



Evaluation of Parental Knowledge, Attitudes, and Health Literacy in Common Pediatric Surgical Diseases

Sık Görülen Pediatrik Cerrahi Hastalıklarda Ebeveyn Bilgi, Tutum ve Sağlık Okuryazarlığının Değerlendirilmesi

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Evaluation of Parental Knowledge, Attitudes, and Health Literacy in Common Pediatric Surgical Diseases

ABSTRACT

Objective: Pediatric surgical diseases are a significant public health issue due to their morbidity and burden on healthcare systems. This study aimed to assess parents' knowledge, attitudes, and health literacy regarding common surgical diseases and to examine their relationship with sociodemographic factors, as well as to explore the potential impact of these factors on pediatric surgical processes.

Material and Method: In this cross-sectional descriptive study, 121 parents of children aged 0–18 years presenting to family health centers were included. Data were collected through a structured questionnaire including sociodemographics, a 10-item knowledge test, a 10-item attitude scale, and the Health Literacy Scale–Short Form (HLS-SF12). Statistical analyses involved t-tests, ANOVA, and correlation tests.

Results: Of the participants, 71.1% were female and 51.2% were aged 36–45. Knowledge levels were high for appendicitis and circumcision but low for hydrocele and undescended testis. Higher health literacy scores were significantly associated with female gender, higher education, urban residence, civil servant status, and higher income ($p<0.05$). Additionally, 55.4% of the participants stated that they looked for information online, but only 4.1% trusted social media. 57% directly consulted an expert, while 84.3% received a second expert opinion.

Conclusion: Parents' knowledge and health literacy are significantly affected by sociodemographic characteristics. Deficiencies in knowledge about common diseases that can lead to serious complications and timing of treatment can be overcome by strengthening the counseling role of family physicians and disseminating simple, reliable and comprehensible information resources for groups with low health literacy. Structured and systematic education programs, such as school-based initiatives and digital health platforms, could play a pivotal role in achieving these goals.

Keywords: Cross-sectional study, Family physician, Health literacy, Knowledge level, Pediatric surgery.

ÖZET

Amaç: Çocuklarda sık görülen cerrahi hastalıklar, morbidite ve sağlık sistemine yük açısından önemli bir halk sağlığı sorunudur. Bu çalışmada, ebeveynlerin yaygın cerrahi hastalıklara ilişkin bilgi, tutum ve sağlık okuryazarlıklarını değerlendirmek, bunların sosyodemografik faktörlerle ilişkisini incelemek ve bu faktörlerin pediatrik cerrahi süreçleri üzerindeki olası etkilerini araştırmak amaçlanmıştır.

Gereç ve Yöntem: Kesitsel ve tanımlayıcı nitelikteki çalışmaya, aile sağlığı merkezlerine başvuran, 0–18 yaş aralığında çocuğu bulunan 121 ebeveyn dahil edilmiştir. Veriler; sosyodemografik bilgiler, cerrahi hastalıklara yönelik 10 soruluk bilgi testi, 10 maddelik tutum ölçeği ve Sağlık Okuryazarlığı Ölçeği – Kısa Form (HLS-SF12)'dan oluşan anketle toplanmıştır. İstatistiksel analizlerde t-testi, ANOVA ve korelasyon testleri kullanılmıştır.

Bulgular: Katılımcıların %71,1'i kadın, %51,2'si 36–45 yaş aralığındadır. Apandisit ve sünnet hakkında bilgi düzeyi yüksek; hidrosel ve inmemiş testis gibi hastalıklarda bilgi eksiklikleri belirgindir. Yüksek Sağlık okuryazarlığı düzeyi; kadın cinsiyet, yüksek eğitim, memuriyet, şehirde yaşama ve yüksek gelirle anlamlı ilişkilidir ($p<0,05$). Katılımcıların %55,4'ü internetten bilgi aradığını ancak sadece %4,1'inin sosyal medyaya güvendiğini belirtmiştir. %57'si doğrudan uzmana başvururken, %84,3'ü ikinci uzman görüşü almıştır.

Sonuç: Ebeveynlerin bilgi düzeyi ve sağlık okuryazarlığı, sosyodemografik özelliklerden önemli ölçüde etkilenmektedir. Ciddi komplikasyonlara yol açabilecek yaygın hastalıklar ve tedavi zamanlaması konusunda bilgi eksiklikleri, aile hekimlerinin danışmanlık rolünün güçlendirilmesi ve sağlık okuryazarlığı düşük gruplar için basit, güvenilir ve anlaşılır bilgi kaynaklarının yaygınlaştırılmasıyla giderilebilir. Okul temelli girişimler ve dijital sağlık platformları gibi yapılandırılmış ve sistematik eğitim programları bu hedeflere ulaşmada önemli bir rol oynayabilir.

