consequently, the current study is devised to assess the clinical outcomes of the paste retraction system concerning hemorrhage control and the extent of gingival retraction.

Materials and methods

This was a comparative (In vivo) study conducted at the Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka. The study spanned from January 2009 to December 2010. Simple random sampling was employed to select subjects, who were required to meet specific criteria: being at least 18 years old, having preparations for full veneer restoration involving more than one abutment tooth, maintaining sound gingival and periodontal health of the abutment teeth, possessing abutment teeth of normal size and contour (Without developmental anomalies or regressive age changes), and having no cardiovascular disorders, diabetes, hypertension, epilepsy, gingival hyperplasia, blood disorders, or other debilitating diseases. Additionally, participants were required to exhibit no attachment loss or signs of periodontal disease, and their abutment teeth should not be tipped, tilted, or rotated. The

study included a total of 40 patients who required upper anterior fixed partial denture with retraction paste (Traxodent). Each patient underwent a thorough evaluation through medical and dental history, as well as clinical examination based on the provided history sheet.

Preparation of Subjects

Subjects were assessed clinically and radiographically for the sound condition of the abutment. Abutments were prepared for full veneer restoration with subgingival margins taking care to avoid damage to surrounding gingival tissues. After the preparation of teeth the area was isolated thoroughly. The flexible scales were fabricated by printing scale markings on transparent sheets to the accuracy of 0.5 mm.

Paste Retraction System

The paste was injected slowly into the sulcus resting on the tooth. Care was taken to ensure that the point of cannula created a closed space between the tooth and marginal edge of the gingiva. No pressure was applied on gingiva with the cannula. Sufficient quantity was placed so that the paste totally fills the sulcus in order to obtain an adequate retraction. The operator assessed the ease of placement subjectively. Time taken for placement of paste (From start of placement till completion) in the sulcus was recorded. At the end of 2 minutes paste was washed away from sulcus using air and water spray. Amount of hemorrhage after retraction was recorded using scores 0 to 2. Immediately following the assessment of hemorrhage, amount of vertical gingival retraction was recorded at the same three locations (Mesio buccal, midbuccal, disto buccal), using flexible scales. Subsequently image was captured using digital still camera for future verification. Amount of vertical gingival retraction was recorded at the three locations mesio buccal, midbuccal and disto buccal region, using flexible scales.⁹ Score for gingival hemorrhage was washed away from sulcus using air and water spray.³ Amount of hemorrhage after retraction was recorded using scores 0 to 2.

Score 0: No bleeding on removal.

Score 1: Bleeding controlled with air and water spray within 1 minute.

Score 2: Bleeding not controlled within 1 minute

Subjects were asked to feel any pressure or pain during immediately after each material was applied. Data collected on the basis of specific parameters, collected data was recorded on the pre designed data collection sheet. The following methods of statistical analysis have been used in this study. The results were averaged (Mean \pm standard deviation) for each parameter. The following methods of statistical analysis have been used in this study. The results were averaged (Mean \pm standard deviation) for each parameter. The data was analyzed using SPSS statistical package.

Results

This study shows the mean (\pm SD) MB sulcus depth of the study samples (Upper anterior teeth) was 0.34 ± 0.12 mm in group B. Mean (\pm SD) DB sulcus depth of the study samples (Upper anterior teeth) was 0.34 ± 0.13 mm. The mean (\pm SD) average of MB+B+DB sulcus depth of the study sample (Upper anterior teeth) was 0.36 ± 0.09 mm (Table I). The mean (\pm SD) time taken of the study samples (upper anterior teeth) was 45.13 ± 7.96 sec (Table II). Majority (95.0%) has no bleeding on removal (Score 0) and bleeding (Score 1) can be controlled with air and water spray within 1 minute for the rest was 5.0% (Table III).

Table I Distribution of the study sample according to different sulcus depth (n=80)

Different parameter	Mean \pm SD	Range
Mesio Buccal (MB)	0.34 ± 0.12	0.25-0.50
Mid Buccal	0.41 ± 0.14	0.25-0.75
Disto Buccal (DB)	0.34 ± 0.13	0.25-0.75
Average of MB+B+DB	0.36 ± 0.09	0.25-0.75

Table II Distribution of the study sample according to time taken for application (n=80)

	Mean \pm SD	Range
Time (Sec.)	45.13 ± 7.96	31-62

Table III Status of hemorrhage score of the study sample

	Number	Percentage (%)	Mean \pm SD
Score 0	38	95.0	
Score 1	2	5.0	0.05 ± 0.22
Score 2	0	00	

Discussion

Numerous studies have explored the effectiveness of both cords and paste in various applications. The current study, however, was specifically crafted to clinically assess the efficiency of the paste retraction system and medicated retraction cords. The evaluation focused on criteria such as ease of use, hemorrhage control, and the extent of gingival retraction.

In this study, 40 patients requiring full veneer restoration with a minimum of two abutment teeth to be prepared were selected. One tooth underwent preparation using a cord, while the other was prepared using a paste. Following the preparation of the abutment teeth, the area was meticulously isolated. Sulcus depth measurements (Mesio-buccal, mid-buccal, disto-buccal) were taken using flexible scales, which were created by printing scale markings on transparent sheets with an accuracy of 0.5 mm for easy insertion into the sulcus. The paste retraction system was then applied. Subsequently, subjective assessments were made regarding the ease of placement and hemorrhage scores. Post-retraction measurements of sulcus depth were conducted using flexible scales.

This study shows the meantime taken for paste retraction technique was 45.13 seconds. The results indicated a statistically significant increased time required for medicated retraction cord compared to paste retraction system because cord was placed by the cord packer which was time consuming.

In this study easy of placement using paste retraction technique was 100% (40 subjects) because no feeling any pressure or pain during immediately after each material was applied. The results indicated paste retraction system to be more operator - friendly in comparison to medicated retraction cord, also showed that paste was easy to use, nontraumatic, and less time consuming retraction of the sulcus and did not induce bleeding during or after retraction.^{11,10} Although cord can be painful and uncomfortable for the patient.¹²

In another study reported that paste designed for easy and fast temporary retraction of the sulcus and also nontraumatic and conservative method.¹³ Easy and fast application directly to the sulcus without pressure or packing. Comfortable to the patient. No haemostatic chemicals to contaminate the impression site – no need for extensive rinsing. Outstanding retraction for perfect impressions.

In this clinical study the mean hemorrhage scores using paste retraction technique was 0.05. This was similar to the findings reported by 10 who found that less bleeding and pain was observed with the paste retraction technique compared with the use of medicated retraction cord.

Regarding the mean vertical gingival retraction using paste retraction technique was 0.36 mm. Similar study carried out by 14, retracted sulcus in the paste retraction was 0.34 ± 0.36 . Based on the findings, gingival retraction with paste method caused less injury to gingival tissues than impregnated cord, while both provide gingival retraction.

This study shows the mean vertical gingival retraction using paste retraction technique at mesio buccal location was 0.34 mm, at midbuccal location was 0.41 mm and at disto buccal location was 0.34 mm. This findings consistent with several studies.^{1,4,5,7}

Conclusion

In the confines of this study, the paste retraction system emerges as a promising method for managing hemorrhage with ease of application. Nevertheless, the vertical gingival retraction achieved with the paste retraction system was notably lower compared to the medicated retraction cord system. While the paste retraction system shows potential for both effective hemorrhage control and optimal gingival retraction, additional research is needed to thoroughly explore this aspect.

Disclosure

All the authors declared no competing interest.

References

1. Al Hamad KQ, Azar WZ, Alwaeli HA, Said KN. A clinical study on the effects of cordless and conventional retraction techniques on the gingival and periodontal health. *J Clin Periodontol*. 2008; 35(12):1053-1058.
2. Ferencz JL. Maintaining and enhancing gingival architecture in fixed prosthodontics. *J Prosthet Dent*. 1991; 65:650-657.
3. Weir DJ, Williams BH. Clinical effectiveness of mechanical-chemical tissue displacement methods. *J Prosthet Dent*. 1984; 51:326-329.
4. Bishop K, Briggs P, Kelleher M. Margin design for porcelain fused to metal restorations which extend onto the root. *Br Dent J*. 1996; 180:177-184.
5. Trivedi SC, Talim ST. The response of human gingiva to restorative materials. *J Prosthet Dent*. 1973; 29:73-80.
6. Nemetz H, Donovan T, Landesman H. Exposing the gingival margin: A systematic approach for the control of hemorrhage. *J Prosthet Dent*. 1984; 51:647.
7. Donovan TE, Gandara BK, Nemetz H. Review and survey of medicaments used with gingival retraction cords. *J Prosthet Dent*. 1985; 53:525-531.
8. Donovan TE, Chee WWL. Current concepts in gingival displacement. *Dent Clin North Am*. 2004; 48:433-470.
9. Rena T Vakay, John C Kois. Universal Paradigms for Predictable Final Impressions. *Compendium*. 2005;26(3)132-137.
10. Sushma Phatale, P.P. Marawar, Girish Byakod, Sanjay B. Lagdive and Jitendra V Kalburge. Effect of retraction materials on gingival health: A histopathological study. *J Indian Soc Periodontol*. 2010;14(1):35-39.
11. Abdulaziz m albaker, gingival retraction - techniques and materials: a review, *Pakistan Oral & Dental Journal*. 2010; 30(2):95-100.
12. Agripina Zaharia, Mihaela Duta, Corina Stefanescu. Modern technique for the gingival sulcus management. *OHDMBSC*. 2007;VI(2).
13. Kazemi, M.; Memarian, M.; Loran, V. Comparing the Effectiveness of Two Gingival Retraction Procedures on Gingival Recession and Tissue Displacement: Clinical Study. *Research Journal of Biological Sciences*. 2009; 4 (3): 335-338.

Mortality Pattern in Hospitalized Children Younger than 12 Years of Age in a Tertiary Hospital, Chattogram, Bangladesh

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Abstract

Background: Accurate and timely information on the causes of child deaths is essential in guiding efforts to improve child survival by providing data from which health profiles can be constructed and relevant health policies formulated. This study aimed to identify causes of death in children younger than 12 years old in a tertiary hospital in Chattogram, Bangladesh.

