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Admission patterns and care experiences of adolescents in a tertiary facility in South India: a mixed methods study

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ABSTRACT

Background: Adolescents face unique health challenges often under-recognized in tertiary care. Understanding their hospitalization patterns and care experiences is vital for designing responsive services. This study aimed to describe the socio-demographic and clinical profile of hospitalized adolescents in a tertiary centre in southern India and explore their care experiences, expectations, and recommendations.

Methods: A concurrent mixed-methods study was conducted in 2022. The quantitative component analysed hospital records of 21,391 adolescent inpatients (aged 10–19 years) from 2017 to 2021. A stratified subsample (N=1250) was assessed for diagnosis and outcomes. The qualitative component involved in-depth interviews with five adolescents admitted to general medicine and surgery departments. Quantitative data were analysed using Statistical Package for the Social Sciences (SPSS) Statistics 27; qualitative data were thematically analysed using Picker's principles of patient-centred care.

Results: Adolescents made up 6.2% of total admissions. Late adolescents (16–19 years) formed 51.1% of this group, with a female predominance due to obstetric cases. Leading causes of admission included injuries and poisoning (15.6%), obstetric complications (15.5%), and genitourinary conditions (9.1%). Highest mortality rates were noted in neuroscience (6.6%), plastic surgery (5.6%), and internal medicine (5.5%) departments. Qualitative findings revealed appreciation for staff behaviour and cleanliness but identified gaps in communication, privacy, emotional support, and shared decision-making.

Conclusions: This mixed method study aims to describe the causes of adolescent hospital admissions, and determine the gaps between requirements and provision of adolescent healthcare in tertiary care centres, thus furnishing a holistic report on adolescent hospitalization.

Keywords: Adolescents, Mixed-methods, Patient-centred care, Tertiary hospital, India

INTRODUCTION

Adolescents stage is characterized by rapid physical, psychological and social changes and also face challenges such as mental health issues, early pregnancy, HIV/sexually transmitted infections, violence, injuries, malnutrition, and substance abuse.^{1,2} Despite their generally robust health, adolescents often encounter

overlooked health predicaments, with limited specific data available for this age group.^{3,4} Adolescents constitute a special group due to their transitional care needs, dynamic developmental stages, and relatively small population share.⁵ However, the existing system often fails to adequately address their needs. Barriers to healthcare seeking among adolescents stem from both external factors, such as social and financial constraints, and

internal factors related to the developmental context of adolescence, such as a desire for privacy and confidentiality.⁶

In 2019, Indian adolescents aged 10–19 accounted for over 32 million DALYs- with YLLs comprising up to 65.9% among older males, reflecting a high burden of preventable morbidity and mortality.⁷ These patterns emphasize the critical role of tertiary care facilities in addressing complex adolescent health needs and informing system-level improvements. However, little is known about the profiles, experiences, and outcomes of adolescents admitted to tertiary care facilities, particularly in resource-constrained settings. Understanding the socio-demographic characteristics, clinical presentations, and hospitalization trends of adolescents is essential for identifying gaps in care delivery and informing targeted improvements. Furthermore, exploring their expectations, experiences, and recommendations can provide valuable insights into how health systems can better meet their needs and align services with the principles of patient-centered care.

Hence, this study aims to study the socio-demographic characteristics, clinical diagnoses, duration of hospitalization, and outcomes among hospitalized adolescents in a tertiary care centre in southern India. Additionally, it explores adolescents expectations, experiences of care, and recommendations for enhancing care quality.

METHODS

This concurrent mixed-method study conducted in 2022 (January-August) at Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India, combines both quantitative and qualitative approaches to give a comprehensive understanding of the adolescent in-patient admission experiences. The quantitative aspect involved a record-based descriptive study, while the qualitative aspect employed a phenomenological approach. The study was conducted at a tertiary care teaching hospital with a capacity of 2,300 beds. All adolescents aged 10-19 years who were admitted to the hospital between January 2017 and December 2021 were considered for the retrospective record-based analysis. A total of 21,391 hospital records were analysed for socio-demographic details. For a more detailed analysis of admission diagnoses, duration of stay and outcomes a simple random sampling of 250 patient records was done for each year, totalling to 1,250. Data was extracted from the hospital information system (HIS). Data were entered into an Excel spreadsheet and analysed using Statistical Package for the Social Sciences (SPSS) Statistics 27. Continuous variables were assessed for normality before reporting means and standard deviations. Categorical variables were summarized using frequency proportions.

