The Journal of Teachers Association

ISSN 1019-8555 (Print) & ISSN 2408-8854 (Online)
Frequency: Bi-Annual
DOI: https://doi.org/10.62469/taj.v037i01.029

OPEN ACCESS
Website: www.tajrmc.com
Email: editor@tajrmc.com
Volume-37 | Issue-1 | Jan-Jun 2024

Outcome of gastroschisis in Rajshahi Medical College Hospital: Searching for the way of improvement

Md. Zamil Hossain[1]*, Md. Nowshad Ali[2], Shah Md. Ahsan Shahid[3], Shantona Rani Paul[4], Abdullah Al Mamun[5]

[1]Resident Surgeon, Department of Pediatric Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
[2]Professor, Department of Paediatric Surgery, Rajshahi Medical College, Bangladesh
[3]Associate Professor, Department of Pediatric Surgery, Rajshahi Medical College, Bangladesh
[4]Assistant Professor, Department of Pediatric Surgery, Rajshahi Medical College, Bangladesh
[5]Assistant Registrar, Department of Pediatric Surgery, Rajshahi Medical College & Hospital, Bangladesh

Abstract: ***Background:*** Gastroschisis is a congenital abdominal wall defect requiring complex surgical intervention. Its management remains challenging, especially in resource-limited settings. ***Objective:*** The primary objective was to evaluate the outcomes and associated factors in treating gastroschisis patients at Rajshahi Medical College Hospital from January 2020 to December 2021. ***Methods:*** We conducted a retrospective analysis of 50 gastroschisis cases. Patient data were collected, including demographics, mode of delivery, place of birth, term/preterm status, antenatal history, treatment modalities, surgical procedures, post-operative events, outcomes, associated illnesses, post-operative complications, and duration of stay. Percentages were calculated for various variables to provide insights into the patient population and outcomes. ***Results:*** The study 50 patients examining gastroschisis outcomes and management. Gender distribution revealed 29 males (58.3%) and 21 females (41.7%). Regarding mode of delivery, 32 patients (63.9%) underwent Normal Vaginal Delivery (NVD), while 18 (36.1%) had Caesarian Section. Most patients (90.3%) were born out of hospitals. Gestational age distribution showed 70.8% term and 29.2% preterm births. Among the patients, 61.1% had a birth weight over 2.5 kg. Operative treatment was administered to 45 patients (90%), while 5 (10%) died before surgery. Primary repair was the most common treatment (57.7%), followed by Silo closure with staged repair (33.41%). These findings suggest a need for tailored interventions based on patient characteristics. ***Conclusions:*** This study highlights the challenges in managing gastroschisis at our institution, particularly in cases with high cardiac arrest and mortality rates. Improving pre-operative care, surgical techniques, and post-operative monitoring are needed to enhance patient outcomes.

Keywords: Gastroschisis, outcomes, mortality, surgical intervention, resource-limited settings.

Orginal Research Article

Correspondence:
Md. Zamil Hossain
Resident Surgeon, Department of Pediatric Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
Email: dr.zamilmunna@gmail.com
https://orcid.org/0009-0006-2925-5164

How to cite this article:
Hossain MZ, Ali MN, Shahid SMA, Paul SR, Mamun AA; Outcome of gastroschisis in Rajshahi Medical College Hospital: Searching for the way of improvement. Taj 2024;37 (1): 192-200.

Article history:
Received: January 12, 2024
Revised: February 26, 2024
Accepted: April 17, 2024
Published: June 03, 2024

Article at a glance:

Study Purpose: *Evaluate outcomes of gastroschisis patients at Rajshahi Medical College Hospital.*
Key findings: *The majority born via NVD, preterm infants faced higher risk, cardiac arrest, a significant post-op event, and associated illnesses, including LBW and preterm birth.*
Newer findings: *Reinforced the importance of timely surgical intervention and improved post-operative care.*
Abbreviations: *NVD: Normal Vaginal Delivery; CS: Cesarean Section; LBW: Low Birth Weight.*

