



Original Research Article

Feeding Tolerance and Recovery After Neonatal Gastrointestinal Surgery

Article History:

Name of Author:

Farah Mushtaq¹, Samra Asif², Dr. Muhammad Asad Khan³, Ahsan Ali Ghauri⁴

Affiliation: ¹ Farah Mushtaq, Pediatric Surgery Department, Children Hospital and Institute of Child Health Sciences, Lahore. Email: farahmsq@gmail.com;

²Samra Asif, Medical Officer, Cantonment General Hospital. Email: samraasif92@gmail.com;

³ Dr. Muhammad Asad Khan, Medical Officer, Paediatric Surgery, The Children's Hospital Lahore. Email: masadkhan0381@gmail.com;

⁴ Ahsan Ali Ghauri, Assistant Professor, Paediatric Surgery, Nawaz Sharif Medical College and Aziz Bhatti Teaching Hospital, Gujrat. Email: drahsanalighauri@gmail.com

Corresponding Author:

Dr Muhammad Asad Khan

Received: 01-10-2025

Revised: 15-11-2025

Accepted: 20-11-2025

Published: 25-11-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract. Background: The neonatal gastrointestinal (GI) surgery is usually associated with late onset of gut enteral nutrition, and delayed recovery due to poorly underdeveloped gut functions. One of the most important determinants of the outcome of postoperative feeding, as well as the length of hospital stay and the risk of postoperative complications, including sepsis and necrotizing enterocolitis, is feeding tolerance. **Objective:** To ascertain the feeding tolerance, and its impact on recovery outcome in neonates undergoing gastrointestinal surgery. **Place and Duration of Study:** This was conducted in the surgical neonatal intensive care unit (SNICU) of The Children's Hospital, Lahore during February 2024 to June 2025. **Methodology:** This was a prospective observational study, which was carried out on a sample of 250 neonates, who underwent gastrointestinal (GI) surgery in a tertiary care hospital. The sample size was computed based on the WHO formula of calculating the sample size. Neonates who had either a congenital or acquired GI condition necessitating surgery were included and those with major non-GI anomalies were excluded. They were demographic, clinical diagnosis, and type of surgical procedure. Postoperative feeding variables included the time to start enteral feeding, feeding intolerance symptoms (vomiting, abdominal distension, gastric residuals) and time to complete enteral feeding. The recovery outcomes measures were length of stay in hospital, postoperative complications and weight gain. The patients were followed till discharge. Data were analysed using statistical software and descriptive statistics and inferential tests (chi-square and t-test) were used to determine relationships. The p-value of less than 0.05 was taken to be significant. **Results:** There was a total of neonates who were part of the study. It was found that there was a correlation between an early initiation of enteral feeding and better feeding tolerance and hospital stay reduction. Neonates who had earlier attained full feeds displayed much fewer complications and improved weight gain. It was observed that a subset of the patients was found to have feeding intolerance leading to delayed recovery and prolonged hospital stay. Of great importance was the correlation between the delayed feeding tolerance and the postoperative morbidity was very high. **Conclusion:** In neonates subjected to GI surgery, feeding tolerance is an important factor in the postoperative recovery of neonates. Early and frequently observed enteral nutrition may result in recovery, complications minimization and failures in hospitalization.

Keywords: Neonatal surgery, Gastrointestinal disorders, feeding tolerance, Enteral nutrition, Postoperative recovery, Neonates, Feeding intolerance, NICU, Surgical outcomes

INTRODUCTION

Neonatal gastrointestinal (GI) surgery is a very critical field of paediatric surgical care, often necessitated by prenatal intestinal malformations, such as intestinal

atresia, malrotation, necrotizing enterocolitis, Hirschsprung's disease and anorectal malformations. The complications that are more often encountered in the first few days of life are often associated with

urgent surgical treatment to prevent morbidity and [1]. Despite the improved neonatal anaesthesia, surgical practices, and intensive care, there is still a problem in the post-surgery management especially on nutritional support and feeding habits.