Materials and methods: This descriptive study was conducted between July and December 2022 and assessed the death certificates of children from pediatric wards at the Chittagong Medical College Hospital (CMCH). Data regarding date and time, age, sex, cause of death, mode of death, comorbid conditions, therapeutic interventions received, and length of hospital stay were retrieved and recorded using a structured proforma.

Results: A total of 8942 children were admitted to the Pediatric Department during the study period. Total 424 paediatric deaths, 53.8% males and 46.2% females, were recorded. Out of a total of 424 pediatric deaths, 78.5% were infant deaths. Half (50%) of deaths occurred within 24 hours of admission, 186 (43.9%) were referred to PICU, but only 42 (44.1%) of them were admitted to PICU. Overall, the top three leading causes of death in descending order were acute respiratory infection, septicemia, and meningoenephalitis, representing 83.4% of causes of death at this facility, and 13% of the deaths were complicated with chronic underlying diseases.

Conclusion: Infectious diseases, especially ARI, were the major immediate causes of death, and the mortality in the study population decreased with age.

Key words

Cause of death; Hospitalized children; Immunization.

Introduction

Bangladesh has made considerable progress in child survival rate as the mortality has declined rapidly over the last decades. The successful programs for immunization, control of diarrheal disease and vitamin-A supplementation are the most significant contributors to the decline in child and infant deaths. Despite this progress, challenges remain.^{1,2} In Bangladesh, the majority of children die in hospitals. The number of children hospitalized is increasing, especially in urban centres and large community hospitals.³

Improving hospital care for seriously ill children is critical for promoting children's health. Although hospital-based

mortality review may not be a complete reflection of deaths from various causes in the general population, it may provide opportunities to examine the immediate and underlying causes contributing to deaths occurring at health facilities. With in-depth investigations, these assessments could forewarn the high-risk patient and renew the sense of commitment to fatal conditions among healthcare staff.⁸ The World Health Organization describe hospital-based review as one of the main types of death review that can provide great improvements in clinical practice and increase the survival of critically ill children.⁴ To improve the understanding of the causes of death in children and provide clinical cautionary information to professional healthcare providers, studies have been conducted in different parts of the world.⁵⁻¹¹ However, there is a lack of knowledge about the direct causes of child mortality in developing countries.¹² The present study aimed to retrospectively review and identify the trends of immediate causes and chronic underlying diseases associated with the deaths of children at one of the largest tertiary-level hospitals in Bangladesh. Appraising the mortality pattern in the Pediatric Department of CMCH would allow us to assess our strides toward achieving Sustainable Development Goal (SDG) 3, target 3.2, set to end preventable deaths of newborns and children under 5 years of age.¹³ It would also help us identify the common childhood illnesses causing death. Controlling these diseases would eventually improve the children's quality of life in our locality. This study aimed to identify causes of death in children younger than 12 years old in a tertiary hospital in Chattogram, Bangladesh.

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Materials and methods

A retrospective descriptive study was conducted based on the review of records at the Department of Pediatrics, CMCH, Chattogram, Bangladesh. The hospital is a tertiary level public teaching hospital. Ethical approval was obtained from the Ethical Review Committee of Chittagong Medical College and due to retrospective design informed consent was not required.

The data for this study were collected for a period of 6-months from July 1, 2022 to December 31, 2022. For the purpose of this study, all the children aged 1 month–12 years were included. The hospital death register was used as the starting point to collate the list of deaths that occurred during the study period. Then the relevant death notification forms were retrieved. In order to increase the reliability, the patients' register and the files were also be consulted. Using the register, patient files and the death notification forms, the relevant data as per case record form were collected. Age of the children was grouped as 1–12 months old (Infants), 1–4 years old (Toddlers), and 5–11 years old (Older children). Main causes of deaths, chronic underlying diseases, and other diagnoses during the hospitalization were recorded. The main cause of death in the present study was referred to the diagnosis of direct cause of death registered on the death certificate, and the chronic underlying diseases referred to the complicated chronic disease diagnosed before death. Data processing and analysis were carried out using the Statistical Package for the Social Sciences (SPSS), Version 23.0 (IBM Corp., Chicago, Illinois, USA). Data were expressed as median (Interquartile range) or frequency (Percentage). Differences between proportions of groups was analyzed for statistical significance using the Chi-square test. The level of statistical significance was set at $p < 0.05$.

Results

A total of 8942 children were admitted to the Pediatric Department during the study period and a total of 424 deaths in children under-12 years old were reported during the study period. Of this group, 53.8% were males; with a male to female ratio of about 1.2 boys per girl. Median age of the children was 4.0 (2.0-10.0) months. Infant deaths accounted for Majority (78.5%) of the deaths recorded; while toddlers and older children deaths accounted for 15.6% and 5.9% of total deaths, respectively. The proportion of infantile death was higher among female than male (83.7% vs. 74.1%) but the difference failed to reach statistical significance (Table 1).

Table I Deaths by age and sex among children 1 month to 12 years of age in CMCH July to December 2022

Age category	Male		Female		Total	
	n	%	n	%	n	%
1 month-12 month	169	74.1	164	83.7	333	78.5
1 year-4 years	42	18.4	24	12.2	66	15.6
5 years-12 years	17	7.5	8	4.1	25	5.9
Total	228	53.8	196	46.2	424	100.0

$p=0.053$, Chi-square test.

The majority of the dead children were from rural areas (81.4%). The median time interval between admissions and deaths was 24.5 (7.0-96.0) hours. Further analysis of the distribution of entries and death intervals revealed that 50% of deaths occurred within 24 hours of admission. Out of 424 children, 186 (43.9%) were referred to PICU, but only 42 (44.1%) of them got seats in PICU (Table II). The median length of PICU stay was 3.0 (0.9-6.1) days.

Table II Locality, time of admission, PICU referral, and length of stay in hospital of the death cases

Variables	Frequency	Percentage (%)
Locality		
Urban	79	18.6
Rural	345	81.4
Time of admission		
Early morning	64	15.1
Morning	72	17.0
Noon	74	17.5
Evening	80	18.9
Night	99	23.3
Late night	35	8.3
Length of stay in hospital		
≤ 1 day	212	50.0
>1 day -5days	128	30.2
>5 days	84	19.8
Referred to PICU	186	43.9
Got seat in PICU (n=186)	42	44.1

PICU: Pediatric Intensive Care Unit.

With regard to the causes of deaths, there were noticeable differences among the three groupings. Among Infants, just over half of the deaths (52.3%) were due to ARI; the other most prevalent causes in this group were septicemia and meningoenephalitis. In the toddler group, ARI was the most prevalent cause of death (25.8%) followed by meningoenephalitis and AKI. The three causes constituted over a 62% of all causes recorded in this group. In older children, ARI, meningoenephalitis, and CKD constituted 72% of all deaths recorded in this group (Table III).

Table III Leading cause of death among children 1 month to 12 years of age in CMCH July to December 2022

Cause of death	1-12 month		1-4 years		5-12 years		Total	
	n	%	n	%	n	%	n	%
ARI	174	52.3	17	25.8	6	24.0	197	46.5
Septicaemia	88	26.4	6	9.1	2	8.0	96	22.6
Meningoenephalitis	42	12.6	16	24.2	6	24.0	64	15.1
Meningitis	5	1.5	4	6.1	1	4.0	10	2.4
AKI	3	0.9	8	12.1	0	0	11	2.6
Heart failure	10	3.0	3	4.5	2	8.0	15	3.5
CKD	0	0	0	0	6	24.0	6	1.4
SAM	4	1.2	1	1.5	0	0	5	1.2
AWD	1	0.3	4	6.1	0	0	5	1.2
Hepatic encephalopathy	0	0	3	4.5	0	0	3	0.7
Stroke	3	0.9	0	0	0	0	3	0.7
Status epilepticus	0	0	1	1.5	1	4.0	2	0.5
Others	3	0.9	3	4.5	1	4.0	7	1.7

ARI: Acute Respiratory Infection, AKI: Acute Kidney Injury, CKD: Chronic Kidney Disease, SAM: Severe Acute Malnutrition, AWD: Acute Watery Diarrhoea.

Between 11.7 and 20.0% of the deaths in children were complicated with chronic underlying diseases (Table IV). A congenital abnormality was the most frequent chronic underlying disease observed in infants, and this proportion decreased dramatically with age.

Table IV Distribution of chronic underlying diseases of children 1 month to 12 years of age who died in CMCH July to December 2022

Cause of death	1-12 month		1-4 years		5-12 years		Total	
	n	%	n	%	n	%	n	%
Without chronic underlying disease	294	88.3	55	83.3	20	80.0	369	87.0
With chronic underlying disease	39	11.7	11	16.7	5	20.0	55	13.0
Congenital heart disease	18	5.4	2	3.0	0	0	20	4.7
CHD e Down syndrome	4	1.2	1	1.5	0	0	5	1.2
Chronic kidney disease	1	0.3	2	3.0	1	4.0	1	0.2
Cleft lip and palate	2	0.6	1	1.5	1	4.0	2	0.5
Cerebral palsy	1	0.3	1	1.5	1	4.0	3	0.7
Down syndrome	1	0.3	1	1.5	0	0	2	0.5
Hyperthyroidism with	3	0.9	1	1.5	0	0	1	0.2
Hypothyroidism	5	1.5	2	3.0	1	4.0	2	0.5
Leukemia	4	1.2	2	3.0	0	0	2	0.5
Pulmonary TB	18	5.4	1	1.5	0	0	2	0.5
Severe acute malnutrition	4	1.2	2	3.0	0	0	5	1.2
Seizure Disorder	1	0.3	1	1.5	1	4.0	6	1.4
Syndromic baby	2	0.6	1	1.5	0	0	4	0.9

Discussion

Children hospitalized at a tertiary hospital represent the important subgroups that have a high risk of mortality. Reviewing hospital deaths in a structured way could provide a good understanding of the causes of fatalities and allow for the improvement of better interventions. In the present study, 94.1% of deaths occurred under the age of five, including 78.5% in children under 1 year of age. This is similar to the studies that mentioned around 80% of deaths occurred in children who were under 5 years in hospitals of developing countries and infant mortality accounting for 30–50% of all deaths among children younger than 5 years of ageing Asia.¹⁴⁻¹⁶ These data suggest the vulnerability of children in these ages. The number of dead cases in boys is a bit more than that in girls. This might be partially due to the social tradition of preference for boys over girls, while more seriously ill boys were transferred to the higher medical centre.