INTRODUCTION

A congenital abdominal wall defect called gastroschisis occurs when the herniated intraabdominal viscera are exposed to amniotic fluid during pregnancy. At 4.9 per 10,000 live births, the disease is one of the most prevalent birth defects in pediatric surgery. [1] Studies reveal variations in the frequency of gastroschisis in

various geographical areas. According to a 2023 study, the prevalence varied over a three-year period, from 0.07% to 0.18%, highlighting the population's heterogeneity with this illness.[2] A different population-based study conducted in 2018 found that there were 2.7 cases for every 10,000 live births, which shed light on the frequency of incidence in a larger context.[3] Comprehending the worldwide consequences of gastroschisis necessitates taking into account variables like death rates and patterns. A thorough examination of gastroschisis's yearly incidence, mortality, and trends was carried out to provide insight into the condition's changing epidemiology.[4]

Furthermore, a study conducted across 14 states in the US revealed a rising gastroschisis prevalence, which advances our knowledge of the disease's epidemiological dynamics.[5] On the other hand, several studies have indicated a declining frequency and a temporal trend of gastroschisis in particular areas, highlighting the intricate patterns of the illness throughout time.[6] Globally analyzing the effects of gastroschisis requires taking into account the many risk factors and regional variations. Although the precise origin of gastroschisis is still unknown, a study conducted in Mexico, a nation known for having a high frequency of the disease, attempted to characterize the prevalence and identify associated risk factors.[7] This emphasizes the necessity of more study to clarify the complex nature of gastroschisis and its worldwide effects. Research has indicated that the quality of care received by newborns can differ based on the resources and healthcare system in place.

The prognosis for newborns with gastroschisis is greatly improved by early diagnosis and management. In certain trials, the majority of the newborns were out born, highlighting the significance of specialized care and surgical intervention for the best possible results.[8] Rajshahi Medical College Hospital in Bangladesh must grasp the varying prevalence of gastroschisis and its global outcomes. Recognizing epidemiological patterns is essential for healthcare professionals to formulate effective strategies, focusing on prevention, early diagnosis, and optimal management. As a prominent healthcare facility, the hospital plays a pivotal role in addressing challenges posed by gastroschisis, actively contributing to shaping targeted approaches and aligning healthcare policies with the specific needs of the population served.

METHODOLOGY

This retrospective observational study was conducted in the Pediatric Surgery Department of Rajshahi Medical College Hospital from January 2020 to December 2022. Convenient sampling was applied, and data were collected from hospital records. Descriptive studies were presented in frequency tables, and survival rates were assessed using Kaplan-Meier survival analysis in SPSS version 24. The study, conducted during the specified period, involved including 50 patients to analyze and comprehend various aspects of gastroschisis outcomes and management, incorporating graphical representation for a more comprehensive understanding.

As surgery is the only management option for gastroschisis, all the respondents underwent surgical management except those who died before the operation. The surgical procedure aimed to reduce the contents and primary repair of the defect. If complete reduction was not possible, resection of part of the intestine and end-to-end anastomosis was done before primary repair. When the intestine was found too edematous and impossible to reduce, the silo closure was done with an improvised silo which was made of a polythene bag or urine bag. Subsequently, when gut edema subsided then, staged repair with or without resection and anastomosis was done according to its need.

RESULT

This study encompassed a cohort of 50 patients included in the comprehensive analysis of gastroschisis outcomes and management.

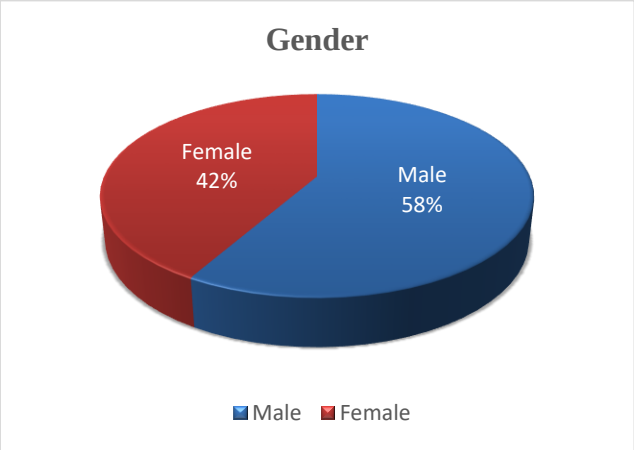


Figure 1: Distribution of the respondents based on gender (n=50)

The distribution of respondents was based on gender, with 29 males (58.3%) and 21 females (41.7%) out of a total of 50 respondents.