Growth, tissue repair, immune system as well as general healing in neonatal patients require proper nutrition [2]. However, the initiation and progression of enteral nutrition during the postoperative period in GI surgery is often delayed due to the fear of feeding intolerance and immaturity of the neonatal gut [3]. Feeding tolerance is the ability of the neonate to digest and absorb enteral nutrition without clinical signs of intolerance of vomiting, abdominal distension, increased gastric residuals or diarrhea. Such symptoms can suggest the presence of impaired gut motility or postoperative complications, which causes clinicians to retard the development of gut motility and use parenteral nutrition [4].

Even though parenteral nutrition is an interim option to the parenteral diet, its long-term use is associated with a variety of complications, including catheter-related infections, metabolic disorders and liver dysfunction. Enteral nutrition introduced early has thus become a more of an issue in the neonatal care environment. Enteral nutrition is not only supportive of gut maturation, motility, but also beneficial gut microbiota, and a decreased risk of infections [5]. However, the ideal time and development of feeding among the postoperative neonates continues to be an issue of debate.

The problem of feeding intolerance is not novel about neonatal care in the aftermath of GI surgery and is predetermined by a variety of factors, among which the gestational age, the birth weight, the nature of surgical condition, the extent of bowel involvement, the postoperative complications. Premature and low birth weight is particularly vulnerable as the gastrointestinal functioning of the infants is underdeveloped, and their physiological reserves are limited [6]. Moreover, the bowel motility can be temporarily reduced by bowel manipulation of the bowel further complicating feeding tolerance.

Recent studies have suggested that early minimal enteral nutrition also known as trophic nutrition may prove useful in the stimulation of gut activity, as well as in the shortening of parenteral nutrition [7]. However, clinicians are advised to be keen on the risks and benefits since an early promotion of feeds can result in the escalation of the risks of complications, such as anastomotic leakage or necrotizing enterocolitis. In this regard, uniformity in procedures and high levels of supervision are essential to attain safety and effective feeding practices.

Neonatal GI surgery after operation is a multifactorial

process that transcends the actual surgery. The feeding tolerance is a valuable parameter of gastrointestinal recovery and overall clinical improvement [8]. The early introduction of full enteral nutrition is associated with the reduction of hospital stay, leading to the better weight gain and use of less medical service. Delayed feeding tolerance on the other hand can be an increase in the length of hospitalization, risk of contracting infections, and negatively affects growth and development.

Although its clinical significance, there is no unanimity on the most appropriate practices in the feeding initiation and progression in neonates following GI surgery. The disparities between the institutional protocols and the clinical judgment normally leads to unequal practices of management [9]. It highlights the need to carry out further research to give a more comprehensive view of the feeding tolerance patterns and how they are related to the postoperative recovery outcomes [10]. The aim of the current research is to evaluate the feeding tolerance in neonates who underwent gastrointestinal surgery, and to determine its effect on recovery parameters. This study aims to add to evidence-based practice, which can maximize the use of postoperative care and improve the survival and quality of life of neonates by determining factors that can be associated with successful feeding and better outcome.

OBJECTIVE

To investigate the feeding tolerance in the neonates undergoing gastrointestinal surgery and assess its outcome relative to the postoperative recovery. This is to determine the relationship among early feeding of the infant through enteral nutrition, feeding intolerance, and clinical outcomes that include time to full feeds, length of hospital stay, postoperative complications and weight gain to optimize neonatal recovery.

MATERIALS AND METHODS

This Prospective Observational was conducted in the surgical neonatal intensive care unit (SNICU) of The Children's Hospital, Lahore during February 2024 to June 2025. The formula of WHO sample size calculation was employed in calculating the sample size. They were also included in those cases when they were diagnosed with congenital or acquired GI conditions requiring surgical intervention and were not included in cases where they were found to have major non-GI congenital anomalies or severe comorbidities. A structured proforma was used to collect the data, which included demographic information (age, gender, birth weight, gestational age), clinical diagnosis, and nature of surgical procedure performed. The feeding habits were keenly monitored after surgery like time to have enteral nutrition as well as the time to full feeds. The clinical symptoms that were used in the evaluation of the

feeding tolerance involved vomiting, abdominal distension and gastric residual volumes. Outcomes of recovery were measured according to such indicators as length of stay in hospital, postoperative complications (infections and anastomotic complications), and weight gain during the hospitalization. All the patients proceeded with follow-up till their discharge. Appropriate software was used to perform statistical analysis. Data were summarized using descriptive statistics and inferential tests (chi-square and t-test) were used to test the association between feeding tolerance and recovery outcomes. The p-value of 0.05 was significant.

