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ORIGINAL ARTICLE

Survey of General Pediatricians' Referral Patterns for Undescended Testis

HAMMAD ASLAM[1], ATIKA UROOJ[2], SIDRA ASHRAF[3], JAVERIA ZAFAR[4]
[1]*Assistant Professor, Department of Paediatric Surgery, Jinnah Hospital, Lahore / Allama Iqbal Medical College, Lahore*
[2]*Senior Registrar, Department of Paediatric Surgery, Jinnah Hospital, Lahore*
[3]*PGR, Department of Paediatric Surgery Ward, Jinnah Hospital, Lahore / Allama Iqbal Medical College, Lahore*
[4]*FCPS General Surgery, Horizon Hospital Lahore*
Correspondence to: Hammad Aslam, Email: hammadaslambutt@gmail.com

ABSTRACT

Background: Undescended testis is one of the most common congenital anomalies in male infants and requires timely referral for surgical correction to reduce the risk of infertility, malignancy, and other long-term complications.
Objective: To assess the referral patterns of general pediatricians for undescended testis and evaluate their knowledge, clinical practices, and adherence to guideline-recommended referral timelines.
Methods: This was a descriptive, cross-sectional survey conducted at Jinnah hospital Lahore from June 2022 to June 2023 including 75 general pediatricians involved in routine pediatric care. The study was designed to assess referral patterns, clinical decision-making, and adherence to guideline-recommended practices for the management of undescended testis.
Results: 42.7% of the sample had 35-45 years of age, and 37.3% had over 10 years of clinical experience. The majority of pediatricians had the correct knowledge of undescended testis (72.0%) and only 52.0% had the reliability of differentiating between the two (undescended and retractile testis). Knowledge on fertility-related complications was found in 76.0 and on malignancy risk was found in 57.3%. Though the majority felt that referral was appropriate at or before 12 months, using 57.4% of the people who thought so, only a quarter of the people practiced immediate referral. Remarking at six months was reported, by 37.3 and 14.7 stayed at two years delay at referral. Pediatricians applied pre-referral imaging in 54.7% of cases and it was linked with delayed referral. The highest referral rates were by the pediatricians who had less than five years' experience (66.7%) and the lowest by those who had more than ten years of experience (32.1%).
Conclusion: There is a high level of referral practices of undescended testis among general pediatricians which are characterized by delays beyond the recommended schedules. The major causes of delayed referral were diagnostic uncertainty, incomplete awareness of guidelines, and the use of pre-referral imaging.
Keywords: Undescended testis; Cryptorchidism; Pediatric referral patterns; Orchidopexy; Pediatric surgery

INTRODUCTION

Undescended testes (UDT) is a common male reproductive disorder in childhood that can compromise future fertility and is associated with an increased risk of testicular malignancy. UDT can be classified into congenital undescended testes (cUDT) and acquired undescended testes (aUDT)[1]. One of the most prevalent congenital anomalies that are experienced in male infants is undescended testis (cryptorchidism), which is found in between 2 and 5 % of full-term infants and up to 30 % of preterm infants at birth, with spontaneous descent also being experienced in a %age of cases in early infancy[2]. Nonetheless, despite this initial positive result, approximately 1-2 % of boys still have undescended testes after the first year of age, and require clinical assessment and possible surgical correction[3]. The clinical concern of cryptorchidism is confirmed by its established relationship with impaired spermatogenesis, poor fertility, predisposition to testicular malignancy, testicular torsion, and the presence of associated inguinal hernia in case of no treatment[45]. Recent international practice suggests referral and surgical correction, so-called orchidopexy, within the period of 6-12 months at the latest, but not later than 18 months of age, in order to maximize the chances of fertility and minimize the morbidity rate in the long term[67]. It has been shown consistently that late intervention is linked with progressive germ cell loss and worse reproductive outcomes, and therefore it is important to detect and refer early[8]. Due to the fact that general pediatricians are the medical practitioners who usually see male infants and children in the routine health examinations, their role in the early detection and subsequent referral of undescended testis cannot be ignored.

Nevertheless, a series of research studies have identified high discrepancy in the knowledge, attitudes, and referral patterns of pediatricians on cryptorchidism=[9,10]. These referral delays appear to stem from misconceptions regarding spontaneous testicular descent beyond infancy, difficulty in differentiating retractile testes from true undescended testes, and poor adherence to the timelines recommended in clinical guidelines[11]. Other hindrances including poor access to pediatric surgical care, absence of standard referral pathways and inadequate continuing medical education also play a role in late management in some environments[12]. The study of referral trends among general pediatricians is thus necessary in order to determine areas of knowledge and practice that can have adverse patient outcomes. Pediatric referral behavior surveys offer meaningful information about clinical decision making in practice and can be used to guide specific educational activities, dissemination of guidelines and to improve health systems[13].

Objective: To assess the referral patterns of general pediatricians for undescended testis and evaluate their knowledge, clinical practices, and adherence to guideline-recommended referral timelines.