Anahtar Sözcükler: Aile hekimi, Bilgi düzeyi, Çocuk cerrahisi, Kesitsel çalışma, Sağlık okuryazarlığı.

Introduction

Surgical diseases in children constitute a significant public health problem in terms of both morbidity and healthcare system utilization. Surgical diseases such as appendicitis, undescended testicles, inguinal hernias, and circumcision are the most common clinical presentations encountered by pediatric surgeons in their daily practice. Appendicitis is one of the most common causes of acute surgical abdominal pain in childhood, and early diagnosis is of vital importance (1). Undescended testicles are a common condition in male children and, if not treated in time, can increase the risk of infertility and testicular tumors (2). Circumcision is a surgical procedure with both medical and socio-cultural aspects, and the complication rate increases significantly under inappropriate conditions (3).

Timely and appropriate access to healthcare services is largely related to parents' level of knowledge and health literacy (HL). HL refers to an individual's ability to obtain, understand, and apply health information and is defined by the World Health Organization as a fundamental health right (4). Low HL can lead to consequences such as decisions based on misinformation, delayed access, and non-compliance with treatment (5). In Türkiye, the National Health Literacy Survey reported that 64.6% of the population had inadequate or problematic HL, with lower scores observed in rural areas, among older adults, and in those with lower education and income levels (6). These disparities highlight the need for targeted interventions, particularly for parents making healthcare decisions for their children (6). The HL level of parents, who are decision-makers in particular for pediatric patients, can directly affect the entire process from diagnosis to treatment (7).

Parents' HL and knowledge level are decisive factors for timely intervention in pediatric surgical diseases. In this process, family physicians providing primary care play an important role. Family physicians are in a critical position in terms of providing parents with accurate information, early diagnosis, and appropriate referral. The primary objective of this study is to assess parents' knowledge level, attitudes, and HL regarding common surgical diseases in children, to examine their relationship with certain sociodemographic factors, and to explore the potential impact of these

factors on pediatric surgical processes.

Material and Method

This study was designed as a descriptive and cross-sectional study. First, approval was obtained from the Hitit University Non-Interventional Research Ethics Committee on May 3, 2025, with decision number 2025-128. The study population consisted of parents who visited family health centers and had children aged 0–18 years. The sample size was calculated using the G*Power 3.1 statistical program. With a significance level of 5% ($\alpha=0.05$), an effect size of 0.3, and 80% power ($1-\beta=0.80$), a minimum of 84 participants were required to conduct the study. However, considering potential losses and analytical validity, the sample size was increased to 121.

The criteria for participation in the study were parents who had children aged 0–18, who agreed to participate in the study voluntarily, and who were competent to complete the questionnaire themselves. Those who did not want to complete the questionnaire, had difficulty communicating, or did not voluntarily participate in the study were excluded. Face-to-face interviews were preferred for administering the questionnaire. Each participant was informed of the purpose of the study, and their consent was obtained. All data were anonymized and used solely for scientific purposes. A four-part questionnaire was used as the data collection tool. This form enabled the systematic collection of data on sociodemographic characteristics, knowledge level, attitudes, and HL within the scope of the study. The Sociodemographic Data Form consists of seven questions covering gender, age, educational status, occupation, income, marital status, and place of residence.

The Knowledge Level Test consists of 10 multiple-choice questions related to common surgical diseases in children (appendicitis, undescended testicles, inguinal hernia, hydrocele, pilonidal sinus, and circumcision). Each correct answer was scored as 1 point, with a total score ranging from 0 to 10.

The knowledge test was developed by the research team based on national pediatric surgery guidelines and previous studies in the literature. Draft questions were reviewed by one pediatric surgeon and one

family medicine specialist to ensure content validity. A pilot test was conducted with 10 parents who were not included in the main study, and minor wording adjustments were made to improve clarity.