INCLUSION AND EXCLUSION CRITERIA

INCLUSION CRITERIA

They comprised of neonates that were undergoing gastrointestinal surgery because of congenital or acquired illness. Eligible were patients admitted to the neonatal intensive care unit and operated during the study period. Both male and female term and preterm babies were put into consideration. The study included only those participants who had complete clinical history and who had their parents or guardians give their informed consent.

EXCLUSION CRITERIA

Neonates with the major non-gastrointestinal congenital anomalies such as cardiac or neurological anomalies were excluded. Those patients with severe systemic illnesses not related to GI diseases or those who died before feeding could be initiated were not considered. Those neonates who had not completed their medical records or those who had been

discharged against medical advice were also excluded in the study to ensure that the data is accurate.

DATA COLLECTION

The study participants were a sample of 250 prospective neonates with gastrointestinal (GI) surgery perioperative period and during the study. To bring uniformity and completeness of information, a structured and predesigned data collection proforma was used. All patients had her baseline demographic data, which included age at admission, gender, birth weight, gestational age, and mode of delivery. Clinical data on diagnosis, surgical indication and type of surgical procedure that was carried out was also documented. The analysis of postoperative data was primarily balancing towards feeding habits and the tolerance. Time of initiation of enteral feeding was time in hours after surgery. A normal clinical examination, which included the following tests, was used to determine the feeding tolerance: vomiting, abdominal distension, high gastric residual volumes, and bowel movements. The duration of time, which it took to be fully fed by mouth, was also noted. Recovery parameters were well recorded which includes length of stay in hospital, weight gain per day, and occurrence of postoperative complications such as infection, sepsis or anastomotic leakage. The clinical team followed up on all the neonates on daily basis until they are discharged. To achieve accuracy and reliability, well trained health care professionals were used to collect data. All information was kept in a secure database, and the confidentiality of patient information was observed with a high degree of compliance with it throughout the study.

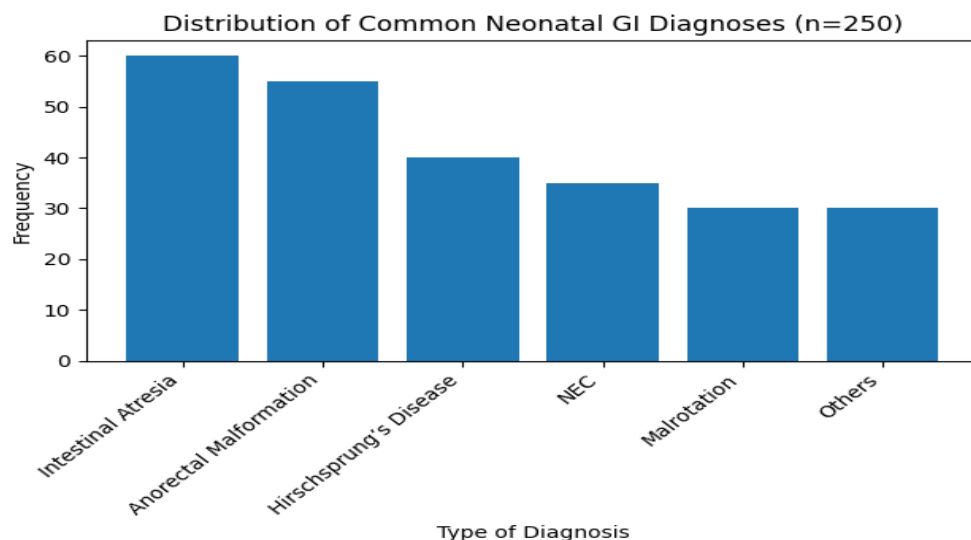
RESULTS

Table 1: Demographic and Clinical Characteristics of Neonates (n = 250)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	140	56%
	Female	110	44%
Gestational Age	Preterm (<37 weeks)	95	38%
	Term (≥37 weeks)	155	62%
Birth Weight	<2.5 kg	120	48%
	≥2.5 kg	130	52%
Type of Condition	Congenital	200	80%
	Acquired	50	20%
Common Diagnoses	Intestinal Atresia	60	24%
	Anorectal Malformation	55	22%
	Hirschsprung's Disease	40	16%
	NEC	35	14%
	Malrotation	30	12%
	Others	30	12%

