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Research Article

Health care seeking behaviour and expenditure pattern among Scrub Typhus patients attending a tertiary care hospital in Mysore city

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ABSTRACT

Background: Scrub typhus is one among the re-emerging infectious diseases throughout the world. Various studies conducted across India reveals that its public health importance is increasing. This study was conducted 1) To describe the socio-demographic and epidemiological profile of patients admitted with scrub typhus. 2) To assess the health care seeking behaviour of these patients. 3) To estimate the cost factors incurred in the current episode of illness.
Methods: This prospective study was conducted from January to December 2013 among all lab confirmed cases of scrub typhus admitted to department of medicine and pediatrics of JSS Hospital, Mysore. The study subjects were interviewed with a pre-tested and structured questionnaire. Data regarding socio-demographic profile, epidemiological profile, disease outcome, health care seeking behaviour and cost factors incurred with current episode of illness were collected. Data entry and analysis were done with SPSS.v.22.0 using descriptive statistics like mean, standard deviations and inferential statistics like chi-square test.
Results: Among 192 patients tested positive by Weil-Felix test and/or Immuno-Chromatographic Test (ICT) for scrub typhus majority 105 (54.7%) were males and were predominantly 135 (70.3 %) from rural areas. Mostly 172(89.6%) were unaware of any mite bite in the past. Majority 167 (87.0%) of them had visited atleast three Health Care Facilities (HCF) for treatment. The mean ± SD total duration of illness was 15.6 ± 4.1 days. Most 104 (54.2 %) of them had suffered from illness for 11-15 days. Majority 175 (91.1%) of them had recovered while 3 (1.6%) of them had succumbed to the condition. The median Total direct cost, total indirect cost and overall total cost were Rs. 7500 (7000-9500), Rs. 3000 (2500-3500) and Rs. 10500 (10000-13000) respectively. Most 104 (54.2%) of them spent from money borrowed from others, followed by 78 (40.6%) spent Out Of Pocket (OOP).
Conclusion: People from rural areas, unskilled workers and children were affected predominantly. With timely diagnosis and appropriate treatment, significant morbidity and mortality could be prevented. Promotion of various public and private health insurance schemes among public would minimise the OOP expenditure and prevents debts.

Keywords: Scrub typhus, Health seeking behavior, Health care facilities, Direct cost, Indirect cost, Total cost

INTRODUCTION

Scrub Typhus is a re-emerging zoonotic bacterial infection in the region known as the 'Tsutsugamushi triangle' of South and Southeast Asia, the Asian Pacific rim, and Northern Australia.[1] The causative organism, Orientia tsutsugamushi, is transmitted to humans by the bite of the larval stage (chigger) of the Trombiculid

mites, most commonly Leptotrombidium deliense. O. tsutsugamushi is a Gram-negative, obligate intracellular bacterium that infects various cells, including endothelial cells and phagocytes, causing acute vasculitis. Clinical manifestations include an acute onset of fever, headache, myalgia, multiple organ dysfunction, and an eschar at the site of inoculation, which is present in a variable proportion of patients. It can range in severity from a mild, self-limiting disease to, if untreated, a fatal illness in 30–50% of those it affects.[2]

It affects people of all ages including children. Humans are accidental hosts in this zoonotic disease.[3] Man's behaviour and climatic changes greatly influence the occurrence of the disease. Its presence in India in has been documented in Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rajasthan, Assam, West Bengal, Maharashtra, Pondicherry, Kerala and Tamilnadu.[4]

Weil-Felix test (WF) which is widely available and used for diagnosis, is less expensive but has low sensitivity. ELISA is preferred but available only in few centers in India. Gold standard test for confirmation of diagnosis is Immuno Fluorescence Assay (IFA) but it is highly expensive. The drug of choice for all age group is Doxycycline.[5] In view of low index of suspicion, nonspecific signs and symptoms like many acute febrile illness and absence of widely available sensitive and specific diagnostic test, this infection is difficult to diagnose. Failure of timely diagnosis leads to significant morbidity and mortality.

With this background the present study was conducted with the following objectives:

1. To describe the socio-demographic and epidemiological profile of patients admitted with scrub typhus.
2. To assess the health care seeking behaviour of these patients.
3. To estimate the cost factors incurred in the current episode of illness.

