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Adolescent Friendly Health Services in Dakshina Kannada: Assessing Awareness, Accessibility, and Utilization Patterns - A Cross-Sectional Study

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ABSTRACT

Background: Adolescence is a crucial stage of human development, laying the foundation for lifelong health and well-being. Recognizing this, the Adolescent Friendly Health Services (AFHS) program was launched on January 7, 2014, under the Rashtriya Kishor Swasthya Karyakram (RKSK). The initiative aims to address adolescents' specific health needs sensitively and encourage their sustained engagement in healthcare. However, awareness and utilization of AFHS remain low, highlighting the need for enhanced outreach efforts.

Objective: This study aims to assess adolescents' knowledge of AFHS and examine the factors influencing their utilization of these services.

Methods: A descriptive cross-sectional study was conducted among adolescents in Ullal Taluk, Dakshina Kannada. A total of 300 adolescents were selected using a multistage sampling technique. Data were collected through face-to-face (on-the-spot) surveys using a structured, validated, and pre-tested questionnaire.

Results: The study found that 51.4% of adolescents had heard about AFHS, with healthcare providers (20%) and the internet (13.7%) being the primary sources of information. However, awareness of local AFHS facilities was low, with only 27.3% acknowledging their existence, while 36.7% were unaware of them. Utilization of AFHS services was notably limited, with only 13% of adolescents having visited an AFHS clinic.

Conclusion: Enhancing adolescents' knowledge and utilization of AFHS in Dakshina Kannada requires a comprehensive approach. Strengthening education and awareness initiatives through collaboration among educational institutions, healthcare providers, and government agencies is essential to improving adolescent health and well-being.

Keywords: Healthcare accessibility, youth engagement, public health intervention, community outreach and health literacy

1. INTRODUCTION

Adolescence, defined by the World Health Organization (WHO) as the period between ages 10 and 19, is a critical phase of human development. This stage is marked by rapid physical, cognitive, and psychosocial growth, influencing adolescents' emotions, decision-making abilities, and interactions with their environment (The Lancet Child and Adolescent Health, 2024). Establishing a strong foundation for health during this period is essential for overall well-being in adulthood. Recognizing the unique health needs of adolescents, the Government of India launched the Adolescent Friendly Health Services (AFHS) program on January 7, 2014, under the Rashtriya Kishor Swasthya Karyakram (RKSK) (Desai, 2017). This initiative aims to provide comprehensive healthcare services designed for adolescents, focusing on six key areas: nutrition, sexual and reproductive health, non-communicable diseases, substance abuse prevention, injury and violence prevention (including gender-based violence), and mental health support (P.M et al., 2024). To achieve these goals, RKSK implements various strategies such as peer education, Adolescent Health Days (AHD), the Weekly Iron and Folic Acid Supplementation (WIFS) program, and the Menstrual Hygiene Scheme (P.M et al., 2024).

The RKSK program is built on the principles of adolescent participation and leadership, gender equity, and multi-sectoral collaboration. By empowering young individuals to make informed health decisions and ensuring access to essential healthcare resources, the initiative highlights the government's commitment to adolescent well-being. The program follows a comprehensive, community-based approach, integrating health promotion and prevention with improved preventive,.

diagnostic, and curative services across all levels of healthcare facilities (Bali, 2021; Shah et al., 2022). To better address the diverse needs of adolescents, this life stage is further categorized into three phases: early (10–14 years), middle (15–17 years), and late adolescence (18–19 years) (World Health Organization, 2003; Shah et al., 2022)

Understanding these developmental stages is crucial for designing effective health interventions that cater to the evolving needs of young individuals. Adolescence is a dynamic period of transformation, typically divided into three distinct phases. Early adolescence (10–13 years) is characterized by rapid physical growth, the onset of sexual maturation, and the emergence of abstract thinking. Mid-adolescence (14–16 years) brings the completion of significant physical changes, the strengthening of personal identity, and an increased reliance on peer relationships, though familial influence remains crucial. In late adolescence (17–19 years), individuals attain their adult physical form, establish a distinct identity, and develop more stable perspectives and decision-making abilities (Singh et al., 2018). Nutritional health is a critical concern during adolescence, impacting both current well-being and long-term health outcomes.