Qualitative in-depth interviews (IDI) were conducted among a total of five adolescents aged 17-19 years who were admitted under general medicine and general surgery. Patients with psychiatric illness, and those who

were unable to speak for at least half an hour due to illness were excluded. Interview was conducted in participants' native language, Tamil using an interviewer's guide. The interview was audio-recorded and transcribed to English. Interview transcripts were analysed using manual descriptive content analysis using a deductive approach. The eight Picker's principles of patient centered care framework was used for the analysis. While reporting the data Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used. This study was approved by the scientific and ethics committee of the institute (JIP/IEC/2022/111). Written informed consent from parents (<18 years) or adolescent (>18 years) were obtained.

RESULTS

Total admissions reported from January 2017 to December 2021 were 3,47,685. Of these, adolescent admissions were 21,391 (6.2%). Of the total 13,855 inpatient deaths recorded during the same period, 3.8% (n=526) were adolescent deaths. Total number of adolescent admissions did not vary much between 2017 to 2019. However, there was a decrease during the COVID-19 pandemic (2020 and 2021). Majority of the adolescent admissions were for those between 16-19 years of age (51.1%) (Table 1).

Table 1: Socio-demographic characteristics of adolescent inpatients from January 2017 to December 2021 in a tertiary care hospital in Puducherry (n=21,391).

Characteristics	Proportion, N (%)
Age (years)	
Early-stage (10-13)	7,112 (33.2)
Mid-stage (14-15)	3,347 (15.6)
Late-stage (16-19)	10,932 (51.1)
Gender	
Male	10,550 (49.3)
Female	10,841 (50.7)
State	
Tamil Nadu	17,553 (82.1)
Pondicherry UT	3,269 (15.3)
West Bengal**	258 (1.2)
Other Southern states*	230 (1.1)
Other states^	81 (0.4)

**It was found that number of patients hailing from West Bengal was significantly higher than other states combined; *other Southern states: Karnataka, Kerala, Andhra Pradesh, Telangana, Andaman and Nicobar Islands; ^other states: Assam, Bihar, Daman and Diu, Gujarat, Haryana, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Sikkim, Tripura, Uttar Pradesh, Uttarakhand

The gender ratio was 1:1 and the distribution was more or less similar over time from 2017 to 2021 (Figure 1). The number of male admissions was higher in the early-stage, aged 10-13 years (59.2%) and mid-stage, aged 14-15 years (60.2%) adolescent groups, whereas female admissions were predominant in the late-stage (female

admissions=60.6%) adolescent group. Paediatrics had the highest number of admissions (22.7%), followed by medicine (19%), and obstetrics (16%) Departments with the most skewed male: female ratio were plastic surgery (8.6:1), neurology (8.4:1), psychiatry (6.7:1), and orthopaedics (5.3:1). The mean length of inpatient stay was significantly longer in psychiatry (21 days), followed by nephrology (19 days) and oncology (14 days). Among the late-stage adolescent females (n=6621), 3408 patients (51.5%) were admitted to the obstetrics department.

Morbidity profiling was done based on ICD 11 classification. The main causes for admission in decreasing order of frequencies are as follows: injuries,

poisoning or certain other consequences of external causes (15.6%), obstetric causes (15.5%), and diseases of the genitourinary system (9.1%) (Table 2). The neuroscience departments had the highest mortality (6.6%), followed by plastic surgery (5.6%), medicine (including medical super specialties) (5.5%), and emergency and trauma (5.5%) (Table 3).

The in-depth interviews were done with two male and three female late-stage adolescents. The qualitative part expanded the knowledge obtained from quantitative component by adding the perspective of adolescents on their experiences during their in-patient admission (Figure 2 and Table 4).

Table 2: Details of adolescent admission to various departments according to stage of adolescence.