Table 1: Distribution of the respondents based on mode of delivery (n=50)

Mode of Delivery	Frequency	Percentage (%)
NVD	32	63.9
Caesarian Section	18	36.1

Table 1 presents the distribution of respondents (n=50) categorized by the mode of delivery. It shows that 63.9% of respondents underwent Normal Vaginal Delivery (NVD), while 36.1% underwent Caesarian Section.

Table 2: Distribution of the respondents based on place of birth (n=50)

Place of Birth	Frequency	Percentage (%)
Out born	45	90.3
Inborn	5	9.7

Table 2 summarizes the birthplaces of 50 respondents, indicating that 90.3% were Out-born and 9.7% were Inborn.

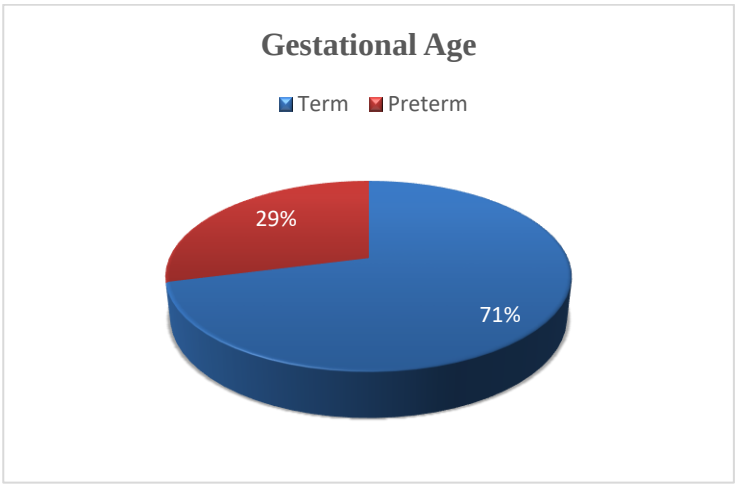


Figure 2: Distribution of Participants Based on Gestational Age (n=50)

The figure illustrates the distribution of births, with 70.8% categorized as term and 29.20% as preterm, providing insights into the gestational age composition.

Table 3: Distribution of the respondents based according to birth weight (n=50)

Birth weight	Frequency	Percentage (%)
1.5 kg to 2.5 kg	20	38.9
>2.5 kg	30	61.1

Table 3 displays the distribution of 50 respondents according to birth weight, with 38.9% weighing between 1.5 kg to 2.5 kg and 61.1% weighing over 2.5 kg. None of them were diagnosed with an antinatal ultrasound scan.

Table 4: Distribution of the participants based according to type of treatment (n=50)

Type of treatment	Frequency	Percentage (%)
Died before surgery	5	10%
Operative	45	90%

The distribution of 50 participants is based on treatment types. The breakdown is as follows: 10% died before surgery (n=5), and the majority, 90%%, underwent Operative treatment (n=45).

Table 5: Distribution of the participants based according to name of treatment (n=45)

	Name of Treatment	Frequency	Percentage (%)
Primary repair	Primary repair without resection and anastomosis	26	57.7
	Primary repair, along with resection and anastomosis	3	6.67
Staged repair	Silo closure followed by staged repair without resection and anastomosis	15	33.41
	Silo closure followed by staged closure along with resection anastomosis	1	2.22

The distribution of 45 participants was based on different treatment names. Primary repair was the most prevalent, constituting 57.7%, followed by Silo closure with staged repair at 33.41%. Primary repair and resection anastomosis accounted for 6.67%, while Staged closure with resection anastomosis was the least common, representing 2.22% of the total sample. This briefly summarizes the prevalence of each treatment modality within the study population.

