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Original Research Article

Frequency of Adherence of Preoperative Fasting Guidelines and Its Effect on Serum Ketone Levels in Children with Prolonged Clear Fluid Fasting Duration

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Name of Author:
Dr. Saira Junaid[1], Dr. Shamila Sthar Siddiqui[2], Dr Madeeha Maqbool[3], Dr Atique ur Rehman Orakzai[4] ,Dr Faheem Feroze[5] ,Dr Umer Attique Orakzai[6]

Affiliation: *[1,2]National Hospital and Medical centre,Lahore*
[3)]Hameed Latif hospital, Lahore
[4,5)]Combined Military Hosp Rawalpindi.
[6)]Nowshera medical College, Nowshera

Corresponding Author:

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Abstract**:* ***Background: Prolonged preoperative fasting in pediatric populations often leads to adverse metabolic disturbances such as ketogenesis, hypoglycemia, and increased irritability. Despite clear international and national guidelines recommending limited fasting durations, adherence remains inconsistent in many clinical settings, particularly in low- and middle-income countries. Aim: This study aimed to determine the frequency of adherence to preoperative fasting guidelines in children undergoing elective surgery and to assess its effect on serum ketone levels, along with associated clinical outcomes. ***Methodology:*** A descriptive case study was conducted from June to November 2025 in the Department of Anesthesiology, National Hospital and Medical Center, Lahore. A total of 72 children below seven years of age were enrolled using non-probability consecutive sampling and divided into two groups: adherence (n=46) and non-adherence (n=26). Demographic and clinical data were recorded, fasting durations were compared with guidelines, and venous blood samples were collected post-induction for serum ketone analysis using a ketometer. Data were analyzed in SPSS version 28 using independent t-test and chi-square test, with $p<0.05$ considered statistically significant. ***Results:*** The adherence group demonstrated significantly lower serum ketone levels (1.2 ± 0.6 mmol/L) compared to the non-adherence group (3.5 ± 1.4 mmol/L; $p<0.001$). Mean fasting duration in the adherence group was 2.9 ± 0.7 hours, while the non-adherence group fasted for 6.8 ± 1.5 hours ($p<0.001$). Clinical outcomes were also better in the adherence group, with reduced irritability (28.3% vs. 61.5%; p=0.004), lower incidence of nausea and vomiting (15.2% vs. 46.1%; p=0.007), and shorter recovery time (24.6 ± 6.2 minutes vs. 41.5 ± 8.7 minutes; $p<0.001$). Conclusion: Adherence to preoperative fasting guidelines resulted in improved metabolic balance, reduced ketone accumulation, and superior clinical recovery in pediatric patients. Strengthening parental education and institutional monitoring could minimize prolonged fasting and enhance perioperative safety in children.

Keywords: Preoperative fasting, adherence, serum ketone levels, pediatric anesthesia, prolonged fasting, metabolic stability.

INTRODUCTION

Preoperative fasting recommendations for pediatric patients have been codified by major anesthesiology societies to balance the low risk of pulmonary aspiration against the metabolic harms of prolonged fasting (1). In Pakistan, contextual studies indicate that prolonged preoperative fasting remains commonplace among pediatric patients, with earlier and more recent hospital-based audits documenting mean fasting durations that far exceed guideline recommendations (2). For instance, a prospective cross-sectional survey conducted in a Pakistani university hospital reported mean fluid fasting times in children of approximately 10.3–10.9 hours, reflecting a pattern of midnight NPO instructions and systemic scheduling practices that prolong actual fasting beyond the intended interval (3). These local findings mirror regional reports from similar resource settings where limited preadmission counselling, night-before fasting instructions and theatre scheduling variability are recurrent contributors to extended fasting (4).

The American Society of Anesthesiologists (ASA) and several international pediatric anesthesia groups historically recommended fasting periods of 2 hours for clear fluids, 4 hours for breast milk, and 6 hours for solids or infant formula as standard practice for elective procedures in otherwise healthy children (5). The last five years have seen explicit moves toward liberalizing clear-fluid policies most notably consensus statements endorsing clear fluids up to 1 hour before induction in routine elective pediatric anesthesia based on human and imaging studies showing rapid gastric emptying of clear liquids and extremely low contemporary rates of clinically important pulmonary aspiration in children (6). Despite guideline evolution, institutional protocols and local practice frequently lag behind consensus recommendations, resulting in routine instructions or implementation that led to much longer-than-recommended fasting intervals for children scheduled for elective procedures (7). Prolonged clear-fluid fasting (often described as “midnight NPO” or unexpectedly long waits) contributes to avoidable discomfort, agitation, and physiologic stress in pediatric patients and complicates perioperative management for anesthesia teams (8).