Department	Total admissions, N (%)	M: F ⁺	Early stage (10-13 years), N (%)	Mid-stage (14-15 years), N (%)	Late stage (16-19 years), N (%)
Paediatrics[@]	4,869 (22.8)	4.3	4,105 (57.7)	645 (19.1)	119 (1.1)
Medicine~	4,061 (19.0)	2.1	326 (4.6)	856 (25.3)	2,879 (26.3)
Obstetrics	3,427 (16.0)	-	-	19 (0.6)	3,408 (31.2)
Surgery^{\$}	1,634 (7.6)	8	142 (2.0)	377 (11.2)	1,115 (10.2)
Neuro[#]	1,008 (4.7)	8.4	264 (3.7)	198 (5.9)	546 (5.0)
Oncology	903 (4.2)	5.6	364 (5.1)	200 (5.9)	339 (3.1)
Orthopaedics	752 (3.5)	5.3	473 (6.6)	196 (5.8)	469 (4.3)
Ear, nose and throat	675 (3.2)	1.8	298 (4.2)	87 (2.6)	290 (2.6)
Endocrinology	655 (3.1)	1.1	287 (4.0)	149 (4.4)	219 (2.0)
Plastic surgery	573 (2.7)	8.6	220 (3.1)	92 (2.7)	261 (2.4)
Cardio*	571 (2.7)	1.3	182 (2.6)	133 (1.2)	256 (2.3)
Immunology	299 (1.4)	1.3	37 (0.5)	83 (2.4)	179 (1.6)
Dermatology	246 (1.2)	1.8	87 (1.2)	60 (1.8)	99 (0.9)
Gynaecology	229 (1.1)	-	56 (0.8)	72 (2.1)	101 (0.9)
Ophthalmology	233 (1.1)	4.2	105 (1.5)	45 (1.3)	83 (0.8)
COVID-19	223 (1.0)	1	47 (0.7)	28 (0.8)	148 (1.4)
Nephrology	175 (0.8)	3.4	47 (0.7)	27 (0.8)	101 (0.9)
Urology	162 (0.8)	3	23 (0.3)	30 (0.9)	109 (1.0)
Psychiatry	151 (0.7)	6.7	19 (0.3)	28 (0.8)	104 (1.0)
Dentistry	84 (0.4)	4.6	19 (0.3)	5 (0.1)	60 (0.5)
Emergency and trauma	55 (0.3)	2.1	20 (0.3)	5 (0.1)	30 (0.3)
Total	21,391	1	7,082	3,377	10,932

+M:F-number of male adolescents admitted per female adolescent, * cardio includes cardiology and cardiothoracic vascular surgery departments; ~ medicine includes general medicine and medical gastroenterology departments; # neuro includes neurology, neuro-epilepsy, neuro-medicine and neurosurgery departments; @ paediatrics includes paediatric ICU, paediatric surgery, paediatric cardiology and paediatric surgical special clinics; \$ surgery includes general surgery and surgical gastroenterology departments

Table 3: Duration of admission and discharge status in various departments (n=21,391).

Department	Total admissions, N (%)	Median days (interquartile range)	Mortality	LAMA ⁺
Cardio*	571 (2.7)	5 (3, 13)	13	0
Clinical immunology	299 (1.4)	6 (2, 11)	2	0
COVID-19	223 (1)	8 (5, 10)	5	0
Dentistry	84 (0.4)	5 (3, 7)	0	0
Dermatology	246 (1.2)	8 (4, 13)	1	0
Ear, nose and throat	675 (3.2)	4 (2, 7)	1	1
Emergency and trauma	55 (0.3)	7 (3, 12)	3	0

Continued.

Department	Total admissions, N (%)	Median days (interquartile range)	Mortality	LAMA ⁺
Endocrinology	655 (3.1)	3 (1, 7)	1	0
Gynaecology	229 (1.1)	7 (4, 12)	3	2
Medicine~	4,061 (19)	4 (2, 8)	223	41
Nephrology	175 (0.8)	12 (6, 24)	10	3
Neuro[#]	1,008 (4.7)	6 (2, 15)	66	17
Obstetrics	3,427 (16)	4 (3, 6)	1	5
Oncology	903 (4.2)	7 (5, 17)	44	5
Ophthalmology	233 (1.1)	4 (2, 6)	0	0
Orthopaedics	752 (3.5)	8 (5, 15)	2	7
Paediatrics[@]	4,869 (22.8)	4 (2, 7)	102	13
Plastic surgery	573 (2.7)	7 (4, 12)	32	3
Psychiatry	151 (0.7)	18 (10, 30)	0	0
Surgery^{\$}	1,634 (7.6)	4 (2, 7)	16	0
Urology	162 (0.8)	6.5 (2, 11.25)	1	0
Total	21,391	4 (2, 9)	526	105

