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Infantile Hypertrophic Pyloric Stenosis in Mogadishu, Somalia: Presentation, Electrolyte and Acid-Base Disturbances: A 9-Year Retrospective Study

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Abstract

Background

Infantile hypertrophic pyloric stenosis (IHPS) is a common cause of vomiting in newborns and young infants. If it is not treated quickly, the baby can lose large amounts of fluid and electrolytes, such as sodium and potassium. Data on IHPS in Somalia are limited.

Methods

This retrospective study included all infants with ultrasound-confirmed IHPS who underwent open pyloromyotomy at Mogadishu Somali-Türkiye Recep Tayyip Erdoğan Training and Research Hospital from January 2017 to January 2026. Bivariate tests were followed by multivariable logistic regression. Results are reported as adjusted odds ratios (AOR) with 95% confidence intervals (CI).

Results

Of 144 infants, 72.2% were male, and the median age at presentation was 3 weeks. Nearly all (98.6%) had an electrolyte or acid–base abnormality, most commonly hypochloremia (79.9%) and metabolic alkalosis (59.7%). Age of 5 weeks or more was associated with metabolic alkalosis (AOR 2.82; 95% CI 1.02–7.82), and clinical dehydration with hypokalemia (AOR 3.35; 95% CI 1.54–7.27). Waiting more than 3 days for surgery was associated with a hospital stay longer than 7 days (AOR 12.44; 95% CI 2.01–76.88).

Conclusion

Most infants with IHPS in Mogadishu present with significant electrolyte and acid–base disturbances. Clinical dehydration, which is recognizable at the bedside, was independently associated with hypokalemia. Waiting more than 3 days for surgery was associated with a longer hospital stay. Whether earlier surgery and prompt correction of fluid and electrolyte losses shorten stay requires prospective evaluation.

1. Introduction

Infantile hypertrophic pyloric stenosis (IHPS) is a condition in which the pyloric muscle thickens during the first weeks of life and obstructs gastric outlet. Affected infants begin to vomit forcefully after feeds, remain hungry, and fail to gain weight. Pyloromyotomy is a simple operation; in well-equipped hospitals it is safe, and many infants go home within one or two days(1, 2).

The incidence of IHPS varies between countries. In Germany it nearly halved between 2005 and 2017(3), whereas in the Netherlands it remained stable at about 1.3 per 1,000 live births(4). Male sex is the best-known risk factor. Other reported factors include maternal smoking, low maternal education, first-born status, cesarean delivery, and bottle feeding(5, 6).

Repeated vomiting causes loss of gastric acid (hydrochloric acid), sodium, potassium, and water. To preserve circulating volume, the kidney retains sodium while excreting potassium and hydrogen ions, producing hypochloremic, hypokalemic metabolic alkalosis. Alkalosis can depress breathing during and after anesthesia(7, 8), so fluid and electrolyte abnormalities should be corrected before surgery, and experts recommend specific chloride and bicarbonate targets before operation(9).

Reports from other settings suggest that early diagnosis limits severe electrolyte disturbance(10, 11). In many African countries, however, infants still present late. In Uganda, 76% of infants had an electrolyte imbalance on admission(12), and in eastern Ethiopia, hypokalemia, severe dehydration, and late presentation predicted poor outcome(13). In Somalia, neonatal mortality in Mogadishu hospitals is high(14, 15), and pediatric surgical services are limited(16). An earlier Somali study of IHPS reported that many infants presented late and malnourished(17).

This study describes the demographic factors, clinical features, laboratory results, treatment, and outcomes of infants with IHPS in Mogadishu.

2. Methods

2.1 Study design and setting

This hospital-based retrospective study was conducted at Mogadishu Somali-Türkiye Recep Tayyip Erdoğan Training and Research Hospital, a national tertiary referral center with pediatric surgical services. The study covered January 2017 to January 2026.

2.2 Study population

All infants admitted with IHPS during the study period were reviewed. Infants were included if abdominal ultrasound confirmed the diagnosis and they underwent open pyloromyotomy. Infants without admission electrolyte results were excluded (5 infants). All 144 eligible infants were included. No sample size calculation was performed because all eligible infants in the period were analyzed; this limits the precision of estimates for the smaller subgroups.