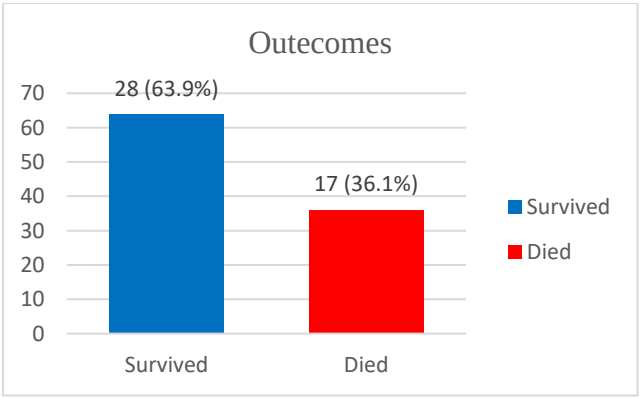
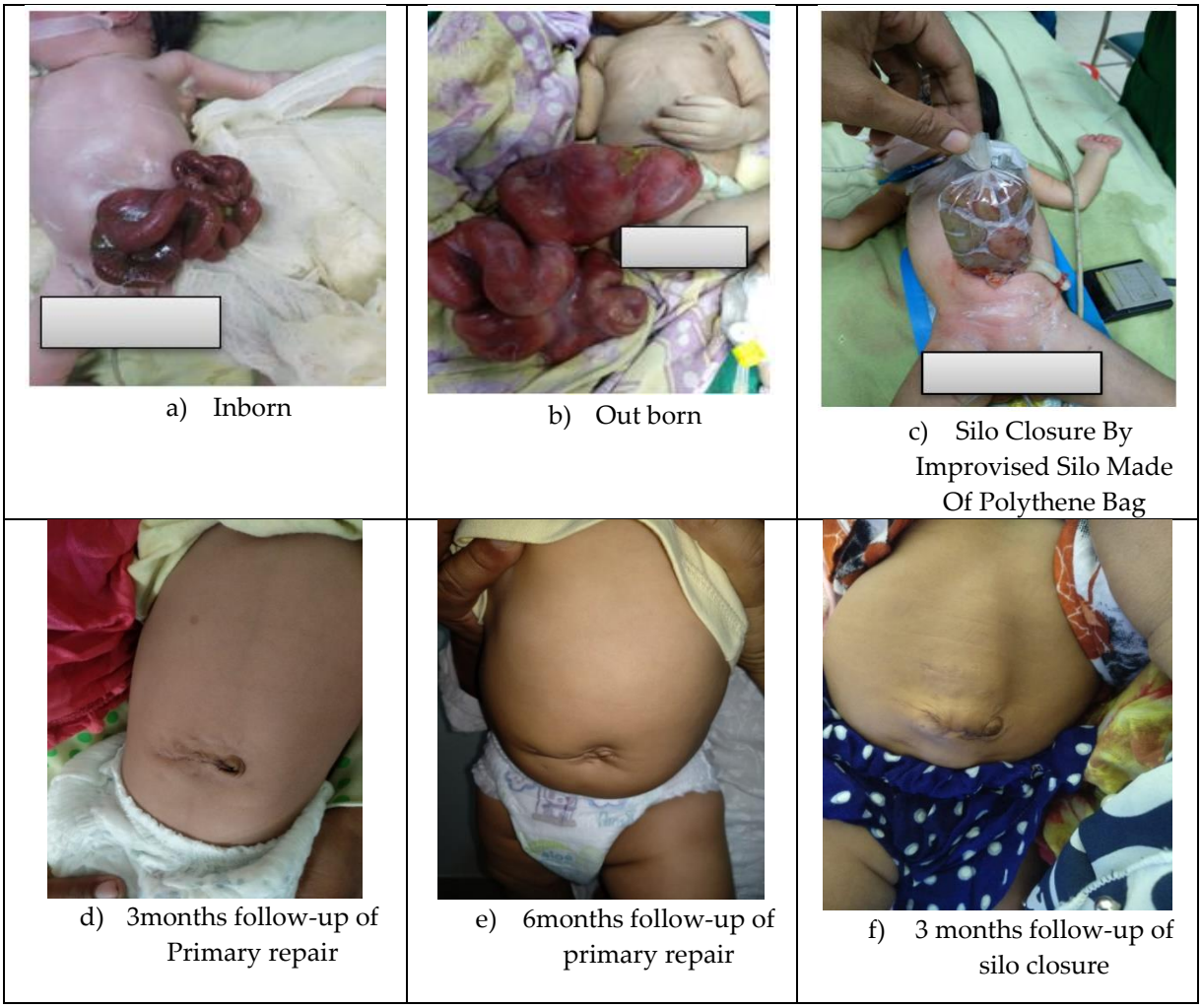