METHODS

A hospital based cross-sectional study was conducted from 1st January 2013-31st December 2013 among all the lab confirmed cases of scrub typhus (tested positive by Weil Felix test (OX K titre ≥1:80) and/or Immuno-Chromatographic Test (ICT)) admitted to the Medicine and Pediatrics inpatient wards at JSS Medical College and Hospital (JSSH), Mysore during the study period who consent to participate in the study. Institutional ethics committee clearance was obtained prior to the start of the study.

Data was collected by interviewing with a pretested structured questionnaire, related to socio-demographic profile, epidemiological profile, health care seeking behaviour and cost factors incurred with current episode of illness were collected. Patients tested positive by Weil-Felix test as well as tested positive for other diseases like enteric fever, leptospirosis, dengue, viral hepatitis, malaria and outpatients tested positive by Weil-Felix test were excluded.

Data was coded and entered in MS office 2013 Excel worksheet and analysed with SPSS version 22.0 software using relevant descriptive statistics like mean, median, standard deviation and inferential statistics like chi-square test.

RESULTS

Socio-demographic profile

Table 1 shows, among the 192 cases of Scrub typhus studied in 2013, majority 78 (40.6%) of them were in the age group of ≤20 years. Male:Female ratio was 1.2:1 Study subjects were predominantly 135 (70.3%) from rural areas in and around Mysore. Majority 55 (28.6%) of them were educated up to high school. As per the Modified B.G Prasad's Socio-Economic Status (SES) classification in 2013, most of them 91 (47.4%) belonged to Class II Socio-economic status. Though majority 57 (29.7 %) of the study subjects were school students and pre-school children, among the adults 37 (19.3%) were unskilled workers by occupation. Majority 89 (46.2%) were single and predominantly 101 (52.6 %) belonged to Nuclear family.

Factors related to occurrence of scrub typhus

As shown in Table 2, the important epidemiological factors related to the occurrence of Scrub typhus were exposure to rodents 85 (44.3%), history of travel in previous month 57 (29.7%) and exposure to domestic pets and/or cattle 56 (29.2%). Majority 172 (89.6%) were unaware of mite bite in the past.

Health care seeking behaviour

First action taken at disease onset

Majority 91 (47.4%) had approached a Health Care Facility (HCF) for treatment followed by 71 (37.0%) who had self-medicated while 26 (13.5%) took home remedies and 4 (2.1%) had visited Faith healers.

Number of health care facilities visited for treatment

From Table 3 it is observed that majority 167 (87.0%) of them had visited atleast three HCF for treatment. Those who had visited atleast one government HCF was 153 (79.7%) and 181 (94.3%) had visited atleast three private HCF. Among the multiple responses given for the major reason for shifting to different HCFs were Non-relief of symptoms among 153 (98.0%) cases followed by unsatisfactory health care services in 68 (43.6%) cases and high cost of treatment in 61 (39.1%) cases.

Table 1: Distribution of study subjects based on socio-demographic profile.

Characteristic	Frequency (N=192)
Age (years)	
≤ 20	78 (40.6)
21-40	69 (35.9)
41-60	34 (17.7)
Above 60	11 (5.7)
Sex	
Male	105 (54.7)
Female	87 (45.3)
Locality	
Urban	57 (29.7)
Rural	135 (70.3)
Educational status	
Post-graduate	2 (1.0)
Under-graduate/diploma	9 (4.7)
PUC/intermediate	21(10.9)
High school	55 (28.6)
Middle school	53 (27.6)
Primary school	29 (15.1)
Illiterate	9 (4.7)
Others*	14 (7.3)
Occupational status	
Professional	2 (1.0)
Semi-professional	5 (2.6)
Clerical, shop owner	7 (3.6)
Skilled	26 (13.5)
Semi-skilled	13 (6.8)
Unskilled	37 (19.3)
Unemployed	6 (3.1)
Retired	7 (3.6)
Housewife	18 (9.4)
Others**	57 (29.7)
Socio-economic status	
Class I	25 (13.0)
Class II	91 (47.4)
Class III	68 (35.4)
Class IV	6 (3.1)
Class V	2 (1.0)
Marital status	
Single	89 (46.2)
Married	77 (40.1)
Widow/widower	20 (10.4)
Divorced/separated	6 (3.1)
Type of family	
Nuclear	101 (52.6)
Three-generation	80 (41.7)
Joint	11 (5.7)

Figures in parentheses denotes percentages

*Children <7 years of age
**Pre-school children and school students

Table 2: Distribution based on factors related to occurrence of Scrub typhus.