2.3 Data collection

Data were abstracted from admission registers, clinical notes, laboratory reports, and operation records using a structured form. Variables comprised: (i) demographic factors: sex, age, birth weight, birth order, gestational age, feeding type, maternal age, family income, referral source, family history, and congenital anomalies; (ii) clinical features: presenting complaints, symptom duration, vomiting type, feeding pattern,

weight loss, current weight, visible peristalsis, palpable olive, and ultrasound findings; (iii) laboratory results: admission serum sodium, potassium, chloride, and bicarbonate; and (iv) treatment and outcome: initial management, time from admission to surgery, complications, length of hospital stay, and condition at discharge.

2.4 Definitions

Normal ranges were sodium 135–150 mmol/L, potassium 3.5–5.5 mmol/L, chloride 97–103 mmol/L, and bicarbonate 22–28 mmol/L. Values outside these ranges were classified as hypo- or hypernatremia, hypo- or hyperkalemia, and hypo- or hyperchloremia. Metabolic alkalosis was defined as bicarbonate above 28 mmol/L on admission. Hypochloremic hypokalemic metabolic alkalosis was defined as the simultaneous presence of hypochloremia, hypokalemia, and metabolic alkalosis. Clinical dehydration was recorded by the admitting clinician from standard signs, such as sunken eyes, dry mucous membranes, reduced skin turgor, and reduced urine output.[20] Prolonged hospital stay was defined as more than 7 days.

2.5 Statistical analysis

Data were entered into Microsoft Excel and analyzed with IBM SPSS Statistics version 27 (IBM Corp., Armonk, NY, USA). Categorical variables are presented as numbers and percentages; continuous variables as mean ± standard deviation or median and interquartile range (IQR). Chi-square tests compared groups, and Fisher's exact test was used when an expected cell count was below 5. The Kruskal–Wallis test compared time to surgery between periods. Spearman correlation assessed the relationship between chloride and bicarbonate. Binary logistic regression identified factors associated with metabolic alkalosis, hypokalemia, and prolonged hospital stay. Variables with $p < 0.25$ in bivariate analysis were entered into the multivariable model as an exploratory screening step; for prolonged stay, only factors with $p < 0.05$ were entered because of the small number of events. Visible peristalsis was not entered because it almost always co-occurred with a palpable olive. Results are reported as crude odds ratios (COR) and adjusted odds ratios (AOR) with 95% CI. A p value below 0.05 was considered statistically significant. This study is reported according to the STROBE statement.[21] Events per variable (EPV) were 17.2 for metabolic alkalosis (86 events; five variables), 18.7 for hypokalemia (56 events; three variables), and 4.5 for prolonged stay (18 events; four variables). The conventional threshold is 10 EPV,[22] so the prolonged-stay model falls below it and its estimates are interpreted as exploratory. EPV alone does not determine adequate sample size,[23] so the screening results are reported with that limitation in mind.

3. Results

3.1 Demographic factors

A total of 144 infants were included. The number of cases increased from 4 in 2017 to 24 in 2025 (2026 was a partial year). Boys accounted for 104 (72.2%), giving a male-to-female ratio of 2.6:1. The median

age at presentation was 3 weeks (IQR 3–4), and most infants (61.8%) presented at 3–4 weeks of age. Most were first-born (91.7%), born at term (85.4%) and breastfed (89.6%). The mean birth weight was 3.17 ± 0.60 kg. Most families had a low income (89.6%) and presented directly to the hospital (84.0%). No infant had a family history of IHPS or another congenital anomaly (Table 1).

Table 1
Demographic factors of infants with IHPS (n = 144)

Variable	**n (%)**
Sex	
Male	104 (72.2)
Female	40 (27.8)
Age at presentation	
≤2 weeks	27 (18.8)
3–4 weeks	89 (61.8)
5–6 weeks	21 (14.6)
≥7 weeks	7 (4.9)
Median (IQR), weeks	3 (3–4)
Birth weight	
<2.5 kg	15 (10.4)
2.5–4.0 kg	124 (86.1)
>4.0 kg	5 (3.5)
Mean ± SD, kg	3.17 ± 0.60
Birth order	
First	132 (91.7)
Second	9 (6.2)
Other	3 (2.1)
Gestational age	
Term	123 (85.4)
Preterm	13 (9.0)
Post-term	8 (5.6)
Feeding type	
Breastfeeding	129 (89.6)
Mixed	8 (5.6)
Formula feeding	7 (4.9)
Maternal age	

