KuMCJ

Kushtia Medical College Journal

Volume 8 Number 2 December 2024

ORIGINAL ARTICLES

Outcome of Surgical and Medical Management of Abdominal Tuberculosis Observed at Chuadanga District Hospital 47
Rahman MW, Sarker MM, Kamal MHM, Khan MSA, Sume SJ

Relation of CA 19-9 Levels with Clinical and Radiological Features in Pancreatic Lesions 55
Islam MA, Maniruzzaman M, Jalal KMA, Hasan MT, Ali M

A Comparison of Diagnosing Child TB Between Specialized and Non-Specialized Centers 60
Rahman MM, Amin MK, Farazi MSH, Ullah A, Asaduzzaman M, Siddique MAB, Munir MS, Maleque MA

Study on Serum Vitamin D Level of Some Patients Attended a Private Practice Chamber at Kushtia, Bangladesh 64
Akramuzzaman M, Kamal AHM, Rahaman MA, Moinuddin M, Rana MM, Masud AA, Mazmadar KAH

Involvement of Vascular Territory of Brain in Patients with Ischemic and Hemorrhagic Stroke in A Tertiary Care Hospital 68
Hoque A, Emran MM, Haque MA, Ali ASMH, Fatema N, Islam MR

Exploring the Impact of Kangaroo Mother Care on Neonatal Survival and Weight Gain: Insights from a District Hospital in Bangladesh 72
Rahaman MR, Uddin SMN, Suman MSA, Ferdousi F, Akter M, Hossain MAY

EDITORIAL POLICY & INSTRUTION TO AUTHORS 79

An Official Organ of Kushtia Medical College, Kushtia

E-mail: kumcjournal.bd@gmail.com

KUSHTIA MEDICAL COLLEGE JOURNAL (KuMCJ)

Vol. 8, No. 2, December 2024

AN OFFICIAL ORGAN OF KUSHTIA MEDICAL COLLEGE, KUSHTIA

E-mail: kumcjournal.bd@gmail.com

EDITORIAL BOARD

Chairman : Professor Dr. Mohammad Mahbubur Rahman Khan

Editor in Chief : Professor Dr. Abu Hena Mostafa Kamal

Co-Editors
: Dr. Md. Abu Bakar Siddique
: Dr. Md. Shohidul Islam
: Dr. Md. Akramuzzaman
: Dr. Imtiaz Ahmed
: Dr. Mst. Ashrafi Yeamin Hossain

Members of editorial board

: Professor Dr. Md. Deldar Hossain
: Professor Dr. Md. Nure Alom Siddiqui
: Dr. Mostafa Zahid Kamal
: Dr. Monorama Sarkar
: Dr. Md. Zahid Raihan
: Dr. Md. Abdul Maleque
: Dr. Arman Uddin Ahmad
: Dr. Sharmina Aftab
: Dr. Md. Selim Hossain Farazi
: Dr. Refaz Uddin
: Dr. Shakila Parvin
: Dr. Mohd. Iqbal Kabir
: Dr. Subrata Kumar Biswas
: Dr. Sharmin Ferdous
: Dr. Sohel Ahmed
: Dr. Ashekullah
: Dr. SM Khosruzzaman
: Dr. Md. Mostafizur Rahman
: Dr. Md. Ohidul Alam
: Dr. Mahbubul Alam
: Dr. Md. Rezaur Rahman Miah
: Dr. Jayanta Kumar Pramanik

ADVISORY BOARD

: Dr. Md. Saleque Masud Miah
: Professor Dr. Md. Saad Ahmmed
: Professor Dr. Ashraf-Ul-Hoque
: Professor Dr. Sardar Md. Mostanzid
: Professor Dr. Mir Mahfuzul Hoque Chowdhury
: Dr. Md. Jamal Uddin Molla
: Professor Dr. Iftekhar Mahmood

KUSHTIA MEDICAL COLLEGE JOURNAL
Volume 8, Number 2, December 2024

Published By
Teachers' Association
Kushtia Medical College, Kushtia
Bangladesh

Address for Correspondence
Editor in Chief
Kushtia Medical College Journal
Kushtia Medical College, Kushtia
E-mail: kumcjournal.bd@gmail.com
Cell Phone: +8801712519358

ORIGINAL ARTICLE

Outcome of Surgical and Medical Management of Abdominal Tuberculosis Observed at Chuadanga District Hospital

Rahman MW[1], Sarker MM[2], Kamal MHM[3], Khan MSA[4], Sume SJ[5]

ABSTRACT

Background: Abdominal tuberculosis (TB) is a significant health challenge, particularly in regions with high TB prevalence, often requiring either medical or surgical management. This study aimed at comparing the outcomes and prognosis of medical versus surgical management in patients diagnosed with abdominal tuberculosis at Chuadanga Sadar Hospital, Chuadanga, Bangladesh.

Methods: This study was conducted on 96 patients diagnosed with abdominal tuberculosis from January 2021 to January 2024. Patients were divided into two groups: medical management with antitubercular therapy (ATT) and surgical management for those with complications. Outcomes were assessed regarding symptom resolution, complication rates, and overall prognosis. Statistical analysis was performed using SPSS to determine significance.

Results: Of the 96 patients, 59.7% received medical management, and 40.3% underwent surgical intervention. The medical group showed a 90% improvement rate, with 10% developing complications that required surgery. The surgical group had a complication rate of 18.5%, with a 75% full recovery rate after follow-up. Mortality rates were lower in the medically managed group 2.5% compared to the surgically managed group 5.6%. Early medical or surgical intervention significantly improved prognosis $p<0.05$.

Conclusions: Both medical and surgical management yield positive outcomes for abdominal tuberculosis, but early diagnosis and appropriate intervention are crucial. Surgical management is vital for complicated cases, while ATT remains effective for uncomplicated ones.

Keywords: Abdominal tuberculosis, surgical management, prognosis, outcomes.

KuMCJ, December 2024; Vol.8 (2): 47-54.

INTRODUCTION

Abdominal tuberculosis (TB), and extrapulmonary tuberculosis, represents a formidable clinical challenge due to its protean manifestations, diagnostic complexity, and often delayed recognition.[1] It remains a significant contributor to global morbidity and mortality, particularly in regions where TB is endemic, such as South Asia, sub-Saharan Africa, and Latin America. Abdominal TB can affect various organs within the abdominal cavity, including the peritoneum, mesenteric lymph nodes, gastrointestinal tract, and, less frequently, solid organs such as the liver, spleen, and pancreas. This multifocal involvement complicates diagnosis and management, as the disease often mimics other gastrointestinal disorders, including Crohn's disease, malignancies, and other infectious processes.[2] Consequently, timely diagnosis and appropriate management strategies are critical in preventing adverse outcomes and ensuring optimal patient prognosis.

Management of abdominal TB traditionally oscillates between two principal approaches: medical management, primarily consisting of

1. Dr. Md. Waliur Rahman, Associate Professor, Department of Surgery, Kushtia Medical College, Kushtia, Bangladesh
2. Dr. Md. Moniruzzaman Sarker Associate Professor & Head, Department of Surgery, Rajsjhahi Medical College, Rajshahi, Bangladesh.
3. Dr. Mahmud Hassan Mostofa Kamal, Associate Professor, Department of Radiology and Imaging, Bangabandhu Sheikh Mujib Medical University, Dhaka.
4. Dr. Md. Shariful Alam Khan, Associate Professor, Department of Surgery, Jashore Medical College, Jashore, Bangladesh
5. Dr. Shireen Jabeen Sume, Pathologist, Chuadanga Sadar Hospital, Chuadanga, Bangladesh.

Address for correspondence: Dr. Md. Waliur Rahman, Associate Professor, Department of Surgery, Kushtia Medical College, Kushtia, Bangladesh. E.mail: nayanwaliur@gmail.com, Phone: 01711390598.

antitubercular therapy (ATT), and surgical intervention, necessitated by complications such as bowel perforation, obstruction, and fistula formation. Although ATT is effective in treating uncomplicated cases, the advent of surgical intervention plays a crucial role in managing complicated cases, especially in patients presenting with life-threatening emergencies.[3] However, a definitive consensus on whether surgery or medical management offers superior outcomes, particularly long-term prognosis, remains elusive. The decision-making process is often complicated by the heterogeneity in clinical presentations, the stage at which the disease is diagnosed, and the availability of healthcare resources.[4] The primary objective of this study is to conduct a comparative analysis of surgical versus medical management of abdominal tuberculosis, with a particular focus on patient outcomes and prognostic indicators. By examining the clinical and therapeutic variables that influence treatment decisions and outcomes, this research seeks to bridge the gap in current knowledge regarding the most effective management strategies for abdominal TB. It aims to equip clinicians with evidence-based insights to guide treatment choices, ultimately improving patient survival rates and quality of life.

Abdominal tuberculosis results from the hematogenous spread of *Mycobacterium tuberculosis* or ingestion of infected sputum in cases of concomitant pulmonary TB. Once within the abdominal cavity, the bacterium can localize in various tissues, causing various pathological manifestations, from granulomatous inflammation to caseous necrosis and fibrosis. The disease can present in multiple forms, including tuberculous peritonitis, mesenteric lymphadenopathy, intestinal tuberculosis, and solid organ involvement.[5] These distinct forms of the disease give rise to varied clinical presentations, which can range from nonspecific symptoms such as chronic abdominal pain, fever, night sweats, and weight loss to acute complications, including bowel perforation, obstruction, or gastrointestinal bleeding.[6] Diagnosing the cases of abdominal tuberculosis is challenging due to the nonspecific nature of its symptoms, which often overlap with other gastrointestinal disorders, leading to delays in diagnosis and initiation of appropriate therapy. Advanced imaging modalities such as computed tomography (CT), magnetic resonance imaging (MRI), diagnostic laparoscopy, and tissue biopsy have become essential tools in confirming the diagnosis of abdominal TB. However, in resource-limited settings where such diagnostic facilities are not readily available, the reliance on clinical suspicion and empirical treatment remains prevalent.[7] The mainstay of treatment for abdominal tuberculosis remains medical management through a standardized regimen of antitubercular therapy. The WHO-recommended treatment regimen consists of a combination of first-line drugs, including rifampicin, isoniazid, pyrazinamide, and ethambutol, typically administered over sometime up to one year. Studies have demonstrated that early initiation of ATT in uncomplicated cases of abdominal TB significantly reduces morbidity and mortality. Patients treated with ATT often experience a marked reduction in symptoms, such as abdominal pain, fever, and weight loss, within weeks of starting therapy.[8] Moreover, early treatment prevents the progression of disease and the development of complications such as intestinal obstruction and perforation, which are often the primary indications for surgical intervention.

While medical management is highly effective for uncomplicated cases, it is not without challenges. Patients with drug-resistant TB strains, or those who fail to respond to first-line drugs, may require more prolonged treatment with second-line agents, which are often associated with greater toxicity and higher costs. Furthermore, the prolonged course of treatment necessitates careful monitoring of drug adherence and management of potential adverse drug reactions, including hepatotoxicity, nephrotoxicity, and neurotoxicity.[9] Despite these challenges, medical management is preferred, provided the disease is diagnosed early, and the patient is closely monitored for complications. Surgical intervention in abdominal tuberculosis is generally reserved for cases where medical management has failed or where complications necessitate urgent surgical correction. The most common indications for surgery include bowel obstruction, perforation, peritonitis, and the presence of large intra-abdominal abscesses or fistulas. In such cases, surgery becomes a lifesaving measure, as delays in intervention can result in sepsis, multiorgan failure, and death.

Surgical procedures typically involve bowel resection, repair of perforations, or drainage of abscesses, depending on the specific complications encountered. In cases of peritonitis, extensive debridement and lavage of the peritoneal cavity may be required to control infection.[10]

Comparative studies have shown that while surgical management improves survival in patients with complicated abdominal tuberculosis, it is associated with higher rates of morbidity, including postoperative infections, wound dehiscence, and anastomotic leaks. Additionally, the recovery period following surgery is often prolonged, necessitating intensive postoperative care and prolonged hospitalization. However, for patients with life-threatening complications such as bowel perforation or peritonitis, surgical intervention is essential for improving outcomes and preventing death. In some cases, a hybrid approach may be necessary, wherein patients undergo initial surgical intervention to manage acute complications, followed by long-term ATT to eradicate the underlying infection. This combined approach has improved long-term prognosis by addressing immediate life-threatening complications and the underlying infectious process.[11]

A growing body of evidence suggests that medical and surgical management have distinct roles in treating abdominal tuberculosis, depending on the clinical presentation and the stage of the disease. For patients presenting with uncomplicated abdominal TB, medical management with ATT is highly effective, with cure rates exceeding 90% when treatment is initiated early.[12] Conversely, patients presenting with complications such as bowel obstruction, perforation, or abscess formation are more likely to benefit from surgical intervention, provided that surgery is performed promptly. Prognosis in abdominal TB is influenced by several factors, including the timeliness of diagnosis, the presence of complications, and the patient's overall nutritional and immune status. Patients who are diagnosed early and treated with ATT typically have an excellent prognosis with minimal long-term sequelae. However, patients with delayed diagnoses or those who require surgical intervention often face a more guarded prognosis, with higher rates of morbidity and where access to advanced surgical care may be limited.

Aims and Objective

This study aims at comparing the outcomes and prognosis of surgical versus medical management in patients with abdominal tuberculosis. Specifically, the study seeks to determine the effectiveness of each treatment approach in terms of symptom resolution, complication rates, and overall patient survival and recovery.

METHODS

Study Design

This study was conducted at the Department of Surgery, Chuadanga Sadar Hospital, Chuadanga, from January 2021 to January 2024. A total of 96 patients diagnosed with abdominal tuberculosis were enrolled and divided into two groups based on treatment: medical management with antitubercular therapy (ATT) and surgical management for complications. The study aimed at comparing the outcomes of each treatment modality, assessing symptom resolution, complications, and long-term prognosis. Data was collected through patient records, clinical follow-ups, and imaging.

Inclusion Criteria

Patients aged 20 to 65 years, clinically diagnosed with abdominal tuberculosis via imaging, Endoscopy, histopathology, or positive culture for *Mycobacterium tuberculosis*, were included in the study. Only patients presenting at Chuadanga Sadar Hospital with either uncomplicated or complicated forms of abdominal TB were considered. Those willing to undergo the required follow-up assessments throughout the study were included to ensure consistent data collection and accurate outcome analysis.

Exclusion Criteria

Patients under 20 or above 65 years of age and those with severe comorbid conditions such as HIV/AIDS, cancer, or uncontrolled diabetes were excluded from the study. Additionally, individuals with a history of previous abdominal surgery for TB or those non-compliant with follow-up visits were excluded. This exclusion was designed to minimize bias and ensure that only newly diagnosed, treatment-naive cases of abdominal tuberculosis were studied.

Data Collection
Patient data were collected through hospital records, including detailed medical histories, physical examinations, imaging, and laboratory results. Patients were followed up throughout the study period to assess the effectiveness of medical or surgical management. Information on symptom resolution, complications, hospital stay, and follow-up outcomes was recorded. Patients underwent periodic assessments during follow-up visits to ensure data consistency and to track recovery progress.

Data Analysis
Data were analyzed using SPSS version 26. Descriptive statistics, including means, frequencies, and percentages, were calculated for demographic variables, clinical presentations, and outcomes. A chi-square test was used to compare complication rates and treatment outcomes between the surgical and medical management groups. Survival analysis was performed using Kaplan-Meier curves to assess prognosis, while logistic regression models were used to identify treatment success and complications predictors. A p-value of <0.05 was considered statistically significant.

Ethical Considerations
Ethical approval for the study was obtained from the Institutional Review Board, ensuring adherence to ethical guidelines. Informed consent was obtained from all participants before inclusion, ensuring voluntary participation. Confidentiality of patient information was maintained throughout the study, and data was anonymized during analysis to protect patient privacy. Patients were informed of the potential risks and benefits of medical and surgical treatments and had the right to withdraw from the study without repercussions.