Factors	Frequency
Exposure to mites	
Present	20 (10.4)
Don't know	172 (89.6)
Exposure to domestic pets /cattles	
Present	56 (29.2)
Absent	136 (70.8)
Exposure to rodents	
Present	85 (44.3)
Absent	107 (55.7)
Travel history in past one month	
Present	57 (29.7)
Absent	135 (70.3)

Figures in parentheses denotes percentages

Table 3: Distribution based on number of health care facilities visited for treatment.

No. of health care facilities (HCF) visited	Frequency (N=192)	Median (Q1-Q3)
Total		
≤3	167	87.0
>3	25	13.0
Government		
<2	153	79.7
≥2	39	20.3
Private		
≤3	181	94.3
>3	11	5.7

Duration of illness

Mean ± SD duration between onset of symptoms and admission in JSSH was 6.9 ± 3.4) days and that for in-patient stay at JSSH was 8.7 ± 2.5 days. total duration of illness ranged between 9 days and 34 days with a mean ± SD of 15.6 ± 4.1 days. Most of them 104 (54.2%) had suffered from illness for 11-15 days as seen in Table 4.

Outcome

Majority 175 (91.1%) of them had recovered and discharged while 14(7.3%) of them obtained discharge against medical advice and 3(1.6%) of them had died of which one died due to Acute Renal Failure and two died due to Acute Respiratory Distress Syndrome**.**

Cost factors incurred in the current episode of illness

Table 5 and 6 shows that, one episode of scrub typhus had incurred a median total direct cost of Rs. 7500 (7000-9500) while the median total indirect cost was Rs. 3000 (2500-3500). The overall total cost ranged between Rs.

7000 - Rs. 44000 with a median of Rs. 10500 (10000-13000). The major source of health care expenditure among the study subjects was money borrowed from others in 104 (54.2%) cases followed by Out Of Pocket (OOP) payment in 78 (40.6%) cases while only 10 (5.2%) cases had utilized health insurance.

Table 4: Distribution of study subjects based on duration of illness.

Duration of illness (Days)	Frequency (N=192)
Duration between onset of symptoms and admission in JSSH	
≤10	167 (87.0)
>10	25 (13.0)
Duration of in-patient admission at JSSH	
≤10	166 (86.5)
>10	26 (13.5)
Total duration of illness	
≤ 10	9 (4.7)
11-15	104 (54.2)
16-20	53 (27.6)
>20	26 (13.5)

Figures in parentheses denotes percentages

Table 5: Profile of cost factors related to current episode of illness.

Cost factor	Media (Rs.)	IQR (Q1-Q3)	Range (Rs.)
Total direct cost	7500	7000-9500	5000-40000
Total indirect cost	3000	2500-3500	1500-5500
Total cost	10500	10000-13000	7000-44000

Table 6: Distribution of direct cost incurred in current episode of illness.

Direct cost factor	Media (Rs.)	IQR (Q1-Q3)	Range (Rs.)
Consultation fee	300	300 - 300	200 - 1000
Investigations	1500	1000 - 1700	1000 - 7000
Medication	3000	3000 - 4000	2000 - 15000
Bed Charges	1000	700 - 1000	500 - 10000
Food and accommodation	1300	1000 -1500	800 - 4000
Transportation	700	500 - 1000	400 - 3000
Total direct cost	7500	7000 - 9500	5000 - 40000

Table 7: Association between direct cost and its related factors.