+ LAMA: leaving against medical advice; * cardio includes cardiology and cardiothoracic vascular surgery departments; ~ medicine includes general medicine and medical gastroenterology departments; # neuro includes neurology, neuro-epilepsy, neuro-medicine and neurosurgery departments; @ paediatrics includes paediatric icu, paediatric surgery, paediatric cardiology and paediatric surgical special clinics; \$ surgery includes general surgery and surgical gastroenterology departments

Table 4: Content analysis of the experience of adolescents during their admission organized using the framework of Picker's principles for person-centred care.

Theme based on Picker's principle	Codes	Quotes	Recommendations by the authors*
Fast access to reliable healthcare advice	Perceived prompt admission and triaging, long waiting hours	“I waited from 7:30 p.m. until 2 a.m., but it felt quick”	Streamline admission processes and triage for adolescents
Effective treatment by trusted professionals	Regularly attended by senior staff, competent care team	“The senior doctor comes to see me three times a day”	Ensure consistent involvement of senior professionals in patient care
Continuity of care and smooth transitions	Chronic treatment seeking made a sense of familiarity to the facility, consistent patient-staff relationship	“Since I am coming to the hospital since I was 10 years old, I don't feel much different now”	Introduce structured follow-ups and discharge counselling
Involvement and support for family and carers	Inadequate caregiver privacy, limited involvement of family	“(Privacy) is the only difficulty we are facing. Others are elders while I'm having a small girl. Sometimes, males come to see their wives admitted here. We can't tell anything. It gets a little uncomfortable.”	Design adolescent friendly wards and improve privacy measures
Information and education	Lack of health information, minimal treatment explanation	“They didn't tell me about the side effects”	Use adolescent-friendly communication tools to empower patients
Respect for preferences	Provided for hospital food, other preferences were not highlighted	“Choice of food was given”	Expand decision-making opportunities to areas like treatment preferences

Continued.

Theme based on Picker's principle	Codes	Quotes	Recommendations by the authors*
Emotional support	Lack of emotional support, patient anxiety unaddressed	“For 10 months I have suffered a lot. So many hospital visits, so many injections.”	Provide counselling and peer support for adolescents
Physical comfort and cleanliness	Clean and hygienic environment, lack of patient privacy, varied meal options	“They clean at 11 a.m., 3 p.m., and 6 p.m.” “(Privacy) is the only difficulty we are facing.” “The food is good. They give dal, porridge, milk, curd rice, egg at specific timings,” “Food was given three times, milk two times. Sweet lime and egg as well. The food is nutritious.”	Maintain cleanliness standards and create private spaces in shared wards