Table 1. Statistical Findings Regarding the Socio-Demographic Characteristics of the Parents Participating in the Study

Introductory Characteristics	n	%
Age		
18 - 25	3	2.5
26 - 35	27	22.3
36 - 45	62	51.2
46 and above	29	24.0
Gender		
Female	86	71.1
Male	35	28.9
Education Level		
Primary School	29	24.0
Middle School	32	26.4
High School	24	19.8
University	27	22.3
Postgraduate	9	7.4
Occupation		
Not working	51	42.1
Freelancer	11	9.1
Civil servant	23	19.0
Worker	23	19.0
Other	13	10.7
Income Level		
Not working	34	28.1
5000 TL and below	7	5.8
5000 - 10000	17	14.0
10000 - 25000	6	5.0
25000 - 40000	17	14.0
40000 TL and above	40	33.1
Marital Status		
Married	102	84.3
Widowed	19	15.7
Place of Residence		
Village / Town	5	4.1
District	6	5.0
City	110	90.9
Total	121	100

Attitude Survey consists of 10 items on a 3-point Likert scale covering topics such as approach to surgery, traditional methods, trust in physicians, and expectations regarding information provision. (Agree – Undecided – Disagree).

Health Literacy Scale – Short Form (HLS-SF12)

is a 12-item, four-point Likert-type measure that assesses individuals' ability to acquire, interpret, and understand health information. Validity and reliability studies have been conducted in Türkiye, and the Cronbach's alpha coefficient is 0.856, indicating a high level of reliability. The scale covers topics such as access to health services, evaluating treatment options, and preventive health behaviors. Responses to each item are scored on a scale from "very difficult (1)" to "very easy (4)." The total score is standardized using the formula $(\text{Mean} - 1) \times 50 / 3$ and ranges from 0 to 50. Higher scores represent better HL (8).

Statistical analysis

All analyses were performed using SPSS software (Version 22.0, SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as frequencies (n) and percentages (%), while continuous variables were presented as mean \pm standard deviation for normally distributed data or median (min-max) for non-normally distributed data. Normality was assessed using the Shapiro-Wilk and Kolmogorov-Smirnov tests, supported by graphical evaluations. For comparisons between groups, the appropriate tests were selected based on data distribution: one-way ANOVA with Tukey's post-hoc test for parametric comparisons of multiple groups, Student's t-test for parametric comparisons between two groups, Kruskal-Wallis test with Dunn-Bonferroni post-hoc correction for non-parametric comparisons of multiple groups, and Mann-Whitney U test for non-parametric comparisons between two groups. Descriptive statistics were used to summarize response distributions for knowledge and attitude items. All tests were two-tailed, with statistical significance set at $p < 0.05$, and adjustments for multiple comparisons were applied where necessary.

Results

The sociodemographic characteristics of the parents participating in the study are presented in Table 1. When the age distribution of the participants was examined, the highest rate was found to be in the 36-45 age group, with 51.2%. When looking at the gender distribution, the rate of women (71.1%) was higher than that of men (28.9%). In terms of educational

Table II. Distribution and Success Rates of Responses to a Questionnaire On Parents' Level of Knowledge Regarding Common Surgical Diseases In Children

Questions	Options	n	%	Performance	
				Incorrect	Correct
What is the most common symptom of appendicitis?	Headache	6	5.0		
	Abdominal pain	113	93.4	8	113
	Joint swelling	1	0.8	%6.6	%93.4
	Skin rash	1	0.8		
What is the ideal timing for the treatment of undescended testis (cryptorchidism)?	After age 5	31	25.6		
	At age 1	61	50.4	60	61
	Puberty	25	20.7	%49.6	%50.4
	No treatment needed	4	3.3		
In which situation should a doctor be consulted urgently after circumcision?	Mild redness	3	2.5		
	Bleeding or infection	92	76.0	29	92
	Temporary loss of appetite	3	2.5	%24	%76
	All of the above	23	19.0		
What is the appropriate approach in a child diagnosed with inguinal hernia?	Surgical repair is recommended	97	80.2		
	Observation is sufficient	4	3.3	24	97
	Medication is used	12	9.9	%19.8	%80.2
	Physical therapy is applied	8	6.6		
Which statement is correct regarding hydrocele?	It is painless and resolves spontaneously	41	33.9		
	Requires emergency surgery	46	38.0	80	41
	Occurs only in adults	15	12.4	%66.1	%33.9
	None of the above	19	15.7		
Where is the safest place for circumcision to be performed?	At home by elder family members	1	0.8		
	In a Ministry of Health-approved healthcare facility	115	95.0	6	115
	By a traditional circumciser	5	4.1	%5	%95
	Collectively in a schoolyard	0	0		
Can a child who has had appendicitis get it again?	Yes	16	13.2		
	No	89	73.6	32	89
	Annual check-up	15	12.4	%26.4	%73.6
	Antibiotics	1	.8		
Where is pilonidal sinus most commonly seen?	Neck	3	2.5		
	Sacral region (tailbone)	109	90.1	12	109
	Abdomen	2	1.7	%9.9	%90.1
	Armpit	7	5.8		
Which condition in children with inguinal hernia requires emergency surgery?	Mild pain	8	6.6		
	Strangulated hernia	108	89.3	0	121
	Sneezing	2	1.7	0	100
	None of the above	3	2.5		
Which of the following is not recommended in post-circumcision care?	Applying powder	86	71.1		
	Keeping it clean	5	4.1	35	86
	Using prescribed medications	5	4.1	%28.9	%71.1
	Avoiding tight clothing	25	20.7		