Globally, ARI was the leading cause of death in the pediatric age group, followed by prematurity.¹⁶ As the present study exclude neonatal death, the main cause of

death was ARI. Infectious diseases, accounting for 61% of total deaths, were the leading causes of death in children under 5 years of age in another study, which agreed with the present study.¹⁴

Half of the deaths reported in the present study occurred within 24 hours of admission, which agreed with regional data.^{9,10} Early death could be attributed to delay in care seeking and referral. Though PICU treatment was indicated, it could not provided in 34% of the cases. Nearly two-thirds of the deaths occurred during the evening and night, which stated some irregularity in the service delivery at the study site.

The present study found that chronic underlying diseases complicated 13% of the deaths in children. However, it was estimated that around 70% of no-injury deaths among children ages 1–4 and more than 80% of deaths among all school-age children were the result of chronic causes.¹⁷ This study found that congenital abnormality was the most frequent chronic underlying disease observed in children of all ages. Even with advances in corrective surgery, congenital heart disease remains the leading cause of death in children with congenital malformations.¹⁸

Limitation

The major end of this study was its retrospective design. Although some parts of the results were consistent with the global and national data of mortality, these results should be interpreted bearing in mind that they only included deaths occurring at a medicine unit of a tertiary health care facility. This study was limited to six months, a longer study period may show a different pattern of causes of death.

Conclusion

In conclusion, the top three leading causes of death in children under 12 years old treated at the pediatric medicine ward of CMCH were in descending order: ARI, Septicaemia, and Meningoencephalitis. These three conditions represent 83.4% of causes of death at this facility.

Recommendation

Further investigation should be carried out to explore the clinical presentation and therapy strategies related to death in hospitalized children. With this information, healthcare providers could recognize fatal situations more efficiently and treat these patients more effectively.

Acknowledgement

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Disclosure

The authors declared no conflicts of interest.

References

1. Hossain A, Islam S, Munira S, Farzana S, Sarker S, Ahmed R, et al. Infant and child mortality status of Bangladesh: A study on demographic and health survey. *Asian Journal of Social Science Studies*. 2018;3(1):43-53.
2. Rahman AE, Hossain AT, Siddique AB, Jabeen S, Chisti MJ, Dockrell DH, et al. Child mortality in Bangladesh—why, when, where and how? A national survey-based analysis. *Journal of global health*. 2021;11:04052.
3. Paul R, Srivastava S, Rashmi R. Examining infant and child death clustering among families in the cross-sectional and nationally representative Bangladesh Demographic and Health Survey 2017–2018. *BMJ Open*. 2022;12(6):e053782.
4. Theiss-Nyland K, Rechel B. PMNCH Knowledge Summary 2013#27, Death review: maternal, prenatal and child. 2013. <http://www.who.int/pmnch/knowledge/publications/summaries/ks27.pdf>.
5. George IO, Tabansi PN. An audit of cases admitted in the children emergency ward in a Nigerian tertiary hospital. *Pakistan Journal of Medical Sciences*. 2010;26(3):740-744.
6. Okechukwu AA, Nwalozie C. Morbidity and mortality pattern of admissions into the Emergency Paediatric Unit of University of Abuja Teaching Hospital, Gwagwalada. *Nigerian journal of medicine: Journal of the National Association of Resident Doctors of Nigeria*. 2011;20(1):109-113.
7. Sa'ad YM, Hayatu A, Al-Mustapha II, Orahachi YM, Hauwa MU. Morbidity and mortality of childhood illnesses at the emergency pediatric unit of a tertiary hospital, north-eastern Nigeria. *Sahel Medical Journal*. 2015;18(1):1-3.
8. Ntuli ST, Malangu N, Alberts M. Causes of deaths in children under-five years old at a tertiary hospital in Limpopo province of South Africa. *Global journal of health science*. 2013;5(3):95-100.
9. Roy RN, Nandy S, Shrivastava P, Chakraborty A, Dasgupta M, Kundu TK. Mortality pattern of hospitalized children in a tertiary care hospital of Kolkata. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*. 2008;33(3):187-189.
10. Patil SW, Godale LB. Mortality pattern of hospitalized children in a tertiary care hospital in Latur: A record based retrospective analysis. *National Journal of Community Medicine*. 2013;4(01):96-99.
11. Rashid JA, AlKhalidi MJ, Majeed BA, Saleh KH. Causes of death among hospitalized children under 5 years of age in Sulaymani Pediatrics Teaching Hospital. *Iraqi journal of medical sciences*. 2009;7(1):11-20.
12. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year?. *The lancet*. 2003;361(9376):2226-2234.
13. Das T, Holland P, Ahmed M, Husain L, Ahmed M, Husain L. Sustainable Development Goal 3: Good health and well-being. In *South-East Asia Eye Health: Systems, Practices and Challenges*. Springer Singapore. 2021;61-78.
14. Zhu Y, Zhu X, Deng M, Wei H, Zhang M. Causes of death in hospitalized children younger than 12 years of age in a Chinese hospital: A 10 year study. *BMC pediatrics*. 2018;18(1):1-7.
15. George IO, Alex-Hart BA, Frank-Briggs AI. Mortality pattern in children: A hospital based study in Nigeria. *International journal of biomedical science*. 2009;5(4):369-372.
16. United Nations Inter-agency Group for Child Mortality Estimation. *Levels & Trends in Child Mortality: Report 2022, estimates developed by the United Nations Inter-agency Group of Child Mortality Estimation*. New York, NY: United Nations Children's Fund. 2023.
17. Wise PH. The transformation of child health in the United States. *Health Affairs*. 2004;23(5):9-25.
18. Perkin RM, Swift JD, Newton DA, Anas NG. *Pediatric hospital medicine*. 2nd ed. USA: Lippincott Williams & Wilkins. 2008;434-436.

Background of Drug Addiction among the Admitted Patients of Selected Rehabilitation Centers in Chattogram

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Abstract

Background: In Bangladesh drug addiction is a serious problem affecting the whole population, predominantly among the young generation. Multi drug abuse have deteriorated the overall condition affecting personal, social and economic life, which increased criminal activities, impairing health. This study aims to find out the causes of drug addiction among addicted patients of drug rehabilitation centers in Chattogram city.

Materials and methods: This cross sectional study was conducted from August to September 2023 among 52 patients admitted in different rehabilitation centers of Chattogram city through purposive sampling technique by using structured interviewer administered questionnaire. The collected data were analyzed by SPSS version 23.

Results: Out of 52 participants, 13(25%) participants were students and 38(73.1%) of participants had taken drugs under the influence of their friends. Majority of them 41(78%) lived in nuclear family, 37(71.2%) consumed cannabis and 32(61.5%) consumed Yaba. 16(30.8%) of the total participants hailed from lower class, 24(46.2%) started taking drugs before 18 years of age.

Conclusion: The prevalence of drug addiction have been shifted from upper and middle class to lower class. National plan is needed to motivate young generation for involvement in study and productive activities, to get rid of this curse.

Key words

Addiction, Drug, Rehabilitation

Introduction

In a Journal of Family Medicine and Primary care it is mentioned that 12% of deaths of liver cancer were due to alcohol consumption.¹ Bangladesh lies between golden triangle and golden crescent.² Bangladesh is now a major transit point of drug dealer due to easy access of land, sea, and air. The number of drug abuses increased as the drug dealers of America, Africa and Europe changed their route of transit through Dhaka, Chattogram, Comilla, Khulna.^{3,4} Now drug abuse is seen everywhere in the house, work place, streets, parks, slums, markets and even in educational institutes.⁵ In a report of BBS it is noted that 33% have started to take drugs at the age of 15-19 years.⁶ 7.66% suffered from drug abuse related disorder which is evident by survey of National Institute of Mental

Health in Dhaka.⁷ Yaba, cannabis, heroin, pethidine, cocaine, sleeping pills, cough syrup like phensidyl, dexpotenec are the common drugs in Bangladesh which is evident by ICDDRDB survey.⁸ Alcohol is locally produced and easily available despite of law prohibition.⁹ Yaba addiction is very popular now as Phensedyl is costly. From the HIV behavioral surveillance survey shows that the practice of needle/syringe practices has not reduced despite of Needle and Syringe Program.¹⁰ Drug addiction by the drivers is the main reason for road traffic accident. Dope test for drivers in Dhaka city is mandatory to see the level of drugs in blood. From a study in Sylhet it is seen that 64% drug abusers got money from family whereas in a report of Police Staff Journal, 17% abusers got money from home.¹¹ In a study by Dhaka Ahsania Mission, it is evident that female abusers were not keen to take treatment from rehab center. 85% of female addicts take treatment under family pressure.¹² This study aims to find the causes of drug addiction among drug addicted patients admitted in rehabilitation centers of Chittagong.

Materials and methods

This study was a descriptive type of cross-sectional study was carried out in Alert drug addiction and rehabilitation center, Dristi drug addiction and rehabilitation center and Proshanthi drug addiction and rehabilitation center of Chattogram city. The primary data were collected by visit to rehabilitation centers by face to face interview of the drug addicted patients, during the period from August 2023 to September 2023.

The sample were selected among the drug addicted patients admitted in different rehabilitation centers in Chattogram city. Total 52 patients was enrolled in this study. Purposive sampling of Non Probability type.

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Data collection tool: Data were collected by using pretested interviewer administered questionnaire. Data were collected, compiled and tabulated according to key variables and analysis was done by using SPSS version 23.

Inclusion criteria

- Drug addicted patients
- Those who are willing to participate in the study

Exclusion criteria

- Patients who are violent, mentally unsound.
- Those who are not willing to participate in the study.