*Derived by discussion of the qualitative results among the authors

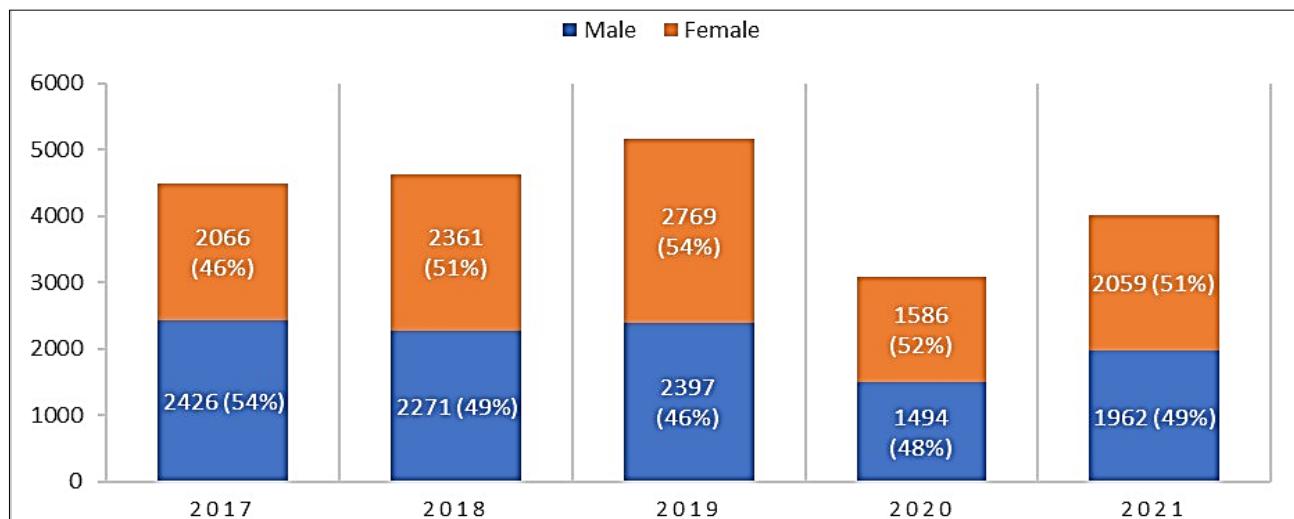


Figure 1: Gender-wise breakdown of admissions every year (January 2017 to December 2021).

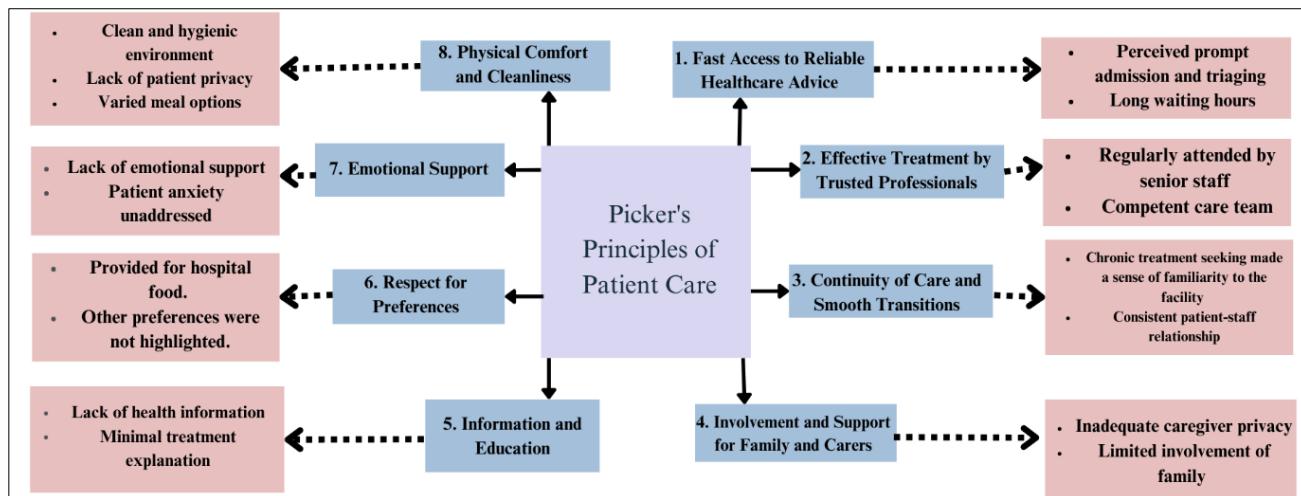


Figure 2: Content analysis of the experience of adolescents during their admission organized using the framework of Picker's principles for person-centred care.

Fast access to reliable healthcare advice

Adolescents perceived the admission process as efficient, even when they waited for several hours. A 19-year-old

male shared that he was “immediately admitted,” highlighting a sense of prompt responsiveness. A 17-year-old female, who came to hospital at around midnight and was admitted on the subsequent day indicated that

although there was a delay, the process moved steadily through the night. Another 17-year-old female acknowledge that she “had to wait a bit” in spite of waiting for 7 hours (from 7.30 pm to 2.00 am). Participants commonly recounted waiting for three to six hours but still described the admission process as swift and efficient. In a high-volume setting, even responsiveness was perceived as something to be grateful for.

