

Socio demographic differences in emergency dental service utilization – comparison of patients' data from a dental institution in the years 2018 and 2024 from southern part of India

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Abstract

Objective: To compare the period prevalence's of emergency dental visits between the years 2018 and 2024 and to assess the influence of any socio-demographic factors on emergency dental visits.

Methodology: This retrospective cross-sectional study used research data retrieved from the patient records stored at the out-patient department of a dental institution in South India. Dental emergency patients were identified based on the preliminary diagnosis of the conditions. Emergency dental visits were compared to socio-demographic features of the patients. Descriptive statistics were calculated initially, followed by bivariate analysis with Chi square test, and binomial logistic regression analysis was performed to assess the predictors for emergency dental visits.

Results: We retrieved data from 6700 (3000 in 2018 and 3700 in 2024) patients visiting this outpatient department for the first time during the months of January, May, and September of 2018 and 2024. the prevalence of emergency dental visits among the total visits in a dental teaching hospital was 46.8% in the year 2018 and 38.49% in the year 2024. Logistic regression models identified rural residents were 2.36 times, farmers has 3.2 times, having no education has 3.06 times and males were more likely to have emergency dental visits. **Conclusion:** Although there is a decline in the proportion of emergency dental visits between two study periods, the recent trend of 38.49% is still alarming. Dental public health interventions should be planned to address the barriers in seeking periodic dental care and to promote preventive dental care.

Key words: Dental service, Dental care, Urgent care.

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Introduction

Systematic use of oral health care services is essential for achieving good oral health status in

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any community, especially universal access to preventive dental care and utilization, which is essential for optimal oral health. Periodic dental care helps in assessing the individual risk factors, normative dental needs assessment, and prevention of dental diseases before it causes irreversible damage to dentition [1]. Access to dental care is multifaceted, and prior research indicates that there are notable inequalities in the oral health status of different sections of people in India. Various studies reported that dental service utilization rates in India range from 27 to 34% [2].

Lack of perceived need for dental care was reported as one of the major barriers to dental care utilization, and that amplifies the gaps between normative dental needs and actual utilization rates [3]. One of the barriers to the utilization of primary and secondary levels of prevention in dental diseases was the way the symptoms manifest in the two most prevalent dental diseases, such as dental caries and periodontal diseases. In both conditions, the patient feels the pain at advanced stages and thus perceives the need for seeking dental care [4]. A study conducted by Yaddanapalli SC et al. in coastal parts of Andhra Pradesh, India, reported that dental service utilization rates were 23.4%, and among these, dental pain was the main reason for 13.1% of the participants seeking dental care [5]. Dental pain has a significant impact on day-to-day activities and adversely affects the quality of life [6].

In spite of this, more than half of the dental patients in India are referred to as "problem-based attendees," who only seek dental treatment when they experience severe dental pain or issues, often after trying home remedies and/or self-medication [7].

A study conducted by Jaiswal AK et al to assess the prevalence of dental pain and self-medication practices in a rural part of India reported that the prevalence of dental pain in past six months prior to data collection was 28.3% and nearly half (49.6%) of the people who experienced dental pain, used over the counter self-medication before visiting dentist [8]. This type of self-medication behaviour not only worsens the dental disease but also increases the risk of unintentional overdose of analgesics, which may adversely affect patients' general health.

These problem-oriented attendees typically use emergency dental care, mostly tertiary care, often repeatedly and for the same issue [9, 10], and they also present to other medical care professionals such as general physicians or medical practitioners, emergency departments of hospitals, and other allied health workers because they only consult health care personnel when they have acute dental pain [9, 10]. A study conducted by Adunola F. et al. included 790 participants from the USA; 15.5% of the study participants had emergency dental

visits, and low General Oral Health Assessment Index scores were associated with emergency dental visits [11].

Although little is known about the rates or determinants of emergency dental care-seeking behaviours. Research on emergency dental care attendance is crucial in order to develop interventions that promote regular dental attendance. Part of this understanding must include the socio-demographic factors of these patients in order to facilitate appropriate interventions to promote periodic dental care.

Andhra Pradesh is one of the five southern states of India on the east coast with a population of approximately 54 million. Almost one-third of the population lived in cities, with the remainder living in rural areas [12]. Previous research in Andhra Pradesh found that dental service usage rates ranged from 21.4% to 23.4% [3, [3,5]. One of the barriers to dental care consumption in India was the availability of dental services, and there has been an increase in the number of dentists and dental office settings over the previous five years [13, 14]. It is important to find out whether this improved dental care access has any impact on the urgent dental care trends.