Results

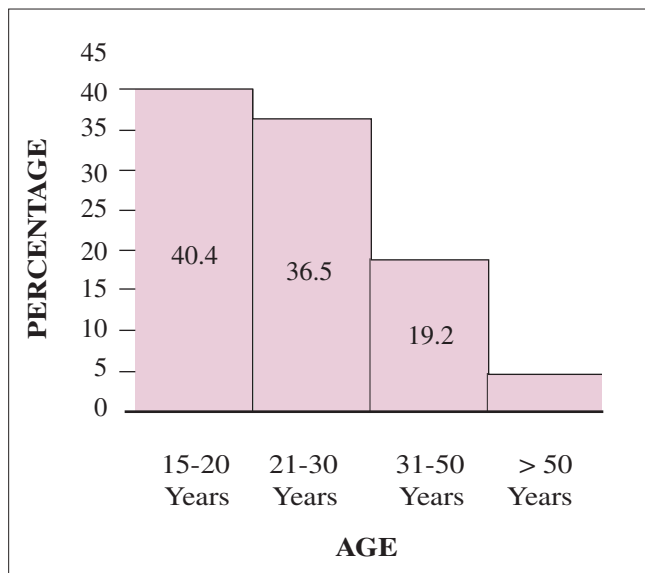


Figure 1 Age of the drug addicts (n=52)

The figure reveals that 40.4% of the respondents were aged between 15 to 20 years whereas only 4.5% of them were above 50 years

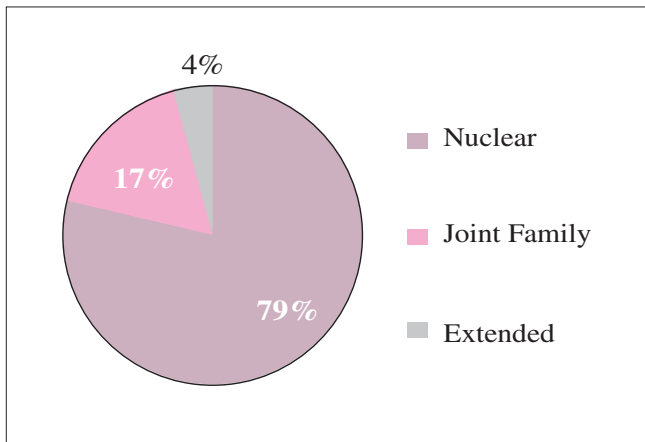


Figure 2 Family types

Above figure reveals that majority 79% belongs to nuclear family and 4% come from extended family.

Table I Socio economic status of patients (n=52)

Socio economic type	Frequency	Percentage (%)
Upper class	2	3.8
Upper middle class	13	25
Lower middle class	13	25
Upper lower class	8	15.4
Lower class	16	30.8
Total	52	100

The table reveals that 30.8% respondents belonged to lower class whereas only 3.8% were of upper class.

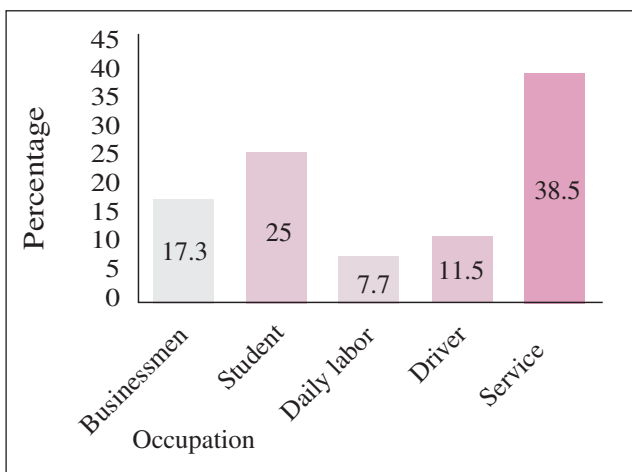


Figure 3 Profession of the respondents (n=52)

From the bar chart it is observed that 20(38.5%) of the participants are service holder and 13(25%) were students.

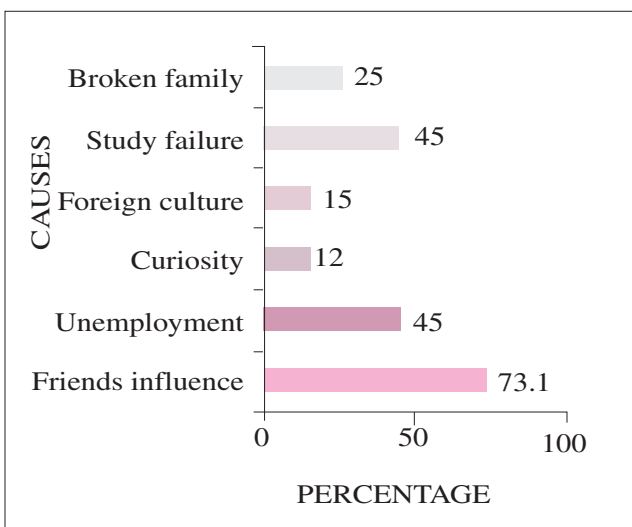


Figure 4 Reason stated by addicted person (n=52)

Above figure reveals that majority 38(73.1%) of the participants had taken drugs under the influence of their friends, 13(25%) belonged to broken family.

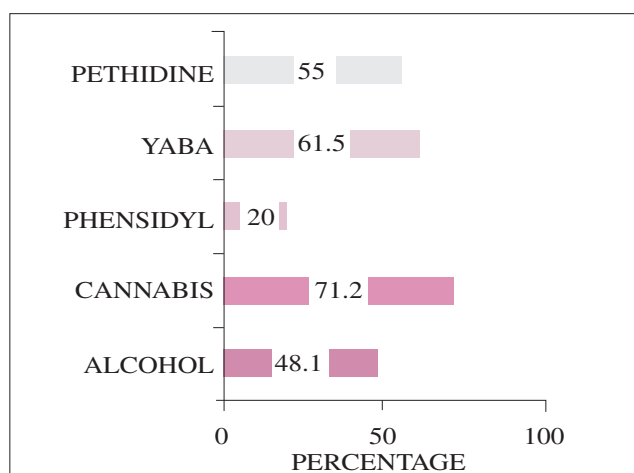


Figure 5 Types of drug s

Above figure shows that 37(71.2%) of the participants took cannabis and 32(61.5%) were habituated on yaba.

Discussion

The present study reveals that 40.4% of the respondents belonged to age group 15-20 years and 4.5% are aged above 50 years. In a study done in Sylhet a big number 31% fall under the age group 22-25 years.¹⁴ Considering sex of the respondents 100% were male in the present study while it is 72% male and 28% female in a study done in Dhaka. In the current research 40.4% of the respondent have passed secondary school, 26.9% passed primary and higher secondary school and only 4.5% passed honors and above.¹⁴ Whereas in a similar study done in Sylhet revealed that highest number of drug addicts (39.34%) studied up to secondary level of education. About 30.81% only studied up to primary level. Only 2.38% had achieved post-graduation degree. Nuclear family members are in more risk of involvement in drug addiction than extended or joint family members. The present study carried out shows that 79% of drug addicts come from nuclear family and 17% from Joint family and 4% from extended family. While in a similar study done in Sylhet it is seen that 33% of drug addicts come from nuclear family and 67% lived in extended family.¹³ In a study done in Mumbai City of India it is observed that 44.2% of the respondents belonged to upper lower class where in the current study it is seen that 30.8% belongs to lower class and only 3.8% belongs to upper class.¹² In this study 17.3% were businessmen, 25% were students, 38.5% were service holder, 11.5% were driver and 7.7% were daily labor whereas in a study done in Rajshahiit 20.19% were businessmen, 21.15% were service holder, 24.03% were students.¹³ In this study 46.2% started taking drugs before 18 years of age where as in Mumbai minimum age for starting drug abuse is 7 years. The current study revealed that highest 71.2% addicted to cannabis, yaba 61.5%, 55% Pethidine, 48.1% alcohol and 20% Phensidyl. Whereas in Sylhet 95.2% of the drug addicts had the addiction of Cannabis and 61.9% used

Yaba for addiction.¹³ In the current study 71.3% took drugs under friends influence, 45% due to unemployment and failure in studies, 25% due to broken family issues, 12% due to curiosity and 15% under influence of foreign culture. This findings is supported by another study done in Dhaka where 54.6% took drugs under friends influence, 15% due to unemployment, 34% for family issues.¹² Present study shows that highest number of drug addicts (57.7%) directly dependent on their family members and 9.1% revealed that they were involved in criminal activities like hijackings, extortion, murder etc to generate money for buying drugs. Only 1.2% were dependent on relatives, neighbors and some local traders to get money for buying drugs. Whereas in a similar study, it is seen highest number of drug addicts 64.2% were directly dependent on family members and 30.95% revealed that they were involved in several criminal activities.¹⁵

Limitation

Study area and sample size is very small. Therefore, it may not represent the fact. A wide range of research is necessary for this purpose. The researchers had to limit the sample size and range of the study due to financial ground and inadequacy of the work force. The respondents were not frank when responding in some cases.

Conclusion

Drug addiction has significantly increased in Bangladesh.. Day-by-day, youth segment of our country are getting involved in drug addiction. The trend of drug consumption is higher in youth, their age spanning between 15 to 20 years. Education level of most of the sampled drug addicts is not much satisfactory. Lower education level of young adults is associated with a greater risk of drug abuse. Some of them are also involved in criminal activities to generate money for buying drugs. The study also revealed that, highest numbers of respondents involved in cannabis and yaba addiction. Some of them are also involved in Phensedyl addiction. In recent times, Yaba has gained popularity and has become a "fashionable" drug. Cannabis and Cough syrup (Phensedyl) remains the most popular among the masses because of its low price and easy availability. Support from family members and their monitoring, professional help from doctors and will power of the patient during inpatient or outpatient drug addiction treatment may help to end dependence on drugs.

Recommendation

In the study area there is no rehabilitation centers for women. Necessary steps should be taken to establish rehabilitation centers for women in Chattogram. Government can add drug related lesson in textbook of national curriculum. Government can regulate drug related business strictly. Drug abuse prevention programs can be implemented in school and college. Rehabilitation program should be improved by government. Regular monitoring of parents and elder member to the young. Parents should be

aware about the friend circle of their children. There needs to raise awareness to the society about negative aspect of drug addiction. Those people who came back from addiction they can play proper role by tutoring other as a living example. Social media can play proper role by creating event, films etc. against drug addiction.

Disclosure

All the author declared no competing interest.