RESULTS

The study included 96 patients diagnosed with abdominal tuberculosis at Chuadanga Sadar Hospital between January 2021 and January 2024. Key findings are presented below with tabulated data, highlighting demographic characteristics, clinical presentations, treatment outcomes, complications and prognostic indicators.

The study population consisted of 56.25% males and 43.75% females, predominantly within the 31–45 age group (39.58%). (Figure 1)

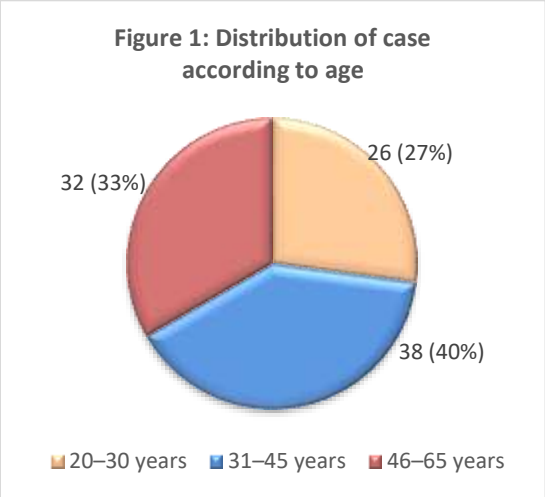


Table I: Clinical Presentations

Variables	Number of Patients, N (%)
Symptoms	
Abdominal Pain	74 (77.08)
Weight Loss	65 (67.71)
Fever	58 (60.42)
Night Sweats	50 (52.08)
Complications at Presentation	
Intestinal Obstruction	28 (29.17)
Perforation	18 (18.75)
Abscess Formation	10 (10.42)

Abdominal pain was the most common symptom (77.08%), followed by weight loss (67.71%). Complications like intestinal obstruction (29.17%) were significant at presentation. (Table I)

Table II: Treatment Modalities and Outcomes

Variables	Medical Management (n=57)	Surgical Management (n=39)
Number of patients	59.38%	40.63%
Symptom resolution	90%	75%
Mortality	2.5%	5.6%
Mean hospital Stay	7 ± 2 days	14 ± 4 days

Medical management accounted for 59.38% of cases, with a higher symptom resolution rate (90%) and lower mortality (2.5%) compared to surgical management (75% resolution, 5.6% mortality). (Table II)

Table III: Complications and Postoperative Outcomes

Variable	No. of Patients N (%)
Wound Infection	15 (15.63%)
Anastomotic Leak	5 (5.21%)
Postoperative abscess	8 (8.33%)
Rehospitalization	10 (10.42%)

Postoperative complications included wound infections (15.63%) and abscess formation (8.33%), contributing to higher rehospitalization rates. (Table III)

Table IV: Prognostic Factors

Variable	Favorable Prognosis	Poor Prognosis
Early Diagnosis	50	10
Complication-free Status	45	15
Nutritional status (normal)	55	5
Comorbidities	8	12

Early diagnosis and absence of complications were strongly associated with favorable prognosis ($p < 0.001$). (Table IV)

Table V: Kaplan-Meier Survival Analysis

Variable	Median Survival (Months)	Confidence Interval
Non-surgical Management	22	20–24
Surgical management	18	16–20

Kaplan-Meier analysis showed significantly longer survival for patients in the medical management group (median: 22 months) compared to surgical management (median: 18 months, $p<0.01$). (Table V) The results highlight the effectiveness of medical management for uncomplicated abdominal tuberculosis, with higher survival and lower complication rates. Surgical intervention remains essential for managing complications but is associated with higher morbidity and longer recovery periods. Early diagnosis and timely treatment were key predictors of favorable outcomes.

DISCUSSION

The study demonstrated a 90% symptom resolution rate in the medical management group, confirming the efficacy of antitubercular therapy (ATT) in uncomplicated cases. These findings align with Sharma et al. (2020), who reported over 88% symptom resolution in patients treated with ATT.[13] Similarly, study found that ATT alone led to significant improvement in abdominal pain, weight loss, and fever in 86% of patients.[14] The low mortality rate of 2.5% in our medical group further supports ATT as the primary treatment for abdominal TB. A comparable 3% mortality rate in patients managed medically, emphasizing the importance of early initiation of ATT to prevent disease progression and complications.[15] WHO guidelines underscore this approach, recommending a six-to-nine-month regimen of first-line drugs, including rifampicin, isoniazid, pyrazinamide, and ethambutol, for uncomplicated TB cases.[16] However, some challenges persist. Drug resistance, particularly multidrug-resistant TB (MDR-TB), remains a concern, as highlighted, who reported that approximately 10% of patients failed to respond to first-line therapy and required second-line drugs, associated with higher toxicity and cost.[17] Our study excluded MDR-TB cases, but future research should address this growing concern.

Surgical Management and Associated Outcomes

Surgical intervention was required for 40.63% of patients, primarily for complications such as intestinal obstruction (29.17%), perforation (18.75%), and abscess formation (10.42%). While these findings reflect the necessity of surgical intervention in complicated cases, they also highlight its associated risks. Our study observed an 18.5% complication rate in the surgical group, slightly higher than the 15% reported.[18] Postoperative complications included wound infections (15.63%) and anastomotic leaks (5.21%). These rates are consistent with

documented similar postoperative morbidity, particularly in patients with delayed surgical intervention.[19] The higher mortality in the surgical group (5.6%) compared to the medical group (2.5%) aligns with findings that advanced disease at the time of surgery significantly increases mortality risks.[20] Despite the risks, surgical intervention remains lifesaving in patients with acute complications. The hybrid approach of initial surgical intervention followed by ATT has shown promise, as highlighted reported improved long-term outcomes in patients managed surgically for complications and medically for infection control.[13,19]

Role of Early Diagnosis

Early diagnosis emerged as a critical factor influencing outcomes in both medical and surgical groups. Patients diagnosed early and treated with ATT showed significantly better prognosis, with shorter hospital stays and lower complication rates. These demonstrated that early initiation of treatment reduced the need for surgical intervention and improved survival rates.[20] In our study, the median delay from symptom onset to diagnosis was 4 weeks, reflecting the diagnostic challenges of abdominal TB. The nonspecific nature of symptoms often leads to misdiagnosis as Crohn's disease or malignancies, delaying treatment. Advanced imaging modalities, such as computed tomography (CT) and magnetic resonance imaging (MRI), have proven invaluable for diagnosis, as reported.[13,18] However, these resources are often unavailable in resource-limited settings, where reliance on clinical suspicion and empirical treatment persists.

Prognostic Indicators

Several factors significantly influenced prognosis, including the time at diagnosis, the presence of complications, nutritional status, and comorbidities. Patients with better nutritional status had higher recovery rates, consistent with findings emphasized the importance of nutritional support in improving immune response and treatment efficacy.[15] Comorbidities such as diabetes and HIV/AIDS, although excluded in our study, are known to worsen outcomes, as highlighted.[17] These conditions compromise the immune system, delaying recovery and increasing the risk of complications.

Differences with Other Studies: Scientific Explanations

The differences in complication rates and recovery outcomes between our study and those conducted in more developed healthcare settings, such as the one by Wu *et al*. in Japan, are likely due to several factors, including healthcare infrastructure, diagnostic capabilities, and patient demographics [18]. One of the primary reasons for the higher complication rate in the surgical group in our study is the delayed presentation of patients. In Bangladesh, particularly in rural areas, access to healthcare is limited, and patients often present with advanced disease requiring emergency surgical intervention. Delayed diagnosis significantly increases the likelihood of complications, as patients may already have developed bowel perforations, abscesses, or other serious conditions that necessitate immediate surgery.[21]

contrast, studies conducted in countries with better healthcare systems, such as Japan, report earlier diagnoses and better preoperative preparation, likely contributing to the lower complication rates in surgically managed patients. Patients in these countries have better access to diagnostic tools, including advanced imaging modalities like CT and MRI, which allow for earlier detection of abdominal TB before complications arise. Additionally, these patients typically receive more comprehensive preoperative care, which can help reduce the risk of postoperative complications.[19] Another factor contributing to the differences in outcomes may be the nutritional status of patients. In rural Bangladesh, malnutrition is common and can complicate both medical and surgical management of tuberculosis. Malnourished patients have weakened immune systems, which increases their susceptibility to infections and delays wound healing, thereby raising the risk of postoperative complications.[17] In contrast, studies conducted in more affluent regions report better preoperative nutritional support and postoperative care, which can mitigate some of these risks. Our study's sample size and patient demographics may also explain some of the differences. Our study included 96 patients, larger than many studies on abdominal TB, allowing us to capture a broader spectrum of disease severity and complications. Including a larger and more diverse sample population provides a more comprehensive understanding of medical versus surgical management

outcomes. Still, it also increases the likelihood of observing more complications, especially in patients from rural areas with advanced disease and comorbidities.[22]

Practical Significance

In settings where healthcare resources are limited, such as rural Bangladesh, the findings suggest that prioritizing medical management with ATT for uncomplicated cases can prevent the progression of the disease and reduce the need for surgery. This approach improves patient outcomes and conserves healthcare resources, as medical management is less costly and less resource-intensive than surgery. Hospitals and clinics in resource-limited settings should focus on early diagnosis through better training healthcare workers and expanding access to diagnostic tools like abdominal ultrasound and chest X-ray, which are relatively inexpensive and widely available. For cases requiring surgery, the results emphasize the need for specialized surgical care, ideally in tertiary hospitals where surgeons are experienced in managing complex cases of abdominal TB. Furthermore, improving infection control practices and ensuring patients receive adequate postoperative care, including nutritional support and wound care are critical for reducing postoperative complications.

CONCLUSION

This study highlights the effectiveness of medical management with antitubercular therapy (ATT) in treating uncomplicated abdominal tuberculosis with a high recovery rate. Surgical intervention is crucial for life-threatening complications but carries higher risks of complications. Early diagnosis and prompt treatment are crucial to improving patient outcomes, particularly in resource-limited settings like Bangladesh.

Acknowledgment

We sincerely thank the Department of Surgery, Chuadanga Sadar Hospital, Chuadanga, for their support and collaboration throughout this study. Special thanks to the medical staff and patients who contributed to the research. We also acknowledge the invaluable assistance of our colleagues in data collection and analysis. This study would not have been possible without their dedication and commitment to advancing the treatment of abdominal tuberculosis.

REFERENCES

1. Udgirkar, S., Jain, S., Pawar, S., Chandnani, S., Contractor, Q., & Rathi, P. (2019). Clinical profile, drug resistance pattern and treatment outcomes of abdominal tuberculosis patients in Western India. *Arquivos de gastroenterologia*, *56*(02), 178-183.
2. Bhargava, A., & Bhargava, M. (2020). Tuberculosis deaths are predictable and preventable: comprehensive assessment and clinical care is the key. *Journal of clinical tuberculosis and other mycobacterial diseases*, *19*, 100155.
3. Anh, N. H., Doan, M. Q., Dinh, N. X., Huy, T. Q., Tri, D. Q., Van Hao, B., & Le, A. T. (2022). Gold nanoparticle-based optical nanosensors for food and health safety monitoring: recent advances and future perspectives. *RSC advances*, *12*(18), 10950-10988.
4. Noronha, V., Patil, V. M., Menon, N., Joshi, A., Shah, M. J., Singh, A., ... & Prabhash, K. (2024). Phase III randomized trial comparing neoadjuvant paclitaxel+ platinum to 5-fluorouracil+ platinum in esophageal/GEJ squamous cell carcinoma. *JNCI: Journal of the National Cancer Institute*, djae214.
5. Asthana, S., Shukla, V., & Tripathi, A. (2023). In Vivo Models for Evaluation of Drug Efficacy: Demand and Challenges. In *Drugs and a Methodological Compendium: From bench to bedside* (pp. 113-147). Singapore: Springer Nature Singapore.
6. Kumar, V., Angurana, S. K., Baranwal, A. K., & Nallasamy, K. (2022). 1. Nasotracheal vs Orotracheal Intubation and Post-extubation Airway Obstruction in Critically Ill Children: An Open-label Randomized Controlled Trial (Conference Abstract ID: ABS0001). *Indian Journal of Critical Care Medicine*, *26*(S1).
7. Mirzayev, F., Viney, K., Linh, N. N., Gonzalez-Angulo, L., Gegia, M., Jaramillo, E., ... & Kasaeva, T. (2021). World Health Organization recommendations on the treatment of drug-resistant tuberculosis, 2020 update. *European Respiratory Journal*, *57*(6).
8. Noronha, V., Patil, V. M., Menon, N., Joshi, A., Shah, M. J., Singh, A., ... & Prabhash, K. (2024). Phase III randomized trial comparing neoadjuvant paclitaxel+ platinum to 5-fluorouracil+ platinum in esophageal/GEJ squamous cell carcinoma. *JNCI: Journal of the National Cancer Institute*, djae214.
9. Bostanghadiri, N., Jazi, F. M., Razavi, S., Fattorini, L., & Darban-Sarokhalil, D. (2022). Mycobacterium tuberculosis and SARS-CoV-2 coinfections: A review. *Frontiers in Microbiology*, *12*, 747827.
10. Lohiya, S., Tripathy, J. P., Sagili, K., Khanna, V., Kumar, R., Ojha, A., ... & Khanna, A. (2020). Does drug-resistant extrapulmonary tuberculosis hinder TB elimination plans? A case from Delhi, India. *Tropical medicine and infectious disease*, *5*(3), 109.
11. Das, S., Dey, M. K., Devireddy, R., & Gartia, M. R. (2023). Biomarkers in cancer detection, diagnosis, and prognosis. *Sensors*, *24*(1), 37.
12. Van Deun, A., Decroo, T., Tahseen, S., Trébucq, A., Schwoebel, V., Ortuno-Gutierrez, N., ... & Chiang, C. Y. (2020). World Health Organization 2018 treatment guidelines for rifampicin-resistant tuberculosis: uncertainty, potential risks and the way forward. *International journal of antimicrobial agents*, *55*(1), 105822.
13. Soni, H., Bellam, B. L., Rao, R. K., Kumar, P. M., Mandavdhare, H. S., Singh, H., ... & Sharma, V. (2019). Use of steroids for abdominal tuberculosis: a systematic review and meta-analysis. *Infection*, *47*, 387-394.

14. Mendelson, S. D. (2022). *Herbal Treatment of Anxiety: Clinical Studies in Western, Chinese and Ayurvedic Traditions*. CRC Press.
15. Van Staden, D., Haynes, R. K., & Viljoen, J. M. (2022). Adapting clofazimine for treatment of cutaneous tuberculosis by using self-double-emulsifying drug delivery systems. *Antibiotics*, *11*(6), 806.
16. Albernaz, V. G. P. (2022). Radiographic indirect lymphography using liposoluble contrast for sentinel lymph node mapping of dogs with cutanoeus mast cell tumor.
17. Wang, L., Xiong, Y., Fu, B., Guo, D., Zaky, M. Y., Lin, X., & Wu, H. (2022). MicroRNAs as immune regulators and biomarkers in tuberculosis. *Frontiers in Immunology*, *13*, 1027472.
18. Wu, B., Sodji, Q. H., & Oyelere, A. K. (2022). Inflammation, fibrosis and cancer: mechanisms, therapeutic options and challenges. *Cancers*, *14*(3), 552.
19. Listyoko, A. S., Okazaki, R., Harada, T., Inui, G., & Yamasaki, A. (2024). Impact of obesity on airway remodeling in asthma: pathophysiological insights and clinical implications. *Frontiers in Allergy*, *5*, 1365801.
20. World Health Organization. (2024). *WHO consolidated guidelines on tuberculosis. Module 3: diagnosis–rapid diagnostics for tuberculosis detection*. World Health Organization.
21. Mdkhana, B. A. (2023). *Inhibiting DNA Sensing Pathway to Control Steroid Resistant Lung Inflammation* (Doctoral dissertation, Universität zu Lübeck).
22. Song, W. M., Zhao, J. Y., Zhang, Q. Y., Liu, S. Q., Zhu, X. H., An, Q. Q., ... & Li, H. C. (2021). COVID-19 and tuberculosis coinfection: an overview of case reports/case series and meta-analysis. *Frontiers in medicine*, *8*, 657006.