Association between direct cost and its related factors							
Total direct cost (Rupees)	**Total duration of illness (Days)**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤15	**>15**					
≤20000	113 (62.4)	68 (37.6)	181 (100)	16.690	**<0.001**	0.376	0.311-0.453
>20000	0 (0)	11 (100)	11 (100)				
Total direct cost (Rupees)	**Total No. of HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤3	**>3**					
≤20000	163 (90.1)	18 (9.9)	181 (100)	26.395	**<0.001**	15.847	4.227 -59.407
>20000	4 (36.4)	7 (63.6)	11 (100)				
Total direct cost (Rupees)	**No. of Govt. HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	<2	**≥2**					
≤20,000	142 (78.5)	39 (21.5)	181(100)	2.974	0.124	0.785	0.727 -0.847
>20000	11(100)	0 (0)	11 (100)				
Total direct cost (Rupees)	**No. of Pvt. HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤3	**>3**					
≤20000	175 (96.7)	6 (3.3)	181 (100)	34.094	**<0.001**	24.306	5.764 -102.484
>20000	6 (54.5)	5 (45.5)	11 (100)				
Total direct cost (Rupees)	**Complications**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	Absent	**Present**					
≤20000	149 (82.3)	32 (17.7)	181 (100)	40.433	**<0.001**	0.177	0.129 -0.242
>20000	0 (0)	11 (100)	11 (100)				

Figures in parenthesis denotes percentage; **P <0.05** is significant; *Chi-square test

Table 8: Association between Indirect Cost and its related factors.

Factor	Total indirect cost (Rupees)		Total	X^2 (df = 1)	P*	OR	95% CI
	≤3000	>3000					
Total No. of HCF visited							
≤3	120 (71.9)	47 (28.1)	167 (100)	25.738	**<0.001**	10.213	3.623-28.790
>3	5 (20.0)	20 (80.0)	25 (100)				
No. of Govt.							
<2	104 (68.0)	49 (32.0)	153 (100)	2.730	0.131	1.819	0.890-3.720
≥2	21 (53.8)	18 (46.2)	39 (100)				
No. of Pvt.							
≤3	122 (67.4)	59 (32.6)	181 (100)	7.351	**0.010**	5.574	1.411-21.545
>3	3 (27.3)	8 (72.7)	11 (100)				
Total duration of illness (days)							
≤15	92 (82.4)	21 (18.6)	113 (100)	32.164	**<0.001**	6.107	3.183-11.717
>15	33 (41.8)	46 (58.2)	79 (100)				
Complication							
Absent	100 (80.0)	25 (20.0)	125 (100)	1.183	0.364	0.681	0.339-1.364
Present	49 (73.1)	18 (26.9)	67 (100)				

Figures in parenthesis denotes percentages; **P <0.05** is significant; *Chi-square test

Table 9: Association between total cost and its related factors.

Association between total cost and its related factors							
Total direct cost (Rupees)	**Total duration of illness (Days)**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤15	**>15**					
≤20000	113 (63.8)	64 (36.2)	177 (100)	23.274	**<0.001**	0.362	0.297-0.440
>20000	0 (0)	15 (100)	15 (100)				
Total direct cost (Rupees)	**Total No. of HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤3	**>3**					
≤20000	163 (92.1)	14 (7.9)	177 (100)	52.261	**<0.001**	32.018	9.011-113.771
>20000	4 (26.7)	11 (73.3)	15 (100)				
Total direct cost (Rupees)	**No. of Govt. HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤2	**>2**					
≤20,000	140 (79.1)	37 (20.9)	177 (100)	0.490	0.542	0.582	0.126-2.694
>20000	13 (86.7)	2 (13.3)	15 (100)				
Total direct cost (Rupees)	**No. of Pvt. HCF visited**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	≤3	**>3**					
≤20000	174 (98.3)	3 (1.7)	177 (100)	68.272	**<0.001**	66.286	14.397-305.182
>20000	7 (46.7)	8 (53.3)	15 (100)				
Total direct cost (Rupees)	**Complications**		**Total**	X^2 **df = 1**	**P***	**OR**	**95% CI**
	Absent	**Present**					
≤20000	148 (83.6)	29 (16.4)	177 (100)	47.111	**<0.001**	0.014	0.002-0.111
>20000	1 (93.3)	14 (6.7)	15 (100)				