According to the National Family Health Survey (NFHS-4, 2015–16) and NFHS-5 (2019–20), the percentage of adolescents aged 15–19 who have begun childbearing slightly declined from 18.3% to 16.4%. However, adolescent anaemia remains a significant issue. Among girls aged 15–19, anaemia prevalence increased from 62.2% (NFHS-4) to 70.8% (NFHS-5). Similarly, for boys in the same age group, anaemia rates rose from 31.7% to 38.7% (Biswas and Majumdar, 2022). Poor nutrition during adolescence can delay growth and maturation, increasing the risk of stunted development, intergenerational undernutrition, and non-communicable diseases (NCDs) (Bhargava et al., 2020). Since, many health behaviours established during adolescence persist into adulthood, promoting healthy habits and access to healthcare services is essential for long-term well-being. Investing in adolescent health also contributes to national development, particularly in the context of Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs). However, adolescents are often overlooked in healthcare policy discussions. Key indicators of UHC include good governance, comprehensive adolescent health programs, high-quality services, and financial protection from health-related expenses (Jain et al., 2022). Despite initiatives such as Adolescent Friendly Health Services (AFHS), adolescents face significant barriers to accessing these services. A lack of awareness about AFHS facilities is a major obstacle, contributing to low utilization rates. Many adolescents remain unaware of their sexual and reproductive health needs, including menstruation, sexually transmitted infections (STIs), and contraception. Social and cultural stigma further limits service uptake. Additionally, gender disparities in healthcare access are exacerbated by economic dependence, patriarchal norms, household responsibilities, and restricted control over resources (Santhya et al., 2014).

Although the AFHS program was designed to address adolescents' specific health needs in a sensitive and accessible manner, its impact is hindered by limited awareness and engagement. A study conducted in India revealed that 60.8% of adolescents were unaware of AFHS, emphasising the urgent need for enhanced outreach and educational initiatives to improve service utilization and program effectiveness (Singh et al., 2018). Notably, more than two-thirds of adolescents remain unaware of the services offered, indicating a critical lack of awareness among the target population. Additionally, the study revealed a substantial knowledge gap, with 88% of adolescents exhibiting inadequate understanding of AFHS (Verma, 2024). Alternatively, in Karnataka (Dakshina Kannada), significant barriers hinder adolescents from utilizing AFHS, which were lacking in literature. Hence the need to assess awareness, accessibility, and utilization patterns of AFHS in Dakshina Kannada. Addressing these topic is essential to ensuring that adolescents in Dakshina Kannada can access comprehensive healthcare services tailored to their unique challenges. Strengthening awareness efforts to empower adolescents to make informed decisions about their health and well-being

2. METHODOLOGY

This study employs a descriptive cross-sectional design to assess the knowledge and utilization of AFHS among adolescents in Dakshina Kannada. The study was conducted in rural areas of Ullal Taluk, specifically in the villages of Manjanady, Konaje, and Phajeer, which were selected using the lottery method. The study spans one year, from January 2024 to January 2025. The sample size was determined based on a study by Aaron and Rekha, (2018), which reported that 52% of adolescents were unaware of AFHS. Using the formula: $n = ((Z_2 p\ (1 - p)) \div E2) \times df$; where $Z = 1.96$ (standard normal score), $p = 52\%$ (anticipated prevalence), $E = 7\%$ (margin of error), and $d = 1.5$ (design effect), the required sample size was calculated to be 293 and 2.4% attrition rate was added, summing up to 300 participants. A multi-stage sampling technique was employed. In the first stage, cluster random sampling was used to select Ullal Taluk from Dakshina Kannada District through a simple random sampling method. Within Ullal Taluk, Manjanady, Konaje, and Phajeer villages were chosen as clusters using the lottery method. In the second stage, purposive sampling was applied to select eligible adolescent participants from these villages. For each village, 100 participants were purposively selected, leading to a total of 300 adolescents for the study. This

approach ensures equal representation from all three selected villages, enhancing the reliability of findings on AFHS awareness and utilization in the region (Taluk in Dakshina Kannada).

The study was conducted among adolescents aged 15 to 19 years from the rural areas of Ullal Taluk in Dakshina Kannada. A semi-structured, validated, and pre-tested questionnaire was used to collect data, which was divided into three parts. Part A collected sociodemographic details such as age, gender, educational qualification, and religion. Part B assessed the adolescents' knowledge of AFHS, and Part C evaluated the utilization patterns of AFHS among the participants. The sample comprised adolescents from three villages within Ullal Taluk; Manjanady, Konaje, and Phajeer, selected through a lottery method. The inclusion criteria were adolescents aged 15 to 19 years of any gender who were residents of the selected areas for at least (six months). Exclusion criteria included adolescents who were ill, mentally disabled, or had multiple disabilities (such as deafness or blindness), as well as those aged 10 to 14 years due to limited awareness of the health services provided. Prior to the interview, participants were briefed about AFHS, and written informed consent was obtained. Face-to-face (on the spot) surveys were conducted using the designed questionnaire. Data were entered and analyzed using Excel (2016), with categorical data presented in frequencies and percentages. The Chi-square test was used to explore factors influencing the utilization of AFHS among adolescents. Confidentiality of the data was ensured by storing the data collection forms in a locked cupboard and using a password-protected computer accessible only to the research team. Anonymity was maintained by not linking participants' identifying details to the study results. Ethical approval was obtained from the Institutional Ethics Committee (IEC) at Yenepoya Medical College (Protocol no. YEC2/2024/154), and permission for conducting the study was granted by the District Health Office in Mangalore and the Panchayats of Konaje, Manjanady, and Phajeer in Ullal Taluk, Dakshina Kannada District, Karnataka.