The aim of this study was to compare the period prevalence's of emergency dental visits between the years 2018 and 2024 and to assess the influence of any socio-demographic factors on emergency dental visits.

Materials and Methods

Sources of data

This retrospective cross-sectional study used research data retrieved from the patient records stored at the out-patient department of a dental institution in South India. We retrieved data from 6700 (3000 in 2018 and 3700 in 2024) patients visiting this outpatient department for the first time during the months of January, May, and September of 2018 and 2024. This study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies. We retrieved patient data during the same period (months) in both years in order to avoid confounding factors such as time, days, seasons, and other factors.

Dental emergency patient classification

Dental emergency patients were identified based on the preliminary diagnosis of the conditions such as acute pulpitis and/or apical periodontitis, pericoronitis, cellulitis, acute gingivitis, abscess in the oral cavity, acute periodontitis, temporomandibular joint disorders, trismus, tooth fracture, open wound or ulcer in the oral cavity, and lip and any other oral condition that requires immediate care.

Patients were classified based on the age (18-25 years, 26-35 years, 36-45 years, 46-55 years, 56-65

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years and above 65 years), gender and socio-demographic features such as area of residence, educational status and occupation. This study protocol was approved by the Institutional Review Board of Saveetha Dental College and Hospital, India [SRB/SDC/PhD/PHD-2324/23/TH-099].

Statistical analysis

Collected data was analysed using statistical software for social Sciences (IBM SPSS statistics version 20, License Authorization Wizard. Ink, Chicago, USA). Descriptive statistics were calculated initially, followed by bivariate analysis, and binomial logistic regression analysis was performed to assess the predictors for emergency dental visits. Variables that were found to be significant in bivariate analysis were included in the binomial logistic regression analysis. For all comparisons, $P \leq 0.05$ was considered statistically significant.

Results

Data from 3000 patients for the year 2018 and 3700 patients for the year 2024 was included in this study. Descriptive statistics were presented in the **Table 1**. Almost equal numbers of males and females were included in the study, 54.43% the participants from the year 2018 data, 52.92% of them from the year 2024 data were rural residents and remaining were residents of peri-urban and urban areas which was statistically significant ($P=0.001$). Nearly, one-fifth (19.97%) of the participants from the year 2018 data and 15.97% from the year 2024 data were illiterates. In both data sets, majority of the participants were unskilled daily wage- labourers and farmers.

Table 1: Socio-demographic features of the participants

Variable	Year 2018	Year 2024	P value (Chi-square test)
GENDER			
Male	1451(48.37)	1856(50.16)	0.342
Female	1549(51.63)	1844(49.84)	
Overall	3000(100)	3700(100)	
AGE GROUP			
18-25 years	723(24.10)	738(19.95)	0.688
26-35 years	619(20.63)	1040(28.11)	
36-45 years	637(21.23)	860(23.24)	
46-60 years	605(20.17)	744(20.11)	
>60 years	416(13.87)	318(8.59)	
AREA OF RESIDENCE	401(13.37)	747(20.19)	0.001

Urban	)	)	
Peri urban	666(22.20)	625(16.89)	
Rural	)	)	
	1933(64.43)	2328(62.92)	
EDUCATION	599(19.97)	591(15.97)	0.064
No education	)	)	
Primary school	502(16.73)	522(14.11)	
Middle school	)	)	
High school	409(13.63)	571(15.43)	
Inter or diploma	)	)	
Graduate	420(14)	798(21.57)	
Professional	442(14.73)	)	0.344
	)	355(9.59)	
	428(14.27)	622(16.81)	
	)	)	
	200(6.67)	241(6.51)	
OCCUPATION	537(17.90)	563(15.22)	0.344
None	)	)	
Unskilled daily wage-labourer	653(21.77)	667(18.03)	
Farmer	)	)	
Private skilled employee	646(21.53)	817(22.08)	
Govt employee	)	)	
Self-employed	364(12.13)	580(15.68)	
Professional	)	)	
	220(7.33)	387(10.46)	
	400(13.33)	523(14.14)	
	180(6)	)	
		163(4.41)	