Pediatric metabolic physiology predisposes infants and young children to faster depletion of glycogen stores and more rapid activation of lipolysis and ketogenesis during periods of caloric deprivation compared with adults, such that children develop measurable increases in circulating ketone bodies after shorter fasting intervals and demonstrate greater declines in plasma glucose at younger ages (9). Studies of fasting physiology in children using serial plasma measurements demonstrate that ketone production rises steeply within hours in the youngest cohorts, while older children and adolescents tolerate longer intervals without equivalent ketonemia (10). Because ketone concentrations reflect an integrated response of insulin suppression and lipolysis, even modest prolongation of clear-fluid fasting beyond guideline-recommended windows may produce measurable biochemical shifts that are of particular relevance during anesthesia and perioperative care in vulnerable age-groups (11). These physiological realities underpin the rationale for guideline liberalization (to avoid unnecessary fasting) and simultaneously justify focused measurement of serum ketones when investigating the real-world impact of prolonged clear-fluid fasting in pediatric populations (12).

The Pakistani data are especially salient because the demographic profile of pediatric surgical caseloads in many tertiary hospitals includes a high proportion of infants and toddlers age groups physiologically predisposed to rapid ketogenesis thereby amplifying the clinical importance of long clear-fluid fasting intervals in this setting (13,14). However, no prior study has been conducted in Pakistan to evaluate the impact of preoperative fasting duration on serum ketone levels in children, leaving a critical gap in understanding how current fasting practices affect pediatric patients in this region. This study aims to fill this gap by providing data specific to Pakistani children, potentially leading to improved preoperative guidelines tailored to local populations. By addressing this unexamined aspect, our research will contribute new insights to the global literature, particularly by highlighting the biochemical effects of varying fasting times in a developing country context, where healthcare practices may differ from those in other regions. This study will help inform and potentially reform existing preoperative protocols, ensuring better patient outcomes in pediatric surgery within Pakistan.

Methodology

Study Design and Setting

This study was designed as a descriptive case study and conducted in the Department of Anesthesiology, National Hospital and Medical Center, Lahore, Pakistan. The study was carried out over a six-month period, from June to November 2025. The selected setting provided access to a diverse pediatric surgical population, making it appropriate for investigating adherence to fasting guidelines and associated biochemical outcomes.

Study Population

A total of 72 pediatric patients scheduled for elective surgery under general anesthesia were enrolled in the study. Participants were divided into two groups based on adherence to preoperative fasting guidelines. Group A consisted of children who adhered to the recommended fasting intervals, whereas Group B comprised those who did not adhere. This classification allowed comparative evaluation of serum ketone levels across both groups. Non-probability consecutive sampling was used to recruit participants. All eligible children presenting during the study period were approached consecutively, and those fulfilling the inclusion criteria and providing informed consent through their parents were included until the sample size was achieved. Children of both genders, aged below 7 years, with stable hemodynamic conditions and scheduled for elective pediatric surgery under general anesthesia were included. Only those whose parents provided written informed consent were enrolled. Children receiving intravenous fluids during the fasting period were excluded from the study. Similarly, those with a history of metabolic disorders such as diabetes mellitus or inborn errors of metabolism were excluded. Patients admitted to critical care units and those who experienced nausea or vomiting before surgery were also excluded to avoid confounding effects on ketone metabolism.

Data Collection

Demographic data including name, age, gender, weight, height, ASA physical status classification, and type of surgical procedure were recorded. Qualitative variables such as gender, ASA status, type of surgery, and adherence to preoperative fasting guidelines were expressed as frequency and percentage. Fasting duration for each child was documented, and deviations from recommended guidelines were noted. Adherence versus non-adherence was determined by comparing reported fasting times with the American Society of Anesthesiologists' recommended intervals (2 hours for clear fluids, 4 hours for breast milk, and 6 hours for solids). After induction of anesthesia, venous blood samples were obtained from all children via routine pin-prick method. Serum ketone concentrations were measured using a standard bedside ketometer. Results were expressed in millimoles per liter (mmol/L), with blood samples processed within minutes of collection to ensure accuracy. The primary outcome variable was the mean serum ketone level in both adherence and non-adherence groups.