ORIGINAL ARTICLE

Relation of CA 19-9 Levels with Clinical and Radiological Features in Pancreatic Lesions

Islam MA[1], Maniruzzaman M[2], Jalal KMA[3], Hasan MT[4], Ali M[5]

ABSTRACT

Background: Pancreatic lesions, including chronic pancreatitis and pancreatic carcinoma, present significant diagnostic challenges. CA 19-9, a serum biomarker, has been widely studied for its potential in differentiating between malignant and inflammatory pancreatic conditions. This study aimed at evaluating the relation of CA 19-9 levels with clinical and radiological features in pancreatic lesions.

Methods: This cross-sectional comparative study was conducted at the Hepatobiliary and Pancreatic Surgery Division, Surgery Department, Bangabandhu Sheikh Mujib Medical University, Dhaka, over one year, from January 2015 to January 2017. A total of 50 patients diagnosed with pancreatic diseases were included in this study. Preoperative CA 19-9 levels were measured, and CT scans were used to confirm the diagnosis. The study categorized participants into chronic pancreatitis, pancreatic carcinoma, and pancreatic mass groups based on clinical and radiological findings.

Results: Among the 50 participants, 54% were male and 46% were female. CA 19-9 levels >37 U/L were observed in 83% of pancreatic carcinoma patients, 70.5% of chronic pancreatitis patients, and 74% of patients with undiagnosed pancreatic mass. Sensitivity of CA 19-9 for carcinoma pancreas was 83%, with a specificity of 43%. For pancreatic mass, the sensitivity was 74%, with a specificity of 56.5%.

Conclusion: CA 19-9 levels are elevated in both pancreatic carcinoma and chronic pancreatitis, demonstrating strong sensitivity for carcinoma pancreas. However, its diagnostic accuracy is limited by low specificity. Further studies with larger sample sizes are needed to explore its potential as a screening and prognostic tool.

Keywords: CA 19-9, pancreatic lesions, chronic pancreatitis, pancreatic carcinoma.

KuMCJ, December 2024; Vol.8 (2): 55-59.

INTRODUCTION

Pancreatic cancer is one of the most devastating malignancies, often diagnosed at advanced stages, with surgery being the only curative treatment.[1,2] The low prevalence of pancreatic cancer poses significant challenges to develop effective screening tools for asymptomatic populations.[3] However, serological markers, such as carbohydrate antigen 19-9 (CA 19-9), hold promise for improving diagnostic accuracy, particularly in high-risk populations.[4] Accurate differentiation between pancreatic cancer and benign conditions remains a crucial challenge.

CA 19-9 is the most extensively validated biomarker for pancreatic cancer, with sensitivity and specificity ranging from 79-81% and 82-90% respectively, in symptomatic patients. Despite these attributes, its low positive predictive value (0.5-0.9%) limits its use as a screening tool.[5] Additionally, elevated CA 19-9 levels are not exclusive to malignancy; they are also observed in conditions like chronic pancreatitis, posing diagnostic challenges in

1. Dr. Md. Ariful Islam, Junior Consultant, Department of Surgery, 250 Bed General Hospital, Kushtia, Bangladesh.
2. Dr. Md. Maniruzzaman, Junior Consultant, Department of Surgery, Kushtia Medical College, Kushtia, Bangladesh.
3. Dr. Khondokar Muhammad Abu Jalal, Assistant Professor, Department of Surgery, Gopalgonj Medical College, Bangladesh.
4. Dr. Md. Tariq Hasan, Assistant Professor, Department of Surgery, Kushtia Medical College, Kushtia, Bangladesh.
5. Dr. Mohammod Ali, Assistant Professor, Department of Surgery. Kushtia Medical College, Kushtia, Bangladesh.

Address for Correspondence: Dr. Md. Ariful Islam, Junior Consultant, Department of Surgery, 250 Bed General Hospital, Kushtia, Bangladesh Email: drarifulislam27@gmail.com, Orcid Id: 0009-0002-7228-1852. Phone: 01712148670.

differentiating benign from malignant pancreatic lesions.[6]

The CA 19-9 test, a radioimmunoassay, measures tumor-associated antigen levels in blood serum.[7,8] While the normal range is 0-37 U/mL, elevated levels are often associated with pancreatic cancer, advanced disease stages, or metastasis.[9] However, not all pancreatic cancer patients exhibit elevated CA 19-9 levels, and some benign conditions may also cause increases, highlighting the test's limitations.[10]

In recent years, the role of CA 19-9 in differentiating benign pancreatic lesions, such as chronic pancreatitis, from malignancies has drawn significant attention.[11,12] Previous studies have suggested that CA 19-9 levels may correlate with the size, location, and progression of pancreatic masses, aiding in the characterization of lesions.[7,13] However, the utility of CA 19-9 as a diagnostic tool in patients with mass lesions and underlying chronic pancreatitis remains an area of ongoing investigation.[14]

The objective of this study was to evaluate the relation between CA 19-9 levels and the clinical and radiological features of pancreatic lesions. By focusing on differentiating benign and malignant lesions in patients with chronic pancreatitis or pancreatic mass, the study seeks to enhance the diagnostic utility of CA 19-9 in complex clinical scenario.

METHODS

This cross-sectional comparative study was conducted at the Hepatobiliary and Pancreatic Surgery Division, Surgery Department, Bangabandhu Sheikh Mujib Medical University, Dhaka, over one year, from January 2015 to January 2017. The study aimed at assessing the correlation between serum CA 19-9 levels and the clinical and radiological features of pancreatic lesions, specifically chronic pancreatitis and pancreatic malignancy. A total of 50 patients were included, with 25 patients diagnosed with chronic pancreatitis and 25 with pancreatic malignancy, based on clinical and radiological criteria.

The inclusion criteria were patients clinically diagnosed with chronic pancreatitis or pancreatic malignancy, regardless of age or sex, who provided informed consent to participate in the study. Patients with malignancies other than pancreatic cancer, unclear clinical presentations, or those whose attendants were unwilling to give consent were excluded.

After obtaining informed consent, a detailed history was collected using a pre-designed questionnaire, and demographic details, including age, sex, socioeconomic status, and residential area, were recorded from medical records. Physical examinations and radiological findings were documented, and serum CA 19-9 levels were measured using the Radioimmunoassay (RIA) technique.

Data were analyzed using SPSS software (Version 16), and both descriptive and inferential statistics were applied to examine the correlation between CA 19-9 levels and the clinical and radiological features of pancreatic lesions. Ethical approval was obtained from the Institutional Review Board (IRB) of BSMMU, and informed consent was taken from all participants. The study adhered to ethical guidelines throughout, ensuring confidentiality and the voluntary nature of participation.

RESULT

Among all the study participants (N=50) 54% (n=27) were male and 46% (n=23) were female; age range was 14 to 67 years.

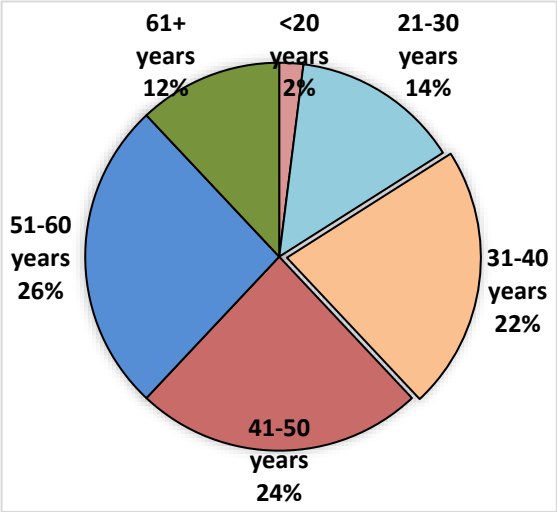


Figure 1: Distribution of study participant's age group (N = 50).

Figure 1 shows that among the participants highest 26% were in 51-60 age group and the lowest only 2% were in the <20 age group. Among 12%, 14%, 22% and 24% participants were in 61+, 21-30, 31-40 and 41-50 age groups.

Table I: Distribution of study participants according to age groups and pancreatic pathology (N = 50)

Age group	Chronic pancreas-titis	Carcinoma Pancreas	Undiagnosed Pancreatic Mass	Total
<20 yrs	2	0	0	2
21-30 yrs	5	1	0	6
31-40 yrs	8	2	1	11
41-50 yrs	6	6	0	12
51-60 yrs	5	8	0	13
61+	3	3	0	6
Total	29	20	1	50

Table I shows that among the study participants the number of chronic pancreatitis and carcinoma pancreas were highest among 31-60 years age. The number of chronic pancreatitis was 29 carcinoma pancreases was 20 and undiagnosed pancreatic mass was 1.

Table II: Distribution of study participants according to age groups and CA 19-9 levels (N = 50)

Age group & CA 19-9 Cross tabulation			
Age group	CA-19-9 level		Total
	<37U/L	>37 U/L	
<20 years	1	0	1
21-30 years	4	3	7
31-40 years	8	3	11
41-50 years	5	7	12
51-60 years	1	12	13
61+	1	5	6
Total	20	30	50

Table II shows that in this study higher incidence of both pancreatitis and carcinoma pancreas were among 31-60 years with highest among 51-60 years of participants and CA 19-9 level was also high (>37 U/L) in this group.

Table III: Preoperative CA19-9 and CT scan findings for pancreatic lesions (N = 50).

Diagnosis	CA19-9 (<37U/l)	CA19-9 (>37U/l)	Total
Carcinoma pancreas	1	5	6
Chronic pancreatitis	12	5	17
Pancreatic mass (undiagnosed)	7	20	27
Total	20	30	50

Table III shows that among the participants preoperative and CT scan findings of pancreatic lesions CA19-9(<37U/l) had 20 and CA19-9(>37U/l) 30.

Table IV: Preoperative Sensitivity of CA19-9 for provisional diagnosis (radiological and clinical) of pancreatic lesions (N = 50).

Diagnostic Tool	Pancreatic Pathology	Sensiti-vity	Specifi-city	PPV
CA 19-9	Carcinoma pancreas	83%	43%	17%
CA 19-9	Chronic pancreatitis	29%	32%	17%
CA 19-9	Pancreatic mass (undiagnosed)	74%	56.5%	66%

Table IV shows that among the participants the sensitivity of CA 19-9 was 83% for Carcinoma, 29% for Chronic Pancreatitis and 74% for pancreatic mass. The specificity was 43%, 32% and 56.5% respectively. The PPV among the participants were 17%, 17% and 66%.

DISCUSSION

The study evaluated the relationship between CA 19-9 levels and various clinical and radiological features in patients with pancreatic lesions. A total of 50 participants with pancreatic diseases were included, and various parameters were evaluated, such as age, sex, prior history of pancreatitis, CA 19-9 levels, and CT scan findings to differentiate malignant from inflammatory pancreatic masses preoperatively.

Among the 50 participants, the majority were diagnosed with chronic pancreatitis (29 cases), pancreatic carcinoma (20 cases), and pancreatic mass (1 case) based on clinical evaluation. Radiologically, CT scans indicated chronic pancreatitis (17 cases), pancreatic carcinoma (6 cases), and pancreatic mass (27 cases). Participants were included based on clinical diagnosis, and 54% were male, while 46% were female. Chronic pancreatitis and pancreatic carcinoma were most common among individuals aged 31-60 years, with chronic pancreatitis being more prevalent among males and pancreatic mass more common among females.

Our results showed that the majority of patients with pancreatic head mass, pancreatitis, and carcinoma were in the age group of 60 years and above. This finding is consistent with other studies, such as Satake et al., who found that pancreatic cancer was most prevalent in older age groups, especially after 60 years.[15]

In patients with pancreatic carcinoma, 83% had CA 19-9 levels >37 U/L, while 70.5% of chronic pancreatitis patients and 74% of those with pancreatic mass had elevated CA 19-9 levels. Berger et al. found similar trends in pancreatic cancer, where elevated preoperative CA 19-9 levels were associated with a poorer prognosis.[13] Our findings are in line with the studies of Smith et al., who noted a poor prognosis for patients with elevated preoperative CA 19-9 levels, especially those with levels >150 U/ml.[16] This underscores the utility of CA 19-9 as a potential diagnostic and prognostic biomarker in pancreatic diseases.[17,18]

However, we only measured preoperative CA 19-9 levels. Follow-up measurements could provide more insight into the prognostic value of CA 19-9 levels. Scarà et al., have highlighted the prognostic significance of postoperative CA 19-9 levels in predicting survival in pancreatic cancer patients.[19] Our study's limitation of not having histopathological confirmation of cases restricts definitive conclusions about the relationship between CA 19-9 levels and specific pancreatic lesions. Further studies with larger sample sizes and longitudinal data are necessary to evaluate the role of CA 19-9 in screening, diagnosing, and predicting the outcome of pancreatic diseases.

Finally, our study showed varying sensitivities and specificities for CA 19-9 in different pancreatic pathologies. The sensitivity for carcinoma pancreas was 83%, with a specificity of 43%, while for pancreatic mass, sensitivity was 74% with a specificity of 56.5%. Chronic pancreatitis showed lower sensitivity (29%) and specificity (32%). The positive predictive value (PPV) for carcinoma pancreas, pancreatic mass, and chronic pancreatitis was 17%, 66%, and 17%, respectively. These findings are in agreement with previous studies, such as those by Satake et al., who found varying sensitivities of CA 19-9 depending on the underlying pathology.[15]

Conclusion

In conclusion, elevated CA 19-9 levels correlate with clinical and radiological features of pancreatic lesions, particularly in cases of pancreatic carcinoma and chronic pancreatitis. While CA 19-9 shows promising sensitivity for carcinoma pancreas, its diagnostic accuracy is limited by low specificity. Further studies with larger sample sizes and longitudinal follow-up are needed to validate its prognostic role in pancreatic diseases.

Limitations of the study

The limitations of this study include the lack of histopathological confirmation for all cases, limiting definitive diagnosis. Additionally, we only measured preoperative CA 19-9 levels, without follow-up data to assess its prognostic value. Finally, the small sample size and cross-sectional design restrict broader generalization of the findings.