status, the most common groups were secondary school (26.4%) and primary school (24%), while the proportion of those with postgraduate education was 7.4%. In terms of occupational distribution, the highest proportions were among those not working

(42.1%) and workers/civil servants (each at 19%). When income level was examined, it was seen that 33.1% of participants had an income of 40,000 TL or more. In terms of marital status, the percentage of married individuals (84.3%) was significantly higher

Table III. Distribution of Responses to the Attitude Survey for Parents Regarding Common Surgical Diseases in Children

Questions	Options	n	%
I first consult the family physician when my child has a surgical condition.	Disagree	69	57.0
	Neutral	9	7.4
	Agree	43	35.5
I believe procedures like circumcision should be performed in a hospital setting.	Disagree	7	5.8
	Neutral	1	0.8
	Agree	113	93.4
I search the internet for information about surgical procedures.	Disagree	33	27.3
	Neutral	21	17.4
	Agree	67	55.4
I wait for a referral from the family physician instead of consulting a pediatric surgeon directly.	Disagree	69	57.0
	Neutral	15	12.4
	Agree	37	30.6
I believe traditional methods are safer than surgical treatments.	Disagree	101	83.5
	Neutral	8	6.6
	Agree	12	9.9
The opinion of the family physician is important in my surgical decision-making.	Disagree	49	40.5
	Neutral	25	20.7
	Agree	47	38.8
Cost is a priority for me when making surgical decisions.	Disagree	93	76.9
	Neutral	15	12.4
	Agree	13	10.7
I seek a second opinion when my child needs surgery.	Disagree	11	9.1
	Neutral	8	6.6
	Agree	102	84.3
I trust health information on social media.	Disagree	95	78.5
	Neutral	21	17.4
	Agree	5	4.1
I would like to attend educational seminars about pediatric surgical diseases.	Disagree	21	17.4
	Neutral	36	29.8
	Agree	64	52.9

than that of single individuals. The vast majority of participants (90.9%) lived in cities.

The survey results evaluating parents' knowledge levels regarding common surgical diseases in children are presented in Table 2. Abdominal pain (93.4%) was correctly identified as the most common symptom of appendicitis. 50.4% of participants answered correctly that the ideal time for undescended testicle treatment is 1 year of age. Among the conditions requiring urgent medical consultation after circumcision, bleeding or infection (76%) had the highest correct response rate. The percentage of those who knew that surgical repair was recommended for inguinal hernia treatment was determined to be 80.2%. When examining the responses to the question about hydrocele, 38% of participants gave an incorrect

response that hydrocele requires emergency surgery, while 33.9% correctly selected the option 'it is painless and resolves on its own.' 95% of respondents answered correctly that circumcision should be performed in the safest manner at health institutions approved by the Ministry of Health. Parents' responses to other questions can be examined in detail in Table 3.

The survey results evaluating parents' attitudes towards surgical diseases are summarized in Table 3. 93.4% of participants stated that procedures such as circumcision should be performed in a hospital setting. The tendency to search for information about surgical procedures on the internet was accepted by 55.4%. The percentage of those who did not agree with the idea that traditional methods are safer than surgical treatments was determined to be 83.5%. 84.3% of participants stated that they tend to seek a

second opinion when making surgical decisions for their children. The rate of trust in health information on social media remained at only 4.1%. Parents' responses to other questions can be examined in detail in Table 3.