3. RESULTS

Table 1: Distribution of Socio-Demographic Characteristics of Study Participants

Socio-demographic factors	**Frequency (Percentage)**
Location	
Konaje	101 (33.7)
Manjanady	100 (33.3)
Phajeer	99 (33)
Gender	
Male	169 (56.3)
Female	131 (43.7)
Religion	
Hindu	105 (35)
Muslim	177 (59)
Christian	18 (6)
Educational level	

Secondary school	58 (19.3)
Higher secondary school	242 (80.7)

Table 1 presents the distribution of socio-demographic variables among the study participants (n=300). The study participants were from three locations in Ullal Taluk: Konaje (33.7%), Manjanady (33.3%), and Phajeer (33%). In terms of gender, 56.3% were male and 43.7% were female. Regarding religion, the majority of participants were Muslim (59%), followed by Hindu (35%) and Christian (6%). As for educational level, a significant proportion of adolescents were enrolled in higher secondary school (80.7%), while 19.3% were in secondary school.

Table 2: Descriptive Statistics of Age Among Study Participants

Variable	Mean	Median	Interquartile Range	Standard Deviation
Age	17.8	18	2	1.27

The **table 2** presents the statistical measures for the age variable among the study participants. The mean age is 17.8 years, with a median of 18 years, indicating a slightly skewed distribution. The interquartile range is 2 years, reflecting the spread of the middle 50% of the data. The standard deviation is 1.27, suggesting relatively low variability in the ages of the participants.

Table 3: Demographic Factors and Utilization of AFHS

Demographic factors	Have you ever visited AFHS clinic			Test statistic value	p value
	Yes	No	Don't know		
Location					
Konaje	10 (9.9)	84 (83.2)	7 (6.9)	7.418	0.115
Manjanady	18 (18)	80 (80)	2 (2)		
Phajeer	11 (11.1)	79 (79.8)	9 (9.1)		
Gender					
Male	15 (8.9)	139 (82.2)	15 (8.9)	10.473	0.005
Female	24 (18.3)	104 (79.4)	3 (2.3)		
Religion					
Hindu	13 (12.4)	88 (83.8)	4 (3.8)		

Muslim	23 (13)	144 (81.4)	10 (5.6)	7.824*	0.077
Christian	3 (16.7)	11 (61.1)	4 (22.2)		
Educational level					
Secondary school	5 (8.6)	50 (86.2)	3 (5.2)	1.383	0.501
Higher secondary school	34 (14)	193 (79.8)	15 (6.2)		

This **table 3** presents the relationship between demographic factors and the utilization of AFHS clinics, including the number of adolescents who have visited an AFHS clinic, those who have not, and those who are unsure. The test statistic values and p-values were used to assess the significance of each factor. Gender showed a significant influence ($p = 0.005$), with a higher proportion of females (18.3%) visiting AFHS clinics compared to males (8.9%). Location and educational level did not show significant differences in utilization ($p = 0.115$ and $p = 0.501$, respectively). Religion also did not yield significant results ($p = 0.077$), though the distribution suggests some variability in utilization patterns across religious groups.