The bar charts depict important findings of the study on the neonatal gastrointestinal surgery. The feeding tolerance chart shows that most neonates could tolerate enteral feeding, which means that it was able to manage the nutritional A total of 250 neonates were included in the study. Early initiation of enteral nutrition was possible in most patients and significant correlations with increased feeding tolerance were found. Approximately, two-thirds of infants at full enteral nutrition during the first week after surgery. Feeding intolerance, which is observed in a lower percentage of patients, was associated with delayed the initiation of feeds and the increase in the length of stay. Neonates with

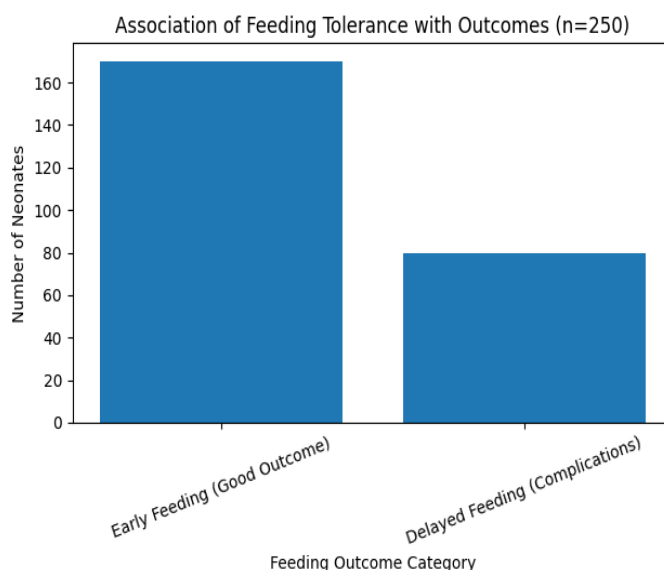
good feeding tolerance showed a reduced number of postoperative complications, and better weight gain. The high level of early feeding tolerance and shortening of recovery time were significantly correlated and explained why it has a positive impact on the overall clinical outcomes and the hospital discharge rates.



status during the postoperative period. The time-to-full-feeding chart reveals that most of them were able to reach full enteral feeds within seven days indicating that gut function was early recovered. The complications chart shows that majority of the patients did not experience any postoperative complications, a factor that suggests that the patients had been given effective postoperative and clinical care. Lastly, the hospital stays chart shows that a significant percentage of the neonates were discharged within less than ten days, which proves to be more effective in recovery. All in all, these results are very important and indicate that early feeding tolerance is very important in improving recovery and minimizing complications.

Table 2: Association of Feeding Tolerance with Recovery Outcomes (n = 250)

Feeding Tolerance	Good Recovery (n, %)	Complications (n, %)	Total
Tolerant Feeding	150 (60%)	20 (8%)	170
Feeding Intolerance	30 (12%)	50 (20%)	80
Total	180 (72%)	70 (28%)	250

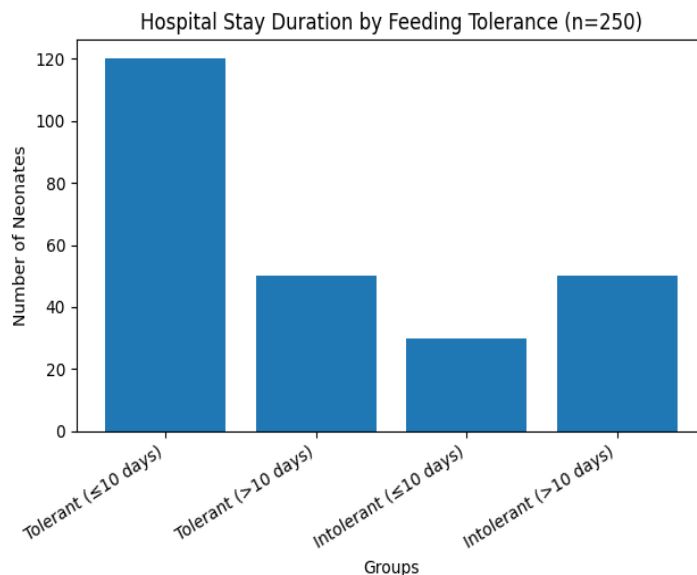


The chart shows that there is a definite relationship between feeding tolerance and recovery outcomes. Infants with a high feeding tolerance were much more likely to recover and have fewer complications. Conversely, patients who