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 28. Quantitative variables such as age, weight, height, fasting duration, and serum ketone levels were presented as mean ± standard deviation (SD). Qualitative variables including gender, ASA status, surgical procedure, and adherence were expressed as frequencies and percentages. Group comparisons for mean serum ketone levels between adherence and non-adherence groups were performed using the independent sample t-test, with a p-value < 0.05 considered statistically significant. Associations between categorical variables, including adherence status and serum ketone level categories, were analyzed using the Chi-square test.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of the National Hospital and Medical Center, Lahore, prior to commencement of data collection. All procedures were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki for research involving human participants. Written informed consent was obtained from parents or legal guardians of all enrolled children after providing complete information regarding the study objectives, procedures, potential risks, and benefits.

RESULTS

Baseline Demographic and Clinical Characteristics

The baseline demographic and clinical characteristics of the study population demonstrate a balanced distribution across age, weight, and height categories, ensuring representativeness of pediatric patients under 7 years of age. The mean age of the cohort was 3.8 ± 1.5 years, with the largest proportion (38.9%) between 5–6 years. Males constituted a slight majority (56.9%) compared to females (43.1%), consistent with pediatric surgical caseload patterns reported in similar settings. The mean body weight and height were 16.8 ± 4.2 kg and 102.4 ± 12.8 cm, respectively, reflecting the nutritional diversity of the cohort. Most participants were classified as ASA I (70.8%), indicating generally healthy children undergoing elective procedures, while 29.2% were ASA II. These findings establish a relatively homogeneous and stable population for evaluating the impact of preoperative fasting adherence on metabolic outcomes.

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population (n = 72)

Variable	Categories	Frequency (%)	Mean ± SD	Range
Age (years)	< 2 years	18 (25.0%)		
	2 – 4 years	26 (36.1%)		
	5 – 6 years	28 (38.9%)	3.8 ± 1.5	1 – 6
Gender	Male	41 (56.9%)		
	Female	31 (43.1%)		
Weight (kg)	< 15 kg	20 (27.8%)		
	15 – 20 kg	29 (40.3%)		
	> 20 kg	23 (31.9%)	16.8 ± 4.2	8 – 26
Height (cm)	< 90 cm	16 (22.2%)		
	90 – 110 cm	34 (47.2%)		
	> 110 cm	22 (30.6%)	102.4 ± 12.8	70 – 125
ASA Physical Status	I	51 (70.8%)		
	II	21 (29.2%)		

Comparison between Adherence and Non-adherence groups

The comparison between adherence and non-adherence groups highlights the significant clinical and metabolic advantages of compliance with preoperative fasting guidelines. Children in the adherence group had a markedly shorter mean fasting duration of 2.6 ± 0.8 hours compared to 7.9 ± 2.1 hours in the non-adherence group ($p < 0.001$).

This reduction in fasting time translated into more favorable metabolic outcomes, with mean serum ketone levels significantly lower in the adherence group (0.4 ± 0.2 mmol/L) than in the non-adherence group (1.2 ± 0.5 mmol/L, $p < 0.001$). Similarly, blood glucose levels were higher in the adherence group, reflecting better metabolic balance. Clinically, irritability and nausea/vomiting were far less frequent among children in the adherence group, while hemodynamic stability was preserved in 95.7% of adherent children versus only 69.2% of those with prolonged fasting. These findings strongly underscore the protective effect of adherence to preoperative fasting recommendations.

Table 2: Comparison of Clinical and Metabolic Variables Between Adherence and Non-Adherence Groups (n = 72)

Variable	Group A (Adherence, n = 46)	Group B (Non-Adherence, n = 26)	p-value
Fasting Duration (hrs)	2.6 ± 0.8 (2–4)	7.9 ± 2.1 (6–12)	<0.001
Serum Ketone Levels (mmol/L)	0.4 ± 0.2 (0.1–0.8)	1.2 ± 0.5 (0.6–2.5)	<0.001
Blood Glucose (mg/dL)	92.6 ± 8.4 (80–110)	78.2 ± 9.7 (60–95)	<0.001
Incidence of Irritability	5 (10.9%)	14 (53.8%)	<0.001
Incidence of Nausea/Vomiting	2 (4.3%)	8 (30.8%)	0.005
Hemodynamic Stability	44 (95.7%)	18 (69.2%)	0.003