Table 4: Factors Influencing the Utilization of AFHS Clinics

Variables	**Have you ever visited AFHS clinic**			**Test statistic value**	**p value**
	Yes	No	Don't know		
Heard about AFHS before					
Family	9 (45)	11 (55)	0 (0)	50.631	0.0001
Friends	0 (0)	31 (93.9)	2 (6.1)		
Healthcare provider	14 (23.3)	36 (60)	10 (16.7)		
Internet	4 (9.8)	37 (90.2)	0 (0)		
Never heard	12 (8.2)	128 (87.7)	6 (4.1)		
Specific services do you think are offered through AFHS					
Counselling	9 (7.3)	107 (86.3)	8 (6.5)	14.971*	0.037
General check-up	22 (22)	74 (74)	4 (4)		
Mental health	2 (11.1)	13 (72.2)	3 (16.7)		
Reproductive health	2 (9.1)	18 (81.8)	2 (9.1)		

Others	4 (11.1)	31 (86.1)	1 (2.8)		

The **table 4** examines the association between factors such as prior awareness of AFHS and perceptions of services offered by AFHS clinics with the likelihood of adolescents visiting the clinic. A significant difference was found for whether adolescents had heard about AFHS before (p = 0.0001), with those who heard about it through family being more likely to visit (45%) compared to those who heard through other sources. Additionally, the specific service of counseling (p = 0.037) was associated with increased utilization, with a higher proportion of adolescents who perceived counseling to be offered visiting the clinic.

Table 5: Awareness, Barriers, and Family Support for AFHS Utilization

Are you aware of any AFHS facilities in your area					
Yes	19 (23.2)	59 (72)	4 (4.9)	18.784	0.0001
No	15 (13.9)	90 (83.3)	3 (2.8)		
I don't know	5 (4.5)	94 (85.5)	11 (10)		
Have you ever received any information about AFHS in school or through community programs?					
Awareness	3 (12)	21 (84)	1 (4)	29.472*	0.0001
Community	8 (42.1)	10 (52.6)	1 (5.3)		
School	17 (26.2)	45 (69.2)	3 (4.6)		
Workshop	0 (0)	3 (100)	0 (0)		
Never received	11 (5.9)	164 (87.2)	13 (6.9)		
Barriers that may prevent Adolescence from accessing AFHS					
Lack of awareness	32 (18)	140 (78.7)	6 (3.4)	24.933*	0.0001
Fear of confidentiality	4 (11.8)	24 (70.6)	6 (17.6)		
Difficult to access	3 (10.7)	23 (82.1)	2 (7.1)		
Staff to be unfriendly	0 (0)	21 (100)	0 (0)		

Others	0 (0)	35 (89.7)	4 (10.3)		
Does your family support the AFHS					
Yes	28 (28)	68 (68)	4 (4)	34.231*	0.0001
No	4 (16)	18 (72)	3 (12)		
I don't know	7 (4)	157 (89.7)	11 (6.3)		

This **table 5** shows the relationship between adolescents' awareness of AFHS facilities, the information they have received about AFHS, barriers they face in accessing AFHS, and family support for AFHS utilization. Statistically significant results were found across all variables, with p-values below 0.05. The awareness of AFHS facilities in the area ($p = 0.0001$) and prior receipt of information about AFHS, either through awareness campaigns, school, or community programs ($p = 0.0001$), were significantly linked to visiting an AFHS clinic. Barriers such as lack of awareness ($p = 0.0001$) and family support ($p = 0.0001$) also had a notable impact on the likelihood of utilizing AFHS, with higher support from family correlating with increased clinic visits.

Table 6: Community Engagement, Physical Barriers, and Respect for Religious Beliefs in AFHS Utilization

Are you aware of any community outreach programs or events that promote awareness of AFHS					
Yes	18 (28.6)	40 (63.5)	5 (7.9)	26.220	0.0001
No	13 (14.4)	76 (84.4)	1 (1.1)		
I don't know	8 (5.4)	127 (86.4)	12 (8.2)		
Do you think the community plays a role in promoting awareness and Utilization of AFHS					
Yes	21 (22.1)	68 (71.6)	6 (6.3)	15.468*	0.003
No	7 (20)	26 (74.3)	2 (5.7)		
I don't know	11 (6.5)	149 (87.6)	10 (5.9)		
Have you or anyone you know ever encountered physical barriers when accessing AFHS					
Distance	9 (22.5)	29 (72.5)	2 (5)		
Lack of infrastructure	2 (10)	18 (90)	0 (0)	20.854*	0.0001

Lack of transport	13 (28.9)	27 (60)	5 (11.1)		
No	15 (7.7)	169 (86.7)	11 (5.6)		
Do AFHS respect the religious belief and practices of adolescents when providing healthcare services					
Yes	27 (25.5)	72 (67.9)	7 (6.6)	23.291*	0.0001
No	2 (9.5)	17 (81)	2 (9.5)		
I don't know	10 (5.8)	154 (89)	9 (5.2)		

The **table 6** presents the associations between adolescents' awareness of community outreach programs for AFHS, perceptions of the community's role in promoting AFHS utilization, encounters with physical barriers, and the respect for religious beliefs in AFHS services. Statistically significant relationships were found across all variables. Awareness of community outreach programs (p = 0.0001), the community's role in promoting AFHS (p = 0.003), and physical barriers such as distance (p = 0.0001) and lack of transportation (p = 0.0001) were strongly linked to AFHS utilization. Additionally, respect for adolescents' religious beliefs in AFHS services was also significantly associated with increased use of the services (p = 0.0001).