Table 2 describes the emergency dental visits with socio-demographic features of the participants. The proportion of the patients with emergency dental visits out of total patients were 46.8% in the year 2018 and 38.49% in the year 2024. In both the years, the percentage of emergency dental visits were significantly higher in males than female participants i.e. 50.59 % vs 43.25 % in the year 2015 and 42.94 % vs 34 % in the year 2024. The percentage of emergency dental visits were more in rural residents than urban counterparts (42.44% vs 25.44%) in 2024 year's data and such variations were not found in 2018 data. The percentage of emergency dental visits were inversely proportion to the level of education in both data sets, professionals and graduates were having less percentage of emergency visits compared to illiterates and people who completed just primary education. Emergency dental visits were more in unskilled daily wage- labourers and Farmers compared to other occupations.

Table 2: Comparison of social-demographic features with type of dental visit

Variable	Year 2018			Year 2024		
	Urgent	Non-urgent	P value	Urgent	Non-urgent	P value

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	care	urgen t care	lu e	care	nt care	lu e
GENDER						
Male	734(50.59)	717(49.41)		797(42.94)	1059(57.06)	0.003
Female	670(43.25)	879(56.75)	0.000	627(34)	1217(66)	
Overall	1404(46.8)	1596(53.2)		1424(38.49)	2276(61.51)	
AGE GROUP						
18-25 years	348(48.13)	375(51.87)		322(43.63)	416(56.37)	0.088
26-35 years	301(48.63)	318(51.37)		378(36.35)	662(63.65)	
36-45 years	286(44.90)	351(55.10)	0.462	346(40.23)	514(59.77)	
46-60 years	289(47.77)	316(52.23)		270(36.29)	474(63.71)	
>60 years	180(43.27)	236(56.73)		108(33.96)	210(66.04)	
AREA OF RESIDENCE						
Urban	167(41.65)	234(58.35)	0.684	190(25.44)	557(74.56)	0.038
Peri urban	306(45.96)	360(54.04)		251(40.50)	274(59.50)	
Rural	939(48.56)	994(51.44)		988(42.44)	1340(57.56)	
EDUCATION						
No education	332(55.43)	267(31.78)		305(51.61)	286(48.39)	0.016
Primary school	280(55.78)	222(44.22)		289(53.6)	233(46.4)	
Middle school	229(55.99)	180(44.01)	0.004	222(38.88)	349(61.12)	
High school	189(45)	231(55)		236(29.57)	562(70.43)	
Inter or diploma	174(39.37)	268(60.63)		186(52.39)	169(47.61)	
Graduate	136(31.78)	292(68.22)		138(22.19)	484(77.81)	
Professional	64(32)	136(68)		48(19.92)	193(80.08)	
OCCU						

PATIENT	249(46.37)	288(53.63)	0.026	265(47.07)	298(52.93)	0.000
Unskilled daily wage-labourer	363(55.59)	290(44.41)		326(8.88)	341(51.12)	
Farmer	372(57.59)	274(42.41)		179(30.86)	401(69.14)	
Private skilled employee	133(36.54)	231(63.46)		109(8.17)	278(18.3)	
Govt employee	98(44.55)	122(55.45)		125(39.0)	398(61.0)	
Self-employed	136(34)	264(66)		35(21.47)	128(78.53)	
Professional	53(29.44)	127(70.56)				

Logistic regression model to assess the predictors of emergency dental visits for 2018 data identified two variables which statistically significant-emergency dental visit patterns were more in male patients compared to female patients (odds=2.34, P=0.002) and also more in patients who did not have any formal education(odds=3.06, P=0.000)[Table3].

Table3: Binary logistic regression analysis for predictors of emergency dental visits in the year 2018

Variable	Adjusted Odds ratio	95% CI	P-value
GENDER			
Female	1.00 (ref)	-	-
Male	2.34*	1.26, 3.67	0.002
EDUCATION			
Professional	1.00 (ref)	-	-
Graduate	1.28	0.96, 1.44	0.074
Inter or diploma	1.09	0.92, 1.45	0.244
High school	1.26	0.86, 1.42	0.066
Middle school	1.21	0.91, 1.39	0.142
Primary school	1.34	1.19, 2.00	0.524
No education	3.06*	1.74, 4.25	0.000
OCCUPATION			
Professional	1.00 (ref)	-	-
Self-employed	1.26	0.89, 1.35	0.464
Govt employee	0.96	0.68, 1.26	0.086
Private skilled	1.26	0.68, 1.26	0.488

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employee	1.15	1.36	0.302
Farmer	2.86	0.90,	0.024
Unskilled daily wage- labourer	1.63	1.30	0.084
None		0.93,	
		1.26	
		0.96,	
		3.28	
		1.18,	
		2.06	

Regression model for 2024 data identified three variables such as male patients, rural residents and farmer by occupation. Emergency dental visits were two times more in male patients compared to female patients (odds= 2.22, P=0.003), rural residents have 2.36 times and farmers has 3.20 times more chances of having emergency dental visits[Table 4].