Figure 3: Gastroschisis Outcomes - Mortality vs. Discharge Rates (n=45)

The figure depicts the results of gastroschisis cases, with 28 (63.9%) of patients discharged and 17 (36.1%) unfortunately succumbing to the condition.



a) Inborn

b) Out born

c) Silo Closure By Improvised Silo Made Of Polythene Bag

d) 3months follow-up of Primary repair

e) 6months follow-up of primary repair

f) 3 months follow-up of silo closure

Figure 4: Photograph of various stages of management of Gastroschisis

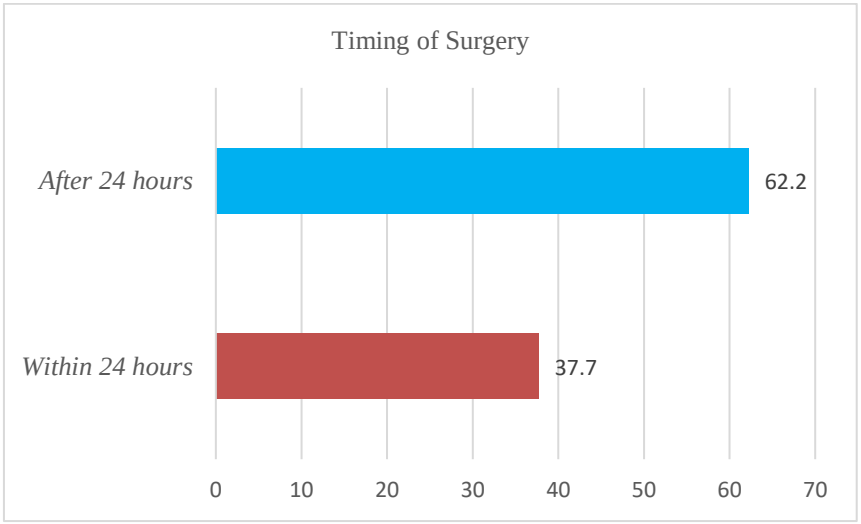


Figure 5: Distribution of respondents based on timing of surgery (n=45)

This figure shows the timing of surgery: 16 (37.7%) were performed within 24 hours of birth, while 29 (62.22%) were performed after 24 hours in gastroschisis cases.

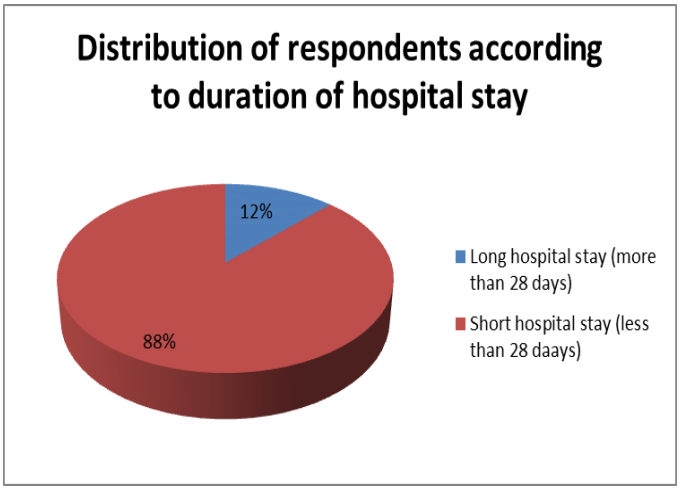


Figure 6: Distribution of respondents according to duration of hospital stay (n=45)

The figure illustrates the duration of hospital stays, indicating that 12.5% of cases had a long stay (more than 28 days), while 87.5% experienced a short hospital stay (less than 28 days). Our study investigated survival times in individuals with low and normal birth weights during hospital stays. The results revealed minor differences: low birth weight had a mean survival time of 4.448 days (median 5.000 days), while normal birth weight had a mean of 4.708 days (median 6.000 days). Combining both groups, the overall mean was 4.592 days (median 6.000 days). Statistical tests found no significant distinctions, highlighting comparable survival experiences across the observed period.