Table IV. Statistical Findings Regarding the Relationship between Socio-demographic Characteristics and the Health Literacy Scale-Short Form

Introductory Characteristics	n	Mean±SD/Medyan (min-max)	p values	Post-hoc p values
Age				
18 - 35	30	38.01±5.91	0.011 ^a	1-3: 0.007
36 - 45	62	35.28±6.7		
46 and above	29	32.47±8.25		
Gender				
Female	86	36.34±6.69	0.010 ^b	-
Male	35	32.7±7.64		
Education Level				
Primary School	29	30.56 (18.06 - 43.06)	<0.007 ^c	1-4: <0.001 1-5: <0.001 2-4: <0.001 2-5: 0.001 3-4: 0.030 3-5: 0.030
Middle School	32	32.64 (25 - 48.61)		
High School	24	34.72 (23.61 - 47.22)		
University	27	41.67 (19.44 - 50)		
Postgraduate	9	43.05 (38.89 - 50)		
Occupation				
Not working	51	33.33 (19.44 - 48.61)	0.007 ^c	1-3: 0.007 2-3: 0.001
Freelancer	11	30.55 (18.06 - 41.67)		
Civil servant	23	40.27 (19.44 - 50)		
Worker	23	34.72 (20.83 - 47.22)		
Other	13	36.11 (25 - 50)		
Income Level				
Not working	34	34.02 (19.44 - 48.61)	0.003 ^c	2-6: 0.009
5000 TL and below	7	27.77 (18.06 - 36.11)		
5000 - 10000	17	31.94 (20.83 - 50)		
10000 - 25000	6	34.72 (30.56 - 47.22)		
25000 - 40000	17	33.33 (25 - 50)		
40000 TL and above	40	39.58 (19.44 - 50)		
Marital Status				
Married	102	35.08±7.12	0.489 ^b	-
Widowed	19	36.33±7.31		
Place of Residence				
Village / Town / District	11	27.77 (19.44 - 48.61)	0.018 ^d	-
City	110	34.72 (18.06 - 50)		
Total	121			

^aOne way ANOVA test

^bStudent's t-test

^cKruskal-Wallis test

^dMann Whitney U test

The relationship between sociodemographic characteristics and the short form of the HL Scale is examined in Table 4. Statistically significant differences were found between the short form scores of the HL Scale and the sociodemographic characteristics of age, gender, educational status, occupation, income status, and place of residence ($p=0.011$, 0.010 , $p<0.001$, $p=0.001$, $p=0.003$, $p=0.018$). In addition, box-plots showing the distribution of HL scores across gender and age groups are presented in Figure 1 and Figure 2, respectively. There were no differences in scale scores between marital status groups ($p=0.489$). According to the post-hoc test results, when age groups were compared, the HL scores of the 18-35 age group (38.01±5.91) were found to be significantly higher than those of the 46 and older age group (32.47±8.25) ($p=0.007$). Women's scores (36.34±6.69) were statistically higher than men's (32.7±7.64) ($p=0.010$). HL scores increased significantly with increasing education level; the difference between postgraduate graduates (43.05) and primary school graduates (30.56) was notable. University graduates' HL scores were significantly higher than those of primary school, middle school, and high school graduates ($p<0.001$, <0.001 , $p=0.030$, respectively). The HL scores of postgraduate degree holders were significantly higher than those of primary school, secondary school, and high school graduates ($p<0.001$, 0.001 , $p=0.030$, respectively). When comparing occupational groups, civil servants' HL scores (40.27) were significantly higher than those of unemployed individuals (33.33) and self-employed individuals (30.55) ($p=0.007$, $p=0.001$, respectively). In terms of income, the HL scores of those with an income of 40,000 TL and above (39.58) were significantly higher than those in the 5,000 TL and below income group (27.77) ($p=0.009$). Additionally, a statistically significant difference was found between the scores of the 5,000-10,000 TL income group (31.94) and the 40,000 TL and above income group ($p=0.009$). The scores of those with an income level of 40,000 TL and above (39.58) were higher than those with an income below 5,000 TL (27.77) ($p=0.009$). The scores of those living in cities (34.72) were significantly higher than those of residents of villages/towns and districts (27.77) ($p=0.018$).

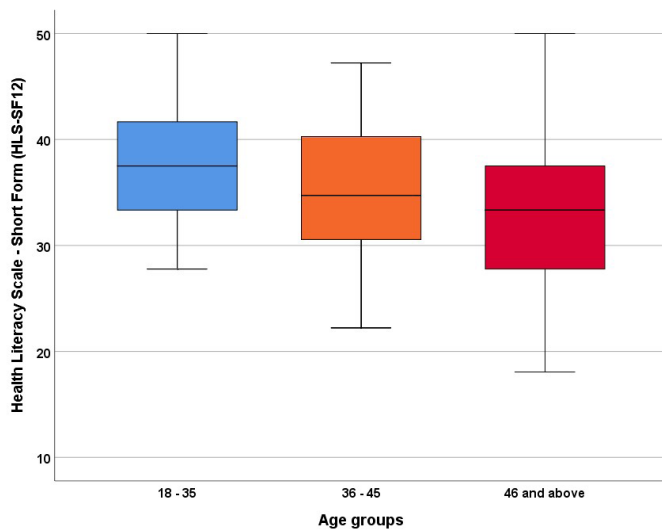


Figure I. Boxplots Showing Comparisons of Health Literacy Scale-Short Form (HLS-SF12) Scores by Age Group