Table4: Binary logistic regression analysis for predictors of emergency dental visits in the year 2024

Variable	Adjusted Odds ratio	95% CI	P-value
GENDER			
Female	1.00 (ref)	-	-
Male	2.22*	0.77, 3.68	0.003
AREA			
Urban	1.00 (ref)	0.68,	-
Peri urban	1.20	1.12	0.194
Rural	2.36*	0.97, 3.58	0.000
OCCUPATION			
Professional		-	
Self-employed	1.00 (ref)	0.88,	-
Govt employee	1.02	1.69	0.546
Private skilled employee	0.86	0.79,	0.468
Farmer	1.35	1.20	0.086
Unskilled daily wage- labourer	3.20*	1.06,	0.000
None	1.10	1.94	0.838
	0.90	1.12,5.32	0.178
		0.84,	
		1.22	
		0.67,	
		1.11	
EDUCATION			
Professional		-	
Graduate	1.00 (ref)	0.86,	
Inter or diploma	1.12	1.44	0.074
High school	1.23	0.90,	0.254
Middle school	1.12	1.40	0.364
Primary school	0.84	0.96,	0.332
No education	1.24	1.56	0.624
	1.15	0.91,	0.222
		1.39	
		1.04,	
		2.12	

		0.91,	
		1.32	

Discussion

Over two study periods, the prevalence of emergency dental visits among the total visits in a dental teaching hospital was 46.8% in the year 2018 and 38.49% in the year 2024. The study setting of this research was a private dental teaching institute situated in the coastal part of Andhra Pradesh, India, and dental care was offered at free of cost or very low cost to all the patients irrespective of insurance or socioeconomic status. In the year 2017, this dental care facility shifted to electronic patient records from manual records, so patients’ data from the year 2018 was taken for initial assessment. This study included data from patients who visited for the first time to the outpatient department of this dental facility, and data of repeat visitors/attendees were not included in this study to avoid confounding factors. The majority of the patients attending this dental care facility were from rural areas, 64.43% of the total participants from the year 2018 and 62.92% from the year 2024. The urban-rural distribution of the participants was close to the urban-rural population distribution of Andhra Pradesh. [12] The urban-rural gap in emergency dental visits for the year 2018 was not significant, and after five years (2014), there are significant differences in emergency dental proportions, 25.44% in urban patients and 42.44% in rural patients, which is statistically significant [P=0.038]. and the logistic regression model also identified rural residents were 2.36 times more likely to have emergency dental visits compared to urban and peri-urban areas [odds=2.36; 95% CI:0.97,3.58; P=0.000]. These findings were similar to the study conducted in Guntur district, Andhra Pradesh, India, by Yaddanapalli SC et al., in which authors reported that urban residents had 2.7 times more dental service utilization, whereas most of the rural residents visited the dentist in case of a dental emergency [5]. One of the reasons rural residents tended to visit the dentist only in case of dental emergencies was their poor oral health knowledge compared to urban counterparts. A study conducted in the Chengalpattu district, Tamil Nadu, India, by Sivakumar A. et al. reported that rural patients have less knowledge than urban patients (mean rank: 65.9 vs. 161.1) and poor oral health practices (mean rank: 95 vs. 132) [15]. Poor access to dental care for rural residents due to maldistribution of dentists/dental care services may be another possible reason for rural residents seeking more emergency dental visits. A study reported by Pramod Nayak P. et al. about the geospatial distribution of oral health care services in coastal Karnataka districts, India, highlighted the fact that the dentist-to-population ratio in urban areas was

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1:13,836, whereas in rural areas it was 1:50,000-100,000 [16].