Table 6: Analysis of survival Patient Outcomes (n=28)

Variable	Number of Patients	Percentage
Gender		
Male	19	67.9%
Female	9	32.1%
Term/Preterm		
Term	21	75.0%
Preterm	7	25.0%
Birth Weight		
<2.5kg	6	21.4%
>2.5kg	22	78.6%
Timing of Surgery		
Within 24 Hours	12	42.9%
After 24 Hours	16	57.1%
Primary vs. Staged Closure		
Primary Closure	16	57.1%
Staged Closure	12	42.9%

The table presents survival outcomes for 28 patients across various variables. Gender distribution shows 19 males (67.9%) and 9 females (32.1%). Term births account for 21 patients (75.0%), while preterm births represent 7 patients (25.0%). Regarding birth weight, 22 patients (78.6%) weigh over 2.5kg, with 6 patients (21.4%) under 2.5kg. Surgery within 24 hours occurred for 12 patients (42.9%), while 16 patients (57.1%) underwent surgery after 24 hours. Primary closure was performed on 16 patients (57.1%), and staged closure on 12 patients (42.9%). These statistics underscore potential correlations between these factors and patient survival, prompting further investigation and tailored interventions.

DISCUSSION

The presented study offers a comprehensive of gastroschisis cases, encompassing various factors and outcomes. The outlook for infants with gastroschisis is primarily determined by the extent of intestinal damage during prenatal development. This emphasizes the importance of providing thorough prenatal care and measures to reduce the risk of problems. According to the survey, there are 41.7% females and 58.3% males. According to similar research investigations, this is consistent with typical trends in gastroschisis instances, where males are frequently more impacted than females.[9] Regarding delivery modes, 63.9% underwent Normal Vaginal Delivery, while 36.1% had Caesarian Section. This finding aligns with broader research trends and insights from various studies.[10-13] Birthplaces indicate that 90.3% were Out born, with 9.7% Inborn. One notable finding in our study is the higher prevalence of gastroschisis among males, consistent with previous findings.[14] This gender disparity in gastroschisis incidence has been reported in various studies globally and suggests potential biological or genetic factors contributing to the development of the condition.[15] However, it's essential to note that while our study reflects a similar gender distribution, the specific reasons behind this disparity may vary across populations and warrant further investigation.

In terms of mode of delivery, our study found that the majority of gastroschisis cases were delivered via Normal Vaginal Delivery (NVD), with a smaller proportion delivered by Caesarian Section (CS). This finding aligns with broader trends observed in the literature, where NVD is often the preferred mode of delivery unless there are specific obstetric indications for CS.[16] However, the relatively lower proportion of CS deliveries in our study compared to some reports may be influenced by institutional protocols, patient preferences, or variations in clinical practices across different healthcare settings. Another important aspect of our study is the distribution of treatment modalities for gastroschisis. We found that most patients underwent operative treatment, primarily primary repair without resection and anastomosis. This finding is consistent with standard surgical approaches recommended for gastroschisis management, emphasizing the importance of timely surgical intervention to achieve optimal outcomes.[17] However, our study's relatively lower prevalence of staged repair compared to other reports suggests potential variations in surgical practices or patient selection criteria, which may impact post-operative outcomes and complication rates.

The high mortality rate among patients who did not undergo surgery highlights the critical importance of prompt surgical intervention in gastroschisis cases. Early diagnosis and timely surgical management are crucial for reducing mortality and improving overall outcomes in gastroschisis patients.[18-20] In this study, the authors found that 12 (75%) out of 16 patients who underwent surgery within the first 24 hours after birth survived. On the other hand, 29 patients were operated on after 24 hours of birth, and only 16 (55%) were survived. Our study underscores the need for enhanced pre-operative care, surgical techniques, and post-operative monitoring to optimize patient outcomes and minimize complications. Multidisciplinary collaboration and resource allocation are essential to effectively address the complex challenges posed by gastroschisis. Our study findings have several implications for clinical practice and healthcare policy. Firstly, they underscore the importance of early diagnosis and prompt surgical intervention in gastroschisis cases to improve patient outcomes and reduce mortality rates. Healthcare providers should prioritize timely referral and access to specialized care for infants diagnosed with gastroschisis to ensure optimal management and treatment.