References

1. Eashwar VMA, Gopalakrishnan S, Umadevi R, Geetha A. Pattern of alcohol consumption and its associated morbidity among alcohol consumers in an urban area of Tamil Nadu. *J Family Med Prim Care*. 2019;8(6):20292035. doi:10.4103/jfmpc.jfmpc_226_19.
2. Azizul, Islam, and FaruqueHossain Md. "Drug Abuse and Its Impact on Bangladesh." *International Journal of Sociology and Anthropology*. 017;9(11):143–156. doi:10.5897/ijasa2016.0736.
3. Islam, R., N. Tabessum, A. Safiuzzaman, and M. Sarker. "A Case Study of Drug Abuse". *Medicine Today*. 2013;24(2):82-84. doi:10.3329/medtoday.v24i2.15014.
4. Islam, R., N. Tabassum, A. Shafiuzzaman, B. Umar, and M. Khanam. "Methamphetamine (YABA) Abuse: A Case Study in Young Male". *Faridpur Medical College Journal*. 2013;7(2):102-104. doi:10.3329/fmcj.v7i2.13527.
5. Firoz RA. Drug abuse in Bangladesh. *The Independent (STETHOSCOPE)*, 23 July, 2017. Abdul Kader Mohiuddin., *IJART*. 2019;2:10. [IJART:https://escipub.com/international-journal-of-addiction-research-and-therapy/](https://escipub.com/international-journal-of-addiction-research-and-therapy/) 10.
6. Maruf MM, Khan MZ, Jahan N. Pattern of Substance Use: Study in a De-addiction Clinic. *Oman MedJ*. 2016;31(5):327–331. doi:10.5001/omj.2016.66.
7. Mohit MA. Diagnosis of patients attending outpatient department (OPD) of NIMH. *Bang J Psychiatry* 2001;15(1):5-12.
8. Kamal M, Huq N, Mali B, Akter H, Arafat SMY. Epidemiology of Substance Abuse in Bangladesh: A Narrative Review. *J MentDisord Treat* 2018;4:165. DOI: 10.4172/2471-271X.1000165
9. Islam JY, Zaman MM, Bhuiyan MR, et al. Alcohol consumption among adults in Bangladesh: Results from STEPS 2010. *WHO South East Asia J Public Health*. 2017;6(1):67–74. doi:10.4103/2224-3151.206168
10. Khan SI, Reza MM, Crowe SM, Rahman M, Hellard M, Sarker MS, Chowdhury EI, Rana AKMM, Sacks-Davis R, Banu S, Ross AG. People who inject drugs in Bangladesh - The untold burden! *Int J Infect Dis*. 2019;83:109-115. doi: 10.1016/j.ijid.2019.03.009.
11. Nathan A. Thompson. Inside Bangladesh's methamphetamine problem: Booming regional drugs trade takes its toll on country's youth. *Nikkei Asian Review (Economy)*, July 23, 2017.
12. Ahad MA, Chowdhury M, Kundu I, Tanny NZ, Rahman MW. Causes of Drug Addiction among Youth in Sylhet City of Bangladesh. *IOSR Journal Of Humanities And Social Science (IOSR-JHSS)*. 2017;22(2):27-31. ISSN: 2279-0837, p-ISSN: 2279-0845.
13. Ranjan et Al (2021): A study of socio-demographic factors contributing to the habit of drug abuse in the urban slum community of Mumbai. *Biomedical Research*. 2010; 21 (3): 277-284.
14. Hossain, Md. Faruque and Mamun, Mahmuda. A Critical Analysis of the impact of Drug Addiction in Urban life of Bangladesh. Department of Social Work, Univeristy of Rajshahi, Rajshahi. 2006;6205:60- 64.
15. Kamal M, Huq N, Mali B, Akter H, Arafat SMY. Epidemiology of Substance Abuse in Bangladesh: A Narrative Review. *J MentDisord Treat*. 2018;4:165. DOI: 10.4172/2471-271X.1000165.

Hearing Impairment in School Going Children Attending at Marine City Medical College and Hospital

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Abstract

Background: Various elements, including overcrowding, subpar hygiene, socioeconomic conditions, climate, restricted medical access and low health awareness influence the prevalence of hearing loss in children. Each family of a hearing-impaired child harbors distinctive cultural, social, educational, and financial contexts warranting tailored support. The objective of this study is to identify the possible cause of hearing-impairment of school children attending the OPD of Marine City Medical College and Hospital.

Materials and methods: The cross sectional study involved 100 school children aged 7 to 12 from diverse areas in Chittagong City attending the OPD of Marine City Medical College and Hospital during the period from June 2021 to July 2022 representing various societal strata and both genders. They underwent for evaluations of hearing impairment and its underlying causes, including detailed ENT examinations.

Results: The study revealed that Wax being the leading cause (42%) of hearing impairment in school going children. The highest prevalence of hearing loss occurred at around 8 years (35%) old children. 55% of population was having bilateral hearing loss with a majority from low socio-economic backgrounds. Males exhibited significant preponderance (60%) over females (40%). Most cases had mild hearing loss (26-45 dB) (35%).

Conclusion: The study supports the effectiveness of screening for diagnosing hearing impairment in school children and root causes and suggested its expansion to all schools. Early diagnosis of hearing loss is crucial for determining the effectiveness of corrective methods and ensuring proper rehabilitation. Addressing hearing issues in children at an early age can prevent more complex management difficulties later on.

Key words

Children; Economic factors; Hearing loss; School; Social factors.

Introduction

In the realm of pediatric health, hearing impairment stands as a critical concern that significantly impacts a child's overall development and social well-being. It also has adverse effects on a child academic performance, as well as development of appropriate speech, language and psychosocial abilities. Any type of hearing loss can delay the children progress at school, resulting in learning and behavioral problems.

Hearing loss is considered one of the most prevalent disabling disorders worldwide.¹ Understanding the prevalence, causes and consequences of hearing impairment in school-going children is essential for designing effective intervention strategies. In Bangladesh hearing impairment is one of the major public health problems. The country has a population of over 170 million and about 13 million people are suffering from variable degree of hearing loss.³ million are suffering from severe to profound hearing loss leading to disability. Hearing impairment in children poses unique challenges, often requiring specialized attention and resources to address its multifaceted nature. Tertiary care hospitals such as Marine city hospital play a pivotal role in providing comprehensive healthcare services, making them ideal settings for an in-depth exploration of hearing-related issues in school-aged children. This research endeavors to contribute valuable insights into the prevalence and diverse etiologies of hearing impairment within this specific population.

The significance of this research is to bridge the existing gaps in our understanding of hearing impairment in school-going children, bringing up collaboration between healthcare and educational sectors, and contribute to the development of strategies that promote the well-being of children facing auditory challenges. The study will adopt a cross sectional study approach, enabling the collection of real-time data and the potential cause of hearing impairment in school-going children.

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Materials and methods

This research project engaged a descriptive cross sectional study comprising of 100 school children, aged between 7 and 12 years, hailing from diverse localities within Chittagong city attending at Marine City Medical College and Hospital over a period of June 2021 to July 2022. The participants were carefully selected to ensure a comprehensive representation of various social backgrounds and both genders. Inclusion criteria: Age (7-12), Patients having history of hearing impairment. Exclusion Criteria: Age <7 years and >12 years.. Data were collected in a prescribed data collection sheet. The data of each patients included age, sex, symptoms, signs, Otoscopic finding and provisional diagnosis. Then all data were compiled and analyzed. Statistical analysis was done by using appropriate statistical test. To facilitate the seamless execution of the study, requisite permissions were obtained from school headmasters, and collaboration with the Department of E.N.T. at Marine City Medical College and Hospitals was established. Necessary permission is been taken from proper authority before commencing this study.

Results

Figure 1 shows age group distribution; where majority were 8 years age group, 35%.

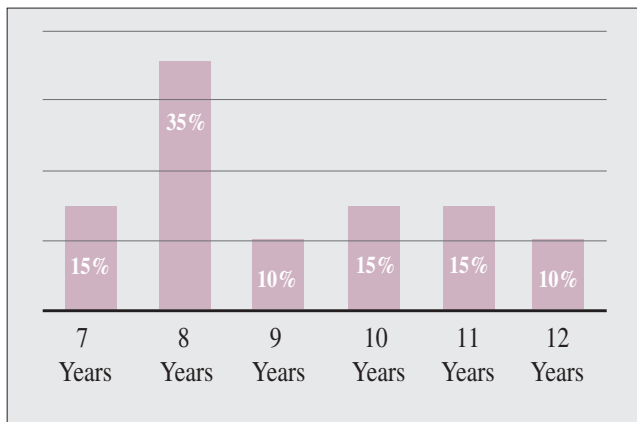


Figure 1 Age group distribution

Figure 2 shows gender distribution where 60% were male.

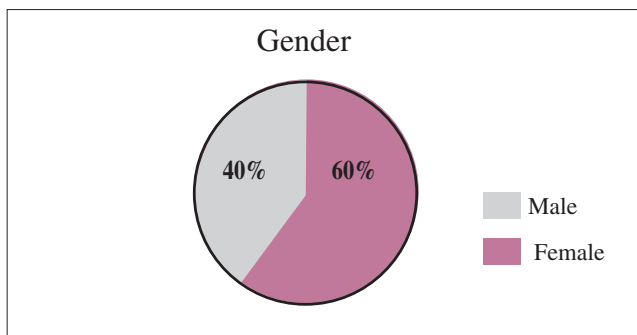


Figure 2 Gender distribution

Figure 3 shows mode of onset of hearing loss where, 84.95% had gradual hearing loss. And 15.05% had sudden hearing loss.

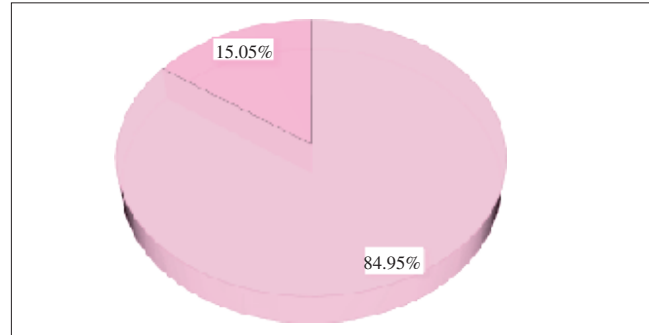


Figure 3 Mode of onset hearing loss

Figure 4 shows The manifestation of symptoms in a group of 100 patients experiencing hearing impairment., where majority had decreased hearing, followed by 38.71% had heaviness of ear, 37.63% had pain in ear.