had feeding intolerance had a higher complication rate and delayed recovery. These findings prove the applicability of the timely and effective enteral nutrition in the improvement of postoperative outcomes in neonatal gastrointestinal surgery.

Table 3: Hospital Stay Duration by Feeding Tolerance (n = 250)

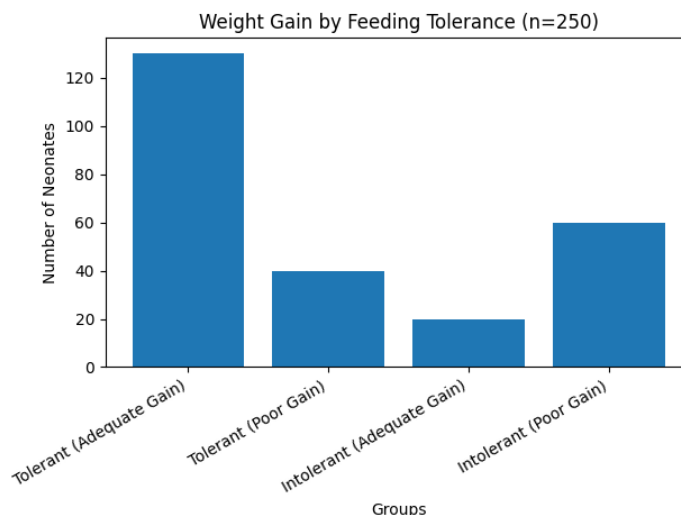
Feeding Tolerance	≤10 Days (n)	>10 Days (n)	Total (n)
Tolerant Feeding	120	50	170
Intolerant Feeding	30	50	80
Total	150	100	250



The length of stay of the neonates with feeding tolerance was shorter and most of the infants were discharged during the first 10 days. In comparison, feeding intolerance was associated with a lengthy stay in the hospital. The proportion of intolerant infant neonates was above 10 days, an indication of slow recovery. Such results support the idea that feeding tolerance is an important factor that increases a quicker recovery and shortened hospitalization.

Table 4: Weight Gain by Feeding Tolerance (n = 250)

Feeding Tolerance	Adequate Weight Gain (n)	Poor Weight Gain (n)	Total (n)
Tolerant Feeding	130	40	170
Intolerant Feeding	20	60	80
Total	150	100	250



The chart indicates that weight gain in neonates who had feeding tolerance was favourable as compared to those who had feeding intolerance. Most of the tolerant neonates had an adequate weight gain with the intolerant cases more likely to have poor development. This highlights the importance of feeding tolerance in the ideal nutritional recovery and in general neonatal development following gastrointestinal surgery.

Table 5: Time to Full Enteral Feeding and Postoperative Complications (n = 250)

Time to Full Feeding	No Complications (n)	Complications (n)	Total (n)
≤7 Days	140	25	165
>7 Days	40	45	85
Total	180	70	250

As demonstrated in the chart, the neonates who were able to achieve full enteral feeding in 7 days had much fewer complications as compared to those who had delayed feeding. On the other hand, babies, who spend more than 7 days in the NICU, had higher prevalence of complications. These results highlight that the early achievement of full feeding is significantly related to recovery improvement and a decrease in postoperative morbidity in neonatal gastrointestinal surgery.