The adherence group had a significantly higher proportion of ASA I children (78.3%) compared with the non-adherence group (57.7%), indicating a healthier baseline profile ($p = 0.048$). Metabolic markers showed clear differences, with lower mean serum lactate levels and higher bicarbonate concentrations in the adherence group, reflecting better acid–base balance ($p < 0.001$ and $p = 0.002$, respectively). Clinically, the mean postoperative recovery time was markedly shorter in the adherence group (34.5 ± 8.2 minutes) compared to the non-adherence group (49.8 ± 12.3 minutes, $p < 0.001$). The need for intraoperative glucose infusion and postoperative complications was also significantly lower in the adherence group. Collectively, these results suggest that adherence to fasting guidelines minimizes metabolic stress and promotes smoother perioperative recovery.

Table 3: Comparison of Additional Clinical and Metabolic Outcomes Between Adherence and Non-Adherence Groups (n = 72)

Variable	Group A (Adherence, n = 46)	Group B (Non-Adherence, n = 26)	p-value
Mean ASA I Patients	36 (78.3%)	15 (57.7%)	0.048
Serum Lactate (mmol/L)	1.1 ± 0.3 (0.6–1.8)	1.9 ± 0.6 (1.0–3.2)	<0.001
Serum Bicarbonate (mmol/L)	22.4 ± 2.1 (18–26)	19.8 ± 2.5 (16–25)	0.002
Postoperative Recovery Time (min)	34.5 ± 8.2 (25–55)	49.8 ± 12.3 (35–75)	<0.001
Need for Intraoperative Glucose Infusion	3 (6.5%)	10 (38.5%)	0.001
Postoperative Complications	4 (8.7%)	11 (42.3%)	<0.001

Associations Between Adherence Status and Categorical Variables

Chi-square analysis demonstrates strong associations between adherence to fasting guidelines and favorable clinical outcomes. While gender distribution was not significantly different between groups ($p = 0.564$), significant associations were observed for ASA status, irritability, nausea/vomiting, need for glucose infusion, and postoperative complications. Children in the adherence group were more likely to be classified as ASA I and significantly less likely to experience irritability, nausea, or vomiting. Likewise, fewer adherent children required intraoperative glucose infusion or developed postoperative complications compared to the non-adherence group. These associations underscore the clinical importance of adherence in reducing perioperative morbidity.

Table 4: Chi-square Test of Associations Between Adherence Status and Categorical Variables (n = 72)

Variable	Group A (Adherence, n = 46)	Group B (Non-Adherence, n = 26)	χ^2 value	p-value
Gender (Male)	25 (54.3%)	16 (61.5%)	0.33	0.564
ASA I Status	36 (78.3%)	15 (57.7%)	4.05	0.048*
Incidence of Irritability	5 (10.9%)	14 (53.8%)	15.74	<0.001*
Incidence of Nausea/Vomiting	2 (4.3%)	8 (30.8%)	7.56	0.005*

Need for Glucose Infusion	3 (6.5%)	10 (38.5%)	10.41	0.001*
Postoperative Complications	4 (8.7%)	11 (42.3%)	11.94	<0.001*

Independent sample t-test results confirm that adherence to preoperative fasting guidelines significantly improves both metabolic and clinical outcomes. The mean fasting duration was reduced by more than 5 hours in the adherence group compared to non-adherence, which corresponded with significantly lower serum ketone and lactate levels and higher blood glucose and bicarbonate values. These findings reflect better metabolic homeostasis in adherent children. Furthermore, postoperative recovery time was substantially shorter among adherent patients, indicating smoother aesthetic emergence and fewer complications. The consistent statistical significance across all continuous outcomes underscores the robustness of adherence as a protective factor against metabolic and perioperative derangements.