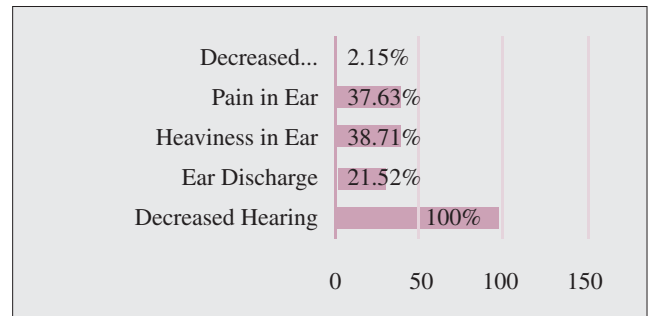


Figure 4 The manifestation of symptoms in a group of 100 patients with hearing impairment

Table I The categorization of 100 hearing-impaired patients based on the unilateral or bilateral nature of deafness distribution

TYPE	(%)
Unilateral(right)	25%
Unilateral (left)	20%
Bilateral	55%

55% had bilateral nature of deafness whereas 45% had unilateral in nature weather right or left of deafness.

Table II Identification of the lesion type causing deafness in a group of 100 patients with hearing impairment

TYPE OF LESION	(%)
CSOM	22%
ASOM	10%
WAX	42%
Trauma	13%
Secretory otitis	
Media	9%
Sensorineural	
Deafness	3%
Idiopathic	1%

Table II shows, 42% had wax type of lesion followed by 22% had CSOM and 13% had trauma.

Table III Evaluation of the level of hearing loss using audiometry in a cohort of 100 patients

DEGREE OF DEAFNESS	%
Borderline (16-25dB)	24%
Mild (26-45dB)	35%
Moderate (46-65dB)	30%
Severe (66-85dB)	11%
Profound (≥ 86 dB)	0%
Anacusis (No measurable threshold)	0%

35% had mild level of degree of deafness.

Discussion

Hearing impairments among school-age children in developing countries have been widely regarded as a major health problem. Moreover, the hearing screening of school-age children is not a part of routine clinical examination in the developing countries.¹⁻² In Bangladesh we are facing the same problem regarding hearing impairment in school children.

In our study we found there is association between hearing loss and socioeconomic status. Children those were from low socio-economic status were having impacted wax (42%) and otitis media (CSOM 22%, ASOM 10%) causing hearing impairment. Similar kind of picture was found in another study that showed, poor access to health care facility, poor hygienic condition, low immunization rate, and unnecessary use of ototoxic medications in population with low-socioeconomic status causing hearing impairment in children.³ Although, some researchers suggest that higher socioeconomic status is related to higher risk of chronic otitis media in children because of early enrollment of children in day-care centers by these working parents intensifies the risk of cross-infection.⁴⁻⁵

An article showed that the age group of hearing impairment children attending school was 9.66 ± 1.66 years. In our study we found that the mean age of hearing impairment of school attending children was around 8 years which is near similar to previous study.⁶ In another study the author discussed that the degree of hearing impairment in school going children was mild in category and was around (23%). In our study we found that the degree of hearing impairment is around 35%. The impacts of mild hearing loss on school performance may be controlled and treated via an appropriate hearing screening protocol and program. It is highly recommended that every child undergoes a hearing assessment, especially those who have poor academic performance.⁷

According to the WHO criteria, disabling hearing impairment was observed in about 0.1% of children. Unilateral hearing losses (37.0%) were less common than bilateral losses. In another study the author showed that the overall prevalence of unilateral HI >20 dB was 3.6/1000. The overall prevalence of bilateral HI >40 dB HL was 1.5/1000.⁸ In our study we found bilateral hearing loss is about 55% around. Although bilateral hearing loss causes communication difficulties in children due to adverse listening conditions, such as noisy classrooms.⁹ Among the diverse complaints reported, majority had decreased hearing, followed by 38.71% had heaviness of ear, 37.63% had pain in ear. This aligns with one research, where over 30% of patients seen at the ENT OPD for ear problems had discharge.¹⁰ The gender distribution in our study showed a total of 60% male patients and 40% female patients. Interestingly, this distribution closely parallels the percentages of boys and girls with hearing impairment among school-aged children reported by one study.¹¹

Identifying the causes of hearing loss, in our study, wax emerged as the most common culprit (42%). This aligns closely with other article finding that wax was the cause of hearing loss in 45.3% of children with hearing impairment.¹²

Around 45% of the 100 patients in our study exhibited unilateral hearing loss, with no significant difference between right and left unilateral hearing loss. This finding is consistent with other study.¹³ In terms of treatment, our study found that 55% of individuals with hearing loss were treated with medication alone. Surgical therapy (Excision of aural polyp) was administered to only 1% individuals, with two reporting improvement in symptoms, which is similar to other study.¹⁴ This nuanced approach to treatment aligns with the multifaceted nature of hearing impairments and emphasizes the need for personalized interventions.

In summary, our research delves into the intricate details of childhood hearing impairment, offering a nuanced understanding of prevalence, causes and associated factors. By synthesizing our findings with established research, we contribute to the collective knowledge that shapes interventions and care strategies for children grappling with auditory challenges.

Limitation

The study has certain limitations like only center study, small sample size and short study period.

Conclusion

The study affirms the effectiveness of school screening programs, with otoscopic screening proving valuable for identifying hearing issues in children. Otoscopy and tuning fork tests exhibit 99% efficiency in detecting both conductive and sensorineural hearing losses. The study emphasizes the importance of otoscopic screening, supplemented by tuning fork tests, for early identification of common cause of hearing impairment in school

children. To enhance early detection, educating parents and teachers through mass media and health workers is recommended, fostering a collaborative approach for comprehensive ear health.

Recommendation

Large samples size with multi-center study to be recommended.

Acknowledgement

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Disclosure

All the authors declared no competing interest.

References

1. Rao RS, Subramanyam MA, Nair NS, Rajashekhar B. Hearing impairment and ear diseases among children of school entry age in rural South India. *Int J Pediatr Otorhinolaryngol*. 2002;64:105–110. [PubMed] [Google Scholar].
2. Olusanya BO, Okolo AA, Ijaduola GT. The hearing profile of Nigerian school children. *Int J Pediatr Otorhinolaryngol*. 2000;55:173–179. [PubMed] [Google Scholar].
3. Kelly A, Malcoim, Jonathan J, Suen and Carrie L. Nieman. Socioeconomic position and hearing loss: Current understanding and recent advances. *Curr Opin Otolaryngol Head Neck Surg*. 2022;30(5): 351–357.
4. Sarafraz M, Ahmadi K. A practical screening model for hearing loss in Iranian schoolaged children. *World J Pediatr*. 2009;5(1):46-50
5. Saim A, Saim L, Saim S, Ruszymah BH, Sani A. Prevalence of otitis media with effusion amongst pre-school children in Malaysia. *Int J Pediatr Otorhinolaryngol* 1997;41:21-28.
6. Mir Mohammad Jalali, Fatemeh Nezamdoust, Hedieh Ramezani, Masomeh Pastadast. Prevalence of Hearing Loss among School-Age Children in the North of Iran. *Iranian Journal of Otorhinolaryngology*. 2020;32(2):109.
7. Reem Elbeltagy, Prevalence of Mild Hearing Loss in Schoolchildren and its Association with their School Performance. *Int Arch Otorhinolaryngol*. 2020; 24(1): e93–e98.
8. Inger Uhlén, Allison Mackey & Ulf Rosenhall, Prevalence of childhood hearing impairment in the County of Stockholm. A 40-year perspective from Sweden and other high-income countries. Published online: 2020 ; 866-873.
9. Sarafraz M, Ahmadi K. A practical screening model for hearing loss in Iranian school-aged children. *World J Pediatr*. 2009;5(1):46-50. [PubMed] [Google Scholar] [Ref list]
10. Elahi M.M., Elahi F., Elahi A. & Elahi S.B.: Pediatric hearing loss in rural Pakistan. *J. of Otolaryngology*. 1998;27(6): 348-353.
11. Sajad Hamid, Saud Lateef Chishty, Esbah-i-Lateef Mohd Lateef Chishty, Asif Wani, Qazi Najeeb; A prospective study of hearing impairment in school going children of Ghaziabad city attending a tertiary care hospital; *International Journal of Research in Medical Sciences* Chishty SL et al. *Int J Res Med Sci*. 2014;2(3):1127-1133.
12. Anita Aramani, Saurabh Kumar, Minton Mathew, Mahesh Bhat, and Vinay V. Rao. Prevalence of hearing impairment amongst school going children in the rural field practice area of the institution. *Indian J Otolaryngol Head Neck Surg*. 2019; 71(Suppl 2): 1567–1571.
13. Mishra, R.N., Bhatia B.P.R. and Bhatia, M.L. Investigations of hearing loss in school children. *Indian JLO India*. 1961;13:107.
14. Lenarz T.: Sensorineural hearing loss in children. *mt. Journal of Pediatric Otorhinolaryngology*. 1999;49:S 179-S 181.

Study on Measurement of Normal Range of Maximal Mouth Opening and Its Relationship with Age, Body Height, Weight, Face form and Face Profile of Adult Population in Chattogram City

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Abstract

Background: Maximum Mouth Mouth (MMO) measurement is an important diagnostic tool for dentists as a primary assessment of various oral and systemic diseases. Limited mouth opening during mandibular movement may be due to Temporomandibular Disorder (TMD) oral sub mucosal fibrosis, rheumatic disease, infection, malignancy, or facial trauma. Furthermore, it is also important to ensure the correct course of treatment in the oral cavity, which is one of the key factors for effective treatment. However, the normal range of MMO levels varies among different populations and ethnicities and there are no data on her MMO in the population of Chattogram City. The purpose of this study is to fill this knowledge gap by measuring her MMO in a population sample from Chattogram City and determining the normal range of MMO values.

Materials and methods: This descriptive cross-sectional study was conducted attending OPD of CIDCH & Dental Unit, CMCH within the adult population of Chattogram City. The research spanned a period July 2023 to December 2023 to capture a representative sample of participants. Three hundred and eighty six participants of age 18 to more than 61 years selected by purposive sampling were interviewed using questionnaire to elicit information. Data were collected through face to face interview from hospital's outdoor, following a convenient random sampling method.