Figures in parenthesis denotes percentage; **P <0.05** is significant**;** *Chi-square test

DISCUSSION

Socio-demographic profile

In our study it was observed that the patients' age ranged between one year to 85 years of age. Cases as young as two months and as old as 91 years of age have been reported by Rathi NB et al.[6] and Vivekanandan et al.[7] respectively. Majority of them in our study were in the age group of ≤20 years followed by those in 21-40 years. This could be attributed to the outdoor recreational activities, occupation and travel involved in this age group, as found in the studies done by Kawoosa Z et al.,[8] Prabakaran A et al.,[9] Lee YS et al.[10] and Walker JS et al.[11]

Similar to our study in most of the studies[6,9,12-14] it was observed that males were predominantly affected than females but other studies[7,15-17] have also reported vice versa.

As reported by many other studies[7,8,12,13] it was also observed in our study that majority of the cases were from rural areas than urban areas. This could be explained due to their close proximity with abundant vegetation and cattle whereas in urban areas it could be attributed to exposure to domestic pets and rodents. Majority of them were school students followed by unskilled workers whereas it was least in professional and semi-professionals. This may be attributed to the outdoor recreational and occupational activities among the students and workers respectively. Similar observation was reported in many studies[8,13,17] done in India.

Epidemiological profile

Factors related to occurrence of scrub typhus

History of recent travel is one of the factors related to occurrence of Scrub typhus especially travelling to areas with dense vegetation is an important factor as pointed out by Subbalaxmi MVS et al.[13]

Exposure to domestic pets and cattle is another major factor related to occurrence of Scrub typhus as pointed out by Mahajan SK.[4] In addition to this rodent exposure is yet another contributing factor for occurrence of Scrub typhus as mentioned by Mittal V et al.[15]

Exposure to cattle and dense vegetation would be an important source of infection among people from rural areas while exposure to rodents and domestic pets could play a vital role in the urban areas.

Although Rathi NB et al.[6] had observed majority of study subjects had exposure/bite of mites, in our study most of them did not know about it similar to the studies done by Kawoosa Z et al.,[8] Udayan U et al.[17] and Prakash et al.[18]

Number of health care facilities (HCF) visited for treatment

Majority of the study subjects had visited atleast three HCFs for treatment of which most of them had visited atleast one government HCF and atleast three private HCFs. The total number of HCFs visited ranged from minimum one to maximum six. Majority had shifted from one HCF to another due to non-relief of symptoms. This could be attributed to a low index of suspicion and a lack of widely available investigations which leads to empirical treatment of cases.

In addition to this, unsatisfactory health care services and high cost of treatment were among the other reasons for shifting of HCFs by the patient. The cost of treatment could be brought down if the investigations for scrub typhus are included along with other tests done for fever evaluation, especially in the endemic areas. If the diagnosis is established as early as possible, cheap yet effective treatment with Doxycycline could be started which would reduce the duration of illness as well as the number of health care facilities visited for treatment.

Duration of illness

In our study we observed that the Mean ± SD duration of in-patient stay at JSSH was 8.7 ± 2.5 days and majority 86.5% had stayed ≤10 days as in-patients. The total duration of illness ranged between 9 days and 34 days with a mean ± SD of 15.6 ± 4.1 days. Most of them 54.2 % had suffered from illness for 11-15 days. This was comparable to Subbalaxmi MVS et al.[13] study where the average duration of hospital stay was 7.2 ± 3.95 days and majority 68.8 % of them had stayed <7 days.

Outcome

Mortality rate of Scrub typhus in our study was 1.6%. Other studies[5,6,7,12,19] have reported mortality rate between 2-12%. Lower mortality rate indicates that timely diagnosis and early initiation of appropriate treatment would lead to a significant reduction in mortality.

Cost factors related with current episode of illness

Factors associated with total direct cost

Among the expenditures that contributed towards the total direct cost, medication and investigations contributed relatively greater than others. This could be because of non-specific symptoms of the disease, lack of a high index of suspicion leading to various investigations for other diseases and therefore empirical treatment with various drugs which would not have relieved the symptoms. This could have had led to patient dissatisfaction resulting in shifting many HCFs thereby increasing the duration of illness and indirectly the bed charges in case of private HCFs, food and accommodation expenses incurred.