Variable	n (%)
<20 years	98 (68.1)
20–30 years	38 (26.4)
>30 years	8 (5.6)
Family monthly income	
Low	129 (89.6)
Middle	9 (6.2)
High	6 (4.2)
Referral source	
Self	121 (84.0)
Other hospital	17 (11.8)
Primary health center	6 (4.2)
Family history of IHPS	0 (0.0)
Associated congenital anomalies	0 (0.0)

3.2 Clinical features

Nearly all infants had non-bilious vomiting (99.3%), which was projectile in 91.0%. Poor feeding (88.9%), failure to thrive (86.1%) and weight loss (71.5%) were common, and 42.4% were clinically dehydrated. The median duration of symptoms was 4 days (IQR 3–5). A palpable olive was found in 55.6% and visible peristalsis in 53.5%. Ultrasound confirmed the diagnosis in all infants. At admission, 70.8% weighed less than at birth, with a median loss of 20% of birth weight (Table 2).

Table 2
Clinical features (n = 144)

Variable	n (%)
Non-bilious vomiting	143 (99.3)
Type of vomiting	
Projectile	131 (91.0)
Non-projectile	13 (9.0)
Poor feeding	128 (88.9)
Failure to thrive	124 (86.1)
Clinical dehydration	61 (42.4)
Weight loss	103 (71.5)
Visible peristalsis	77 (53.5)
Palpable olive	80 (55.6)
Diagnosis confirmed by ultrasound	144 (100.0)
Weight at admission below birth weight	102 (70.8)
Duration of symptoms	
≤3 days	59 (41.0)
4–6 days	65 (45.1)
≥7 days	20 (13.9)
Median (IQR), days	4 (3–5)
Weight at admission, mean ± SD, kg	2.65 ± 0.71
Change from birth weight, median (IQR), %	-20.0 (-30.8–0.0)

3.3 Laboratory results

The median values at admission were sodium 134 mmol/L, potassium 3.7 mmol/L, chloride 87 mmol/L and bicarbonate 32 mmol/L. Only 2 infants (1.4%) had completely normal results. Hypochloremia was the most common abnormality (79.9%), followed by metabolic alkalosis (59.7%), hyponatremia (58.3%) and hypokalemia (38.9%). The classic biochemical triad (hypochloremia, hypokalemia and metabolic alkalosis) was present in 29.9% (Table 3). Chloride and bicarbonate showed a moderate negative correlation ($\rho = -0.51$, $p < 0.001$): the lower the chloride, the higher the bicarbonate. Dehydrated infants had more metabolic alkalosis (72.1% vs 50.6%, $p = 0.009$), hypochloremia (88.5% vs 73.5%, $p = 0.026$), hypokalemia (55.7% vs 26.5%, $p < 0.001$) and hyponatremia (68.9% vs 50.6%, $p = 0.028$) than infants without dehydration.

Table 3
a. Serum electrolyte values at admission (n = 144)

Variable (normal range)	Mean ± SD	Median (IQR)	Range
Serum values (mmol/L)			
Sodium (135–150)	134.7 ± 8.3	134 (130–139)	117–169
Potassium (3.5–5.5)	3.8 ± 0.9	3.7 (3.1–4.2)	2.0–7.0
Chloride (97–103)	85.3 ± 14.8	87 (76–95)	51–129
Bicarbonate (22–28)	32.7 ± 9.8	32 (24–39)	18–73

Table 3
b. Electrolyte and acid–base abnormalities at admission (n = 144)

Abnormality (mmol/L)	n (%)
Hyponatremia (Na < 135)	84 (58.3)
Hypernatremia (Na > 150)	5 (3.5)
Hypokalemia (K < 3.5)	56 (38.9)
Hyperkalemia (K > 5.5)	6 (4.2)
Hypochloremia (Cl < 97)	115 (79.9)
Hyperchloremia (Cl > 103)	15 (10.4)
Metabolic alkalosis (HCO_3^- >28)	86 (59.7)
Low bicarbonate (HCO_3^- <22)	8 (5.6)
Hypochloremic hypokalemic metabolic alkalosis	43 (29.9)
Any abnormality	142 (98.6)

3.4 Treatment and outcome

All infants received intravenous fluids and underwent open pyloromyotomy. Electrolyte correction was given to 78.5% and a nasogastric tube was inserted in 53.5%. The median time from admission to surgery was 2 days (IQR 1–2). This time decreased during the study, from 3 days in 2017–2019 to 2 days in later years ($p < 0.001$). The median hospital stay was 5 days (IQR 4–6), and 18 infants (12.5%) stayed more than 7 days. Wound infection occurred in 4 infants (2.8%), and no infant died (Table 4).