Secondly, our findings highlight the need for standardized protocols and guidelines for the management of gastroschisis across healthcare settings. Consistent approaches to pre-operative assessment, surgical techniques, and post-operative care can help streamline patient management and improve treatment outcomes. Healthcare institutions should consider implementing multidisciplinary care teams comprising pediatric surgeons, neonatologists, nurses, and other specialists to coordinate comprehensive care for gastroschisis patients. Furthermore, our study emphasizes the importance of ongoing research and surveillance to monitor

trends in gastroschisis incidence, outcomes, and associated risk factors. Longitudinal studies tracking patient outcomes over time can provide valuable insights into the effectiveness of different treatment strategies and identify areas for improvement in clinical practice.

In our study contributes to the growing body of literature on gastroschisis outcomes by providing insights specific to our hospital setting in Bangladesh. identifying key factors influencing patient outcomes and highlighting areas for improvement in clinical practice, our research aims to inform evidence-based approaches to gastroschisis management and ultimately improve the quality of care for affected infants. The survival analysis in gastroschisis cases indicates minimal disparities in mean and median survival times between low and normal birth weights, with no statistically significant differences, underscoring the comparable survival experiences throughout the observed period.[21] Exploring strategies such as enhanced prenatal care, advanced surgical procedures, and post-operative management is under scrutiny to enhance outcomes in gastroschisis cases. Emphasizing a multidisciplinary approach, ongoing research aims to minimize complications and optimize long-term prognosis.

CONCLUSION

Our study provides valuable insights into the management and outcomes of gastroschisis patients at Rajshahi Medical College Hospital. The findings underscore the importance of timely surgical intervention, multidisciplinary collaboration, and standardized protocols to improve patient outcomes. While consistent with broader literature trends, variations in treatment modalities highlight the need for tailored approaches based on patient characteristics. Further research and surveillance are essential to optimize care and reduce mortality in gastroschisis cases.

Funding: No funding sources

Conflict of interest: None declared

REFERENCES

1. Jones AM. Increasing prevalence of gastroschisis—14 states, 1995–2012. MMWR. Morbidity and mortality weekly report. 2016;65.
2. Machaea SS, Chitnis MR, Nongena P. Prevalence of gastroschisis and its neonatal mortality in the Eastern Cape Province tertiary institutions. African Journal of Paediatric Surgery. 2023 Jan 1;20(1):46-50.
3. Anderson JE, Galganski LA, Cheng Y, Stark RA, Saadai P, Stephenson JT, Hirose S. Epidemiology of gastroschisis: a population-based study in California from 1995 to 2012. Journal of pediatric surgery. 2018 Dec 1;53(12):2399-403.
4. Egger PA, Souza MP, Riedo CD, Dutra AD, Silva MT, Pelloso SM, Carvalho MD. Gastroschisis annual incidence, mortality, and trends in extreme Southern Brazil. Jornal de Pediatria. 2022 Feb 14;98:69-75.
5. Jones AM, Isenburg J, Salemi JL, Arnold KE, Mai CT, Aggarwal D, Arias W, Carrino GE, Ferrell E, Folorunso O, Ibe B. MMWR Morb Mortal Wkly Rep.
6. Li N, Chen YL, Li J, Li LL, Jiang CZ, Zhou C, Liu CX, Li D, Gong TT, Wu QJ, Huang YH. Decreasing prevalence and time trend of gastroschisis in 14 cities of Liaoning Province: 2006–2015. Scientific reports. 2016 Sep 14;6(1):33333.
7. Robledo-Aceves M, Bobadilla-Morales L, Mellín-Sánchez EL, Corona-Rivera A, Pérez-Molina JJ, Cárdenas-Ruiz Velasco JJ, Corona-Rivera JR. Prevalence and risk factors for gastroschisis in a public hospital from west M éxico. Congenital Anomalies. 2015 May;55(2):73-80.
8. Machaea SS, Chitnis MR, Nongena P. Prevalence of gastroschisis and its neonatal mortality in the Eastern Cape Province tertiary institutions. African Journal of Paediatric Surgery. 2023 Jan 1;20(1):46-50.
9. Bhat V, Moront M, Bhandari V. Gastroschisis: a state-of-the-art review. Children. 2020 Dec 17;7(12):302.
10. Liu S, Evans J, Boutin A, Luo W, Gheorghe M, Auger N, Arbour L, Moore A, Joseph KS, Little J. Time trends, geographic variation and risk factors for gastroschisis in Canada: A population-based cohort study 2006–2017. Paediatric and Perinatal Epidemiology. 2021 Nov;35(6):664-73.