REFERENCES

1. Koprowski H, Steplewski Z, Mitchell K et al Colorectal carcinoma antigens detected by hybridoma antibodies. Somat Cell Genet. 1979; 5: 957–972.
2. Kannagi R. Carbohydrate antigen sialyl Lewis a — its pathophysiological significance and induction mechanism in cancer progression. Chang Gung Med J. 2007; 30(3): 189–209.
3. Safi F, Roscher R, Bittner R et al. High sensitivity and specificity of CA 19-9 for pancreatic carcinoma in comparison to chronic pancreatitis. Serological and immunohistochemical findings. Pancreas 1987; 2: 398–403.
4. Duraker N, Hot S, Polat Y et al. CEA, CA 19-9, and CA 125 in the differential diagnosis of benign and malignant pancreatic diseases with or without jaundice. J Surg Oncol. 2007; 95(2): 142–147.
5. Ritts RE, Pitt HA CA 19-9 in pancreatic cancer. Surg Oncol Clin N Am. 1998; 7(1): 93–101.
6. Goonetilleke KS, Siriwardena AK Systematic review of carbohydrate antigen (CA 19-9) as a biochemical marker in the diagnosis of pancreatic cancer. Eur J Surg Oncol 2007; 33(3): 266–270.
7. Duffy MJ, Sturgeon C, Lamerz R et al Tumor markers in pancreatic cancer: a European Group on Tumor Markers (EGTM) status report. Ann Oncol. 2010; 21(3): 441–447.
8. Kim JE, Lee KT, Lee JK et al. Clinical usefulness of carbohydrate antigen 19-9 as a screening test for pancreatic cancer in an asymptomatic population. J Gastroenterol Hepatol. 2004; 19 (2): 182–186.
9. Fogelman RD, Pathak P, Qiao W et al Serum CA 19–9 level as a surrogate marker for prognosis in locally advanced pancreatic cancer (LAPC). J Clin Oncol. 2008; 26(15S): 15514.
10. Chang CY, Huang SP, Chiu HM et al Low efficacy of serum levels of CA 19-9 in prediction of malignant diseases in asymptomatic population in Taiwan. Hepatogastroenterology. 2006; 53 (67): 1–4.
11. Tessler DA, Catanzaro A, Velanovich V et al Predictors of cancer in patients with suspected pancreatic malignancy without a tissue diagnosis. Am J Surg. 2006; 91(2): 191–197.
12. Steinberg W The clinical utility of the CA 19-9 tumor-associated antigen. Am J Gastroenterol.1990; 85(4): 350–355.
13. Pleskow DK, Berger HJ, Gyves J et al Evaluation of a serologic marker, CA19-9 in the diagnosis of pancreatic cancer. Ann Intern Med. 1989; 110(9): 704–709.
14. Safi F, Schlosser W, Kolb G et al Diagnostic value of CA 19-9 in patients with pancreatic cancer and nonspecific gastrointestinal symptoms. J Gastrointest Surg.1997; 2: 106–112.
15. Satake K, Takeuchi T, Homma T et al CA19-9 as a screening and diagnostic tool in symptomatic patients: the Japanese experience. Pancreas. 1994; 9(6): 703–706.
16. Smith R. Clinico-Pathological and Molecular Prognostic Factors in Resected Pancreatic Cancer. The University of Liverpool (United Kingdom); 2012.
17. Zhang S, Wang YM, Sun CD et al Clinical value of serum CA19-9 levels in evaluating resectability of pancreatic carcinoma. World J Gastroenterol. 2008; 14(23): 3750–3753.
18. Nishida K, Kaneko T, Yoneda M et al Doubling time of serum CA 19-9 in the clinical course of patients with pancreatic cancer and its significant association with prognosis. J Surg Oncol. 1999; 71(3): 140–146.
19. Scarà S, Bottoni P, Scatena R. CA 19-9: biochemical and clinical aspects. Advances in Cancer Biomarkers: From biochemistry to clinic for a critical revision. 2015: 247-60.

ORIGINAL ARTICLE

A Comparison of Diagnosing Child TB Between Specialized and Non-Specialized Centers

Rahman MM[1], Amin MK[2], Farazi MSH[3], Ullah A[4], Asaduzzaman M[5], Siddique MAB[6], Munir MS[7], Maleque MA[8]

ABSTRACT

Background: The diagnosis of childhood TB is difficult largely since clinical signs of TB can be non-specific and variable in children. Sputum smear examination for diagnosis of TB is also difficult for young children as they cannot produce sputum. There is also a lack of specimen collection facilities in the outpatient departments of the hospitals. This study was conducted to compare the diagnostic outcome of specialized TB center to that of non-specialized TB center.

Methods: It was a descriptive type case study done on the hospital record of 2019.One hundred and ten cases of diagnosed child TB patients from three specialized centers and 110 cases of diagnosed child TB patients from three non-specialized centers were included in the study. Data were collected from hospital records and then telephone contact. Diagnosed Child TB patients under-fifteen years of age were included.Data were collected from service provider regarding barriers to child TB detection.

Results: In specialized child TB centers 41 (37%) child were bacteriologically confirmed pulmonary TB compared to 20 (18%) of children in non-specialized child TB centers (Odd's ratio 2.67:1). In specialized child TB centers 83(75.45%) children were having extra-pulmonary TB compared to 77(70%) of children in non-specialized child TB center (Odd's ratio 1.32:1). Regarding H/O contact Specialized Vs No-Specialized Odd's ratio was 2.67:1.

Conclusion: Greater proportion of history of TB contact, bacteriologically confirmed TB cases and extra-pulmonary TB were revealed in specialized child TB centers – may be due to relatively higher level of knowledge on child TB; though they were trained on tuberculosis control program as a whole but no one received any training related to child TB program.

Key words: Child TB, Specialized Child TB center, Non-specialized Child TB center.

KuMCJ, December 2024; Vol. 8(2): 60-63.

INTRODUCTION

Tuberculosis (TB) is an infectious bacterial disease caused by Mycobacterium tuberculosis (MTB).[1] Despite a tremendous performance in controlling the disease, TB remains a severe health problem worldwide with an estimated 37 million lives saved by improved diagnosis and treatment since 2000.[2] In Global Health Report 2015, tuberculosis (TB) is the leading cause of morbidity and mortality globally, ranking alongside the human immunodeficiency virus (HIV).[3] Globally, 10.4 million people were reported to have contact with tuberculosis in 2015, with 1.8 million people dying from the disease.[4] In 2015, almost 95% of the estimated 1.8 million TB deaths occurred in low- and middle-income countries.[3]

1. Dr. Md. Monjur Rahman, MBBS, MPH, Assistant Professor, Dept. of Community Medicine, Kushtia Medical College, Kushtia, Bangladesh.
2. Dr. Mohammad. Kamrul Amin, MBBS, MPH, Associate Professor, Dept. of Community Medicine, National Institute of Preventive and Social Medicine (NIPSOM), Mohakhali, Dhaka.
3. Dr. Md. Selim Hossain Farazi, MBBS, MPH, Assistant Professor, Dept. of Community Medicine, Kushtia Medical College, Kushtia, Bangladesh.
4. Dr. Ashek Ullah, MD (Psychiatry) Assistant Professor, Dept. of Psychiatry, Kushtia Medical College, Kushtia, Bangladesh.
5. Dr. Mohammad Asaduzzaman, MPH, Assistant Professor, Dept. of Community Medicine, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh.
6. Dr. Md. Abu Bakar Siddique, MBBS, DCH, FCPS (Paediatrics), Professor, Dept.of Paediatrics, Magura Medical College, Magura.
7. Dr.Md.SirajumMunir,MBBS, MD (Cardiology),Assistant Professor, Patuakhali Medical college, Patuakhali.
8. Dr. Md. Abdul Maleque, MBBS, MS (Orthopaedics), Associate Professor Orthopaedics, Kushtia Medical College,Kushtia.

Address for correspondence: Dr. Md. Monjur Rahman MBBS, MPH, Assistant Professor, Department of Community Medicine, Kushtia Medical College, Kushtia, Bangladesh. Phone no: 01712 262896; E.mail: monjur.rahman@yahoo.com

Even though tuberculosis is a preventable and treatable disease, the situation in Bangladesh has remained essentially constant over the years, with moderate progress and no signs of a breakthrough in the near future.[5] Bangladesh established End TB goals, including a 95% reduction in TB mortality and a 90% reduction in TB incidence by 2035 compared to 2015 levels, with intermediary goals set for 2020, 2025 and 2030.[6] The Stop TB Partnership' has issued TB diagnosis and treatment targets for Bangladesh for 2018–2022 as a result of the United Nations High-Level TB Meeting (UNHLM). To meet the UNHLM's cumulative five-year TB targets, Bangladesh must raise diagnosis and treatment by 45% above the total notifications reported during the pre-UNHLM five-year period (2014–2017).[7]

The diagnosis of childhood TB is difficult largely since clinical signs of TB can be non-specific and variable in children. Sputum smear examination for diagnosis of TB is also difficult for young children as they swallow sputum. There is also a lack of specimen collection facilities in the outpatient departments of the hospitals. Setting up Specialized Child TB Center was an overdue fundamental step to address the problem.The Specialized Child TB Centers are well-equipped with efficient specimen collection facilities, clinical examination, X-ray examination, Gene Xpert examination and other testing and trained staff for collection of specimens and hence makes diagnosis of child TB easier.

METHODS

The case study was designed to compare child TB case finding between specialized child TB centers and non-specialized child TB centers and to assess the attributes of child TB patients in the selected centers, to assess the barriers to effective implementation activities of child TB centers and socio-demographic characteristics of care givers of child TB patients.

The patients under 15 years old who were diagnosed at specialized Child TB centers and non-specialized Child TB centers in 2019. Data were collected from hospital records and then telephone contact.

Specialized Child TB centers included were Paediatrics out-patient departments of Dhaka Shishu Hospital, Dhaka Medical College Hospital, Mymensingh Medical College Hospital. And, Non-specialized Child TB centers included were Paediatrics outpatient departments of Shaheed Suhrawardi Medical College Hospital, Sir Salimullah Medical College & Mitford Hospital and 250 Bed General Hospital, Kushtia.

All presumptive TB cases under-fifteen children in the study area in 2019.

Inclusion criteria: All diagnosed Child TB patients under-fifteen.
Exclusion criteria: Child TB patients not registered with NTP designated centers.

Data was presented as actual number percentage of total. Odd's ratio was used for comparison.

RESULTS

Total 110 cases from specialized Child TB centers and another 110 cases from Non-Specialized Child TB centers were included in this study.

Among these under-fifteen TB cases, in specialized child TB centers 33 (30%) child were 0-5 years age group compared to 28 (25.45%) of child in non-specialized child TB centers.

Table I: Family income of the cases was –

Income in Tk/month	Specialized child TB center n (%)	Non-specialized child TB center n (%)
<10,000	52(42.27%)	41(37.27%)
10,000 - 20,000	48 (43.64%)	60 (54.55%)
>20,000	10 (9.09%)	09 (8.18%)

There was no substantial difference in the distribution age and in the distribution of pulmonary and extra-pulmonary TB among the two types of centers. History of contact with a TB case were 19% in specialized centers and 5% in non-specialized centers.

Majority of the child's care-givers were engaged with their household activities.

In specialized child TB center 21 (19.9%) caregiver of children were illiterate compared to 27(24.54%) in non-specialized child TB center. In specialized child TB center 35(31.82%) care-giver of children were primary level compared to 55(50%) in non-specialized child TB center. In specialized child TB center 38(34.55%) caregiver of children were secondary level compared to 24 (21.82%) in non-specialized child TB center. In specialized child TB center 16 (14.54%) caregiver of children were higher secondary & above level compared to 04 (3.64%) in non-specialized child TB centers.

Majority of children's caregiver were mother. In specialized child TB centers number of family member 5 or >5 is considerably greater in number.

In specialized child TB centers 41 (37%) child were bacteriologically confirmed pulmonary TB compared to 20 (18%) of children in non-specialized child TB centers.

Table II: Bacteriological confirmation of cases was –

TB center Types	Bacteriologically confirmed n (%)	Bacteriologically not confirmed, n (%)
Specialized child TB center	41 (37%)	69 (63%)
Non-specialized child TB center	20 (18%)	90 (82%)

Odd's ratio between specialized center and non-specialized center was 2.67:1.

In specialized child TB centers 83(75.45%) children were having extra-pulmonary TB compared to 77(70%) of children in non-specialized child TB center.

Table III: History of contact with TB cases was –

TB center Types	H/O contact with TB n (%)	No H/O contact with TB n (%)
Specialized child TB center	21(19.09%)	89(80.71%)
Non-specialized child TB center	6 (5.46%) of	104 (94.54%)

Odd's ratio between specialized center and non-specialized center was 2.67:1.

DISCUSSION

A considerably greater number of under 5 were diagnosed in specialized child TB centers. Under 5 child TB diagnosis is very necessary which is very minimum in our country.

A greater number of extra-pulmonary TB diagnosed (75% vs 70%) in specialized child TB centers.

A greater number of bacteriologically confirmed TB diagnosed (37% vs 18%) in specialized child TB centers. It seems to be more utilization of gene X pert machine as well as enhancement of gastric lavage procedure in specialized child TB centers.

Care-givers of children were more educated in specialized Child TB centers compared to non-specialized child TB centers.

A considerably greater number of child TB patients of specialized child TB centers have the history of contact with TB patients compared to no-specialized child TB centers.

Gastric aspiration (special emphasis) enhance diagnosis of child TB which has similarity with specialized child TB centers in this study.[8] Better diagnostics is often neglected because of technical difficulties, difficulty in obtaining specimens, and the diverse and relatively nonspecific clinical presentation of TB in this group (children).[9] Key informants mentioned that diagnostic advances like Gene Xpert contributed increase case number like specialized child TB centers in this study.[10] The use of systematic screening at facility entry-point to identify children with presumptive TB together with the strengthening of clinical skills and better access to microbiological tests and chest X ray contributed to reducing missed opportunities for diagnosis has the similarity with specialized child TB centers of this study.[11]

Conclusion

Greater proportion of history of TB contact, bacteriologically confirmed TB cases and extra-pulmonary TB were revealed in specialized child TB centers –may be due to relatively higher level of knowledge on child TB; though they were trained on tuberculosis control program as a whole but no one received any training related to child TB program.

REFERENCES

1. Luba TR, Tang S, Liu Q, Gebremedhin SA, Kisasi MD, Feng Z. Knowledge, attitude and associated factors towards tuberculosis in Lesotho: a population-based study. BMC Infect Dis. 2019; 19: 96. pmid: 30696417
2. World Health Organization. Global tuberculosis report 2014. World Health Organization; 2014. https://apps.who.int/iris/handle/10665/137094
3. World Health Organization. Global tuberculosis report 2015. World Health Organization; 2015. https://apps.who.int/iris/handle/10665/191102
4. WHO. Tuberculosis. In: WHO | Regional Office for Africa [Internet]. 2015 [cited 2 Sep 2022]. https://www.afro.who.int/news/tuberculosis
5. Nazneen A, Tarannum S, Chowdhury KIA, Islam MT, Islam SMH, Ahmed S, et al. Implementation status of national tuberculosis infection control guidelines in Bangladeshi hospitals. Engelbrecht M, editor. PLOS ONE. 2021; 16: e0246923. pmid: 33592049
6. World Health Organization. The End TB Strategy. 2015 [cited 4 Dec 2021]. https://www.who.int/teams/control-of-neglected-tropical-diseases/yaws/diagnosis-and-treatment/global-tuberculosis-programme
7. Kak N, Chakraborty K, Sadaphal S, AlMossawi HJ, Calnan M, Vikarunnessa B. Strategic priorities for TB control in Bangladesh, Indonesia, and the Philippines—comparative analysis of national TB prevalence surveys. BMC Public Health. 2020; 20: 560. pmid: 32334545
8. A.J. Stockdale, T. Duke, S. Graham, J. Kelly Evidence behind the WHO guidelines: hospital care for children: what is the diagnostic accuracy of gastric aspiration for the diagnosis of tuberculosis in children? J Trop Pediatr, 2010; 56: 291-298.
9. L.E. Cuevas, R. Browning, P. Bossuyt, M. Casenghi, M.F. Cotton, A.T. Cruz, etal. Evaluation of tuberculosis diagnostics in children: 2. Methodological issues for conducting and reporting research evaluations of tuberculosis diagnostics for intra thoracic tuberculosis in children - Consensus from an expert panel. J Infect Dis, 2012; 205 (Suppl 2): S209-S215.
10. Pantha S, Aguinaldo Ma J, Bari S M H, Chowdhury S, Dendup U,et al. Facilitators and Barriers to implementation of a childhood tuberculosis program in Bangladesh: A mixed- Methods study from urban DOTS centers in Dhaka. Nurs.Rep. 2022;12(2): 371-386.
11. Wobudeya E,Nanfuka M et al. Effect of decentralising childhood Tuberculosis diagnosis to Primary health center versus district hospital levels on disease detection in children from six high Tuberculosis incidence countries: an operational research, pre-post intervention study: E clinical Medicine 70(10); 105527 April 2024.