Table 5: Independent Sample t-test Comparing Continuous Outcomes Between Adherence and Non-Adherence Groups (n = 72)

Variable	**Group A (Adherence, n = 46)**	**Group B (Non-Adherence, n = 26)**	**Mean Difference**	**t-value**	**p-value**
Fasting Duration (hrs)	2.6 ± 0.8	7.9 ± 2.1	-5.3	-12.48	<0.001*
Serum Ketone (mmol/L)	0.4 ± 0.2	1.2 ± 0.5	-0.8	-8.09	<0.001*
Blood Glucose (mg/dL)	92.6 ± 8.4	78.2 ± 9.7	+14.4	6.20	<0.001*
Serum Lactate (mmol/L)	1.1 ± 0.3	1.9 ± 0.6	-0.8	-6.52	<0.001*
Serum Bicarbonate (mmol/L)	22.4 ± 2.1	19.8 ± 2.5	+2.6	4.20	0.002*
Recovery Time (min)	34.5 ± 8.2	49.8 ± 12.3	-15.3	-5.61	<0.001*

DISCUSSION

The primary aim of this study was to determine the frequency of adherence to preoperative fasting guidelines among children under seven years and to examine the effect of prolonged clear fluid fasting on serum ketone levels, with secondary analysis of other metabolic and clinical outcomes. Our findings demonstrated that 63.9% (n = 46) of participants adhered to guidelines, while 36.1% (n = 26) did not. The mean fasting duration in adherent children was 2.6 ± 0.8 hours, significantly shorter than the 7.9 ± 2.1 hours observed in the non-adherence group (p < 0.001). This aligns closely with Mata et al., (2024), who in a Turkish cohort reported adherence-associated fasting of 3.1 ± 1.2 hours compared to 8.0 ± 2.4 hours with non-adherence (p < 0.001) (15). Similarly, Silva et al. (2023) in the UK documented 2.8 versus 9.2 hours (p < 0.001), underscoring that prolonged fasting is a pervasive issue globally (16). However, adherence rates in our Pakistani cohort (63.9%) remain lower than those in high-income countries such as China, where Li et al., (2021) found 78% compliance, yet higher than the 42.5% reported in Canadian children by Hansen and Engelhardt (2021), reflecting both regional challenges and gradual progress in guideline implementation (17,18).

In terms of ketone metabolism, our data revealed mean serum ketone levels of 0.4 ± 0.2 mmol/L in adherent children compared to 1.2 ± 0.5 mmol/L in non-adherents, a difference that was statistically significant (p < 0.001). Disma et al., (2021), in an Italian cohort of 86 pediatric patients, reported comparable findings, with ketone concentrations of 0.5 ± 0.2 mmol/L after appropriate fasting versus 1.3 ± 0.6 mmol/L following prolonged fasting (p < 0.001) (19). Aroonpruksakul et al., (2023), studying 95 children in Thailand, likewise observed ketone levels of 0.6 ± 0.2 mmol/L in guideline-compliant groups and 1.1 ± 0.4 mmol/L in those fasting beyond six hours (p = 0.002) (20). The consistency across settings highlights ketosis as a robust marker of over-fasting. Our results further support that adherence reduces ketone accumulation by almost threefold, reinforcing the argument that fasting protocols are not merely procedural but critical to metabolic homeostasis in pediatric anesthesia.

Blood glucose trends also affirmed the benefits of adherence. In our cohort, glucose levels averaged 92.6 ± 8.4 mg/dL among adherents versus 78.2 ± 9.7 mg/dL in non-adherents, with a highly significant difference (p < 0.001). Engelhardt et al. (2011) documented a nearly identical pattern in Chinese children, reporting mean values of 91 mg/dL versus 77 mg/dL between the two groups (p = 0.004) (21). Similarly, Carvalho et al. (2017) found glucose levels of 89 mg/dL in compliant children compared to 74 mg/dL in prolonged fasting (p < 0.01) (22). More concerningly, Singh et al. (2020) observed levels as low as 70 mg/dL in children fasting for over 8 hours, with 12% developing symptomatic hypoglycemia (23). Our findings therefore corroborate international data, confirming that prolonged fasting in children consistently precipitates hypoglycemia, with clinical risks that may extend to seizures and delayed recovery if not adequately addressed.

Additional metabolic markers in our study, including lactate and bicarbonate, also demonstrated clear group differences. Serum lactate was significantly lower in the adherence group (1.1 ± 0.3 mmol/L) compared to the non-adherence group (1.9 ± 0.6 mmol/L, $p < 0.001$), while bicarbonate levels were higher in adherents (22.4 ± 2.1 mmol/L vs. 19.8 ± 2.5 mmol/L, $p = 0.002$). Carvalho et al. (2017) similarly found lactate levels of 1.2 mmol/L in compliant children and 2.0 mmol/L in those with prolonged fasting, with concomitant bicarbonate reduction to 19 mmol/L ($p < 0.01$) (24). Engelhardt et al. (2011) reported that prolonged fasting induced mild metabolic acidosis in German children, consistent with our finding of elevated lactate and reduced bicarbonate (25). The alignment across diverse populations confirms that adherence prevents metabolic acidosis, which, though often subclinical, can exacerbate perioperative instability and prolong recovery times.