Effective treatment by trusted professionals

Consistent attention from senior doctors and nurses fostered trust among adolescents. They felt reassured by the regular presence and involvement of senior medical staff, including nurses and consultants. One adolescent noted that the senior doctor visited “three times a day,” while another described how the team first came at 3 p.m., then again at 7 p.m., emphasizing the regularity. Frequent visits reassured confidence in the quality of care.

Continuity of care and smooth transitions

Many adolescents with chronic conditions expressed familiarity with the hospital settings. One of them remarked, “Since I am coming to the hospital since I was 10 years old, I don’t feel much different now.” While this could indicate comfort in the sense of routine, it could also reflect emotional indifference. Though patients appreciated regular attention from senior staff during their stay but they commented that the transition from inpatient care to discharge could be improved.

Involvement of family and friends

Parents were less concerned about limited information on treatment or prognosis to caregivers.

Emotional support, empathy, and respect

The adolescents felt that they were treated with kindness and consideration by the hospital staff, which shaped their positive hospital experience. However, mental strain of prolonged illness and hospitalization was evident among some adolescents. One adolescent shared, “I feel upset that I’m a young patient here,” while another recounted, “For 10 months I have suffered a lot. So many hospital visits, so many injections and so many problems coming one after another,” breaking into sobs. These accounts reveal the psychological burden faced by adolescents in predominantly adult hospital settings. Caregivers raised concerns on privacy especially for girls. With no screens in the wards, they felt uncomfortable around male visitors. One caregiver, accompanying a young girl, expressed her unease: “(Privacy) is the only difficulty we are facing. Others are elders while I’m having a small girl. Sometimes, males come to see their wives admitted here. We can’t tell anything. It gets a little uncomfortable.” This highlights a need for gender-sensitive spaces in adolescent wards.

Clear information, communication, and support for self-care, provision of information regarding diagnosis and prognosis

Communication around procedures and diagnoses was often insufficient unless adolescents/caregivers actively asked questions. One adolescent remarked, “They didn’t tell anything. They took a lot of blood in 5 tubes.” Another, referring to a lumbar puncture, noted,

“They didn’t tell me about the side effects. They explained about the risk.” Several participants suggested that the lack of information was partially due to their own hesitance to ask questions. One of them said, “We did not ask about the procedures. So, they didn’t tell.” Another added, “No, we did not ask about the problem. They will be discussing (among themselves). So, I did not interrupt.” Overall, adolescents expressed a need for clearer, more proactive communication about their care. They also blamed themselves for not proactively enquiring about their illness.

Respect for patient preferences

Adolescents appreciated the nutritious meal and the choices available in the meal provided by the hospital. One shared, “Food was given 3 times, milk 2 times. Sweet lime and egg as well. The food is nutritious. Choice of food is also given.” Food quality also received positive feedback: “The food is good. They give dal, porridge, milk, curd rice, egg at specific timings.” However, they felt this choice did not extend to medical procedures. While basic procedures such as blood sample collection were explained, treatment options were not discussed with them.

Physical comfort and cleanliness

Adolescents and their parents valued privacy and age-appropriate spaces and expressed dissatisfaction with limited privacy especially while changing clothes. Cleanliness, however, was consistently appreciated. Others described the wards and washrooms as clean and well-maintained. A parent accompanying an 18-year-old female, “Yes, the wards are clean. That’s why we preferred this hospital to General Hospital back in (their district)”.

DISCUSSION

The present study describes the causes of adolescent admissions and explores their needs and expectations of care in a tertiary care centre in southern India. Adolescents accounted for 6.2% of total admissions recorded from January 2017 to December 2021, with a higher proportion of male admissions in early (59.2%) and mid-stage (60.2%) adolescence. In contrast, female admissions predominated in late-stage adolescence, primarily due to obstetric causes. Overall, the leading reasons for admission were injuries, poisoning, or other consequences of external causes (15.6%), obstetric complications (15.5%), and diseases of the genitourinary system (9.1%).