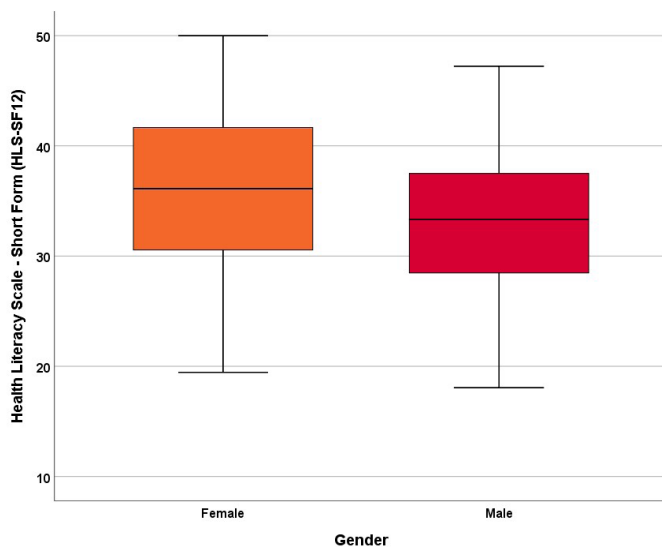


Figure II. Boxplots Showing Comparisons of Health Literacy Scale-Short Form (HLS-SF12) Scores by Gender Group

Discussion

Our study revealed important findings in terms of knowledge gaps, parental attitudes, and demographic factors affecting HL. Our findings show that the level of knowledge is sufficient for some surgical diseases, but there are significant gaps in less known or misconception-prone topics. It was observed that parents' knowledge and HL levels were significantly associated with sociodemographic factors such as age, gender, education, occupation, income, and place of residence. Additionally, it was found that digital sources are frequently used in the search for information, but the level of trust remains low; in the processes of seeking healthcare and making

decisions, there is a tendency to seek the opinion of a specialist rather than a family doctor. These general findings indicate that parental behavior toward pediatric surgery is shaped not only by knowledge but also by trust, access, and perceptions of the healthcare system.

Parents' lack of knowledge about pediatric surgical diseases can directly affect not only individual health outcomes but also the burden on the healthcare system. In particular, misperceptions about the urgency of diseases can lead to unnecessary visits to emergency departments, causing congestion in healthcare service delivery and inefficient use of resources. For example, viewing conditions such as hydrocele, which often do not require urgent intervention, as reasons for emergency visits can increase the workload of healthcare workers and cause delays in the management of actual emergency cases. Similarly, parents with misinformation about treatment timing can increase healthcare system costs through unnecessary tests and referrals. Therefore, addressing information gaps will not only improve clinical outcomes but also contribute to the efficient use of healthcare resources.

The data obtained revealed that participants had sufficient knowledge about some pediatric surgical diseases, but there were serious gaps in their knowledge in some critical areas. In particular, high rates of correct answers regarding appendicitis symptoms (93.4%), surgical approach to inguinal hernia (80.2%), and circumcision (95.0%) suggest that awareness of these conditions is high in the community and that frequent media coverage has positively influenced knowledge levels. On the other hand, the lower level of knowledge about less well-known diseases such as undescended testicles and hydrocele indicates that some misconceptions and information gaps persist in society. Only 50.4% of participants correctly knew that the ideal time for treatment of undescended testicles is around 1 year of age. A significant portion of participants believe that this treatment should be postponed to later stages, such as after the age of 5 (25.6%) or during adolescence (20.7%). This misconception paves the way for significant clinical delays that could lead to serious complications in children, such as testicular

atrophy, subfertility, and malignancy (2). Knowledge about hydrocele was limited. Thirty-eight percent believed it requires emergency surgery. In reality, it is usually painless, resolved on its own, and only needs regular monitoring (9). Such misconceptions can cause unnecessary anxiety in families and lead to premature visits to pediatric emergency departments, thereby increasing the workload on the healthcare system. Indeed, a review reported that one in three parents who visited the emergency department had low HL, and that interventions targeting this group could reduce unnecessary visits (10). These findings indicate that health education should not only focus on introducing disease names but also clearly and comprehensively explain details such as the timing of treatment, urgency level, and appropriate referral steps for each disease. It has been demonstrated that written educational materials used for this purpose not only increase parents' knowledge but also enhance their satisfaction and reduce anxiety levels prior to surgical procedures (11). Otal and colleagues have shown that parents informed with simplified educational materials recognize postoperative complications earlier and utilize healthcare services more effectively (12). We believe that family physicians play a critical role in informing parents about these common but often misunderstood surgical conditions, as this is essential for the timely and accurate diagnosis and treatment process.