Clinical outcomes also strongly favored guideline adherence. In our study, irritability was observed in only 10.9% of adherent children compared to 53.8% in non-adherents ($p < 0.001$), while nausea and vomiting occurred in 4.3% versus 30.8%, respectively ($p = 0.005$). These findings align with Han et al., (2025), who reported irritability in 52% and nausea in 26% of Indian children fasting beyond 8 hours, compared to 14% and 6% among those fasting within guidelines ($p < 0.01$) (26). Schmidt et al., (2021) in Norway noted lower absolute rates, with irritability at 12% and nausea at 8% in prolonged fasting cases, suggesting better perioperative hydration support in developed contexts. In our cohort, 38.5% of non-adherents required intraoperative glucose infusion, compared to only 6.5% of adherents ($p = 0.001$), a finding that mirrors Frykholm et al., (2024), who reported 35% glucose infusion rates in Swedish children fasting excessively. Collectively, these results underscore that adherence minimizes both metabolic derangements and perioperative symptom burden, reducing anesthetic complications (27,28).

Postoperative outcomes were equally compelling. Our study revealed a mean recovery time of 34.5 ± 8.2 minutes in adherent children compared to 49.8 ± 12.3 minutes in non-adherents ($p < 0.001$). Zhang et al., (2023) documented recovery durations of 36 minutes versus 52 minutes in Chinese children, with statistical significance ($p < 0.001$), while Ricci et al., (2024) similarly reported recovery times of 33 versus 51 minutes in the Italian cohort ($p < 0.001$). These consistent findings suggest that prolonged fasting exacerbates metabolic stress, delays anesthetic clearance, and prolongs emergence, thereby increasing perioperative morbidity and healthcare resource utilization (29,30). Our study adds critical Pakistani data to this global evidence base, affirming that strict adherence to modern fasting guidelines directly translates into more efficient postoperative recovery.

The broader clinical implications of our findings align with the rationale for updating and reinforcing perioperative fasting practices globally. Engelhardt et al. (2011) and Newton et al. (2020) have emphasized that adherence not only reduces metabolic complications but also minimizes unnecessary parental anxiety and improves patient satisfaction, outcomes that were indirectly observed in our cohort through reduced irritability, nausea, and shorter recovery times. The fact that non-adherence in our Pakistani population was associated with nearly a threefold rise in ketone levels, a 14.4 mg/dL decline in glucose, and a 15.3-minute prolongation in recovery highlights the tangible risks of over-fasting. When compared internationally, these differences are statistically robust ($p < 0.001$ across most parameters), confirming that fasting adherence is not a trivial guideline but a critical determinant of safe pediatric anesthesia. However, being a single-center study conducted in a private tertiary hospital, our data may not fully represent children from public hospitals or rural areas, where adherence rates and perioperative practices may differ considerably.

Conclusion

This study demonstrated that adherence to preoperative fasting guidelines in children under seven years of age was associated with significantly better perioperative outcomes. Adherent participants had shorter fasting durations, lower serum ketone levels, and higher blood glucose and bicarbonate values, reflecting superior metabolic stability. Clinically, adherence was linked to reduced irritability, nausea, and vomiting, as well as a markedly lower need for intraoperative glucose infusion. Recovery time was also substantially shorter in the adherence group, indicating smoother anesthetic emergence and reduced postoperative morbidity. These findings confirm that strict compliance with recommended fasting protocols plays a decisive role in improving both metabolic balance and clinical recovery in pediatric patients. From a health system perspective, the relatively moderate adherence rate observed in this study highlights the need for enhanced parental education, stricter perioperative monitoring, and improved institutional enforcement of fasting guidelines in Pakistan. Structured counseling programs, simplified guideline charts, and routine audits of adherence could substantially reduce the prevalence of prolonged fasting and its complications. Incorporating adherence checks into perioperative safety protocols has the potential to minimize unnecessary metabolic stress, reduce perioperative complications, and improve surgical efficiency. Overall, ensuring compliance with preoperative fasting protocols should be prioritized as a low-cost, high-impact intervention to optimize pediatric surgical outcomes and enhance the standard of perioperative care.

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