Early treatment shows better outcome and faster resolution than delayed treatment.[20] Undiagnosed and misdiagnosed illness leads to development of complications and may eventually lead to death and huge OOP. This chain of events has often been termed as the "poverty ratchet" by Chambers et al.[21] or the "medical poverty trap" by Whitehead et al.[22] From Table 7, it is observed that, in our study, the association of direct cost incurred in the current episode of illness with the duration of illness, total number of HCFs visited for treatment especially the private HCFs and complications of the disease were statistically significant.

Factors associated with total indirect cost

Indirect costs results from sickness absenteeism of the patient as well as their accompanying relatives, due to loss of wages. It could sometimes exceed the direct cost incurred, especially in case of chronic diseases rather than acute diseases.[23] In our study we found statistically significant association between total indirect cost incurred due to current episode of illness and total duration of illness, total number of HCFs visited for treatment especially private HCFs, as shown in Table 8.

Factors associated with total cost

Total cost is the sum of total direct cost and total indirect cost incurred due to the current episode of illness. As shown in Table 9, in our study we found that the association of the total cost incurred due to the current episode of illness with the duration of illness, total number of HCFs visited for treatment especially the private HCFs and complications of the disease were statistically significant.

Source of expenditure

In our study we observed that majority of them had borrowed money or spent Out Of Pocket (OOP) while only a few had utilized health insurance. This could be because of inadequate personal savings and a lack of utilization of health insurance schemes, probably due to lack of awareness. We noticed in our study that majority 68.8 % among those who had spent >Rs. 20000 had utilised Health Insurance whereas among those who had spent between Rs. 10001 - Rs. 20000, majority 63.7% of them had borrowed money and 36.3% of them had spent OOP. There exists a statistically significant association between the source of expenditure and the total cost incurred due to the current episode of the illness.

As per NSS 2004-05, Out-Of-Pocket (OOP) payments in India were estimated to account for approximately two thirds of total health expenditure[21] and fewer than 10% of households had health insurance for at least one member.[22] OOP payments are considered "Catastrophic Health Expenditure (CHE)" when they drive households into having to reduce expenditure on basic necessities.[23] Raban MZ et al.[24] reported using NSS 2009-10 data that Outpatient and Inpatient OOP payments were responsible 73.1% and 13.2% of the households with CHE in India. According to Chowdhury S[25] high OOP payments can reduce the healthcare seeking behaviour of people or CHE would make them impoverished.

CONCLUSION

It is evident from the present study that people from rural areas are more prone to scrub typhus, also unskilled workers and children are affected predominantly. Specific preventive measures would help to reduce the occurrence of scrub typhus like usage of personal protective measures like wearing full sleeve shirts, long trousers with shoes and socks; application of repellents like DEET to exposed skin surfaces; impregnation of clothes and blankets with benzyl benzoate to prevent mite infestations; minimization activities around dense vegetation and close contact with cattle/ domestic pets; Clearance of any unwanted vegetation around the residence; maintenance of proper sanitation in and around the house along-with rodent control measures; thorough inspection of the body after routine occupational activities nearby vegetation followed by prompt removal and regular bathing; disinfection of pet animals/cattle with dusts, sprays or dips of malathion, propuxor, permethrin and their resting place may be sprayed with malathion, deltamethrin or Pyrethrum simultaneously and minimization of travel to mites infested terrain especially in cooler months of the year.

As majority of the subjects had 11-15 days of illness and had visited atleast three health care facilities for treatment due to non-relief of symptoms, inclusion of investigations for scrub typhus, especially Weil-Felix test during initial evaluation of fever is recommended. High Index of clinical suspicion by the physicians followed by early diagnosis and early initiation of treatment with cheaper yet effective drug, Doxycycline would lead to a speedy recovery, would ensure patient satisfaction, prevent development of complications as well as reduce the total cost spent for the illness.

Underutilization of health insurance schemes and inadequate savings by the patients can lead to high out of pocket expenditure and debts. Awareness creation and Behaviour change communication related to adoption of various public and private health insurance schemes could address this issue.

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