Table 4
Treatment and outcome (n = 144)

Variable	n (%) or median (IQR)
Initial treatment	
Intravenous fluids	144 (100.0)
Electrolyte correction	113 (78.5)
Nasogastric tube	77 (53.5)
Pyloromyotomy	144 (100.0)
Time from admission to surgery, median (IQR), days	2 (1–2)
2017–2019	3
2020–2022	2
2023–2026	2
More than 3 days	14 (9.7)
Hospital stay, median (IQR), days	5 (4–6)
More than 7 days	18 (12.5)
Wound infection	4 (2.8)
Condition at discharge	
Recovered	119 (82.6)
Improved	24 (16.7)
Complications	1 (0.7)
Death	0 (0.0)

Time to surgery differed between periods (Kruskal–Wallis p < 0.001).

3.5 Factors associated with metabolic alkalosis and hypokalemia

In bivariate analysis, metabolic alkalosis was more common in infants aged 5 weeks or more (78.6% vs 55.2%; COR 2.98, 95% CI 1.12–7.89) and in dehydrated infants (72.1% vs 50.6%; COR 2.53, 95% CI 1.25–5.12). In the multivariable model, only age of 5 weeks or more remained significant (AOR 2.82, 95% CI 1.02–7.82; p = 0.047). Dehydration was close to significance (AOR 2.15, 95% CI 0.98–4.67; p = 0.055). For hypokalemia, clinical dehydration was the only independent factor (AOR 3.35, 95% CI 1.54–7.27; p = 0.002). Sex, birth weight, gestational age, feeding type, duration of symptoms and type of vomiting were not associated with either outcome (Tables 5a and 5b).

Table 5

a. Bivariate and multivariable logistic regression of factors associated with metabolic alkalosis (HCO_3^- >28 mmol/L)

Factor	Category	Alkalosis n/N (%)	COR (95% CI)	p	AOR (95% CI)	p
Demographic factors						
Sex	Male	64/104 (61.5)	1.31 (0.63–2.74)	0.474	—	
	Female	22/40 (55.0)	1			
Age at presentation	≥ 5 weeks	22/28 (78.6)	2.98 (1.12–7.89)	0.023	2.82 (1.02–7.82)	0.047
	< 5 weeks	64/116 (55.2)	1		1	
Birth weight	< 2.5 kg	8/15 (53.3)	0.75 (0.26–2.19)	0.594	—	
	≥ 2.5 kg	78/129 (60.5)	1			
Birth order	First-born	82/132 (62.1)	3.28 (0.94–11.46)	0.067	3.48 (0.93–13.01)	0.064
	Not first	4/12 (33.3)	1		1	
Gestational age	Preterm	6/13 (46.2)	0.55 (0.17–1.72)	0.296	—	
	Term/post-term	80/131 (61.1)	1			
Feeding type	Formula/mixed	11/15 (73.3)	1.98 (0.60–6.55)	0.256	—	
	Breastfeeding	75/129 (58.1)	1			
Clinical factors						
Duration of symptoms	≥ 5 days	31/48 (64.6)	1.36 (0.66–2.78)	0.400	—	
	< 5 days	55/96 (57.3)	1			

Factor	Category	Alkalosis n/N (%)	COR (95% CI)	p	AOR (95% CI)	p
Nature of vomiting	Projectile	80/131 (61.1)	1.83 (0.58–5.75)	0.296	—	
	Non-projectile	6/13 (46.2)	1			
Clinical dehydration	Yes	44/61 (72.1)	2.53 (1.25–5.12)	0.009	2.15 (0.98–4.67)	0.055
	No	42/83 (50.6)	1		1	
Weight below birth weight	Yes	66/102 (64.7)	2.02 (0.97–4.18)	0.057	1.51 (0.65–3.52)	0.343
	No	20/42 (47.6)	1		1	
Palpable olive	Yes	52/80 (65.0)	1.64 (0.84–3.21)	0.149	1.02 (0.47–2.21)	0.963
	No	34/64 (53.1)	1		1	

Factors with p < 0.25 in bivariate analysis were entered into the multivariable model (—: not entered). COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval; 1, reference category.