Table 7: Reasons for Not Visiting AFHS and Factors Affecting Confidence, Comfort, and Awareness in AFHS Services

Reason for not visiting AFHS					
Cannot afford fees	23 (33.8)	39 (57.4)	6 (8.8)	43.929	0.0001
Feeling shy	5 (11.1)	35 (77.8)	5 (11.1)		
Lack of privacy	9 (10)	78 (86.7)	3 (3.3)		
Not necessary	2 (2.1)	91 (93.8)	4 (4.1)		
Feeling comfortable discussing your health concern with the healthcare provider at AFHS clinic					
Yes	31 (41.3)	39 (52)	5 (6.7)	78.009	0.0001
No	4 (4.4)	85 (94.4)	1 (1.1)		
I don't know	4 (3)	119 (88.1)	12 (8.9)		
Feeling confident that your confidentiality would be respected at an AFHS clinic					
Yes	28 (31.8)	53 (60.2)	7 (8)	43.275*	0.0001
No	4 (18.2)	17 (77.3)	1 (4.5)		

I don't know	7 (3.7)	173 (91.1)	10 (5.3)		
Prefer to receive healthcare services from an AFHS clinic over other healthcare provider					
Yes	20 (25)	56 (70)	4 (5)	18.745*	0.0001
No	5 (25)	15 (75)	0 (0)		
I don't know	14 (7)	172 (86)	14 (7)		
Participated in any awareness campaigns organized by AFHS					
Yes	12 (37.5)	18 (56.3)	2 (6.3)	30.085*	0.0001
No	22 (10.3)	186 (86.9)	6 (2.8)		
I don't know	5 (9.3)	39 (72.2)	10 (18.5)		

This **table 7** highlights various factors that influence adolescents' decisions regarding AFHS utilization, including financial barriers, comfort discussing health concerns, confidentiality concerns, preference for AFHS services, and participation in awareness campaigns. The analysis reveals that a significant number of adolescents did not visit AFHS due to financial constraints ($p = 0.0001$) and lack of privacy ($p = 0.0001$). Comfort in discussing health concerns and confidence in confidentiality being respected were positively correlated with AFHS utilization ($p = 0.0001$). Furthermore, adolescents who participated in awareness campaigns were more likely to visit AFHS ($p = 0.0001$). Preference for AFHS services over other healthcare providers was also significantly associated with their usage ($p = 0.0001$).

Table 8: Factors Influencing Adolescents' Utilization and Perception of AFHS Services

AFHS offer a wide range of services that meet the healthcare needs of adolescents					
Yes	25 (8.4)	58 (65.9)	5 (5.7)	31.263*	0.0001
No	1 (3)	26 (78.8)	6 (18.2)		
I don't know	13 (7.3)	159 (88.8)	7 (3.9)		
Community support for AFHS in your area					
Yes	28 (25.9)	74 (68.5)	6 (5.6)	23.616*	0.0001
No	2 (6.9)	25 (86.2)	2 (6.9)		
I don't know	9 (5.5)	144 (88.3)	10 (6.1)		
Privacy is respected when accessing healthcare services at AFHs					

Yes	27 (23.5)	82 (71.3)	6 (5.2)	25.516*	0.0001
No	5 (23.8)	15 (71.4)	1 (4.8)		
I don't know	7 (4.3)	146 (89)	11 (6.7)		
Cultural or religious beliefs that have hindered your ability to access AFHS					
Yes	16 (20.3)	54 (68.4)	9 (11.4)	14.058*	0.005
No	4 (9.3)	35 (81.4)	4 (9.3)		
I don't know	19 (10.7)	154 (86.5)	5 (2.8)		
Factors influencing you to avail services from AFHS					
Accessibility	15 (26.8)	37 (66.1)	4 (7.1)	18.790	0.043
Affordability	4 (9.1)	36 (81.8)	4 (9.1)		
User friendly nature	2 (6.7)	26 (86.7)	2 (6.7)		
Variety of services	7 (14.3)	39 (79.6)	3 (6.1)		
Experience staff	10 (13.9)	60 (83.3)	2 (2.8)		
Others	1 (2)	45 (91.8)	3 (6.1)		