Results: Total study population was 386 where male and female population was made up of 143(37.04%) and 243(62.95%). Maximum male and female population was in the age group 21-30 year. Where male and female population is 54 (13.98%) and 119 (30.82%). The age ranged from 18 to more than 61 years. The least age group represented were those aged 61 years and above. There were 3 persons in this age group. In this study, there was an increase in MMO from 31-40 years age group (56.07mm) and declined in 21-30 years age group (49.25mm). Average of MMO was higher in male rather than female population which was 53.15mm. The age ranged from 18 to more than 61 years. The least age group represented were those aged 61 years and above. There were 3 persons in this age group. In this study, there was an increase in MMO from 31-40 years age group (56.07mm) and declined in 21-30 years age group (49.25mm). Pearson correlation coefficient shows that there exist positive correlation ($r=1.00$) with face form and negative correlation ($r=0.004$) with face profile of MMO. p value=0.934 which was not significant.

Conclusion: This study has provided a scientific basis for assessment of MMO among patients in a city, it is limited in accuracy because it was impossible to determine if what was obtained was actually the MMO.

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Key words

Facialtrauma; MMO; Mandibular movement; Temporomandibular Disorder (TMD).

Introduction

The title suggests a comprehensive investigation into the parameters influencing maximal mouth opening among adults in Chattogram City. This research endeavors to establish a baseline for the normal range of maximal mouth opening and aims to discern potential correlations with key demographic factors such as age, body height, weight, face form, and face profile. Through meticulous examination and statistical analysis, this study seeks to contribute valuable insights into the physiological and anatomical variations of the adult population in Chattogram City, shedding light on the multifaceted factors that may influence maximal mouth opening in this specific demographic context. The exploration of "Maximum Mouth Opening and its Relationship with Age, Height, Weight, Face Form, and Face Profile" delves into the intricate interplay between various physiological

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and anatomical factors. This study seeks to unravel the correlations that exist between the maximum mouth opening capacity and key parameters such as age, height, weight, face form, and face profile. By investigating these connections, we aim to contribute valuable insights to the understanding of oral health and craniofacial dynamics. Mouth opening is an everyday activity that plays a vital role in mastication and speech and it is a clinical parameter in dentistry as well as ENT department. A known normal range of mouth opening is necessary to enable dental clinicians to conduct a thorough oral examination and dental treatment competently. Mouth opening reflects the mobility of TMJs and at the same time reflects mandibular length (The distance between the mandibular condyle and the lower incisors). Previously documented literature has shown maximal mouth opening to have ethnic, racial, and gender variations.¹ Mandibular function is assessed using a variety of diagnostic tests, including palpation of the masticatory muscles and Temporomandibular Joint (TMJ), occlusion assessment, and radiography. Maximum Mouth Opening (MMO) is also an important diagnostic tool for dentists as a preliminary evaluation.² Apart from temporomandibular disorders, Maximal Mouth Opening (MMO) is also an important indicator of oral health and function and is used in the diagnosis of various conditions such as odontogenic infections, oral malignancies, oral submucosal fibrosis and trauma.

Maximum Mouth Opening (MMO) is defined as "the maximum distance between the incisal edges of the upper and lower central incisors in the midline when the mouth is opened as wide as possible".³ However, the normal range of MMO values varies among different populations and ethnic groups. Limited mouth opening is one of the early signs of many pathological and traumatic conditions. Early detection of reduced or restricted mouth opening is necessary for an adequate and efficient approach to diagnosis and treatment procedure.⁴ There is a growing number of patients of maxillofacial fractures, temporomandibular joint diseases, oral malignancies, oral submucous fibrosis, reconstructed oral defects, and craniofacial syndromes are now recounted for the analysis and treatment to oral medicine and oral surgery field. Mouth opening and its suitability is an important factor in treatment and follow up of all of these situations.⁵ To detect reduced mouth opening it is necessary to find what is the normal range of maximum mouth opening of the people. Therefore, the aims of this study was to measure the MMO in a sample of the population in Chattogram city and determine the range of values for normal MMO.

Materials and methods

The study employed a cross-sectional observational design to investigate the normal range of maximal mouth opening and its associations with age, body height, weight, face form, and face profile within the adult population of Chattogram City. The research spanned a predetermined

period from July to December 2023 to capture a representative sample of participants. A random sampling technique was employed to ensure adequate representation across different age groups, gender and socio-economic backgrounds within Chattogram City. The sample size was calculated using statistical power analysis to achieve sufficient precision and reliability. Total sample size was 386. Adults aged 18 years and above residing in Chattogram City were eligible for inclusion. Informed consent was obtained from all participants, and ethical considerations were adhered to throughout the study. Age, body height, weight and relevant demographic information were collected through participant interviews and clinical records. Face form was categorized based on established anthropometric standards. Face profiles were assessed using standardized facial analysis techniques. The study was conducted in accordance with ethical principles and approval was obtained from the institutional review board. Privacy and confidentiality of participant information were strictly maintained. Study area was Chattogram International Dental College Hospital (CIDCH) and Dental Unit, Chittagong Medical College Hospital (CMCH). Study populations are Adult patient attending Out Patient Department (OPD) of CIDCH & Dental unit, CMCH

Inclusion criteria:

1. Age between 18 and more than 61 years
2. Bangladeshi nationality and permanent residency in Bangladesh
3. No dental prosthesis on the anterior teeth
4. Not more than 1 mm of attrition on the incisal edges
5. No systemic disease such as rheumatoid arthritis, systemic lupus erythematosus or systemic sclerosis.
6. Willing to participate.

Exclusion criteria:

1. Age less than 18
2. Non-Bangladeshi nationality or non-permanent residency in Bangladesh
3. History of temporomandibular joint disorders, oral cancer, trauma, bruxism, pain or other conditions affecting MMO
4. History of Cleft lip & cleft palate
5. Unwilling to participate

Maximal mouth opening was measured using a standardized method, employing a caliper or similar measuring device. Measurements were taken three times for each participant to ensure accuracy, and the average was recorded.

Statistical analysis is performed using the IBM Statistical Package for Social Sciences (SPSS, version 25). The mean, standard deviation, and range of values for the maximum mouth opening in the population of Chattogram City are calculated. Use graphs and charts to compare the effects of gender, age, and other variables on the maximum mouth-opening score. Statistical analyses, including correlation

coefficients and descriptive statistics, were conducted to explore relationships between maximal mouth opening and demographic variables. The significance level was set at $p < 0.05$.

Results

Total study population is 386 where male and female population is made up of 143(37.04%) and 243(62.95%). Maximum male and female population is in the age group 21-30 year. Where male and female population is 54(13.98%) and 119(30.82%) (Figure 1).

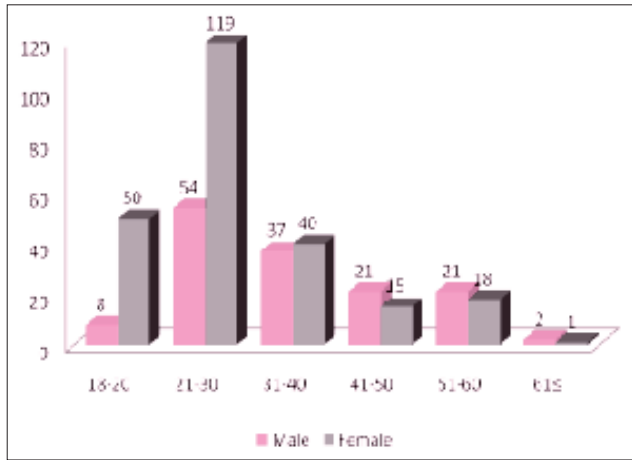


Figure 1 Age and Gender Distribution (n=386)

Average of MMO is higher in male rather than female population which is 53.15mm (Table I).

Table I Mean and SD of MMO (mm) for Gender (n=386)

Sex	Mean	SD
Male (143)	53.15	3.06
Female (243)	49.91	2.38

The age ranged from 18 to more than 61 years. The least age group represented are those aged 61 years and above. There were 3 persons in this age group (Table II). In this study, there was an increase in MMO from 31-40 years age group (56.07mm) and declined in 21-30 years age group (49.25mm) (Table II) (Figure 2).

Table II Mean and SD of MMO (mm) for Age Group (n=386)

Age Group (n)	Mean	SD
18-20 (58)	49.80	2.04
21-30 (173)	49.25	2.03
31-40 (77)	56.07	4.47
41-50 (36)	48.56	1.66
51-60 (39)	54.19	3.14
≥ 61 (3)	46.34	2.70

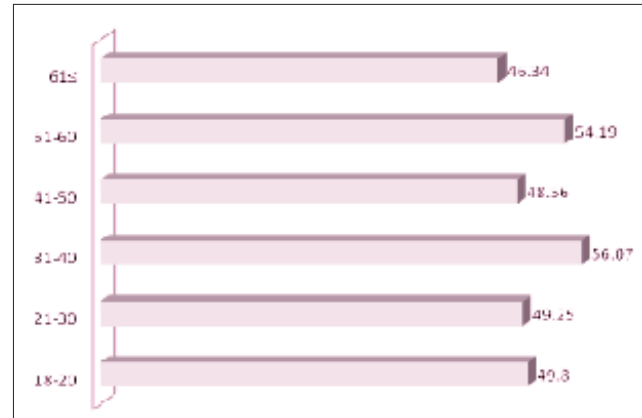


Figure 2 Mean of maximal mouth opening in millimeters for Age Group (n=386)

Pearson correlation coefficient shows that there exist positive correlation ($r=1.00$) with face form and negative correlation ($r=0.004$) with face profile of MMO. p value=0.934 which is not significant.