METHODOLOGY

This was a descriptive, cross-sectional survey conducted at Jinnah hospital Lahore from June 2022 to June 2023, including 75 general pediatricians involved in routine pediatric care.

Inclusion Criteria

- General pediatricians currently practicing clinical pediatrics
- Pediatricians involved in routine examination of male infants and children
- Pediatricians responsible for referral decisions to pediatric surgery or urology
- Willingness to participate and provide informed consent

Exclusion Criteria

- Pediatric surgeons or pediatric urologists
- Pediatric trainees or residents not independently responsible for referral decisions
- Physicians not involved in direct pediatric patient care
- Incomplete or partially filled questionnaires
- Unwillingness to participate

Data Collection: A structured and self-administered questionnaire was used to collect data. The questionnaire measured demographic factors of the participants, knowledge on undescended testis, age at which he/she felt the referral was suitable, the criteria on which the referral was deemed appropriate, the ability to distinguish between retractile and undescended testis,

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and the awareness of the current guideline recommendations. Other data were referral destinations, imaging before referral, and perceived barriers to early referral.

Statistical Analysis: SPSS 26.0 was used to analyze data. Mean±standard deviation was used to present quantitative variables, whereas frequencies and %ages were used to present categorical variables. The relationships between pediatrician characteristics and referral practices were evaluated with the use of chi-square test and independent t-test where necessary. The p-value of <0.05 was taken as statistically significant.

RESULTS

Most respondents were aged 35–45 years (42.7%), followed by those older than 45 years (29.3%), indicating a predominantly mid- to senior-career cohort. Male pediatricians constituted 58.7% of the sample, while females accounted for 41.3%, reflecting moderate gender balance. Nearly three-quarters of participants had more than five years of clinical experience, with 38.7% practicing for 5–10 years and 37.3% for over 10 years, suggesting substantial professional exposure with moderate variability across experience levels. Public-sector practice was slightly more common (41.3%) than private practice (37.3%), while 21.4% worked in both settings.

The proper interpretation of the definition of the condition was noted in 72.0% and poor interpretations were displayed by 28.0 % of the respondents which arrangements moderate variability. Recognition of spontaneous descent, which normally takes place at six months of age, was found to be present in 64.0 % of pediatricians, and in more than a third of pediatricians, descent was anticipated after the age of infancy. The greatest knowledge gap was only 52.0% which was able to reliably distinguish between undescended and retractile testis. The level of awareness of fertility related complications was relatively high at 76.0% with the awareness of malignancy risk at a lower level of 57.3% meaning that risk awareness is not distributed equally.

Although 57.4% of pediatricians identified referral at or before 12 months as appropriate, only 25.3% reported immediate referral in actual practice. Observation until six months was the most common approach (37.3%), while 22.7% extended observation to 12 months. Notably, 14.7% delayed referral until after two years, representing a clinically significant deviation from recommendations. Imaging practices varied considerably, with 45.3% relying solely on clinical examination, while 38.7% routinely ordered ultrasound and 16.0% used imaging selectively, indicating wide practice variation.

Pediatricians with less than five years of experience demonstrated the highest rate of appropriate referral (66.7%), compared to 48.3% among those with 5–10 years and only 32.1% among those with over 10 years of practice, showing a clear inverse trend with increasing experience. Guideline awareness was strongly associated with timely referral, with 72.1% of guideline-aware pediatricians referring appropriately compared to 27.9% who did not. Adequate knowledge of retractile testis differentiation was also linked to higher appropriate referral rates (66.7%).

Table 1. Demographic and Practice Characteristics of Pediatricians (N = 75)

Variable	Category	n (%)	Years Since Graduation
Age Group	< 35 years	21 (28.0)	≤ 8 years
	35–45 years	32 (42.7)	9–18 years
	> 45 years	22 (29.3)	> 18 years
Gender	Male	44 (58.7)	12–25 years
	Female	31 (41.3)	8–20 years
Years of Practice	< 5 years	18 (24.0)	≤ 10 years
	5–10 years	29 (38.7)	11–20 years
	> 10 years	28 (37.3)	> 20 years
Practice Setting	Public sector	31 (41.3)	10–22 years
	Private sector	28 (37.3)	8–20 years
	Public & private	16 (21.4)	15–25 years
Average OPD Load / Day	< 30 patients	19 (25.3)	6–15 years
	30–50 patients	34 (45.3)	10–20 years
	> 50 patients	22 (29.4)	15–25 years

Table 2. Knowledge and Awareness Regarding Undescended Testis

Knowledge Domain	Adequate n (%)	Inadequate n (%)
Definition of undescended testis	54 (72.0)	21 (28.0)
Spontaneous descent timing	48 (64.0)	27 (36.0)
Differentiation from retractile testis	39 (52.0)	36 (48.0)
Fertility risk awareness	57 (76.0)	18 (24.0)
Malignancy risk awareness	43 (57.3)	32 (42.7)
Guideline-recommended referral age	46 (61.3)	29 (38.7)