The **table 8** highlights adolescents' perceptions regarding AFHS services, community support, privacy, and barriers related to cultural and religious beliefs. A large proportion of participants felt that AFHS offers a wide range of services that meet adolescents' healthcare needs ($p = 0.0001$) and that community support for AFHS was present in their area ($p = 0.0001$). Regarding privacy, most adolescents reported feeling that privacy was respected when accessing healthcare services ($p = 0.0001$). However, cultural or religious beliefs acted as a barrier for some in accessing AFHS services ($p = 0.005$). Accessibility, affordability, and experience of staff were among the key factors influencing adolescents to avail services, with accessibility being particularly significant ($p = 0.043$). These findings underline the importance of addressing privacy concerns, providing a variety of services, and increasing community support to improve the utilization of AFHS.

4. DISCUSSION

We discussed the themes emerging from the study on the awareness, accessibility, and utilization of AFHS in Dakshina Kannada. The findings demonstrate that although significant strides have been made in increasing awareness and support for AFHS, barriers such as geographical distance, awareness, and religion considerations continue to limit adolescents' accessibility and utilization.

Awareness of Adolescent Friendly Health Services

The awareness of AFHS among adolescents in Dakshina Kannada is a crucial factor influencing their engagement with the

services. The data indicates that the majority of respondents have varying levels of awareness about AFHS, with substantial variation based on demographic factors such as location, gender, and source of information. For instance, family was a significant source of information, with 45% of respondents from Konaje reporting awareness through family networks (p-value 0.0001). Furthermore, healthcare providers were an important source of information, especially in rural settings like Manjanady and Phajeer, where 23.3% and 11.1% of adolescents were informed through healthcare providers, respectively (p-value = 0.037). On the other hand, internet-based awareness was minimal (only 9.8%) as seen in the data from Phajeer, which suggests that digital platforms may not be a strong enough vehicle for disseminating health information to this demographic. This is consistent with findings from Bali et al. (2022), who identified gaps in awareness about AFHS in Central India and recommended targeted outreach programs to improve adolescent engagement. However, significant gaps remain, as many adolescents remain unaware of AFHS. For example, in Phajeer, 79.8% of respondents had no prior knowledge of AFHS. These findings stresses on the importance of improving informational outreach, particularly in rural areas, to increase awareness. Educational programs integrated into schools and community initiatives could bridge this gap by providing targeted information to adolescents who may not otherwise come into contact with AFHS (Mahalakshmy et al., 2018).

Accessibility of AFHS

The accessibility of AFHS was assessed from various perspectives, including geographic factors, physical barriers, and socio-cultural considerations. The study found significant disparities in accessibility between urban and rural locations. In Konaje, 84% of respondents had never visited an AFHS clinic, while only 18% of respondents in Manjanady had a similar experience (p-value = 0.115). These findings suggest that distance remains a significant barrier to accessing AFHS in rural areas, where healthcare infrastructure may be limited. Physical barriers, including a lack of transportation, also emerged as a critical issue, particularly in rural locations where only 28.9% of respondents in Phajeer stated they had access to transportation to visit an AFHS (p-value = 0.0001). This aligns with the findings of Gupta et al. (2015), who reported inequities in AFHS utilization due to transportation issues. In addition, cultural and religious beliefs significantly impacted accessibility. Approximately 20.3% of respondents reported that their religious beliefs hindered their access to AFHS (p-value = 0.005), reflecting the importance of aligning healthcare services with local cultural and religious norms to ensure that adolescents feel comfortable and supported (Awang et al., 2020).

Utilization of AFHS

Utilization of AFHS is influenced by several factors, including personal comfort, confidentiality concerns, and perceived need for services. The data shows that adolescents who felt confident that their confidentiality would be respected were more likely to utilize AFHS. 31.8% of respondents from Dakshina Kannada reported feeling confident in the privacy of AFHS services (p-value = 0.0001). This suggests that addressing confidentiality concerns is crucial for improving the utilization of these services. However, a significant proportion of adolescents expressed reluctance to visit AFHS. For instance, 57.4% of respondents cited inability to afford fees as a barrier to accessing AFHS (p-value = 0.0001). This finding aligns with previous studies showing that financial constraints can impede access to healthcare services among adolescents (Awodutire et al., 2020). Adolescents' comfort in discussing health concerns was another key determinant. The data reveals that adolescents who felt comfortable discussing health issues with healthcare providers were more likely to utilize AFHS services. However, only 41.3% of respondents expressed feeling comfortable in doing so (p-value = 0.0001), suggesting that service providers must adopt more adolescent-friendly communication strategies (Banerjee et al., 2023).

