Turkish Journal of Pediatric Surgery 2026;40(3):123-128
https://doi.org/10.62114/JTAPS.2026.235

Turkish Journal of Pediatric Surgery

Original Article

OPEN ACCESS

Awareness and management approaches of first-contact physicians in pediatric foreign body ingestion cases

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Foreign body ingestion in the pediatric population is one of the most common causes of emergency department visits and occurs with particularly high incidence among children aged six months to six years, who are in the exploratory phase of development.[1-3] Although the majority of ingested objects pass spontaneously through the gastrointestinal (GI) tract without the need for intervention, a subset of cases requires urgent endoscopic or surgical management to prevent permanent injury.[1-4]

The clinical course and therapeutic strategy are primarily determined by the physical characteristics of the ingested foreign body (type, size, number) as well as its anatomical location within the GI tract.[1,2] Button batteries, multiple magnets, and sharp objects are categorized as "high-risk" foreign bodies due to their substantial morbidity and mortality potential.[2,5] Esophageal

Received: February 16, 2026
Accepted: May 04, 2026
Published online: June 23, 2026

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Citation:

İnanç İ, Çeliktürk E, Erdener Çeliktürk C, Yıldız S. Awareness and management approaches of first-contact physicians in pediatric foreign body ingestion cases. Turkish J Ped Surg 2026;40(3):123-128. doi: 10.62114/JTAPS.2026.235.

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Abstract

Objectives: This study aims to evaluate the awareness levels and guideline-based management strategies of physicians who initially assess pediatric foreign body ingestion cases but do not perform definitive interventions.

Patients and Methods: Between July 2025 and February 2026, this cross-sectional, descriptive survey was conducted at Trakya University Faculty of Medicine. A total of 131 physicians, comprising 67 females (51.1%) and 64 males (48.9%), fully completed a 10-item online scenario-based questionnaire. In terms of specialty, 42.7% (n = 56) were general practitioners, 24.4% (n = 32) were emergency medicine specialists or residents, 18.3% (n = 24) were family medicine specialists or residents, and 14.5% (n = 19) were pediatric specialists or residents. Five items assessed demographic and professional characteristics, and five evaluated knowledge of contemporary management strategies. Correct responses were scored as 1 point (total score range: 0-5). Multivariable logistic regression analysis was performed to identify independent predictors of high awareness (score ≥ 4).

Results: The median total knowledge score obtained from scenario-based questions on pediatric foreign body ingestion was 4 (interquartile range: 3-4; range: 0-5). The highest correct response rates were observed in magnet (82.4%) and sharp object management (81.7%), whereas the lowest rate was noted in button battery management (61.8%). Primary care practice was independently associated with a lower likelihood of high awareness (odds ratio [OR]: 0.357, 95% confidence interval [CI]: 0.14-0.89, p = 0.027). Increasing annual case volume was also inversely associated with high awareness (OR: 0.614, 95% CI: 0.40-0.94, p = 0.025).

Conclusion: Awareness of current management guidelines among first-contact physicians was moderate, with critical gaps in time-sensitive scenarios such as button battery ingestion. Structured educational interventions and updated triage algorithms are necessary to improve early management and optimize patient outcomes.

Keywords: Attitudes, clinical competence, emergency medicine, foreign bodies, health knowledge, pediatrics, practice.

foreign bodies require urgent intervention regardless of symptomatology, whereas low-risk objects that have progressed into the stomach may be managed conservatively under appropriate clinical conditions.[1,4]

In pediatric foreign body ingestion cases, the clinical process is typically initiated not by pediatric surgeons who ultimately perform definitive treatment, but by physicians in the units where the patient first presents. At this stage, the implementation of an accurate diagnostic approach, appropriate selection of imaging modalities, and—particularly in time-critical cases such as button battery ingestion—the prompt decision to refer are fundamental to preventing complications.[3,6] The literature suggests that variability in initial management and deviations from guideline-based care may be related to gaps in clinical awareness at the first point of contact.[7,8]

The aim of this study is to evaluate the awareness levels and guideline-based management strategies of physician groups who are the first to encounter pediatric foreign body ingestion cases in clinical practice, yet who do not perform the definitive endoscopic or surgical intervention by virtue of their specialty (general practitioners, pediatricians, emergency medicine physicians, and family physicians).