11. Calderon MG, Santos EF, Abreu LC, Raimundo RD. Increasing prevalence, time trend and seasonality of gastroschisis in São Paulo state, Brazil, 2005–2016. Scientific Reports. 2019 Oct 10;9(1):14491.
12. Egger PA, Souza MP, Riedo CD, Dutra AD, Silva MT, Pelloso SM, Carvalho MD. Gastroschisis annual incidence, mortality, and trends in extreme Southern Brazil. Jornal de Pediatria. 2022 Feb 14;98:69-75.
13. Xu L, Li X, Dai L, Yuan X, Liang J, Zhou G, Li Q, He C, Miao L, Wang Y, Zhu J. Assessing the trend of gastroschisis prevalence in China from 1996 to 2007 using two analytical methods. Birth Defects Research Part A: Clinical and Molecular Teratology. 2011 Mar;91(3):177-84.
14. Qiao L, Wang X, Smith P, Fan J, Lu Y, Emmett B, Li R, Dorling S, Chen H, Liu S, Benton TG. Soil quality both increases crop production and improves resilience to climate change. Nature Climate Change. 2022 Jun;12(6):574-80.
15. Mai CT, Isenburg JL, Canfield MA, Meyer RE, Correa A, Alverson CJ, Lupo PJ, Riehle-Colarusso T, Cho SJ, Aggarwal D, Kirby RS. National population-based estimates for major birth defects.
16. Robinson PG, Maempel JF, Rankin CS, Gaston P, Hamilton DF. Evaluation of the patient acceptable symptom state following hip arthroscopy using the 12 item international hip outcome tool. BMC Musculoskeletal Disorders. 2020 Dec;21:1-0.
17. Wright N, Abantanga F, Amoah M, Appeadu-Mensah W, Bokhary Z, Bvulani B, Davies J, Miti S, Nandi B, Nimako B, Poenaru D. Developing and implementing an interventional bundle to reduce mortality from gastroschisis in low-resource settings. Wellcome Open Research. 2019;4.
18. Lun R. *Understanding and Improving the Relationship Between Cancer and Stroke* (Doctoral dissertation, Université d'Ottawa/University of Ottawa).
19. Hossain MZ, Ali MN, Saha AK, Shahid SA, Paul SR. Paediatric blunt abdominal trauma with organ injury: a comprehensive analysis of cases at a tertiary hospital in Bangladesh. International Journal of Contemporary Pediatrics. 2023 Dec;10(12):1764.
20. Saravanakumar R, Maniraj SP, Barshan AD, Das S, Hasan H, Alazzam MB. Clustering big data for novel health care system. InAIP Conference Proceedings 2023 Nov 21 (Vol. 2587, No. 1). AIP Publishing.
21. Overcash RT, DeUgarte DA, Stephenson ML, Gutkin RM, Norton ME, Parmar S, Porto M, Poulain FR, Schrimmer DB. Factors associated with gastroschisis outcomes. Obstetrics & Gynecology. 2014 Sep 1;124(3):551-7.

The Journal of Teachers Association
Abbreviated Key Title: TAJ
Official Journal of Teachers Association Rajshahi Medical College

Publish your next article in TAJ
For submission scan the QR code
E-mail submission to: tajrmc8555@gmail.com