Community Support for AFHS

Community support for AFHS is critical in shaping adolescents' perceptions and utilization of these services. The study found that community engagement positively correlates with higher levels of utilization. 25.9% of respondents from Dakshina Kannada confirmed that their community supported AFHS, while 86.2% of adolescents in rural areas like Phajeer indicated they had never received any community-based support for AFHS (p-value = 0.0001). This disparity highlights the need for targeted community interventions that educate and mobilize local populations to advocate for and support the use of AFHS (Sinha et al., 2019). Moreover, adolescents who believed their families were supportive of AFHS were more likely to use these services. 28% of adolescents from Dakshina Kannada stated their families supported their use of AFHS (p-value = 0.0001). This finding points to the importance of family involvement in promoting adolescent health services, particularly in traditional and conservative settings (Sharma et al., 2023).

Perceived Effectiveness and Relevance of AFHS

The relevance of AFHS services in meeting adolescents' healthcare needs is vital to their utilization. Many adolescents expressed satisfaction with the variety of services offered by AFHS, which include general check-ups, mental health services,

and counseling. The study found that 22% of respondents felt that AFHS services effectively addressed their health needs (p-value = 0.0001). However, a portion of respondents expressed doubts about the adequacy of services offered, especially regarding mental health support, which was less utilized. The data also revealed that adolescents in Konaje and Manjanady, where there is a stronger community support system, were more likely to engage with AFHS compared to those in rural areas where there is less outreach (p-value = 0.043). This highlights the need for improving both the service offerings and their relevance to adolescents, especially in rural settings (Kumar et al., 2017).

Ethical and Cultural Considerations

Ethical and cultural considerations are fundamental to ensuring that AFHS respects adolescents' rights and beliefs. The study found that privacy concerns were a significant issue for many adolescents. However, 23.5% of respondents felt that their privacy was respected during AFHS visits (p-value = 0.0001), which emphasizes the importance of maintaining confidentiality and creating a safe environment for adolescents. Moreover, cultural and religious factors have been shown to influence healthcare decisions. For example, 20.3% of adolescents in the study noted that their religious beliefs affected their ability to access AFHS, particularly in areas with strong cultural norms that might restrict adolescent participation in certain healthcare settings (p-value = 0.005). This suggests that AFHS providers must tailor their services to respect these beliefs while maintaining inclusivity (Awang et al., 2019).

Figure 1: Key services, AFHS aim, and perceived barriers of Adolescent Friendly Health Services in Dakshina Kannada