PATIENTS AND METHODS

This cross-sectional, descriptive survey was conducted in Edirne, Türkiye, between July 2025 and February 2026. Following local ethics committee approval, a total of 131 physicians who completed the survey in full were enrolled in the study. Of the participants, 51.1% (n = 67) were female, and 48.9% (n = 64) were male. With respect to age distribution, 50.4% (n = 66) were aged 20-29 years, and 38.2% (n = 50) were aged 30-39 years. In terms of specialty, 42.7% (n = 56) were general practitioners, 24.4% (n = 32) were emergency medicine specialists or residents, 18.3% (n=24) were family medicine specialists or residents, and 14.5% (n = 19) were pediatric specialists or residents. Physicians practicing in the city center and districts of Edirne who were potentially involved in the initial clinical evaluation of pediatric foreign body ingestion cases were eligible for inclusion, while those who, by virtue of their specialty, do not perform definitive endoscopic or surgical interventions were categorized as the exclusion criteria. Participation was voluntary, and no personally identifiable information was collected. The study protocol was reviewed and approved by the Trakya University Faculty of Medicine Non-Interventional Scientific Research Ethics Committee (Date: 11.12.2023, Decision No: 19/10). The study was conducted in accordance with the principles of the Declaration of Helsinki.

The study design, analysis, and reporting were conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. The survey instrument used in this study was not developed as a tool for scale validation; rather, it was designed to assess physicians' current awareness levels and their adherence to contemporary literature in the management of pediatric foreign body ingestion through scenario-based questions.

Data were collected using a 10-item questionnaire developed based on current literature and guidelines, with input from an expert panel consisting of four physicians (three pediatric surgeons and one emergency medicine specialist) with 7-10 years of clinical experience in pediatric surgical emergencies. A pilot evaluation of the questionnaire was conducted with five physicians (two pediatric surgery residents, two emergency medicine residents, and one pediatrics resident) to assess clarity and clinical relevance. Based on the feedback obtained, minor revisions were made prior to final distribution. The full survey questionnaire is provided as Supplementary Material 1.

The survey was administered online via the Google Forms® (Google LLC, Mountain View, CA, USA) platform and disseminated through open, voluntary distribution via professional networks and digital communication platforms targeting physicians involved in first-line clinical evaluation. Due to this distribution strategy, the total number of physicians who received the survey could not be determined; therefore, a response rate could not be calculated. The first five questions assessed participants' demographic and professional characteristics (age, sex, specialty, years of professional experience, and annual frequency of encountering such cases). The remaining five questions evaluated knowledge and awareness

TABLE 1
Scenario-based knowledge questions and correct response rates

			Correct responses	
Question topic	Scenario / clinical question summary	Accepted correct approach	n	%
Diagnostic approach	Radiologic diagnostic methods when foreign body ingestion is suspected.	In cases with suspected perforation, a barium contrast study should not be performed.	98	74.8
Button battery	Management of an asymptomatic gastric button battery.	Batteries **> 2 cm** that have remained in the stomach for **> 48 h** should be removed endoscopically.	81	61.8
Magnet	Follow-up of a magnet that has passed distal to the stomach.	If there are no signs of an acute abdomen and the magnet has passed distal to the stomach, conservative follow-up may be appropriate.	108	82.4
Coin	Management of an esophageal coin.	In an asymptomatic patient, observation for **12-24 h** to allow passage into the stomach may be considered.	89	67.9
Sharp objects	Nail, needle, glass fragment, etc., impacted in the esophagus.	If a sharp foreign body is lodged in the esophagus, it must be removed endoscopically.	107	81.7

regarding current management strategies for pediatric foreign body ingestion, as shown in Table 1. Knowledge-based items were structured to include a single correct answer; correct responses were scored as "1" and incorrect responses as "0," yielding a total knowledge score ranging from 0 to 5.

The primary outcome of the study was the total knowledge score (range: 0-5), analyzed as a continuous variable. Secondary analyses were conducted to evaluate the association between knowledge scores and physician characteristics, including specialty, years of experience, and annual case volume.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 29.0 software (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as numbers (n) and percentages (%). The distribution of continuous variables was assessed using the Shapiro-Wilk test. As knowledge scores did not follow a normal distribution, nonparametric tests were used. Continuous variables are presented as median and interquartile range (IQR). Comparisons between two groups were performed using the Mann-Whitney U test, while comparisons among more than two groups were conducted using