ORIGINAL ARTICLE

Study on Serum Vitamin D Level of Some Patients Attended a Private Practice Chamber at Kushtia, Bangladesh

Akramuzzaman M[1], Kamal AHM[2], Rahaman MA[3], Moinuddin M[4], Rana MM[5], Masud AA[6], Mazmadar KAH[7]

ABSTRACT

Background: Vitamin D deficiency and insufficiency is a widely recognized widespread public health problem. Keeping this fact in mind, this study was aimed at having a look into the serum vitamin D level of our population at Kushtia, Bangladesh – a zone around 23^0 north latitude.

Methods: This cross-sectional study was conducted from January 2024 to December 2024. Cases of the study was collected by purposive sampling technique at private chambers of investigators. Patients with complaints of vague bone, joint and muscle pain but no external feature on examination, or complaints of mood change as depression or unexplained skin itch were included in the study with due consent (n=100). Their serum vitamin D levels were measured and compared for different age, sex, occupation and residence. Data were analyzed by 'F' ratio (ANoVa) test and χ^2 (chi squire) test. P<0.05 were considered as level of significance.

Result: Age range was 12 to 69 years. Male were 10 cases (10%) and female were 90 cases (90%). Observed vitamin D level was from 9.98 to 60.80 ng/ml with Mean±SD was 23.266±12.043. They were grouped into Group I (20 years and less), Group II (21–40 years) and Group III (>40 years). No significant difference was observed for vitamin D level in different age group (F=0.200856, p>0.10). No difference was observed between rural vs urban (p>0.10), or male vs female (p>0.10), or housewife vs outside workers (p>0.05). The observation of normal vitamin-D level found in 26% and below normal vitamin-D level was found in74% cases. Here too, no difference was observed between rural vs urban, or male vs female, or housewife vs outside workers for normal vs below normal levels of vitamin D. (P>0.10)

Conclusion: In conclusion we are to say that great majority of our community is suffering from hypovitaminosis D. And, to overcome the situation public awareness should be developed to ensure mid-day sun exposure (from 10am to 4pm) for about 30 min for everyday or at least alternate day. Otherwise, we are to ensure dietary supplementation.

Keyword: Serum Vitamin D level, Sun Exposure, Dietary supplement.

KuMCJ, December 2024; Vol.8(2): 64-67.

INTRODUCTION

Vitamin D insufficiency and deficiency is a widely recognized public health concern.[1,2,3] Milk fortification with vitamin D effectively eradicated rickets worldwide, yet deficiency remains widespread, warranting screening in high-risk populations.[4] Vitamin D is not strictly a vitamin since it can be synthesized in the skin, and under most conditions this is the major source of the vitamin. Only when sunlight exposure is inadequate a dietary source is required. Beyond the latitudes 40° north or south, there is very little ultraviolet radiation of the appropriate wavelength in winter. In temperate climates, the plasma concentration of vitamin D is highest at the end of summer and lowest at the end of winter.[5]

1. Dr. Md. Akramuzzaman, Associate Professor, Department of Medicine, Kushtia Medical College & Hospital, Kushtia.
2. Dr. Abu hena Mostafa Kamal, Professor and Head of the Department of Biochemistry, Kushtia Medical College, Kushtia.
3. Dr. Md Ashadur Rahman, Assistant Professor of Neurology, Kushtia Medical College & Hospital, Kushtia.
4. Dr. Md. Moinuddin, Junior Consultant (Medicine), Kushtia Medical College Hospital, Kushtia.
5. Dr. Md.Masud Rana, Junior Consultant (Gastroenterology), Kushtia Medical College Hospital, Kushtia.
6. Dr. Abdullah Al Masud, Assistant Professor of Cardiology, Kushtia Medical College & Hospital, Kushtia.
7. Dr. Khandakar Abul Hasnat Mazmadar, Junior Consultant (Medicine), Kushtia Medical College Hospital, Kushtia.

Address for Correspondence: Dr. Md. Akramuzzaman, Associate Professor, Department of Medicine, Kushtia Medical college & Hospital, Kushtia. E.mail: dr.akramuzzaman@gmail.com , Phone: 01716078725.

Besides UV ray of sunlight Vitamin D requirement may be fulfilled by taking foods as fatty fish, liver, and egg yolk. Milk, unless it is artificially fortified, is not a good source. The RDA for individuals ages 1–70 years is 15 µg/day and 20 µg/day if over age 70 years. [Note: 1 µg vitamin D = 40 international units (IU).][6]

Vitamin D, the sunshine vitamin, is now recognized not only for its importance of bone health in children and adults, but also for other health benefits including reducing risk of chronic diseases including autoimmune diseases, common cancers and cardiovascular disease, and depression. It also has a role in regulating cell proliferation and differentiation. There is evidence that intake considerably higher than that of required amount to maintain calcium homeostasis, reduces the risk of insulin resistance, obesity, and metabolic syndrome, as well as various cancers. Serum vitamin D level below 20 ng/mL indicating deficiency and levels between 20 and 30 ng/mL suggesting insufficiency; value >30 ng/mL is considered adequate.[4,7]

Keeping these facts in mind, this study was aimed at having a look into the scenario of serum vitamin D level of our population at Kushtia, Bangladesh – a zone around 23^0 north latitude.

METHODS

This cross-sectional study was conducted from January 2024 to December 2024. Cases of the study was collected by purposive sampling technique at private chambers of investigators. Patients with complaints of vague bone, joint and muscle pain but no external feature on examination, or complaints of mood change as depression or unexplained skin itch were included in the study with due consent (n=100).

For good bony health, minimum Vitamin D level is considered to be ≥30 ng/ml and toxic serum level of vitamin D is considered to be ≥150 ng/ml; [8] and so, depending on vitamin D level, they were grouped into <30 ng/ml group and ≥30 ng/ml group.

Their serum vitamin D levels were measured and compared for different age, sex, occupation and residence. Data were analyzed by 'F' ratio (ANoVa) test and χ^2 (chi squire) test. P<0.05 were considered as level of significance.

RESULTS

Total cases (N) were 100. Age range was 12 to 69 years. Male were 10 cases (10%) and female were 90 cases (90%). Range of observed vitamin D level was from 9.98 to 60.80 ng/ml.

According to age they were grouped into Group I (20 years and less), Group II (21–40 years) and Group III (>40 years). (Table-I) No significant difference was observed in vitamin D levels in different age groups. (Table I)

Table I: Age group and vitamin D level.

Groups	Vitamin D Level (ng/ml) Mean ± SD	'F' Ratio & 'P' Value
Group I (≤ 20 years) (N=26)	22.23 ± 11.200	0.200856 & >0.10 (insignificant)
Group II (21-40 years) (N=60)	23.89 ± 12.682	
Group III (>40 years) (N=14)	22.52 ± 11.346	

All cases(n=100); Mean ± SD = 23.266 ± 12.043

No difference was observed between rural vs urban, or male vs female, or housewife vs outside workers. (Table-II)

Table II: The observation of vitamin-D level of different variables as a whole.

Variables	Mean ± SD ng/ml	't' & 'p' value
Residence		
Urban (n=61),	23.33 ± 11.42	't'=0.060
Rural (n=39)	23.16 ± 15.27	p>0.10
Sex		
Male (n=10)	22.03 ± 6.69	't'=0.552
Female (n=90)	23.40 ± 12.51	p>0.10
Occupation		
Housewife (n=58)	24.78 ± 12.65	't'=1.9396
Others (Students, Service & Business) (n=42)	21.18 ± 10.98	p>0.05

Normal vitamin-D level was observed in 26% and below normal vitamin-D level was in 74% follows. Here too, no difference was observed between rural vs urban, or male vs female, or housewife vs outside workers for normal vs below normal levels. (Table-III)

Table III: The observation of normal vitamin-D level and below normal vitamin-D level. (N=100)

Variables	<30 ng/ml (n=74)	≥30 ng/ml (n=26)	χ^2 & 'P' Value
Residence			
Urban (n=61),	43%	18%	1.0005 &
Rural (n=39)	31%	8%	>0.10
Sex			
Male	8%	2%*	0.0000 &
Female	66%	24%**	>0.10
Occupation			
Housewife	40%	18%	0.0057 &
Others (Students, Service & Business)	34%	8%	> 0.10

N.B. – this indicates that residence, sex or occupation have got no impact on serum vitamin D level.

None of our observation was in the toxic range. (value >150 ng/ml)

* These two male cases were urban.

** 16 of these female cases were urban & the remaining 8 cases were rural.

DISCUSSION

We found all the age group were equally affected by vitamin D deficiency (Table-I) and for all cases, mean±SD was 23.266±12.043. One Chinese study among 0–17-year age group, comprising 6348 boys and 4768 girls, the median serum 25(OH)D concentration was 29.72 ng/mL (21.84–39.84 ng/mL) in boys compared to 28.48 ng/mL (20.65– 39.23 ng/mL) in girls [8] – the values were a bit higher than our average value whereas we are in the tropical zone and they are in the subtropical zone.

The prevalence of serum 25(OH)D deficiency and insufficiency was 21.4% and 31.0% respectively, altogether 52.4%.[8] Whereas in our study it was altogether 74%. And, this below normal level of vitamin D was not affected by variation of rural or urban residence (P>0.10), not due to male or female sex (P>0.10) and not due to being outside workers or housewife (P>0.01) (Table III). That means the whole society is affected uniformly. This is really an alarming situation. Because, vitamin D is not strictly a vitamin since it can be synthesized in the skin, and under most conditions this is the major source of the vitamin. Only when sunlight exposure is inadequate a dietary source is required.[4] Whereas, we are in tropical zone where sunshine is abundant both in summer and in winter. As well as only 5-30 min sun exposure, particularly between 10 am to 4 pm either daily or at least twice a week to the face, arm hands and legs without sunscreen usually leads to sufficient vitamin D synthesis.[9]

This indicates that modern mechanized lifestyle has confined us under the roofs, but for healthy life we are to avail sunshine for a few minutes in day time. Otherwise, we are to ensure dietary supplementation. Cod liver oil, oily fish, egg yolk, liver, beef, mushrooms, soy, almond etc. are good sources of Vitamin D.[9]

Toxic serum level is considered to be 150 ng/ml[10] and none of our cases was in that range; highest level we found was 60.80 ng/ml.

Conclusion

In conclusion we are to say that great majority of our community is suffering from hypovitaminosis D. And, to overcome the situation public awareness should be developed to ensure mid-day sun exposure from 10am to 4pm for about 30 min for everyday or at least alternate day. Otherwise, we are to ensure dietary supplementation.

REFERENCES

1. Andiran, N., Celik, N., Akca, H. & Dogan, G. Vitamin D deficiency in children and adolescents. J. Clin. Res. Pediatr. Endocrinol. 4: 25–29. https://doi.org/10.4274/jcrpe.574 (2012).
2. Moy, F. M. & Bulgiba, A. High prevalence of vitamin D insufficiency and its association with obesity and metabolic syndrome among Malay adults in Kuala Lumpur, Malaysia. BMC Public Health 11, 735. https://doi.org/10.1186/1471-2458-11-735 (2011).
3. Ritu, G. & Gupta, A. Vitamin D deficiency in India: Prevalence, causalities and intervention. Nutrition 2014; 6: 729–775. https://doi.org/10.3390/nu6020729
4. David A. Bender. Micronutrients: Vitamins & Minerals; In: Harper's Illustrated Biochemistry 32nd edition Chapter 44, page 538-40. Editors: Peter J. Kennelly, Kathleen M. Botham, Owen P. McGuinness, Victor W. Rodwell, P. Anthony Weil. Copyright © 2023 by McGraw Hill.
5. Lippincott Illustrated Reviews: Biochemistry. Seventh Edition; by Denise R. Ferrier, Chapter 28 Micronutrients: Vitamins. Copyright © 2017 Wolters Kluwer.

6. Holick MF. Vitamin D Status: Measurement, Interpretation and Clinical Application. Ann Epidemiol. 2009 February; 19(2): 73–78. doi:10.1016/j.annepidem.2007.12.001.
7. Kaur J, Khare S, Sizar O, Givler A. Vitamin D Deficiency. Vitamin D Deficiency. https://www.ncbi.nlm.nih.gov/books/NBK532266/ Author Information and Affiliations. Last Update: February 15, 2025.
8. Zhang Y, Zhou L, Ren Y, Zhang H, Qiu W & Wang H. Assessment of serum vitamin D levels in children aged 0–17 years old in a Chinese population: a comprehensive study. Scientific Reports, 2024; 14: 12562. https://doi.org/10.1038/s41598-024-62305-7.
9. Sun exposure. In: Vitamin D Fact Sheet for Health Professionals. Health information>Dietary supplement Fact Sheet. https://ods.od.nih.gov/factsheet/vitaminD
10. Holick MF. Vitamin D Is Not as Toxic as Was Once Thought: A Historical and an Up-to-Date Perspective. Editorial, Mayo Clin Proc. May 2015; 90(5): 561-564. https://dx.doi.org/10.1016/j.mayocp.2015.03.015 www.mayoclinicproceedings.org

ORIGINAL ARTICLE

Involvement of Vascular Territory of Brain in Patients with Ischemic and Hemorrhagic Stroke in A Tertiary Care Hospital

Hoque A[1], Emran MM[2], Haque MA[3], Ali ASMH[4], Fatema N[5], Islam MR[6]

ABSTRACT

Background: Stroke is one of the leading causes of death in the world as well as the leading cause of acquired disability in adult in most regions. According to the World Health Organization (WHO), 15 million people suffer from stroke worldwide each year. Of these, five million die and another five million are permanently disabled. This study aimed at observe the involvement of vascular territory in ischemic and hemorrhagic stroke.

Methods: This cross-sectional observational study was conducted from September 2014 to February 2017 in the indoor and outdoor department of Neurology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. 78 patients of ischemic and hemorrhagic stroke were included in the study by purposive sampling. Detailed history, clinical examination and all information was taken in a prescribed data collection form. Brain imaging (CT scan /MRI) was done for confirmation of diagnosis of ischemic and hemorrhagic stroke and distribution of vascular territory was interrogated. Statistical analyses were executed by using SPSS version 26.0 and all comparisons were considered significant if $p< 0.05$.

Results: Among 78 stroke patients, maximum were more than 50 years old. Mean age of the study population was 60.83 ± 13.36 years and 58.58 ± 14.77 years in ischemic (group A) and hemorrhagic (group B) respectively. Male was predominant in both groups. Most of the study populations were literate in group A but maximum of group B were illiterate. Ischemic stroke was 60 (76.9%) and hemorrhagic stroke was 18 (23.1%). Stroke by infarction was more in MCA region, followed by PCA region and then ACA region in group A which is similar in hemorrhagic stroke, where more in the MCA region, followed by PCA and then ACA region which is confirmed by brain imaging CT scan or MRI of Brain.

Conclusion: Both ischemic and hemorrhagic strokes were more in MCA region, followed by PCA region and then ACA region.

Keywords: Vascular territory, Ischemic stroke and Hemorrhagic stroke.