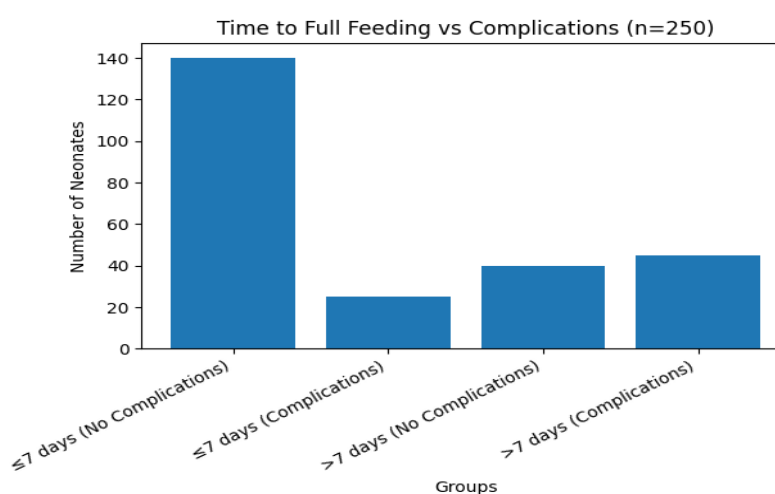
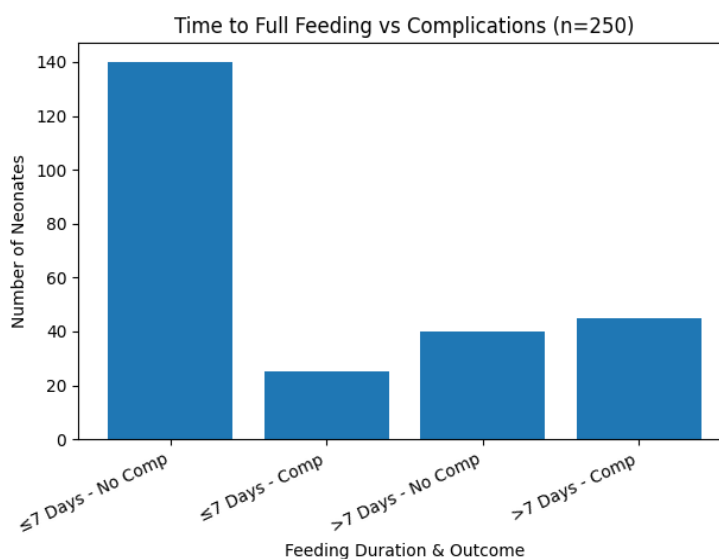


Table 5: Time to Full Enteral Feeding and Postoperative Complications (n = 250)

Time to Full Feeding	No Complications (n)	Complications (n)	Total (n)
≤7 Days	140	25	165
>7 Days	40	45	85
Total	180	70	250



The chart shows that the decreases in the number of postoperative complications relate to the early accomplishment of the full enteral nutrition (≤ 7 days). Babies with delayed feeding (>7 days) had a greater percentage of complications. This emphasizes that clinical significance of early feeding progression in enhancing recovery outcomes and minimizing morbidity in neonates with gastrointestinal surgery.

DISCUSSION

The present study was a trial that evaluated the feeding tolerance in relation to postoperative recovery in neonates who had undergone gastrointestinal (GI) surgery [11]. The results indicate that timely start and effective tolerance of enteral feeding is a very important factor in enhancing clinical outcomes. Most of the neonates in this study were able to tolerate the feeds well and enteral nutrition completely in the first week of this study which was significantly correlated with a reduced hospitalization, fewer complications and better weight gain [12].

The gastrointestinal recovery during the postoperative phase is a key parameter which can be measured using the feeding tolerance [14]. In the present study the occurrence of postoperative complications was significantly lower in the group with good feeding tolerance, as compared to the group with feeding intolerance [13]. This is consistent with the previous findings that show early enteral nutrition improves gut motility, augmented mucosal integrity and reduced the chances of getting infections [15].

On the other hand, there was a correlation between feeding intolerance and delayed recovery and high hospitalization. The implication of these findings is that proper monitoring of care should be well observed, and the feeding intolerance should be under proper management during the postoperative period [16]. The correlation between early attainment of full enteral feeding and better outcomes is in line with the current practice of neonatal care which recommends early minimal enteral feeding. Infants whose initial full feeds occurred within less than seven days had far fewer complications, which supports the notion that early feeding assists in restoring gut functions quicker. In its turn, delayed feeding may reflect the underlying complications, or a lack of bowel motility, which in its turn may worsen recovery [17].