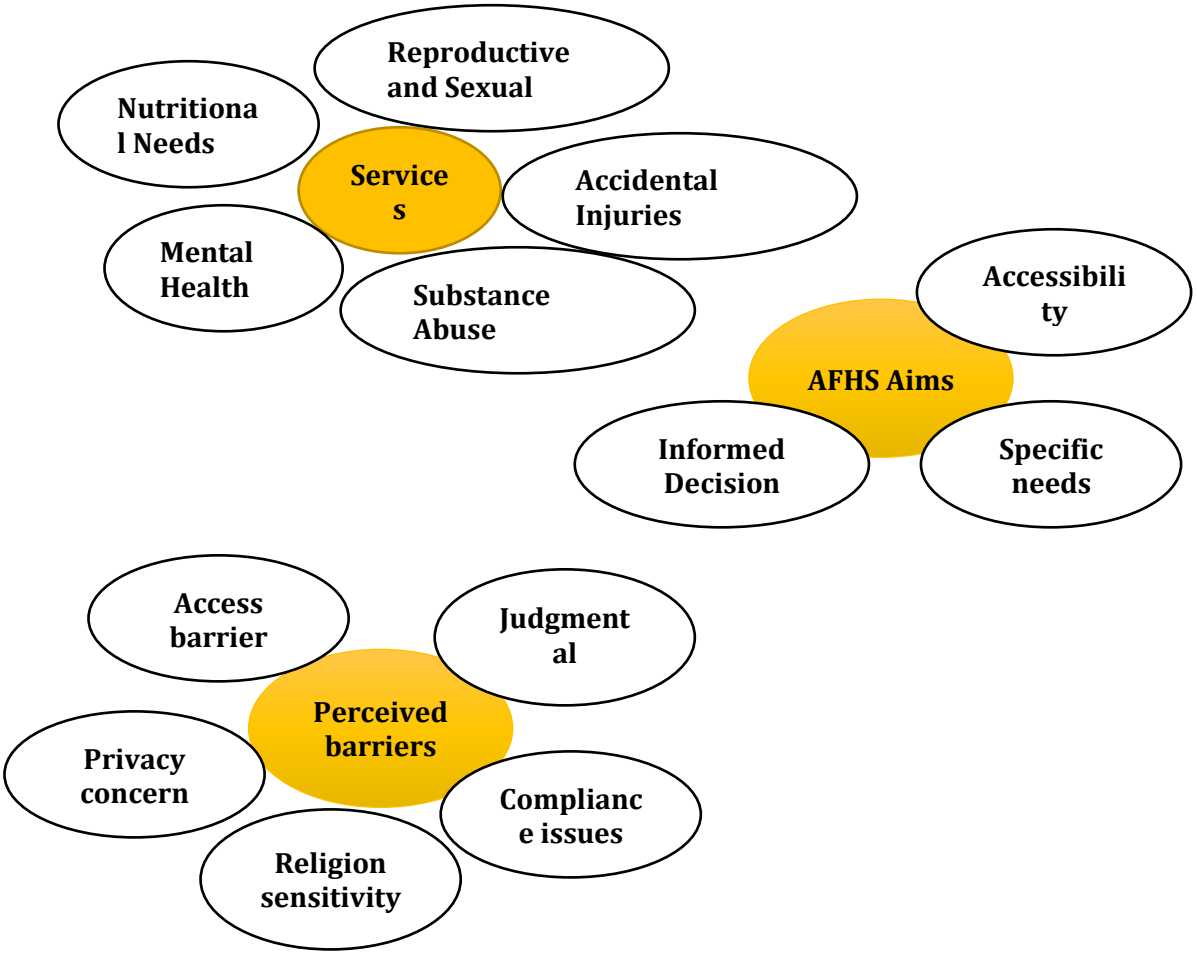

Figure 1 provides a concise overview of AFHS services in Dakshina Kannada, highlighting their key services, aim and perceived barriers. AFHS aims to provide accessible, youth-friendly healthcare by offering preventive, promotive, and curative services, alongside counseling and outreach initiatives. The figure highlights the critical role of AFHS in ensuring adolescents make informed health decisions while addressing barriers such as privacy concerns, accessibility issues, and

provider attitudes. These insights align with the study's focus on assessing awareness, accessibility, and utilization patterns of AFHS in Dakshina Kannada, emphasizing areas for improvement to enhance adolescent healthcare services.

5. CONCLUSION

The study highlights significant gaps and barriers in the awareness, accessibility, and utilization of AFHS in Dakshina Kannada, stressing on the need for targeted interventions. While there is awareness of AFHS, especially through family and healthcare providers, many adolescents, particularly in rural areas; remain unaware or face logistical challenges such as distance, financial constraints, and privacy concerns. A key recommendation is to enhance community engagement and informational outreach programs, particularly in rural areas, using accessible platforms such as schools and community gatherings. Additionally, addressing the affordability of services and ensuring that privacy and confidentiality concerns are met will be essential in increasing utilization rates. A holistic approach that combines educational initiatives with infrastructural improvements and culturally sensitive practices will be crucial in making AFHS more accessible and effective for adolescents in the region.

6. LIMITATION

The research was conducted in only one Taluk in Dakshina Kannada, which limits the generalizability of the results to other regions within the district or state. Additionally, the exclusion of adolescents aged 10-14 years, as this age group is generally less aware of the specific health needs addressed by Adolescent Friendly Health Services (AFHS), such as nutritional needs, reproductive and sexual health concerns, and mental health issues. As a result, their knowledge and views about AFHS could not be assessed, leaving a gap in understanding the perspectives of younger adolescents. These limitations highlight the need for further research that includes a more diverse sample and utilizes strategies to engage younger adolescents in discussions about AFHS.

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Contributions

Amon WA I Sumer, Dr. A.P. Manimegalai and Akuma Ifeanyichukwu contributed to conceptualization, methodology, analysis, and discussion. Dr. A.P. Manimegalai and Akuma Ifeanyichukwu drafted and edited the final manuscript version. All authors have read and approved the final manuscript.

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Ethics approval and consent to participate

The protocol was approved by Yenepoya Ethics Committee-2 (YEC-2) of Yenepoya (deemed to be University, Mangalore, Karnataka, India in accordance with the Indian Council of Medical Research (ICMR) and Declaration of Helsinki (DoH) guidelines. Protocol No. YEC2/2024/154. The informed consent to participate and publish was obtained from the participants.

Competing interests

The authors declare no competing interests.

Data-Availability Statement

The data generated and analyzed during this study are not publicly available but will be made available by the corresponding author upon reasonable request.

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