Yin et al. (2012) reported that parents with low HL trust physician recommendations more (13). In our study, 57% consulted a pediatric surgeon before a family physician. Only 38.8% valued the family physician's opinion, and 84.3% sought a second expert opinion. These findings indicate that parents are seeking trust in the decision-making process. Findings related to the search for digital information are also noteworthy: While 55.4% of participants stated that they conducted internet research on surgical interventions, only 4.1% said they trusted social media information. Parents use digital resources but remain skeptical about their reliability. Indeed, a study evaluating the quality of circumcision videos on YouTube reported that a significant portion of the content was of poor quality,

while videos prepared by medical experts were found to be more reliable (14); this finding is consistent with the fact that parents in our study stated that they did not trust the information they found on the internet. To resolve this confusion, we recommend strengthening the advisory role of family physicians, disseminating verified information sources on digital platforms, and effectively using hospital-based information brochures. In addition, the low level of trust in traditional treatment methods (9.9%) is a positive finding in terms of showing that modern medicine and hospital-based services are accepted in society. However, 10.7% of participants stated that cost was a primary factor in their decision to undergo surgery. This percentage suggests that economic concerns may influence decisions to undergo surgical intervention, particularly among socioeconomically disadvantaged groups. In conclusion, it is evident that parents need reliable sources of information in the surgical decision-making process, but they face a dilemma due to information pollution on digital platforms. This situation necessitates not only increasing the advisory role of healthcare professionals but also disseminating accurate and accessible sources of information. Additionally, considering the impact of socioeconomic factors on the decision-making process, it is important to develop financial support mechanisms, particularly for disadvantaged groups. Maintaining public trust in modern medicine and strengthening HL should be supported by multidisciplinary approaches guided by similar studies.

Parental HL encompasses a set of skills and competencies that enable parents to navigate the healthcare system effectively, understand medical instructions, communicate with healthcare providers (HCPs), and make informed choices about their children's health (15). In pediatric surgery, parents' or guardians' HL levels are extremely important in terms of understanding surgical pathologies, the risks and benefits of surgical procedures, and the implementation of instructions during the pre- and post-operative periods (13,16). The findings in our study regarding HL indicate that individuals' capacity to interpret and apply general health information is significantly associated with demographic factors.

The literature reports that gender has little effect on HL (4). In our study, women's HL scores were found to be higher than men's ($p=0.010$). This finding can be explained by reasons such as women being more closely involved in children's health and seeking health services more frequently. A study investigating HL among parents of children with Hirschsprung's disease reported a significant increase in HL among those over 40 years of age (17). Another study reported a decrease with aging (4). In contrast to the literature, our study found that HL was highest among those aged 18–35 and significantly lower among those aged 46 and older ($p=0.011$). This may be related to differences in the use of health information tools (e.g., digital media). The effect of educational level on HL was clearly demonstrated in our study. HL scores were significantly higher among individuals with university and postgraduate education compared to primary, middle school, and high school graduates ($p<0.001$). This result is a finding commonly reported in the literature and indicates that health education policies should focus specifically on groups with low educational levels (4,15,17). In the study conducted by Kampouroglou et al., the HL rate was reported to be high among healthcare workers (18). In our study, when examined by occupational group, civil servants had higher HL scores than other occupational groups ($p=0.001$). This result may be due to the presence of healthcare professionals in this group and the fact that most of them are university graduates.

A significant relationship was also found between income level and HL ($p=0.003$). Participants who reported an income of 40,000 TL or more had higher literacy scores. This finding is consistent with the literature suggesting that economic resources facilitate both access to health services and access to health information (4,16,18). When evaluated by place of residence, individuals living in provincial centers had higher HL scores than those living in rural areas ($p=0.018$). The ease of access to healthcare services and the diversity of information sources in urban areas may be among the main reasons for this difference.