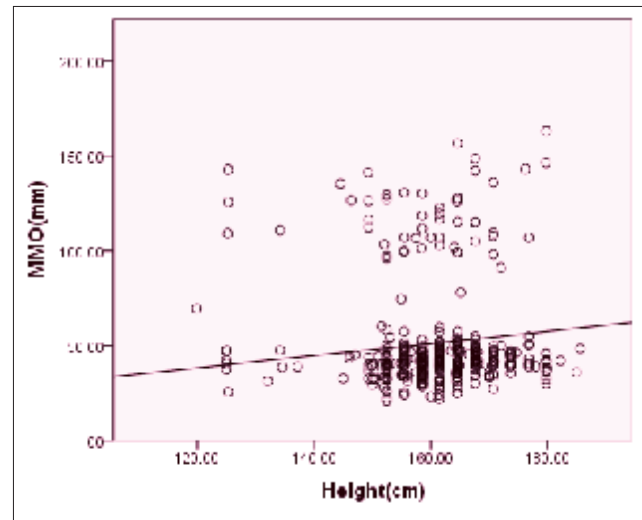


Figure 3 Scatter and linear regression diagrams of Maximal Mouth Opening (MMO) associated with Height

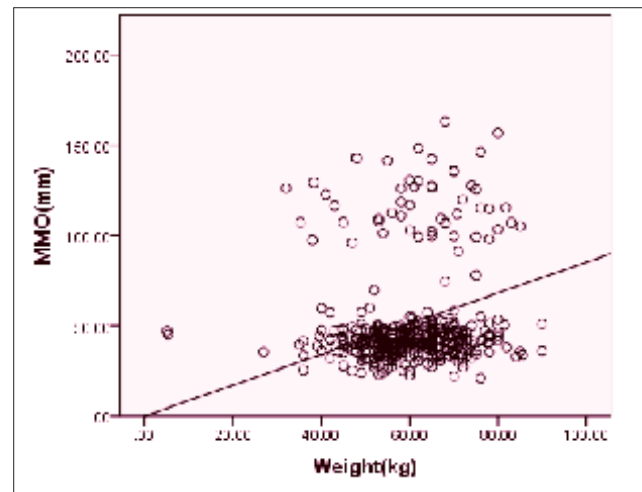


Figure 4 Scatter and linear regression diagrams of Maximal Mouth Opening (MMO) associated with Weight

Discussion

Several clinical studies have been conducted to evaluate the MMO and its association with gender, age, height, weight etc. It is usually reputable that MMO signifies a specific feature determined by interface of a variety of influences (Internal and external) however there are numerous studies that have attempted to meet a normal range of MMO in different ethnic groups.¹ A clinical study was conducted in Albanians to estimate the normal maximum mouth opening. A total of 1,348 adults aged 20 to 78 years, 750 men and 598 women, participated in the study. Participants were patients from Orchidea Dental Clinic. The mean maximum mouth opening for all participants was 43.1 ± 2.49 mm, and the mean MMO was 43.6 ± 3.63 mm for men and 40.8 ± 1.38 mm for women. The difference in her MMO between men and women is statistically significant. Both males and females had smaller mouth openings with increasing age.¹ In this study Figure 3 and 4 shows that scatter and linear regression relation between MMO with Height (cm) and weight (kg). Another study was conducted in young adult Chinese population to measure the normal range of maximum mouth opening and its correlation with variables they found that Average MMO was 52.02 ± 5.09 mm, and the average MMO of males (54.18 ± 5.21 mm) was significantly larger than that of females (49.62 ± 3.69 mm, $p < 0.001$) there was a moderately positive correlation between MMO and height (Pearson correlation coefficient $r = 0.54$, $p < 0.001$) and between MMO and weight ($r = 0.50$, $p < 0.001$). MMO increase with increasing body height and weight.² In a study was completed to measure the MMO among Libyan population they found that the mean MMO of males was 49.35 mm (4.5) mm and for females was 47.11(4.7) mm.³ In a study in Pune Maharashtra, Pune were randomly selected and divided into four groups according to their age ranges. There was a statistically significant difference between the mouth opening of male and female in all the age groups with $p < 0.05$ A linear relationship was observed between the mouth opening and age in both males and females and the mouth opening decreased as the age increased.⁵ A study in the city of Benin found that in the 18-20 year old group similarities between men and women. Women are 50.4mm and men are 50.7 mm. They found peaked in the 21- to 30 year-old group, It is 50.5 mm for women and 50.8mm for men, decreasing to 47.3 mm for women and 47.6 mm for men by age group over 71 years old. The results in this issue are consistent with other studies of age and gender as factors influencing maximum mouth opening in a population.⁶ Another study was done in Kashmiri population to assess the effect of aging they found that the average MMO of male subjects was found to be higher than that of female subjects in both age groups. The mean maximum mouth opening was 54.37 mm and 47.6.9 mm for group I men and women and 50.17 mm and 45.25 mm for group II.

MMO decreased significantly with age, regardless of gender. As part of this study, we concluded that both gender and age had a significant effect on MMO scores in the Kashmiri population, with age being a significant predictor of MMO measurement.⁷

One study was conducted on twenty governmental schools in Riyadh City. A total of 1825 Saudi students (1007 males and 818 females). The mean maximal mouth opening for males was 43.5 ± 4.23 mm (Range 29-59 mm). The mean maximal mouth opening for females was 35.5 ± 4.4 mm (Range 20-45 mm). There was a significant difference between the mouth opening of males and females in all the age group ($p = 0.000$). The mouth opening, regardless of gender, increases significantly with age from the age of 12 years to the age of 14 years ($p = 0.000$) then remained unchanged till the age of 16 years. The mouth opening of males is significantly higher than that of females in all the age group. There was a significant increase in MMO with age up to the age of 14 years regardless of gender.⁸

One study consisted of 1,383 subjects' total 745 boys and 638 in the city of Rohtak, Haryana, India. The results of the present study revealed that MMO in Indian children was 41.61, 44.9, and 46.81 mm for boys and 40.09, 44.22, and 46.2 mm for girls at age of 3, 4, and 5 years respectively. In mixed dentition, the MMO in Indian children was 46.04, 48.53, and 52.38 mm for boys and 45.95, 47.27, and 52.05 mm for girls at age groups of 6 to 8, 8 to 10, and 10 to 12 years respectively. Further significant associations were noted between age, height, body weight, and MMO. However, no gender difference was observed. A definite relationship exists between MMO, age, height, and body weight in Indian children with primary dentition as well as in mixed dentition.⁹

A cross-sectional study was conducted on 391 adult patients aged over 21 years. Mean MMO and standard deviation of the sample was 46.15mm and 8.49mm. Male study subjects showed higher MMO of 48.35 ± 7.07 mm as compared with the female subjects' MMO of 36.39 ± 7.35 mm. The MMO reduced with increasing age of the study subjects, and it showed significant differences across different age groups, gender, educational level, and health status. Weight and BMI showed significant differences with MMO. Presence of upper right and left third molars was also significantly related to MMO. In this study, reported MMO among the sample is lower than that reported in European and African population. Furthermore, MMO is affected by age, gender, educational level, weight, BMI, and presence of upper third molars in the sample.¹⁰

The proposed study included 756 patients (392 male and 364 female) which were randomly selected from concerned hospital with age range of 20-50 years in Yamuna nagar, Haryana. Age limit was further divided into three groups (20-30, 31-40, 41-50). The average mouth opening of males (45.36 ± 6.70 mm) subjects was higher as compared to female (41.27 ± 6.75 mm) with significant, p -value 0.000. The mean mouth opening \pm SD for both sexes

combined was 43.39 ± 7.02 mm. The corresponding values for mean inter-incisal opening in male population aged 20-30, 31-40, 41-50 were 45.52 ± 7.15 , 46.16 ± 5.47 , 42.96 ± 6.82 mm and in female population aged 20-30, 31-40, 41-50 were 41.40 ± 7.08 , 41.60 ± 6.29 and 40.03 ± 6.38 mm respectively. Maximal mouth opening differ significantly with gender. There is a decrease in MMO with older age group.^{11,12}

Limitation

Potential limitations, such as sampling biases or measurement errors, were acknowledged. Efforts were made to mitigate these limitations and ensure the robustness of the study's findings.

Conclusion

This study has provided a scientific basis for assessment of MMO among patients in a city, it is limited in accuracy because it was impossible to determine if what was obtained was actually the MMO, when patients were asked to open their mouths maximally.

Recommendation

It is recommended therefore that a larger population be studied.

Disclosure

All the authors declared no competing interest.

References

1. Beraj S, Vyshka G. The normal range of mouth opening in a group of Albanian population. *Front Oral Maxillofac Med.* 2021;3:1
2. Li XY, Jia C, Zhang ZC. The normal range of maximum mouth opening and its correlation with height or weight in the young adult Chinese population. *Journal of Dental Sciences.* 2017;12:56-59.
3. Ali AA, KA B. Maximum Mouth Opening among Libyan Populations. *J Oral Health Dent Sci.* 2018;5:102.
4. Nagi R, Sahu S, Gahwal D, Jain S. Study on Evaluation of Normal Range of Maximum Mouth Opening among Indian Adults Using Three Finger Index: A Descriptive Study. *J Indian Acad Oral Med Radiol.* 2017;29:186-190.
5. Koranne VV, Joshi SA, Patankar AP, Patankar SA. Evaluation of Normal Range of Maximum Mouth Opening for Pune Maharashtra Adult Population. *Arch Med Health Sci.* 2021;9:216-219.
6. Odai ED, Ugboko VI. Estimation of Maximum Mouth Opening among Healthy Adults in Benin-City, Nigeria. *Nig J Dent Res.* 2017; 2(1): 7-10.
7. Zargar DNM, Lone DMA, Tantray DMA. Effect of aging on MMO in Kashmiri population. *International Journal of Applied Dental Science.* 2019; 5(2): 160-162.
8. Dlaigan YHA, Asiry MA. Maximum Mouth Opening in Saudi Adolescents. *Journal of International Oral Health.* 2014; 6(6):45-49.
9. Kumar A, Hooda A, Gulia J, Agarwal D, Kumar V. Measurement and Evaluation of the Normal Range of Maximal Mouth Opening and Its Correlation with Age, Body Height, Weight, and Gender in the Young Indian Population. *J Oral Health Comm Dent.* 2018;12(1):14-19.
10. Moosa ZH, Slihem AG, Junaidallah AA, Alshathri AA, Samh AKAA, Kandil MM. Maximum Mouth Opening and Its Association with Gender, Age, Height, Weight, Body Mass Index and Systemic Disease in Adult Saudi Population: A Cross-sectional Study. *J Int Oral Health.* 2020;12:173-181.
11. Singh A V, Pandit N. To Establish A Normal Range of Inter-Incisal Opening- A Study of 756 Subjects of Age Group 20-50 Years in Yamunanagar City, Haryana. *J Oral Health Dent Sci.* 2013;7(2):52-55.
12. Orinni F, Akinyemi J, Bamgbose B. A pilot study of the maximum interincisal distance among adult Northern and adult among Southern Nigerian. *Journal of Basic and Clinical Science.* 2019;16:24.

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