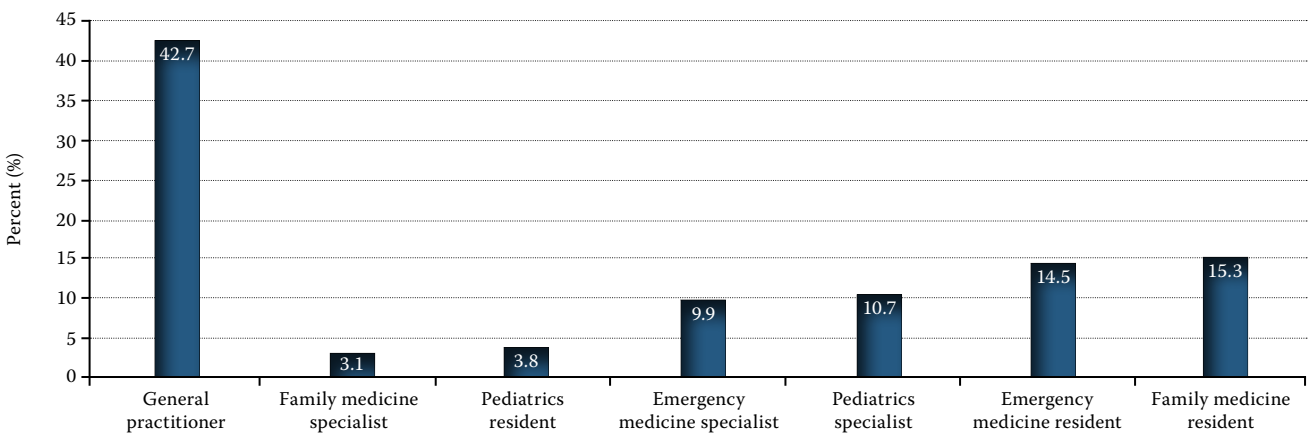


Figure 1. Distribution of physician groups participating in the study.

the Kruskal-Wallis test. Variables included in the multivariable model were selected based on clinical relevance. Multivariable logistic regression analysis was conducted to evaluate independent associations between demographic and professional variables and a predefined "high awareness" level (total knowledge score ≥ 4). A p-value < 0.05 was considered statistically significant.

RESULTS

The demographic and professional characteristics of the participating physicians are illustrated in Figure 1. Regarding clinical exposure, 60.3% of participants (n = 79) reported encountering 1-5 pediatric GI foreign body cases annually, as shown in Figure 2.

The median total knowledge score obtained from scenario-based questions on pediatric foreign body ingestion was 4 (IQR: 3-4; range: 0-5).

When scenario-specific performance was evaluated, the highest correct response rates were observed for questions related to magnet management (82.4%) and sharp object management (81.7%), whereas the lowest success rate was recorded for the button battery management question (61.8%), as shown in Table 1.

When knowledge scores were analyzed according to specialty groups, no statistically significant difference was observed between groups (p = 0.58), with comparable median scores across all specialties.

According to annual case volume, physicians who reported no annual cases had a median score of 4 (IQR: 3-5), whereas those managing more than 10 cases per year had a median score of 3 (IQR: 3-4); this difference was not statistically significant (p = 0.47).

Multivariable logistic regression analysis was performed to identify factors associated with a high level of awareness (total score ≥ 4). Specialty and annual case volume were independently associated with knowledge level. Working in primary care was found to significantly decrease the likelihood of having high awareness (odds ratio [OR]: 0.357; 95% confidence interval [CI]: 0.14-0.89; p = 0.027). Additionally, increasing annual case volume was independently associated with a lower probability of high knowledge level (OR: 0.614; 95% CI: 0.40-0.94; p = 0.025), as shown in Figure 3.

No statistically significant associations were identified between knowledge score and age (p = 0.69), sex (p = 0.50), or years of professional experience (p = 0.41).

DISCUSSION

In this study, we evaluated the level of up-to-date guideline knowledge among physicians who manage triage processes in pediatric foreign body ingestion cases but do not perform definitive surgical treatment. Our principal finding, based on 131 participants, is that overall awareness was moderate (median score: 4 [IQR: 3-4]). While no statistically significant difference in knowledge scores was observed across specialty groups in univariate analysis, multivariable analysis

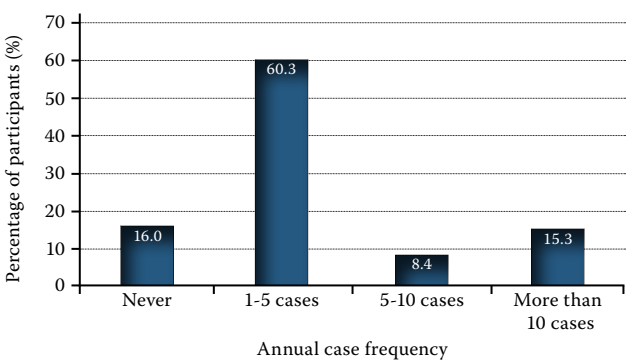


Figure 2. Distribution of annual pediatric foreign body case frequency among participants.