In this study, male patients had more emergency dental visits than female patients in both years' data. The percentage of emergency dental visits in 2018 data was 50.59% for males against 43.25% in females, and in 2024 patients' data, 42.94% in males and 34% in female patients. Logistic regression models were also confirmed that males were 2.34 times more likely to have emergency dental visits in the year 2018 data and 2.22 times in the year 2024 data. According to several published past research studies, women are more concerned about their overall health, including their oral health, are more conscious of the negative effects that poor hygiene might have on their general health, and seek periodic dental care more frequently. [17, 18, 19]. A study reported by Shah et al. found there is a significant difference in the previous treatment received between the male and female study participants; females received more restorative care, whereas males received more extractions [19].

Farmers, followed by unskilled daily wage labourers and dependents (no occupation), were the occupational groups who had more emergency dental visits than other occupational groups in both years' data. However, logistic regression models identified a statistically significant association between emergency dental visits and just farmers in the year 2024 data. i.e. farmers were 3.2 times more likely to have emergency dental visits than others [odds =3.20; 95% CI: 1.12,5.32; P=0.000]. Several factors would influence the dental service utilization of farmers, such as extended work hours and fluctuating income [20]. People tend to visit the dentist when they get time because most of the dental diseases were not life-threatening [21]. A study conducted by Yaddanapalli SC et al. [5] in the Guntur district of Andhra Pradesh, India, about factors influencing dental care-seeking behaviours of the general public, reported that lack of time to visit the dentist and lack of perceived need for care were the major barriers for participants seeking periodic dental care. Similar findings were also reported by Jain VK et al. [7] from Karnataka, where authors reported that lack of money and dental fear were the main barriers for dental service utilization. Farmers in India get money when they harvest their crops, and they have a tendency to wait for that money for spending, which hinders non-emergency dental visits [20].

Emergency dental visits showed a significant inverse relationship with the level of education. i.e. highest percentage of emergency dental visits were observed in patients with no formal education or just complete primary education and least was found in patients who completed professional education and/or any graduation program. The educational status of the patients influences dental

treatment utilization through oral health literacy. Several studies reported on the positive association between oral health literacy and dental service utilization rates [20, 22, 23]. A study conducted by Ramandeep G. et al. in rural areas of North India reported that mean oral health literacy scores were 6.7 in the people who completed graduation and 4.2 in the people who just completed primary education. [23]. A study conducted by Ramababu T et al. about the use and non-use of oral health services in Krishna district, Andhra Pradesh, India, identified lack of perceived need for dental care and poor oral health awareness as the two major barriers to dental service utilization [21].

Although there is a decline in the proportion of emergency dental visits between two study periods, the recent trend of 38.49% is still alarming. The percentage of emergency dental visits out of total dental visits in this study was much higher compared to the similar study reported from the UK by Currie C., in which the period prevalence of urgent dental care during the period of 2013-2029 was 2.76% [24]. Our study findings suggest that 4 out of 10 patients generally visiting the dentist only while suffering with any dental pain or emergency, indicating a lack of oral health awareness.

For the most part, people prefer to seek therapy for existing dental problems rather than attempting to prevent future dental disease from developing.

Utilizing urgent dental care services in a problem-oriented approach heightens the probability that patients were at more odds of experiencing oral health complications and will forgo essential primary preventative dental therapies. Such types of treatment-seeking behavior increase the risk of unfavourable oral health outcomes and not only increase the out-of-pocket dental treatment costs to patients but also increase the financial burden to society [25].

Dental public health interventions should be initiated to encourage preventive dental care and/or periodic dental checkups rather than problem-oriented treatment-seeking behaviours.

Limitations

This study assessed data related to patients who visited outpatient department of a dental teaching hospital in South India where patients does not come across with few major dental care access issues such as financial burden of dental care and travelling difficulties. This data may not represent the patients who seek dental care in private dental setups, which were an important part of the dental care delivery system in India. This study finding may consequently be impacted by these access issues and may not be representative of the rest of the India. Another limitation of the study was that this did not examine the data of repeat attendees for emergency dental care. To determine whether determinants of emergency dental visits are

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comparable elsewhere, more research is needed in other areas.

Conclusion

In conclusion, there is a decline in the percentage of emergency dental visits among total dental visits from 2018 to 2024. However, still having 38.49 % of emergency dental visits indicates unfavourable dental care seeking behaviours in this particular study area. Dental public health interventions should be planned to address the barriers in seeking periodic dental care and to promote preventive dental care.

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