There are very few studies in the international literature examining the HL of parents of pediatric

surgery patients. However, no such studies have been found in Türkiye. This study is unique in that it is the first study in our country to evaluate the HL of parents in the field of pediatric surgery, and it makes a pioneering contribution to this field. Our study revealed important findings in terms of knowledge gaps, parental attitudes, and demographic factors affecting HL. The data obtained are consistent with the limited number of studies related to HL in the field of pediatric surgery. Previous studies emphasizing that individuals with low HL can benefit from appropriate interventions and that literacy-sensitive approaches should provide understandable and accessible information for all patients support our findings (19). Indeed, it has been observed that parents with high HL have higher levels of knowledge. This suggests that pediatric surgeons adapting their communication language by removing technical terms and tailoring it to parents' needs could enhance patient understanding, participation, and care quality. In addition, although Keim Malpass et al. (2015) conducted a systematic review of parental HL among children with special health care needs, their study emphasized the overall scarcity and heterogeneity of measurement tools and outcomes (20). Lawrence (2021) examined the direct link between parental HL and medication errors in children, demonstrating a specific outcome-related methodological approach (21). Reddy et al. in a pediatric intensive care unit setting, applied a mixed-methods design—combining quantitative screening via the Newest Vital Sign tool with qualitative insights from healthcare providers—to assess caregiver HL and implementation challenges (22). These diverse methodological approaches—ranging from systematic review, outcome-focused analysis, to mixed-methods in critical care—highlight the novelty and methodological rigor of our own study, which integrates a disease-specific knowledge test with sociodemographic analysis in a Turkish pediatric surgery context.

For strategies aimed at improving HL to be effective, concrete, accessible, and sustainable interventions must be planned. In this context, it is important to strengthen the advisory role of family doctors and to implement structured education models to improve parents' HL. School-based parent

education programs can provide both children and parents with systematic access to health information; these programs can be structured in collaboration with family physicians and pediatric surgeons to cover topics such as early signs of surgical diseases, treatment processes, and emergency management. In addition, mobile health applications with reliable content and community-based workshops managed by health professionals can enable parents to access the information they need without time and space constraints. These applications, which include short videos about diseases, interactive knowledge tests, and referral guides, will both increase the level of knowledge and reduce access to misinformation. This study is unique in that it is the first research in Türkiye to jointly assess parents' knowledge level, attitudes, and HL regarding pediatric surgical diseases. The study obtained a comprehensive data set using both an objective knowledge test and a HL scale. The questions were prepared based on the most common diseases encountered in clinical practice, ensuring that the findings can be directly reflected in field applications. In addition, the sample structure, which covers different sociodemographic groups, increases the generalizability of the results. The main limitation of our study is that the measurement tools used to assess HL show methodological differences. This makes it difficult to directly compare findings in the literature and generalize the results. In particular, the lack of standardization in terms of content and evaluation of knowledge level questions limits comparative interpretations. The knowledge level questionnaire used in this study was originally developed, and direct comparison with the existing literature is not methodologically appropriate. However, this does not diminish the study's contribution to the field; on the contrary, it provides important data specific to the local health system and parental attitudes. In addition, the fact that the data was collected using a self-reporting method may carry the risk of social desirability bias; in particular, there is a possibility that parents may consciously or unconsciously tend to overstate their level of knowledge. To mitigate this effect, the survey questions were formulated as objective items with clearly defined correct/incorrect answers and

were administered anonymously. Additionally, the study was conducted only in family health centers in specific regions. Research using broader and more diverse samples representing different geographical regions would strengthen the generalizability of the findings.

Conclusion

The findings emphasize the necessity of targeted interventions (e.g., simplified educational materials, family physician-pediatric surgeon collaboration, verified content on digital platforms), particularly in groups with low HL and socioeconomic disadvantages. Additionally, it is recommended to expand community-based programs that increase HL to facilitate parents' access to reliable information and ensure their active participation in surgical decision-making processes. These steps will contribute to early diagnosis, appropriate referral, and treatment compliance in pediatric surgery, thereby improving public health outcomes and ensure their active participation in surgical decision-making processes. Structured, systematic education programs, such as school-based initiatives and digital health platforms, could play a key role in achieving these goals.

The integration of HL assessment systems in outpatient settings can enable the early identification of parents' knowledge and understanding levels and the development of appropriate information strategies. Short, standardized HL screening forms integrated into the patient admission process can help to quickly identify risk groups. Thus, parents with low HL can be provided with educational materials about surgical diseases that are more understandable, visually supported, and based on step-by-step explanations. This approach will both improve the quality of clinical communication and strengthen treatment compliance and patient safety.

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