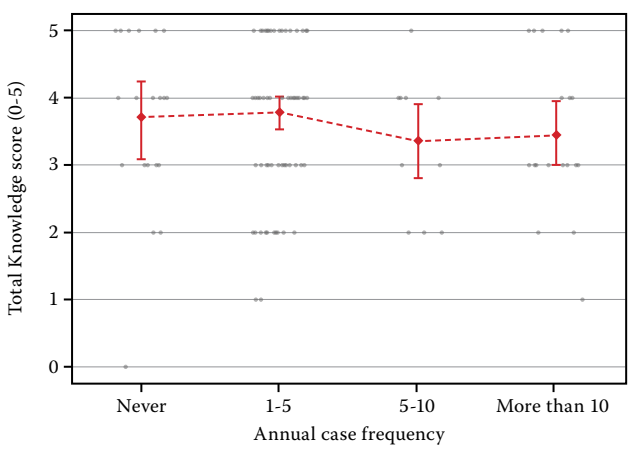


Figure 3. Distribution of total knowledge scores according to annual case frequency.
●, individual participant scores (jitter applied) ◆, arithmetic mean I (vertical lines): 95% confidence interval (CI) ––– Trend of mean score change.

demonstrated that working in primary care was independently associated with a significantly lower likelihood of high awareness (p = 0.027).

In the literature, delayed diagnosis and inappropriate management strategies constitute the primary causes of morbidity and mortality in pediatric foreign body ingestion.[2,5] In our study, the lowest correct response rate (61.8%) was observed in the button battery management scenario, a finding of considerable clinical importance. Esophageal button batteries may cause liquefaction necrosis and perforation within as little as 2 h.[6,9,10] In such cases, the prompt decision of the first-contact physician to initiate an urgent referral, rather than adopting a "wait-and-see" approach, is a key determinant of prognosis.[10,11] Similarly, lack of awareness regarding the inappropriateness of contrast-enhanced (barium) radiography in cases with suspected perforation poses serious risks, including aspiration and mediastinitis.[1,11]

The most distinctive contribution of our study to the literature is the statistically demonstrated inverse association between annual case volume and knowledge score (p = 0.025). Physicians managing more than 10 cases per year had an independently lower likelihood of high awareness (OR: 0.614) (Figure 3). This finding provides empirical support for the phenomenon described in medical education as the "experience paradox."[12] Within the framework of cognitive errors described by Croskerry, physicians with high case loads may develop tendencies toward overconfidence bias or availability bias, potentially leading them to rely on routine patterns rather than updated guidelines.[13] As clinical experience increases, divergence from evidence-based medicine may occur, underscoring the necessity of continuous postgraduate medical education.

In the specialty-based analysis, physicians working in emergency departments demonstrated relatively higher scores, reflecting frequent exposure to acute cases combined with maintained guideline familiarity. In contrast, the significantly lower likelihood of high awareness among primary care physicians highlights the need for structured and standardized training programs in pediatric emergency management for this group.[2,3] The absence of significant associations between knowledge level and age, sex, or years of professional experience suggests that foreign body management is shaped more by institutional education and adherence to updated protocols than by individual demographic characteristics.

This study has several limitations. The data were based on physicians' self-reported theoretical responses, and the potential for social desirability bias must be acknowledged. Participants may have reported what they perceived as the ideal response, suggesting that the actual knowledge gap in real-world clinical practice could be even greater. Additionally, due to the open and voluntary distribution of the survey, the total number of physicians reached could not be determined, and therefore, a response rate could not be calculated. This may limit the representativeness of the sample and the generalizability of the findings.

In conclusion, the success of definitive management in pediatric foreign body ingestion is directly influenced by the triage decision of the first-contact physician. Enhancing guideline adherence in time-sensitive conditions such as button battery ingestion is of critical importance. To mitigate the experience paradox, we recommend the implementation of updated digital triage algorithms and continuous educational modules, including targeted interventions for experienced physicians.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: İ.İ., E.Ç.: Idea/concept, control/supervision, references, design, materials, literature review, data collection and/or processing, writing the article and/or interpretation; C.E.Ç., S.Y.: data collection and/or processing, writing the article and/or interpretation, critical review. All authors reviewed the results and approved the final version of the manuscript.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

AI Disclosure: The authors declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are

the sole responsibility of the authors. The authors further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

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