The present study reports 6.15% adolescent admissions over five years, slightly lower than the 7% reported by Safdarjung Hospital in New Delhi in 2010.³ Male admissions were predominant in early (59%) and mid-stage (60%) adolescence, mirroring trends observed at Safdarjung. However, female admissions increased notably in late adolescence (52%), largely due to obstetric causes. This indicates that the persistence of teenage pregnancy as a public health problem despite the actions taken.⁸ Addressing teenage pregnancies requires a multifaceted approach encompassing education, legal reforms, and healthcare interventions.⁹ Maternal preconception nutritional deficiencies during adolescence have profound consequences for foetal and infant development, underscoring the need for comprehensive preconception care. Despite legal reforms aimed at curbing child marriage, it remains prevalent in India, posing significant risks to maternal and child health.¹⁰

Injuries, poisoning, and external causes were the most common reasons for adolescent admission (15.6%), aligning with findings from Safdarjung Hospital (21.1%). The incidence was nearly three times higher among males than females. Both intentional and unintentional injuries disproportionately affect adolescents, highlighting the need for targeted injury prevention strategies and educational interventions, particularly for young males.¹¹ These injuries not only contribute to adolescent mortality but also result in long-term disabilities, such as acquired brain injury, which can significantly impact health outcomes throughout life.¹²

A prospective analysis of adolescent needs and expectations in hospital settings revealed a nuanced understanding of their experiences. Previous studies have shown that healthcare professionals do not always communicate effectively with adolescents, leaving them under-involved and uncertain about whom to approach with concerns.⁶ While our findings indicate overall satisfaction with ward cleanliness and staff interactions, a notable gap exists in information provision regarding diagnoses, medical procedures, and privacy concerns. Interestingly, some adolescents did not perceive long waiting times (three to five hours before admission) as a downside, possibly due to their low socioeconomic background. This aligns with a study conducted in tertiary hospitals in Southeast Nigeria, where patients from lower socioeconomic backgrounds reported higher satisfaction with waiting times and quality of care.¹³ These findings underscore the need for improved communication and patient-centered care tailored to adolescents.

Mental health emerged as a significant concern among adolescents, with long-term implications for their social adjustment and productivity. Substance use during adolescence compromises physical well-being and increases the risk of future non-communicable diseases (NCDs) and substance use disorders.¹⁴ Puducherry, where our study was conducted, has the third-highest suicide rate in India (29.7 per 100,000), particularly among individuals

aged 15-29 years.⁸ This further emphasizes the urgent need for improved adolescent mental health services.

Healthcare services for adolescents require expansion and adaptation to meet their distinct needs. Adolescent-friendly health clinics (AFHCs) under the Rashtriya Kishor Swasthya Karyakram (RKS) program include counselling provisions but remain largely limited to district-level facilities.¹⁵ Specialized care in tertiary settings- covering neurocare, ENT, endocrinology, and trauma services- should be integrated into the RKS framework. Structured follow-up visits and discharge counselling would ensure smoother transitions by providing clear guidance on next steps and post-care instructions, helping adolescents feel more informed and supported as they move through different stages of care. Additionally, adolescent-specific anaesthetic protocols and parent-focused assurances could enhance the quality of care. Tailored injury prevention programs and mental health services are essential to mitigate risks faced by this demographic.

This study's mixed-methods approach, combining quantitative data with qualitative insights, offers a comprehensive understanding of adolescent healthcare needs in a tertiary care setting. The findings are strengthened by the large sample size and five-year study period; however, the single-institution design limits generalizability.

Furthermore, the influence of socioeconomic factors on patient satisfaction was not explored in depth, representing an area for future research. Despite its limitations, this study highlights the need for a holistic, patient-centred approach to adolescent health, addressing both physical and psychosocial challenges.

CONCLUSION

This mixed-methods study highlights critical gaps and opportunities in the inpatient care of adolescents in tertiary care settings in India. While adolescent admissions represent a small yet significant proportion of hospitalizations, their clinical needs are diverse and experiences point toward a systemic lack of adolescent-specific protocols in tertiary settings that otherwise cater predominantly to paediatric or adult populations. To improve adolescent inpatient care, health systems must adopt adolescent-friendly practices, such as providing age-appropriate wards, structured discharge counselling, involvement in decision-making, and emotional support services. Expansion of the RKS to include services at the tertiary care level can be a pivotal step toward fulfilling adolescents' right to accessible, respectful, and comprehensive care.

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