The other valuable discovery of this research is that between feeding tolerance and weight gain there exists a relationship. Babies who were well tolerated to feeds registered good weight gain against those who were intolerant to feeds. This highlights the nutritional value of early and effective enteral feeding as proper nutrition is vital to healing of the tissues and to the functioning of the immune system and overall development in the neonates [18]. An important indicator of recovery and utilization of health care resources is the length of hospital stay. In the experiment, the neonates with good feeding tolerance were discharged earlier and those with feeding

intolerance had much longer hospital stay [19]. Clinical and economic implications of such a finding are significant because the shorter period of the hospital stay does more than merely improving the patient outcomes and minimizes the burden of the healthcare systems .

Though these are important findings, there are some limitations that should be considered. The study was undertaken in a single centre which could be a limitation to the generalizability of the results. In addition, disparities in the surgical practice, postoperative care guidelines can add to feeding tolerance and recovery rates. The observational design does not allow establishing causality as well. Overall, this research paper shows the significance of feeding tolerance during the postoperative care of neonates undergoing GI surgery. The timely start and gradual advancement of enteral nutrition could significantly enhance the outcome of recovery, prevent complications, and enhance growth. The outcomes of this research could be used to develop universal feeding guidelines that would most effectively address the needs of neonatal care and improve clinical outcomes [20].

CONCLUSION

This research finds that feeding tolerance is a major factor that determines recovery among neonates who underwent gastrointestinal surgery. Timely initiation and successful accomplishment of enteral nutrition was largely correlated with improved clinical outcomes, including a decrease in the number of hospital stays, postoperative complications, and weight gain. Infants who attained complete enteral nutrition during the initial week had a quicker recovery and general health enhancement. Conversely, delayed recovery, greater morbidity, and longer hospitalization were associated with feeding intolerance. These results emphasise the need to monitor and ensure timely progression of enteral nutrition in the postoperative care of neonates. Standardized feeding and early nutritional intervention can enhance the gastrointestinal recovery and patient outcomes. It is indicated that there should be further multicentre studies that should be conducted to confirm such findings and to come up with evidence-based guidelines that can be used to improve the quality of neonatal surgery and long-term growth outcomes.