KuMCJ, December 2024; Vol.8(2): 68-

INTRODUCTION

Stroke is one of the leading causes of death in the world as well as the leading cause of acquired disability in adult in most regions[1]. The most recent definition considers the symptomatology to be a stroke either if the clinical symptoms have lasted for more than 24 hours, or if the symptoms remit below this threshold but imagistic show an acute ischemic lesion in concordance with the clinical picture of the ictus. Ischemic stroke is characterized by definitive ischemic suffering of the cerebral parenchyma in an area where regional blood flow drops below 10ml/100g of tissue/min, secondary to partial or total occlusion of an artery or cerebral vein. According to the World Health Organization (WHO), 15 million people suffer from stroke worldwide each year. Of these, five million die and another five million are permanently disabled. Each year, approximately 795 000 people experience a new or recurrent stroke. Approximately 610 000 of these are first attacks, and 185 000 are recurrent attacks. Mortality data from 2006 indicate that

1. Dr. Aynul Hoque, Assistant Professor, Department of Neurology, Kushtia Medical College, Kushtia.
2. Dr. Mohammad Masum Emran, Assistant Professor, Department of Neurology, Comilla Medical College, Comilla.
3. Dr. Md. Azizul Haque, Junior Consultant, 250 bedded Mohammad Ali Hospital, Bogura.
4. Dr. Abu Shams Md. Hasan Ali, Associate Professor, Department of Neurology, Anwer Khan Modern Medical College Hospital, Dhaka.
5. Dr. Nilufar Fatema, Assistant Professor, Department of Cardiology, BSMMU, Dhaka.
6. Dr. Md. Rezaul Islam, Assistant Professor of Medicine, Kushtia Medical College, Kushtia.

Address of Correspondence: Dr. Aynul Hoque, Assistant Professor, Department of Neurology, Kushtia Medical College, Kushtia. Email: aynulr2@gmail.com, Phone: +8801718752445.

stroke accounted for approximately 1 of every 18 deaths in the United States.[2] The incidence of stroke in UK is 114 per 100000 populations, prevalence rate is 518 per 100000 population, mortality rate is 12% in England & Wales and among morbidity, 24% severely disabled. Nearly half of older stroke survivors experience moderate to severe disability. Care for stroke survivors cost an estimated $18.8 billion in the United States during 2008, and lost productivity and premature mortality cost an additional $15.5 billion. Death from stroke ranks higher in East Asian countries including Japan, China and Taiwan (more than 100 per 100000) than New Zealand and Australia (50-80 per 100000).[3]

Incidence of stroke in Bangladesh is 2.55 per 1000 population per year in both sexes (Bangladesh Bureau of Statistics, 2009). Another study showed that Prevalence of stroke in rural area is 4.27, in sub-urban area 3.42 and in urban area 3.17 per 1000 population respectively[4]. The high number of disability-adjusted life-years lost due to stroke (485 per 10,000 people) show that stroke severely impacts Bangladesh's economy.[5] Many diverse vascular pathologies may cause TIA or stroke. Common causes include atherosclerosis of large extracranial and intracranial arteries, cardioembolism and lipohyalinosis of small penetrating arteries to the brain.[6] Most embolic strokes characteristically occur suddenly and the deficit reaches its peak almost at once. Thrombotic strokes may have an abrupt onset, but they evolve somewhat more slowly over a period of several minutes or hours and occasionally days; in the latter case, the stroke usually progresses in a saltatory fashion. In hypertensive cerebral hemorrhage, also abrupt in onset, the deficit may be virtually static or steadily progressive over a period of minutes or hours, while subarachnoid hemorrhage is almost instantaneous.[7,8] This study aimed to observe the involvement of vascular territory of brain in patients with stroke.

METHODS

This is a cross-sectional observational study, conducted from September 2014 to February 2017 in the indoor and outdoor of department of Neurology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. 78 patients of ischemic and hemorrhagic stroke, meeting the inclusion criteria were included in the study by purposive sampling. Age below 18 years, patients with Transient ischemic attack and patients or attendants unwilling to take part in the study were excluded. An informed written consent was taken from the patient or attendant. Detailed history, clinical examination and all information was taken in a prescribed data collection form. Brain imaging (CT scan /MRI) was done for confirmation of diagnosis of ischemic and hemorrhagic stroke and distribution of vascular territory was interrogated. Statistical analyses were executed by using SPSS version 26.0 and all comparisons were considered significant if $p< 0.05$.

RESULTS

Among 78 stroke patients, maximum were more than 50 years old. Mean age of the study population was 60.83 ± 13.36 years and 58.58 ± 14.77 years in ischemic (group A) and hemorrhagic (group B) respectively.

Figure 1 (below) presented the distribution of the study population by education. Most of the study populations were literate in group A but maximum of group B were illiterate.

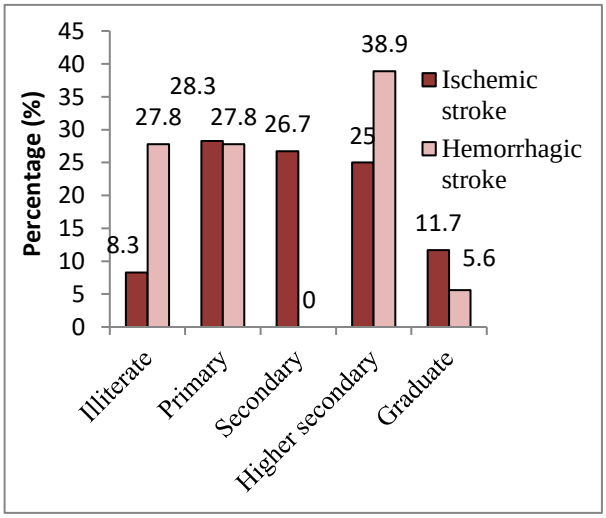


Figure 1: Bar chart of the study population by education

Table I showed distribution of the study population by gender. In both groups male were predominant.

Gender	Groups	
	Group A (Ischemic stroke) n (%)	Group B (Hemorrhagic stroke) n (%)
Male	39 (65.0%)	10 (55.6%)
Female	21 (35.0%)	8 (44.4%)
Total	60 (100%)	18 (100%)

P=0.467 (insignificant, Chi squire test)

Table II: Distribution of the study population by type of stroke (n=78)

Type of stroke	Frequency N (%)
Ischemic	60 (76.9%)
Hemorrhagic	18 (23.1%)
Total	76 (100.0%)

Table II showed distribution of the study population by type of stroke. Ischemic stroke was 60 (76.9%) and hemorrhagic stroke was 18 (23.1%).

Table III: Distribution of the study population by brain imaging (CT scan/MRI) (n=78)

Brain imaging (CT scan/MRI)	Groups	
	Group A (Ischemic stroke) n (%)	Group B (Hemorrhagic stroke) n (%)
ACA Region	5 (8.3)	2 (11.1)
MCA Region	49 (81.7)	12 (66.7)
PCA Region	6 (10.0)	4 (22.2)
Total	60 (100%)	18 (100%)

P=0.345 (insignificant, Chi squire test)

Regarding brain imaging, Infarction was more in MCA region, followed by PCA region and then ACA region in group A. Hemorrhagic stroke was more in the MCA region, followed by PCA and then ACA region (Table III).

DISCUSSION

Many diverse vascular pathologies may cause TIA or stroke. Common causes include atherosclerosis of large extracranial and intracranial arteries, cardioembolism and lipohyalinosis of small penetrating arteries to the brain.[6] Among stroke, ischemic infarction constitutes 85% to 90% and 15% to 10% is caused by intracranial hemorrhage in the western world, while hemorrhages constitute a larger percentage in Asia.[9]

Occlusion of an intracranial vessel causes reduction in blood flow to the brain region it supplies. Ischemia produces necrosis by starving neurons of glucose and oxygen, which in turn results in failure of mitochondria to produce ATP. Without ATP, membrane ion pumps stop functioning and neurons depolarize, allowing intracellular calcium to rise and elevation of lactic acid level with acidosis. Cellular depolarization also causes glutamate release from synaptic terminal; excess extracellular glutamate produces neurotoxicity by activating postsynaptic glutamate receptors. The greatly increased concentration of glutamate (and aspertate) in extracellular space in a depleted energy state results in the opening of calcium channels associated with N-methy-1-D-aspertate (NMDA) and alpha-amino-3-hydroxy-5-methy-4-isoxanole propionate (AMPA) receptors. Persistent membrane depolarization causes influx of calcium, sodium, and chloride ions and efflux of potassium ions. Activation of the N-methy-1-D-aspertate (NMDA) receptor by an increase in glutamate leads to a cascade of chemical reactions that ultimately leads to cell death ("theory of excitotoxicity"). Free radicals are produced by membrane lipid degradation and mitochondrial dysfunction. Free radicals cause catalytic destruction of membranes and likely damage other vital functions of cells. Lesser degrees of ischemia, as are seen within the ischemic penumbra, favour apoptotic cellular death causing cells to die two weeks later.[6]

In our study maximum stroke patients were more than 50 years old. Mean age of the study population was 60.83 ± 13.36 years and 58.58 ± 14.77 years in group A and group B respectively. Biller et al. found that the incidence of stroke increases dramatically with advancing age, and increasing age was the most powerful risk factor for stroke.[8]

In a previous study, Uddin et al. found that majority of the stroke patients belonged to the older age group.[10] Dziedizic et al. and Idicula et al. also found that increasing age was a risk factors for stroke patients in European population.[11,12] So, our study was in concordance with the previous study, possible explanation might be due to atherosclerosis in advanced age

In our study, ischemic stroke was 60 (76.9%) and hemorrhagic stroke was 18 (23.1%). According to clinical classification, ischemic stroke was 85% and hemorrhagic stroke was 15% (Langhorne, 2014). In current study, infarction was more in MCA region, followed by PCA region and then ACA region in group A. Hemorrhagic stroke was more in the MCA region, followed by PCA and then ACA region. Ropper et al. found that, the most common site of cerebral infarction was in the MCA region.[13] Our study was consistent with the previous study due to unknown cause.

Conclusion:

Both Ischemic and Hemorrhagic strokes were more in MCA region, followed by PCA region and then ACA region.

REFERENCES

1.Langhorne, P., (2014). 'Stroke disease'. In: Colledge, N. R., Walker, B. R., Ralston, S.H., Penmen, I. D., 22th edition. *Davidson's Principle and Practice of Medicine,* Elsevier, London, pp. 1231-47.

2. Jones, D. L., Adams, R. J., Brown, T., Carnethon, M., Dai, S., Simone, G. D., Ferguson, B., Ford, E., Furie, K., Gillespie, C., Go, A., Greenlund, K., Haase, N., Hailpern, S., Howard, V., Kissela, B., Kittner, S., Lackland, D., Lisabeth, L., Marelli, A., McDermott, M., Meigs, J., Mozaffarian, D., Mussolino, M., Nichol, G., Roger, V. L., Rosamond, W., Sacco, R., Sorlie, P., Stafford, R., Thom, T., Smoller, S. W., Wong, N. D., Rosett, J. W., (2010). Heart Disease and Stroke Statistics—2010 Update: A Report from the American Heart Association. *Circulation*, vol. 121, pp. 47-8.

3. CDC, (2012). 'Prevalence of stroke-United States, 2006-2010', Morbidity and Mortality Weekly Report, vol. 61, pp. 379-2. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6120a5.htm (Accessed on 10/12/2016).

4. Mohammad, Q. D., Habib, M., Hoque, A., Alam, B., Haque, B., Hossain, S., Rahman, K. M., Khan, S. U., (2011). 'Prevalence of stroke above forty years'. *Mymensingh Medical Journal*, vol. 20, pp. 640–4.

5. Islam, M. N., Moniruzzaman, M., Khalil, M. I., Basri, R., Alam, M. K., Loo, K. W., Gan, S. H., (2012). 'Burden of stroke in Bangladesh'. *International Journal of Stroke*. vol. 8, pp. 211-3.

6. Smith, W. S., English, J. D., Johnston, S. C., (2013). 'Cerebrovascular disease'. In: Hauser, S. H., Josephson, S. A., Third edition, '*Harrison's Neurology in Clinical Practice'*. McGraw-Hill Education, Printed in China, pp. 256-8.

7. Ropper, A. H., Samuels M. A., Klein, J. P., (2014). Tenth edition, *'Adams and Victor's Principles of Neurology'*. McGraw-Hill Education, Printed in China, pp. 781-6.

8. Biller, J., Love, B. B., Schneck, M. J., (2012). 'Ischemic Cerebrovascular Disease'. 'In: Daroff, R. B., Fenichel, G. M., Jankovic, J., Mazziotta, J. C., Sixth edition. *Bradley's Neurology in Clinical Practice*, Elsevier, Philadelphia, pp. 1003-5.

9. Hossain, A. M., Ahmed, N. U., Rahman, M., Islam, M. R., Sadhya, G., Fatema, K., (2011). 'Analysis of sociodemographic and clinical factors associated with hospitalized stroke patients of Bangladesh'. *Faridpur Medical College Journal*, vol. 6, pp. 19-3.

10. Uddin M. J., Mondol, B. A., Ahmed, S., Ullah, A. A., Jabber, M. A., Mohammad, Q.D., (2008). 'Smoking and ischemic stroke'. *Bangladesh Journal of Neuroscience*, vol. 24, pp. 50-4.

11. Dziedzic, T., Pera, J., Slowik, A., Kurek, G., Szczudlik, A., (2007). 'Hypoalbuminemia in acute ischemic stroke patients: frequency and correlates'. *European Journal of Clinical Nutrition*, vol. 61, pp. 1318-2.

12. Idicula, T. T., Waje-Andreassen, U., Brog, J., Naess, H. (2009). 'Serum albumin in ischemic stroke patients: The Higher the Better'. *Cerebrovascular Disease*, vol. 28, pp. 13-7.

13. Ropper, A. H., Samuels M. A., Klein, J. P., (2014). Tenth edition, *'Adams and Victor's Principles of Neurology'*. McGraw-Hill Education, Printed in China, pp. 781-6. ediacenttre/factsheets/fs310. [Accessed on 21.12.2016].

ORIGINAL ARTICLE

Exploring the Impact of Kangaroo Mother Care on Neonatal Survival and Weight Gain: Insights from a District Hospital in Bangladesh

Rahaman MR[1], Uddin SMN[2], Suman MSA[3], Ferdousi F[4], Akter M[5], Hossain MAY[6]

ABSTRACT

Background: Neonatal mortality remains a critical global health concern, particularly in low- and middle-income countries where preterm birth and low birth weight significantly contribute to infant deaths. Kangaroo Mother Care (KMC), an evidence-based intervention involving skin-to-skin contact and exclusive breastfeeding, has been recognized as a cost-effective alternative to conventional neonatal care. And, this study aimed at assessing the impact of KMC on neonatal survival rates and weight gain trends among preterm and low-birth-weight infants admitted to a district hospital in Bangladesh.

Methods: A retrospective observational study was conducted at the 250 Bed General Hospital, Kushtia, Bangladesh, analyzing medical records of neonates admitted to the KMC unit between November 1, 2023, and December 31, 2024. Data included demographic details, gestational age, birth weight, KMC adherence, and neonatal outcomes. Survival analysis, weight gain trends, and regional disparities were examined using SPSS v25 and Python.

Results: A total of 290 neonates were included in the study, with a mean gestational age of 34.2 ± 2.1 weeks and birth weight of 1,850 ± 320 g. The overall survival rate was 91.4%, with survival significantly higher in neonates receiving ≥12 hours/day of KMC (95.8%) compared to those receiving <12 hours/day (82.6%, p=0.003). The mean weight gain rate was 13.4 ± 2.8 g/day, with higher KMC adherence (>15 hours/day) associated with greater weight gain (15.6 g/day vs. 10.4 g/day, p=0.007). Neonates in Kushtia Sadar had the highest survival rate (94.1%) compared to Mirpur (89.3%), likely due to better healthcare access and maternal education. Sepsis (9.5%), hypothermia (12.8%), and rehospitalization (7.6%) were more common in neonates receiving less than 10 hours/day of KMC.

Conclusion: This study provides strong evidence that KMC significantly improves neonatal survival and weight gain in a resource-limited district hospital setting. Given the high survival rate (91.4%) and steady weight gain (13.4 g/day) observed, KMC is a cost-effective, scalable alternative to incubator-based care.

Keywords: Kangaroo Mother Care, Neonatal survival, Neonatal weight gain.