Table 3. Referral Practices and Management Approaches

Variable	Category	n (%)
Preferred Referral Age	≤ 6 months	14 (18.7)
	6–12 months	29 (38.7)
	12–18 months	17 (22.7)
	> 18 months	15 (20.0)
Actual Practice	Immediate referral	19 (25.3)
	Observe till 6 months	28 (37.3)
	Observe till 12 months	17 (22.7)
	Refer after 2 years	11 (14.7)
Imaging Before Referral	None	34 (45.3)
	Routine ultrasound	29 (38.7)
	Selective ultrasound	12 (16.0)
Referral Destination	Pediatric surgeon	46 (61.3)
	Pediatric urologist	18 (24.0)
	General surgeon	7 (9.3)
	Unsure / delayed	4 (5.4)

Table 4. Factors Associated with Appropriate Referral Practice (≤ 12 Months)

Variable	Category	Appropriate Referral n (%)	Inappropriate Referral n (%)	p-value
Years of Practice	< 5 years	12 (66.7)	6 (33.3)	0.034
	5–10 years	14 (48.3)	15 (51.7)	0.312
	> 10 years	9 (32.1)	19 (67.9)	0.201
Guideline Awareness	Present	31 (72.1)	12 (27.9)	0.003
Retractile Testis Knowledge	Adequate	26 (66.7)	13 (33.3)	0.018
Imaging Before Referral	Performed	9 (31.0)	20 (69.0)	0.022
Expectation of Descent	Present	14 (34.1)	27 (65.9)	0.019
Diagnostic Uncertainty	Present	11 (37.9)	18 (62.1)	0.074

DISCUSSION

The given research will offer a thorough evaluation of the referral trends of general pediatricians on undescended testis and illustrate a wide range of variability in terms of knowledge domains, clinical judgement, and the time of the referral. Even though cryptorchidism was the condition that needed to be referred to in the first year of life, only 57.4% of pediatricians in this research thought that referral in the first year, at the age of 12 months was appropriate whereas a significant number of 42.6% thought that referral should be made after 12 months. Delayed referral awareness has been reported as similar proportions in past studies, and there are consistent gaps in the adoption of guidelines even though the guidance has been proposed over a long period of time[14]. There were also deficiencies in areas that pertained to knowledge. Although 72.0% of pediatricians identified the definition of undescended testis correctly, almost one-third (28.0) of them showed poor knowledge with the most frequent misidentification with retractile testis. This practice ambiguity was manifested in practice, with only 52.0% of the respondents being able to consistently distinguish between retractile and undescended testes. There has been similar differentiation rates of between 45 and 60 %ly reported by previous research showing that physical examination skills continue to be a limiting factor in timely referral[15,16]. 84 % of respondents were not aware of the long-term complications. Fertility-related risks were well understood by 76.0% of the pediatricians, but the level of understanding with regards to malignancy was much less at 57.3%. Such difference can result in decreased urgency of referral decisions. The same research also mentions that there were greater awareness of fertility impairment than malignancy risk, which could contribute to

a part of the reason why 20.0% of the pediatricians in the research at hand found referral appropriate after the age of 18 months[17].

There was a significant disconnect between the knowledge and practice. Although 38.7% of the pediatricians reported 612 months as the right referral period, 25.3% still practiced referral on diagnosis. Rather 37.3 % followed an observational method up to six months, 22.7 % continued with observation up to 12 months and 14.7 % referral not made before two years. Past studies have shown that there is similarity in the practices with delay rates of referrals between 10-30 % indicating that practical behavior does not always confirm to awareness of the guidelines[18,19]. Delayed management was also due to the use of imaging before referral. In the present research, 45.3 of pediatricians neither ordered ultrasound at all, and 38.7 and 16.0 recommended it regularly and selectively, respectively. Notably, inappropriate referral rates were higher among pediatricians who obtained imaging prior to referral, with 69.0% of those who used imaging referring patients after 12 months of age. Previous studies consistently demonstrate that reliance on ultrasound delays surgical referral without improving diagnostic accuracy, supporting current recommendations against routine pre-referral imaging[20]. Most referral patterns were quite appropriate, 61.3% to pediatric surgeons and 24.0% to pediatric urologist, although 14.7% referred to general surgeons or was not specific (which is also a potential cause of delay). Past studies have also found inconsistency in referral routes, especially in facilities that have a shortage of subspecialty care[21]. As a whole, these results are consistent with the existing body of literature and suggest that the absence of knowledge, diagnostic uncertainty, and non-evidence-based practice, including routine imaging, are the main causes of delayed referral to undescended testis and not the lack of access. The solution of these modifiable factors by means of specific education, structured examination training and strengthening of guideline-imposed referral schedules can significantly enhance the early surgical management and the rates of long-term results.

CONCLUSION

It is concluded that referral practices for undescended testis among general pediatricians show considerable variability, with a substantial proportion of clinicians not adhering to guideline-recommended referral timelines. Although more than half of pediatricians recognized referral at or before 12 months as appropriate, delayed referral beyond this period remained common in clinical practice. Gaps in knowledge regarding differentiation between retractile and undescended testis, underestimation of malignancy risk, and reliance on pre-referral imaging were key factors contributing to delayed referral.

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