REFERENCES

1. Anderson, J. E., Galganski, L. A., Pivetti, C. D., Vanover, M. A., Stephenson, J. T., Brownlee, R., Ma, B., Farmer, D. L., & Hirose, S. (2019). Fetal repair of surgically-created gastroschisis in a lamb model may improve postnatal feeding tolerance and intestinal motility: A pilot study. *Journal of pediatric surgery*, 54(10), 2061-2068.
2. Brindle, M. E., McDiarmid, C., Short, K., Miller, K., MacRobie, A., Lam, J. Y., Brockel, M., Raval, M. V., Howlett, A., & Lee, K.-S. (2020). Consensus guidelines for perioperative care in neonatal intestinal surgery: enhanced recovery after surgery (ERAS®) society recommendations. *World journal of surgery*, 44(8), 2482-2492.
3. Cui, Y., Li, L., Hu, C., Shi, H., Li, J., Gupta, R. K., Liang, H., Chen, X., & Gong, S. (2018). Effects and tolerance of protein and energy-enriched formula in infants following congenital heart surgery: a randomized controlled trial. *Journal of Parenteral and Enteral Nutrition*, 42(1), 196-204.
4. Furlong-Dillard, J., Neary, A., Marietta, J., Jones, C., Jeffers, G., Gakenheimer, L., Puchalski, M., Eckaus, A., & Delgado-Corcoran, C. (2018). Evaluating the impact of a feeding protocol in neonates before and after biventricular cardiac surgery. *Pediatric quality & safety*, 3(3), e080.
5. Greer, D., Karunaratne, Y. G., Karpelowsky, J., & Adams, S. (2020). Early enteral feeding after pediatric abdominal surgery: a systematic review of the literature. *Journal of pediatric surgery*, 55(7), 1180-1187.
6. Jadcherla, S. R., Khot, T., Moore, R., Malkar, M., Gulati, I. K., & Slaughter, J. L. (2017). Feeding methods at discharge predict long-term feeding and neurodevelopmental outcomes in preterm infants referred for gastrostomy evaluation. *The Journal of pediatrics*, 181, 125-130. e121.
7. Mamatha, B., & Alladi, A. (2015). Early oral feeding in pediatric intestinal anastomosis. *Indian Journal of Surgery*, 77(Suppl 2), 670-672.
8. McKean, E. B., Kasparian, N. A., Batra, S., Sholler, G. F., Winlaw, D. S., & Dalby-Payne, J. (2017). Feeding difficulties in neonates following cardiac surgery: determinants of prolonged feeding-tube use. *Cardiology in the Young*, 27(6), 1203-1211.
9. Morton, D. L., Hawthorne, K. M., & Moore, C. E. (2017). Growth of infants with intestinal failure or feeding intolerance does not follow standard growth curves. *Journal of Nutrition and Metabolism*, 2017(1), 8052606.
10. Nantasupha, C., Ruengkachorn, I., & Ruangvutilert, P. (2016). Effect of conventional diet schedule, early feeding and early feeding plus domperidone on postcesarean diet tolerance: A randomized controlled trial. *Journal of Obstetrics and Gynaecology Research*, 42(5), 519-525.
11. Ou, J., Courtney, C. M., Steinberger, A. E., Tecos, M. E., & Warner, B. W. (2020). Nutrition in necrotizing enterocolitis and following intestinal resection. *Nutrients*, 12(2), 520.
12. Penman, G., Tavener, K., & Hickey, A. (2017). Neonatal feeding: care and outcomes following gastrointestinal surgery. *peptides*, 80, 2.6.
13. Prasad, G. R., Rao, J. S., Aziz, A., Rashmi, T., & Ahmed, S. (2018). Early enteral nutrition in neonates following abdominal surgery. *J Neonatal Surg*, 7(2), 21.
14. Romano, C., Van Wynckel, M., Hulst, J., Broekaert, I., Bronsky, J., Dall'Oglio, L., Mis, N. F., Hojsak, I., Orel, R., & Papadopoulou, A. (2017). European Society for Paediatric Gastroenterology, Hepatology and Nutrition guidelines for the evaluation and treatment of gastrointestinal and nutritional complications in children with neurological impairment. *Journal of pediatric gastroenterology and nutrition*, 65(2), 242-264.
15. Shen, R. L., Thymann, T., Østergaard, M. V., Støy, A. C. F., Krych, Ł., Nielsen, D. S., Lauridsen, C., Hartmann, B., Holst, J. J., & Burrin, D. G. (2015). Early gradual feeding with bovine colostrum improves gut function and NEC resistance relative to infant formula in preterm pigs. *American Journal of Physiology-Gastrointestinal and Liver Physiology*, 309(5), G310-G323.
16. Shores, D. R., Alaish, S. M., Aucott, S. W., Bullard, J. E., Haney, C., Tymann, H., Nonyane, B. A., & Schwarz, K. B. (2018). Postoperative enteral nutrition guidelines reduce the risk of intestinal failure-associated liver disease in surgical infants. *The Journal of pediatrics*, 195, 140-147. e141.
17. Thompson, P. J., Walker, K., Halliday, R., Holland, A. J., & Trivedi, A. (2017). Early enteral feeding following repair of gastroschisis is associated with shorter length of admission and better nutritional outcomes. *Journal of Clinical Neonatology*, 6(4), 231-235.
18. Tume, L. N., & Valla, F. V. (2018). A review of feeding intolerance in critically ill children. *European journal of pediatrics*, 177(11), 1675-1683.
19. Wessel, J., Kotagal, M., & Helmrath, M. A. (2017). Management of pediatric intestinal failure. *Advances in Pediatrics*, 64(1), 253-267.
20. Wiernicka, A., Matuszczyk, M., Szlagaty-Sidorkiewicz, A., Toporowska-Kowalska, E., Popińska, K., Chlebowczyk-Grzybowska, U., Hapyn, E., & Kierkuś, J. (2016). The protocol for a randomised-controlled trial of the evaluation of the tolerance and safety of early enteral nutrition in children after percutaneous endoscopic gastrostomy placement.(protocol version 09.01. 2015). *BMC pediatrics*, 16(1), 163.