KuMCJ, December 2024; Vol. 8(2): 72-78

INTRODUCTION

Neonatal mortality remains a critical global health concern, particularly in low- and middle-income countries where preterm birth and low birth weight contribute significantly to infant deaths.[1] According to the World Health Organization (WHO), complications arising from preterm birth are among the leading causes of neonatal mortality, with limited access to advanced neonatal care exacerbating the problem in resource-constrained settings.[2] Innovative,

1. Dr. Md. Rokiur Rahaman, Senior Consultant, Department of Pediatrics, Dhaka Medical College Hospital, Dhaka.
2. Dr. S M Nazim Uddin, Senior Consultant, Department of Pediatrics, Kushtia Medical College Hospital, Kushtia.
3. Dr. Md Shahin Akter Suman, Junior Consultant, Department of Pediatrics, 250 Bed General Hospital, Kushtia.
4. Dr. Farhana Ferdousi, Registrar, Department of Pediatrics, Kushtia Medical College Hospital, Kushtia.
5. Dr. Mahfuja Akter, Assistant Registrar, Department of Pediatrics, 250 Bed General Hospital, Kushtia.
6. Dr. Mst. Ashrafi Yeamin Hossain, Assistant Professor, Department of Community Medicine, Kushtia Medical College, Kushtia.

Address for correspondence: Dr. Md. Rokiur Rahaman, Senior Consultant, Department of Pediatrics, Dhaka Medical College Hospital, Contact: +8801711399216, Email: drrokib@hotmail.com ORCID: 0009-0006-7488-6205

low-cost interventions such as Kangaroo Mother Care (KMC) have been identified as effective strategies to improve neonatal outcomes, particularly in settings where incubator care is unavailable or inadequate.[3]

KMC involves prolonged skin-to-skin contact, exclusive breastfeeding, and close monitoring, providing essential warmth and reducing the risk of hypothermia and infections in vulnerable neonates.[4] Several studies have demonstrated that KMC significantly reduces neonatal mortality and morbidity while improving weight gain, feeding patterns, and maternal-infant bonding.[5] Despite the widespread recommendation of KMC by WHO and its integration into national neonatal care policies, its real-world effectiveness, particularly in district hospitals in Bangladesh, remains under-evaluated.[6]

Bangladesh has made commendable progress in reducing neonatal mortality; however, geographical disparities persist, particularly in rural and resource-limited settings, where hospital infrastructure and neonatal care services are often suboptimal.[7] District hospitals serve as critical healthcare providers for at-risk neonates, making them ideal settings for KMC implementation. However, there is limited empirical data evaluating the long-term effectiveness of KMC on neonatal survival and weight gain in these hospitals.[8]

This study aims to assess the impact of KMC on neonatal survival rates and weight gain trends among preterm and low-birth-weight infants admitted to a district hospital in Bangladesh. By analyzing retrospective data from a dedicated KMC unit, this research provides valuable insights into the feasibility, effectiveness, and potential scalability of KMC in resource-constrained environments. Findings from this study could guide policymakers and healthcare practitioners in optimizing neonatal care strategies to further reduce neonatal mortality and morbidity in Bangladesh and similar low-resource settings.[3]

METHODS

Study Design and Setting

This retrospective observational study was conducted at the 250 Beded General Hospital, Kushtia, Bangladesh, a referral hospital with a dedicated Kangaroo Mother Care (KMC) unit. The study evaluated the impact of KMC on neonatal survival and weight gain using data from hospital records.[9]

Study Population

Inclusion Criteria:

- Neonates admitted to the KMC unit between November 1, 2023, and December 31, 2024.
- Neonates with complete weight and survival records at birth, KMC initiation, discharge, and follow-up.

Exclusion Criteria:

- Missing or incomplete data in key variables.
- KMC discontinuation due to non-clinical reasons (e.g., parental refusal, transfer).

Data Collection and Variables

Data were extracted from KMC registers and included:

- Demographic information (gender, place of birth, gestational age, birth weight).
- KMC-related data (time of KMC initiation, daily duration of KMC).
- Outcome variables (survival status, weight at birth, KMC initiation, discharge, and follow-up).

Data Analysis

Data were analyzed using SPSS v25 and Python:

- Descriptive statistics: Frequencies, percentages, means, and standard deviations.
- Survival analysis: Kaplan-Meier survival curves.[10]
- Weight gain analysis: Mean daily weight gain comparisons.[11]
- Regional disparities: Chi-square and t-tests.[12]

Ethical Considerations

- Ethical approval was obtained from the Institutional Review Board (IRB).
- Data were anonymized for confidentiality.[13]
- Informed consent was waived due to the retrospective nature.[14]

RESULTS

A total of 290 neonates were included in the study, after excluding cases with missing or incomplete data. The mean gestational age was 34.2 ± 2.1 weeks, and the mean birth weight was 1,850 ± 320 g. (Table I)

Table I: Study Population Characteristics

Characteristics	N (%)
Gender	
Male	152 (52.4%)
Female	138 (47.6%)
Place of Birth	
Home	98 (33.8%)
Health Center	85 (29.3%)
Hospital	107 (36.9%)
Gestational Age Categories	
≤30 weeks	42 (14.5%)
31–34 weeks	118 (40.7%)
35–37 weeks	130 (44.8%)
Birth Weight Categories	
<1000 g (Extremely LBW)	20 (6.9%)
1000–1499 g (Very LBW)	85 (29.3%)
1500–2499 g (LBW)	185 (63.8%

The overall survival rate among neonates receiving KMC was 91.4% (265/290). Survival was significantly higher in neonates with greater KMC adherence and higher birth weights. (Table III)

Table III: Survival Outcomes

Birth Weight Category	Survival Rate (%)	p-value
<1000 g	55.0% (11/20)	0.002
1000–1499 g	87.1% (74/85)	0.042
1500–2499 g	98.4% (182/185)	0.001

Neonates receiving KMC for ≥12 hours/day had a significantly higher survival rate (95.8%) compared to those with <12 hours/day (82.6%, p=0.003). Hypothermia incidence was significantly lower in neonates receiving continuous KMC (6.2% vs. 18.9%, p=0.01).

The mean **weight gain rate** among neonates was **13.4 ± 2.8 g/day**, with better growth observed in **higher KMC adherence groups.** (Ttable IV)

Table IV: Weight Gain Trends

Timepoint	Mean Weight (g)	Weight Gain Rate (g/day)
At Birth	1850 ± 320	-
At KMC Initiation	1823 ± 315	-
At Discharge	2054 ± 340	14.2 ± 2.5
Follow-Up (2 Weeks)	2218 ± 355	13.8 ± 2.7

Weight gain was significantly higher in neonates receiving KMC >15 hours/day (15.6 g/day vs. 10.4 g/day, p=0.007). Weight gain positively correlated with gestational age (R=0.68, p=0.001).

Table II: KMC Adherence and Initiation

KMC Parameter	Value	Key Findings
Pre-counseling Provided	276 (95.2%) mothers	Majority of mothers received KMC education.
Average Age at KMC Initiation	2.3 ± 1.2 days after birth	KMC was initiated within the first few days of life.
Mean Duration of KMC per Day	14.8 ± 3.5 hours	Most neonates received prolonged skin-to-skin con

Survival and weight gain varied **by geographical region (Upazila level)**. (Table V)

Table V: Regional Differences in Outcomes

Region (Upazila)	Survival Rate (%)	Mean Weight Gain (g/day)
Kushtia Sadar	94.10%	14.6 ± 2.5
Kumarkhali	90.80%	12.9 ± 3.1
Mirpur	89.30%	12.1 ± 3.5

Neonates in Kushtia Sadar had the highest survival and weight gain rates, likely due to better healthcare access and maternal education. Lower survival and weight gain in Mirpur may reflect delayed KMC initiation and lower adherence.

Table VI: Complications and Adverse Events

Complication	Incidence Rate	Key Findings
Sepsis Incidence	**9.5% (n=28)**	More common in neonates who received **<10 hours/day of KMC**.
Hypothermia Episodes	**12.8% (n=37)**	Significantly lower in neonates receiving **continuous KMC**.
Rehospitalization Rate	**7.6% (n=22)**	Occurred within **30 days** of discharge.

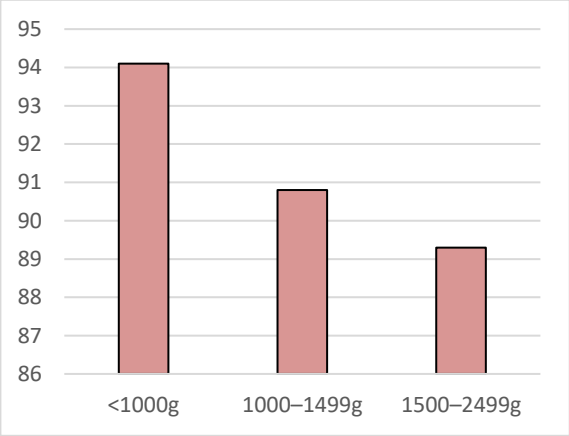


Figure 1: Survival Rates (%) by Birth Weight Category

This chart illustrates the survival rates of neonates based on birth weight categories.

Infants with higher birth weights (>1500g) had significantly higher survival rates (98.4%), whereas extremely low birth weight (ELBW) neonates (<1000g) had the lowest survival rate (55%). The trend suggests that KMC is most effective in improving survival among neonates with moderate to high LBW. (Figure 1)

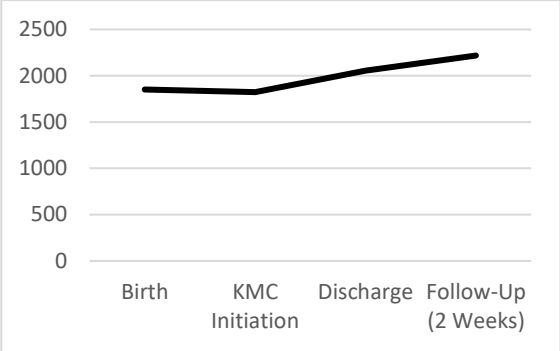


Figure 2: Weight Gain Trends Over Time (g)

This graph presents neonatal weight trends from birth to KMC initiation, discharge, and follow-up visits. The data shows a consistent increase in weight, with the most significant gains occurring after KMC initiation and during follow-up visits. Infants under KMC gained an average of 13.4 g/day, indicating effective nutritional and thermal regulation support. (Figure 2)

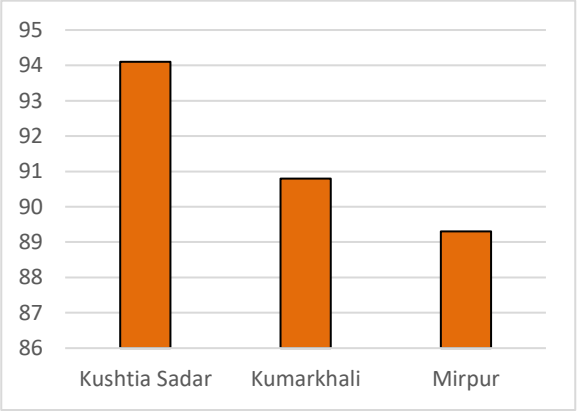


Figure 3: Regional Differences in Survival Rates (%)

This bar chart compares neonatal survival rates across different upazilas. Kushtia Sadar had the highest survival rate (94.1%), followed by Kumarkhali (90.8%) and Mirpur (89.3%). The differences may reflect variations in healthcare access, maternal education, and KMC adherence rates across regions. (Figure 3)

DISCUSSION

This study explored the efficacy of Kangaroo Mother Care (KMC) in improving neonatal survival and weight gain among preterm and low-birth-weight infants in a district hospital in Bangladesh. The findings affirm the pivotal role of KMC in not only increasing survival rates but also in fostering healthier growth trajectories, as evidenced by a mean daily weight gain of 13.4 g. Central to these positive outcomes is the prolonged duration of skin-to-skin contact, especially when exceeding 12 hours per day. This intensive practice appears to mitigate critical risks such as hypothermia and early-onset infections, offering a protective shield to neonates who would otherwise require advanced, and often cost-prohibitive, incubator care. The high survival rate of 91.4% underscores the real-world effectiveness of KMC, aligning with global evidence that situates KMC as a core intervention for fragile neonates, particularly in regions where healthcare resources are constrained.

Although the hospital in Kushtia has demonstrated commendable success, there exist marked regional disparities. Mirpur, with comparatively lower survival and weight gain rates, exemplifies the influence of healthcare accessibility, maternal education, and socio-cultural practices on KMC efficacy. Challenges such as delayed initiation of KMC, limited caregiver adherence, and inadequate follow-up support can erode the benefits otherwise observed in more resourced areas. Previous studies in low- and middle-income countries confirm that maternal literacy and consistent counseling are instrumental in prolonging the duration of KMC, thereby reinforcing the link between knowledge, practice, and neonatal health.[15] In addition, the healthcare infrastructure in certain regions may lack systematic referral pathways or community-based monitoring, further impeding optimal outcomes. Addressing these gaps entails a multi-pronged approach that includes community-level education programs, enhanced antenatal counseling, and targeted postnatal follow-up visits.[16]

The physiological mechanisms underlying KMC's effectiveness primarily stem from sustained skin-to-skin contact, which stabilizes the neonate's temperature, reduces the metabolic costs of thermoregulation, and promotes bonding that can enhance the neonate's overall well-being. The intimate proximity between mother and infant encourages more frequent breastfeeding, thereby improving nutritional intake and facilitating immunological protection through breast milk.[17] This may explain the notably lower rates of hypothermia and sepsis observed in neonates receiving continuous KMC. Such benefits are particularly salient in settings where expensive incubator technology is limited, underscoring KMC's role in bridging the gap in equitable neonatal care. Moreover, KMC fosters emotional and psychological support for mothers, which can be crucial for sustaining engagement in care practices over time.[18]

An important dimension of KMC efficacy relates to health system factors, including training and mentorship of nursing staff, consistency in record-keeping, and availability of dedicated spaces within the facility. Where such infrastructure is absent or intermittently maintained, adherence to KMC protocols can wane, diminishing the intervention's potential benefits. This gap becomes even more pronounced once the family returns home, as successful continuation of KMC hinges on caregiver motivation, social acceptance, and the ability to integrate the practice into daily routines.[19] In many low-resource contexts, daily subsistence activities may compete with the demands of prolonged skin-to-skin contact, leading to sporadic KMC sessions and suboptimal outcomes.

Given the retrospective nature of this study, missing data and loss to follow-up remain notable constraints, limiting the assessment of longer-term neurodevelopmental outcomes. Such outcomes, including psychomotor development and cognitive function, are recognized as key parameters for gauging the sustained impact of neonatal interventions. While the current findings provide strong evidence in favor of KMC, future prospective research with robust follow-up protocols is needed to elucidate these longer-term effects. Multi-center collaborations that encompass diverse geographic and socio-economic contexts in Bangladesh could yield more comprehensive insights into the factors influencing KMC's effectiveness and scalability.[20]

In addition, qualitative inquiries into caregiver experiences, cultural beliefs, and health system barriers can guide more nuanced policy interventions.[21]

From a public health perspective, KMC's scalability is a promising avenue for reducing neonatal mortality in Bangladesh, a country striving to meet global targets for child survival. Integrating KMC into existing maternal and child health initiatives, such as those championed by community health workers, could magnify its reach. Training community midwives to provide prenatal KMC counseling, conduct early postnatal home visits, and monitor infant weight gain can fortify the continuity of care between hospital and community settings.[22] Furthermore, leveraging mobile health technologies—such as SMS reminders or telehealth consultations—may bolster adherence and allow for real-time trouble-shooting.