Table 5
b. Multivariable logistic regression of factors associated with hypokalemia (K^+ <3.5 mmol/L)

Factor	Comparison	COR (95% CI)	AOR (95% CI)	p
Duration of symptoms	≥ 5 days vs < 5 days	1.76 (0.87–3.56)	1.02 (0.44–2.34)	0.970
Clinical dehydration	Yes vs No	3.49 (1.73–7.05)	3.35 (1.54–7.27)	0.002
Palpable olive	Yes vs No	1.59 (0.80–3.16)	1.14 (0.53–2.46)	0.744

Only factors with p < 0.25 in bivariate analysis are shown; all other factors in Table 5a *had p ≥ 0.25.*

3.6 Factors associated with long hospital stay

In bivariate analysis, long hospital stay was associated with symptoms lasting 7 days or more, waiting more than 3 days for surgery, nasogastric tube insertion and, unexpectedly, the absence of hypokalemia. In the multivariable model, waiting more than 3 days for surgery (AOR 12.44, 95% CI 2.01–76.88; p = 0.007) and nasogastric tube insertion (AOR 12.00, 95% CI 2.11–68.35; p = 0.005) remained significant. Hypokalemia was associated with a lower chance of a long stay (AOR 0.14, 95% CI 0.03–0.75; p = 0.022) (Table 6).

Table 6
Bivariate and multivariable logistic regression of factors associated with hospital stay longer than 7 days (18/144)

Factor	Category	Stay > 7 days n/N (%)	COR (95% CI)	p	AOR (95% CI)	p
Clinical factors						
Duration of symptoms	≥ 7 days	7/20 (35.0)	5.53 (1.83–16.75)	0.004	3.15 (0.81–12.31)	0.099
	< 7 days	11/124 (8.9)	1		1	
Clinical dehydration	Yes	10/61 (16.4)	1.84 (0.68–4.97)	0.226	—	
	No	8/83 (9.6)	1			
Demographic factors						
Gestational age	Preterm	2/13 (15.4)	1.31 (0.27–6.44)	0.667	—	
	Term/post-term	16/131 (12.2)	1			
Laboratory factors						
Metabolic alkalosis	Yes	9/86 (10.5)	0.64 (0.24–1.71)	0.369	—	
	No	9/58 (15.5)	1			
Hypokalemia	Yes	2/56 (3.6)	0.17 (0.04–0.76)	0.010	0.14 (0.03–0.75)	0.022
	No	16/88 (18.2)	1		1	
Hyponatremia	Yes	12/84 (14.3)	1.50 (0.53–4.25)	0.443	—	
	No	6/60 (10.0)	1			
Treatment factors						
Time to surgery	> 3 days	6/14 (42.9)	7.38 (2.19–24.82)	0.003	12.44 (2.01–76.88)	0.007
	≤ 3 days	12/130 (9.2)	1		1	
Nasogastric tube	Yes	15/77 (19.5)	5.16 (1.42–18.71)	0.007	12.00 (2.11–68.35)	0.005

Factor	Category	Stay > 7 days n/N (%)	COR (95% CI)	p	AOR (95% CI)	p
	No	3/67 (4.5)	1		1	

Because of the small number of events, only factors with p < 0.05 in bivariate analysis were entered (—: not entered).

4. Discussion

To our knowledge, this is the largest series of IHPS from Somalia in the published literature, and the first to describe its electrolyte and acid–base disturbances in detail. Almost all infants (98.6%) had at least one abnormality, and hypochloremia was present in four of five. Two associations were independently significant: age of 5 weeks or more with metabolic alkalosis, and clinical dehydration with hypokalemia. Surgical outcomes were nevertheless good, with no deaths and a low wound infection rate.

Electrolyte disturbances appeared more common in our cohort than in settings where early diagnosis limits severe imbalance (10, 11). Prevalence estimates are not directly comparable because definitions and reference ranges differ. With this caveat, our profile was closer to other low-resource settings, where 69–79% of infants had an electrolyte imbalance: Uganda (76%)(12), eastern Ethiopia (78.6%) (13), and Pakistan (69.2%) (18). The frequency of metabolic alkalosis (59.7%) was similar to the 53.7% reported from Korea (10), with a median bicarbonate of 32 mmol/L. Hypochloremia was also more frequent than the 42.1% reported from Turkey (19).

The moderate negative correlation between chloride and bicarbonate ($\rho = -0.51$, $p < 0.001$) is consistent with both values reflecting loss of gastric acid. Serum chloride may therefore serve as a practical marker of alkalosis severity and of treatment response where blood gas analysis is unavailable, as also reported by Kim (10). Because four in five infants were hypochloremic, regular electrolyte monitoring should form part of routine preoperative care, in line with expert recommendations (9).