Overall, this study strengthens the argument that Kangaroo Mother Care is a cornerstone intervention for improving neonatal outcomes in resource-limited environments. By mitigating the risks associated with prematurity and low birth weight, KMC offers a tangible solution for hospitals grappling with staff shortages, overcrowded neonatal intensive care units, and budgetary constraints. The implications extend beyond survival, as KMC also fosters positive psychosocial dynamics, encourages exclusive breastfeeding, and reduces healthcare costs associated with extended hospital stays or recurrent infections. Yet, the sustainability of these benefits depends on a supportive health system framework, active community engagement, and continuous monitoring of both maternal and neonatal needs. As Bangladesh looks to expand its healthcare infrastructure, placing greater emphasis on KMC training, follow-up strategies, and research into long-term developmental outcomes will be instrumental in accelerating progress toward reducing neonatal morbidity and mortality.

Conclusion

This study confirms that Kangaroo Mother Care (KMC) effectively enhances neonatal survival and weight gain in preterm and low-birth-weight infants in a resource-limited hospital. With a 91.4% survival rate and steady weight gain (13.4 g/day), KMC proves to be a cost-effective and scalable alternative to incubator care. Addressing regional disparities, strengthening maternal education, and ensuring structured follow-ups can further improve outcomes. Expanding KMC across district hospitals in Bangladesh has the potential to significantly reduce neonatal morbidity and mortality, making it a vital strategy for improving newborn survival in low-resource settings.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

The authors sincerely thank Dr. Masuda Parvin, Kushtia Medical College Hospital, for her guidance and support. We also extend our gratitude to Dr. Rafiqul Islam and Dr. Nasir Uddin, 250 Bed General Hospital, Kushtia, for their administrative assistance.

Special appreciation goes to Study Nurses, Nur Nehar Khatun, Ritu Mondol and Popy Mandal, for their help in data collection and logistics. We also acknowledge the nursing staff of 250 Bed General Hospital, Kushtia, whose dedication was crucial to this study.

Finally, we thank the hospital staff, participating children, and their families for their invaluable contributions. No external funding was received for this study.

REFERENCES

1. World Health Organization (WHO). Kangaroo mother care: a practical guide. Geneva: WHO; 2021.
2. Blencowe H, Cousens S, Oestergaard M, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2019: a systematic review and modelling analysis. *Lancet Glob Health.* 2019;7(1): e37-e46.
3. Lawn JE, Mwansa-Kambafwile J, Horta BL. Kangaroo mother care and neonatal outcomes: A meta-analysis of mortality and morbidity. *Lancet Glob Health.* 2020;8(2): e176-e190.
4. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database Syst Rev.* 2021;(5):CD002771.

5. Debes AK, Kohli A, Walker N. Impact of Kangaroo Mother Care on Neonatal Outcomes: A Systematic Review. *J Perinatol.* 2022; 42(4): 587-598.
6. Rahman A, Haque M, Hossain MM. Effectiveness of Kangaroo Mother Care in district hospitals of Bangladesh: A retrospective analysis. *BMJ Paediatrics Open.* 2021;5(1): e000984.
7. Chowdhury EK, Khanam R, Adhikary G, et al. Barriers to effective neonatal care in rural Bangladesh: Perspectives from mothers and health workers. *Health Policy Plan.* 2020;35(2):150-159.
8. Bhutta ZA, Lassi ZS, Mansoor N. Preterm birth: A global concern in neonatal health. *BMJ Global Health.* 2021;6(1): e005339.
9. World Health Organization (WHO). Kangaroo mother care: a practical guide. Geneva: WHO; 2021.
10. Lawn JE, Mwansa-Kambafwile J, Horta BL. Kangaroo mother care and neonatal outcomes: A meta-analysis. *Lancet Glob Health.* 2020;8(2): e176-e190.
11. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database Syst Rev.* 2021;(5): CD002771.
12. Rahman A, Haque M, Hossain MM. Effectiveness of Kangaroo Mother Care in district hospitals of Bangladesh: A retrospective analysis. *BMJ Paediatrics Open.* 2021;5(1): e000984.
13. Debes AK, Kohli A, Walker N. Impact of Kangaroo Mother Care on Neonatal Outcomes: A Systematic Review. *J Perinatol.* 2022;42(4):587-598.
14. Chowdhury EK, Khanam R, Adhikary G, et al. Barriers to effective neonatal care in rural Bangladesh. *Health Policy Plan.* 2020; 35(2): 150-159.
15. World Health Organization (WHO). Kangaroo mother care: a practical guide. Geneva: WHO; 2021.
16. Lawn JE, Mwansa-Kambafwile J, Horta BL. Kangaroo mother care and neonatal outcomes: A meta-analysis. Lancet Glob Health. 2020;8(2): e176-e190.
17. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Database Syst Rev. 2021;(5):CD002771.
18. Debes AK, Kohli A, Walker N. Impact of Kangaroo Mother Care on Neonatal Outcomes: A Systematic Review. J Perinatol. 2022;42(4):587-598.
19. Rahman A, Haque M, Hossain MM. Effectiveness of Kangaroo Mother Care in district hospitals of Bangladesh: A retrospective analysis. BMJ Paediatrics Open. 2021;5(1): e000984.
20. Chowdhury EK, Khanam R, Adhikary G, et al. Barriers to effective neonatal care in rural Bangladesh. Health Policy Plan. 2020; 35(2): 150-159.
21. Bhutta ZA, Lassi ZS, Mansoor N. Preterm birth: A global concern in neonatal health. BMJ Global Health. 2021;6(1): e005339.
22. Blencowe H, Cousens S, Oestergaard M, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2019: a systematic review and modeling analysis. Lancet Glob Health. 2019;7(1): e37-e46.

Editorial policy & Instruction to Authors

KuMCJ, December 2024; Vol. 8(2): 79-82

Kushtia Medical College Journal is published twice in a year in the month of June and December. Manuscript written in English related to medical science will be received throughout the year and will be considered for publication provided that the article has not been already published or been submitted elsewhere for publication.

Articles submitted for publication may be in the form of original articles, case reports, review articles, recent advances, new techniques, book-review on clinical or medical education, adverse drug reactions or a letter to the editor. Author should obtain & submit written permission from appropriate authority if the manuscript contains any table, data or illustrations from any previously published article of any journal.

Submission of article

Authors are requested to send a soft copy (an email to *kumcjournal.bd@gmail.com*) to the editor in chief. *(Soft copy must be in "WORD" or "EXCEL" format and never be in PDF format.)* Authors must keep a hard & soft copy with them as reference.

Manuscript must be accompanied by a covering letter addressing the Editor in Chief and signed by principal author declaring that
(a) It has neither been previously published nor being submitted elsewhere for publication and that the principal author will responsible for any violation of this precondition.
(b) The manuscript has been approved by all the authors and
(c) The order of authorship is the joint decision of principal author and all the co-authors.

Editorial Procedure

All manuscripts on receipt are initially screened by editors. The manuscripts are sent to reviewers. Thereafter a feedback is provided to the principle author. One copy of the proof-read may be sent to principal author for careful correction of errors if any. The ultimate authority to accept or reject the article rest with the Editorial Board. Editorial board may ask any relevant explanation of any part or whole of the article form the author. Failure to comply or explanation will cause rejection of the article for publication.

No article is rejected unless similar comments are received from at least two reviewers. Ethical aspect and conflict of interest are evaluated by the editorial board at the time of review of the article. Any conflict related to Helsinki declaration of 1975 as revised in 1983 will eliminate the article for publication. On acceptance of manuscript submitted for publication it implies transfer of copyright from author to publisher.

Authorship

Authorship credit should be based only on substantial contribution to:
(a) Conception and design or analysis and interpretation of data.
(b) Drafting the article or revising it critically for important intellectual content.
(c) Final approval of the version to be published.

Conditions (a), (b) & (c) must all be met. Only funding, collection of data or general supervision of a research group is not sufficient for authorship. Editors may ask authors to describe what each author contributed.

Technical requirements of manuscripts

(a) Double-space all parts of manuscripts.
(b) Begin each section or component on a new page.
(c) Review the sequence for original article- Title page, Abstract and key words, text, acknowledgments (not mandatory), references, tables (each on separate page) and legends.
(d) Illustrations (un-mounted prints) should be no larger than 203 X 254 mm (7 X 9 inch).
(e) Keep copies of everything submitted.
(f) Font is to be "Times new Roman", font size is to be "12".
(g) Serial number of tables is to be in Roman style (e.g. Table-I, Table-II, Table-III etc.

(h) Serial number of figures is to be in Arabic style (e.g. Figure-1, Figure-2, Figure-3 etc.

(i) Paper should be of good quality A_4 size with one inch margins on the top, bottom, right and left sides and articles should be typed on one side of the paper.

(j) Number pages consecutively beginning with title page. Put the number on upper or lower right hand corner of each page.

Preparation of the manuscript

The text of observational and experimental article is usually (but not necessarily) divided into sections with the headings – introduction, materials and methods, results and discussion. Long articles may need subheadings within some sections (especially in methods, results and discussions) to clarify their content. Other types of articles such as case reports, review articles and editorials can be in other formats. The tittle page should be the first page of all manuscripts.

Title page

Title page should carry
(i) Title of the article which should be concise, informative, self-explanatory and catchy.
(ii) Article type
(iii) Full name for each author including highest degree and affiliation.
(iv) Contact information for the principal / corresponding author (Name, Address, Mobile and Email).

Format of manuscript

The format of the manuscript depends on the type of the articles, each component should begin in a new page in a sequential order and contain relevant information.

A. Original articles (Length: 2000 ± 500 words)

The following sequence of headings should be followed for original articles
(i) Abstract, (ii) Introduction, (iii) Materials and Methods, (iv) Results, (v) Discussion (with Conclusion), (vi) Acknowledgments, (vii) References.

(i) ABSTRACT

The second page should carry an abstract (of no more than 150 words for unstructured abstract or 250 words for structured abstract). Structured abstract is preferred. The abstract should state the Background or aims of the study, basic procedures/Methods (selection of study subjects; observational and analytic methods), main findings/Results (specific data and their statistical significance, if any) and the principal Conclusions. Below the abstract authors should provide/mention 3 to 10 key words or short phrases. Terms from the medical subject headings (MeSH) list of “Index Medicus” should be used: if suitable are not yet available for recently introduced terms, present terms may be used.

(ii) INTRODUCTION

Provide the wider context that generated the study. This should summarize the rationale for and purpose of the study. Give only strictly pertinent references and do not include data or conclusions form the study being reported.

(iii) MATERIALS & METHODS

This section details the study design to ensure reproducibility of the research. It will include case selection, place and time of study, sampling technique, data collection, ethical aspect and the statistics. Statistical soft wire if used should be specified. Studies that involve human subjects must be approved by an institutional ethical review committee. Mention precisely all drugs and chemicals if used including generic name (s) and route (s) of administration. Reports of randomized clinical trials should present information on all major study elements including the protocol (study population, interventions or exposures, outcomes and the rationale for statistical analysis), assignment of intervention (methods of randomization, concealment of allocation to treatment groups), and the method of masking (blinding).include case selection, place and time of study, sampling technique, data collection, ethical aspect and the statistics. Statistical soft wire if used should be specified Studies that involve human subjects must be approved by an institutional ethical review committee.

Mention precisely all drugs and chemicals if used including generic name(s) and route(s) of administration. Reports of randomized clinical trials should present information on all major study elements including the protocol (study population, interventions or exposures, outcomes and the rationale for statistical analysis), assignment of intervention (methods of randomization, concealment of allocation to treatment groups), and the method of masking (blinding).

(iv) RESULTS

Should be presented in logical sequence in the text, tables and illustrations. The order of presentation of results should parallel the order of the materials and method section. Do not repeat in the text all data in the tables or illustrations; emphasize only important observations.

a) Tables

Type or print out each table with double spacing on a separated sheet of paper, be numbered consecutively using Roman numerals in order of their first citation in the text and supply a brief title for each in the appropriate headers. Do not use internal horizontal and vertical rules. Be sure that each table is cited in the text. Place explanatory matter in foot notes not in the heading. Explain in footnotes all non-standard abbreviations that are used in each table.

b) Illustrations (Figures)

Figures include graphs, charts and photographs. Charts (Pie, histogram, bars, line chart etc) are preferred in Excel format. Figures should be professionally drawn and photographed; freehand or type written lettering is unacceptable. Instead of original drawings, x-ray film and other materials, send sharp, glossy coloured photographic prints, usually 127 X 178 mm (5 X 7 inch) but no larger than 203 X 254 mm (8 X 10 inch). Figures should be numbered consecutively according to order in which they have been first cited in the text. Each figure should be accompanied by a legend at the bottom. Do not write on the back of the figure or scratch or mar them by using paper clips. Do not bend figures or mount them on cardboard. Written permission is needed. When photographs of people are used and if person is unidentifiable then written permission is not mandatory.

(c) Units of measurement

Measurement of length, weight and volume be reported in metric units. Measurement of temperature in Celsius, blood pressure in mm of Hg. All hematological and clinical-chemistry measurements should be reported in SI units. Authors may request editors to add non-SI units before publication.

(v) DISCUSSION

Emphasize the new and important aspects of the study and conclusions that follow from them. This section should include implications of the findings and their limitation including implications for future research. The section should not merely recapitulate the results but compare and contrast the result with other relevant studies. Do not make statement on economic benefits and costs unless the manuscript includes economic data and analyses.

Conclusion

It will be a brief concluding paragraph of the heading “Discussion”, stating the implications of the study results and possible new research directions on the subject.

(vi) ACKNOLEDGEMENT (not mandatory)

Institution, organization, sponsor, individuals or any bodies may be acknowledged for financial, material, technical or any form of assistance or contribution to the work with their consent.

B. Case reports (Length: 1000±200 words)

This should cover uncommon and / or interesting cases with appropriate confirmation process. The number of case may be one or two. Case report should consist of an unstructured abstract (100 ± 200 words), ‘INTRODUCTION’, ‘THE CASE’ including clinical presentation, diagnosis and outcome and ‘DISCUSSION’ that includes brief review of relevant literatures, one table and not more than two figures.

C. Review articles (Length: 3000±500 words)

Submission of reviews and perspectives covering topics of current interest are encouraged. Review articles should be focused on topic of health interest and up to date. Components should include: unstructured abstract (250 ± 50 words), context, objective, data sources, study selection, data extraction, results, analysis and conclusion.

D. Letters to Editor (Length: 300±50 words)

Letters in response to articles published in Kushtia Medical College Journal are welcome. The letter will be followed by comments from original author (where appropriate) of the article in question

E. REFERENCES

References should be arranged according to VANCOUVER system which is based on American National Standards Institute (ANSI) style for its database adapted by the National Library of Medicine (NLM) and used in Index Medicus. In the text references should be numbered by Arabic numeral in the superscript consecutively in the order in which they are first mention in the text. In the reference list it should be numbered sequentially as it appears in the text. Names and initials of the authors are listed if there are six or fewer, otherwise first six and then et al. is added. Authors are responsible for the accuracy of the references cited, these should be checked against original documents before the article is submitted.

Examples of references

i) Standard journal article

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

ii) Book

Author (s)
Ringsven MK, Bond D. Gerentology and leadership skills for nurses. 2nd ed Albany (NY): Delmar publishers; 1996. p 28-35.

editor (s), compiler(s) as author (s)
Norman IJ, Redfan SI, editors. Mental health care for elderly people. 2nd ed. New York: Churchil Livingston; 1996. p 125-129.

Chapter in a book:

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

iii) Electronic material

Standard journal article on the internet.
Kaul S, Diamond GA. Good enough: a primer on the analysis and interpretation of non-inferiority trials. Ann Intern Med (internet. 2006 Jul 4 (cited 2007 Jan 4); 145(1): 662-9 Available from: http:/www.annals.org/cgi/reprint/145/1/62.pdf.

Printed By: Siyam Offsat Press, Sapla Supar Market, Bogura.
Mobile: (+88) 01714-423706, 01733-199778, 01701-777570, e-mail: siyamoffsatprass22@gmail.com