Two associations with electrolyte disturbance were significant. First, infants aged 5 weeks or more had almost three times the odds of metabolic alkalosis (AOR 2.82). This is a hypothesis: a longer period of vomiting before presentation may increase cumulative acid loss. Symptom duration was not associated with either outcome (Tables 5a and 5b), and the confidence interval (1.02–7.82) is wide. Second, clinical dehydration, which can be recognized at the bedside, was the only independent factor associated with hypokalemia (AOR 3.35; 95% CI 1.54–7.27), and it was also linked to hypochloremia and hyponatremia in bivariate analysis. These findings agree with reports from eastern Ethiopia, where dehydration and hypokalemia predicted poor outcome(13), and from Pakistan, where dehydration and electrolyte imbalance were associated with poorer results (18). Recognizing dehydration at admission may therefore help identify infants who need urgent biochemical testing and fluid replacement.

Two factors were associated with prolonged hospital stay. Waiting more than 3 days for surgery was associated with an AOR of 12.44 for a stay longer than 7 days, and this association persisted after adjustment. Waiting times fell during the study period (median 3 days in 2017–2019 and 2 days thereafter; $p < 0.001$), which may indicate improved care, but delay remains a potentially modifiable factor. A standard written protocol with isotonic fluids, regular electrolyte checks, and clear criteria for surgery might shorten this interval; this requires prospective evaluation (2, 9). Our median stay of 5 days was similar to that reported from Nepal (20), but longer than in centers using a fixed postoperative protocol, where the median stay is under one day (1).

Nasogastric tube insertion was also associated with prolonged stay (AOR 12.00). This may reflect confounding by illness severity, which was not adjusted for, rather than a direct effect. The expert panel did not reach agreement on routine tube use (9). The inverse association between hypokalemia and prolonged stay (AOR 0.14; 95% CI 0.03–0.75) was unexpected and may be due to chance. Because potassium values can be affected by hemolysis, this finding should not be interpreted as protective.

Surgical outcomes were good: no infant died, and 2.8% developed a wound infection. This appears favorable compared with the earlier Mogadishu series (wound infection 15.3%) (17) and with eastern Ethiopia (wound infection 10%, mortality 4.2%). These series differ in period, definitions, and case mix, so direct comparison is limited (13). Careful preoperative correction remains essential, because perioperative apnea is a recognized hazard in these infants (7, 8).

This study has several limitations. Diagnoses were confirmed by ultrasound, which is more accurate than palpation of the olive (21), but the retrospective design relied on routine records from a single center. There was no control group, so the findings describe factors associated with electrolyte disturbance and prolonged stay among affected infants, not risk factors for developing IHPS. Blood gas results (pH and base excess) and the timing of blood sampling relative to fluid therapy were not available. The number of prolonged stays was small, which widened the confidence intervals. The yearly increase may reflect changes in hospital workload or referral rather than true incidence, which hospital records cannot establish. Despite these limitations, the study provides baseline data from a country where information is very limited.

5. Conclusion

Most infants with IHPS in Mogadishu presented with significant electrolyte and acid–base disturbances, and clinical dehydration was independently associated with hypokalemia. Surgical outcomes were good. Waiting more than 3 days for surgery was associated with a longer hospital stay. Whether earlier surgery and prompt correction of fluid and electrolyte losses shorten stay requires prospective evaluation. Prospective multicenter studies are needed to confirm these associations.

Abbreviations

IHPS

infantile hypertrophic pyloric stenosis
IQR
interquartile range
COR
crude odds ratio
AOR
adjusted odds ratio
CI
confidence interval
SPSS
Statistical Package for the Social Sciences.

Declarations

Ethics approval and consent to participate:

Ethical approval was obtained from the Ethics Committee of the Mogadishu Somali-Türkiye Recep Tayyip Erdoğan Training and Research Hospital (Approval No. MSTH/27534). The study adhered to the principles of the Declaration of Helsinki. Individual informed consent was waived because this was a retrospective review of anonymized hospital records.

Consent for publication:

Not applicable. The manuscript contains no identifiable personal data.

Competing interests:

The authors declare no competing interests.

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Author Contribution

AAH is responsible for data collection and writing the document. AB is responsible for data analysis and supervision. SSM, MAM, AAM, AOA, LMY, ZYM, AHM take part in data analysis and in reviewing the article.

Availability of data and materials:

The anonymized data are available from the corresponding author on reasonable request.

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