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ORIGINAL ARTICLE

Community health workers to reduce unmet surgical needs in an urban slum in India: an implementation study

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Background: The Surgical Accredited & Trained Healthcare Initiative (SATHI) project demonstrates how community healthcare workers (CHWs) with merely 8 y of formal schooling and training for a short period can reduce unmet surgical needs.

Methods: A pilot study was carried out in the slums of a metropolitan city in India to know the effectiveness of a SATHI in reducing the burden of unmet surgical needs. In total, 12 730 people from 3000 households were included in the study for a duration of 6 months.

Results: We found 10% surgical needs (n=293) out of which 57% had unmet surgical needs. Out of total surgical needs, about half of the needs were cataract and abdominal, followed by extremities and chest conditions. SATHIs were able to convert 99 patients (60%) from unmet to met needs, who underwent surgery/treatment. The conversion from unmet to met among all surgery needs was highest for abdominal conditions (29%) followed by cataracts (17%).

Conclusions: SATHIs with short training can reduce the burden of unmet surgical needs. SATHIs were able to convert a significant proportion of unmet to met needs by trust building, facilitating access to healthcare and ensuring post-operative adherence. Scaling up could help in the achievement of equitable healthcare across India.

Keywords: community health workers, India, low-income and middle-income countries, SATHI, Surgeons OverSeas Assessment of Surgical Need (SOSAS), universal health coverage, unmet surgical need.

Introduction

Surgery has become an integral part of global healthcare, with an estimated 234 million procedures performed yearly.[1] Studies have shown that there is a significant unmet need even in universally free health coverage (UHC) systems, especially in low-and-middle-income countries (LMICs).[2] The Indian government has made concerted efforts to improve the delivery of UHC and overcome bureaucratic hurdles.[3] Surveys showed that the knowledge of UHC is patchy and efforts have been made to increase the education of patient rights and by automation of records.[4]

Our project was carried out in multiple phases. In phase 1, we surveyed a dense urban slum in the metropolitan city of Ahmedabad (population of approximately 8.5 million; 4.49% of the total population of Ahmedabad city live in slums), State of Gujarat (population of approximately 62 million), India. In a cross-sectional survey using the Surgeons OverSeas Assessment of Surgical Need (SOSAS) in urban slums in a cohort of 10 330 subjects in 2066 households, we found that 3.46% (n=274) of people needed surgery; 116 did not avail of surgery, despite obtaining a consultation and were categorised as having 'unmet needs'. Financial reasons (34.5%) and lack of trust (35.3%) were major reasons for not availing of essential surgical care despite obtaining consultation under India's UHC.[5] In phase 2, we conducted a follow-up study in the same urban slum to understand reasons for not availing surgery: 141 in met needs and 91 in unmet needs. We administered 2 instruments, 16 in-depth interviews and 1 focused group discussion. Responses from the two groups for 'the Socio-culturally Competent Trust in Physi-

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cian Scale for a Developing Country Setting' scale did not have significant differences except for the prescription of medicines: patients with unmet needs were less likely to agree (p=0.076). Results between the two groups regarding 'Patient perceptions of quality' did not show a significant difference except for doctors answering questions, where a higher proportion of the unmet needs group agreed (p=0.064). Similar observations were made in the in-depth interviews and focus groups.[6] In phase 3, we developed the Surgical Accredited & Trained Healthcare Initiative (SATHI) curriculum, involving a multidisciplinary team of experts comprising physicians, surgeons, anesthetists, social epidemiologists; experts in public health, psychotherapy and psychology; and community partners.[7] We initiated the curriculum design by specifying an outline of the topics in line with identifying and addressing the problems commonly encountered while accessing surgical care. In total, eight modules were developed to include the following topics. We ensured that the curriculum remained skills-focused and delivered in an interactive way to generate and retain the participants' interest. We also developed an intake form, a monthly fieldwork form, a performance evaluation guide and a test comprising short questions to assess the SATHIs' memory retention and skills-testing at the end of the training.

This concept of the surgical SATHI is similar to the Accredited Social Health Activist (ASHA)[8] in India who motivates women to give birth in hospitals, bring children to immunisation clinics and encourage family planning (e.g. surgical sterilisation). The second program of community health workers (CHWs) in India, namely the Sanitation and Health, Education in Village communities through improved Awareness and Knowledge of Prevention/Management of Diseases and Health Promotion (SEVAK),[9,10] targets rural communities for the prevention of diabetes and hypertension by lifestyle modification.

Herein, we describe our implementation research to study the effectiveness of SATHIs in reducing the burden of unmet surgical needs. They were educated to at least the 8th grade and received short training.[7] The findings of our study could be used to strengthen surgical systems across India and LMICs by wider implementation of CHWs with a focus on surgical conditions.

Table 1. Household-level sociodemographic information (N=3000)

	Frequency	Percent
Type of family members sharing kitchen		
Joint family: parents, children and grandparents	1746	58.2
Nuclear: parents and children	1160	38.7
Third-generation: extended family	94	3.1
Type of house		
Temporary structure	1313	43.8
Brick home	1687	56.2
Ownership of house		
Own house	2610	87.0
Rented house	390	13.0
Drinking-water facility		
In house	1992	66.4
Public tap	1008	33.6
Toilet facility		
Indoor	2948	98.3
Public	45	1.5
In the open with no cover	7	0.2
Type of income		
Daily wages	2301	76.7
Salaried	699	23.3
Yearly family income in US$ (US$@80 INR)		
<1250	1577	52.6
1251–2500	1148	38.3
>2500	275	9.2
Have Below Poverty Level card	288	9.6
Knowledge about *(Pradhan Mantri Jan Arogya Yojana)* PMJAY card	1777	59.2
Have PMJAY card	444	14.8
Number of people having surgical needs in last 1 y	293	9.9
Unmet surgical needs out of surgical needs	169	57.3

Methodology

Implementation research was carried out from January to July 2022 in an urban slum of Ahmedabad, Gujarat–Vatva (population 140 490) and Juhapura (population 124 752). Out of this population, 12 730 people from all 3000 households situated in 2 well-demarcated wards were included in the study. Consent was taken and no financial incentive was provided for participation.

We trained six SATHIs with a well-defined curriculum for 7 d.[7] SATHIs initially carried out a household survey to collect sociodemographic and surgical-needs data from all the households of the selected area. The SOSAS instrument was used for data collection.[5] The surgical needs were self-reported, which may or may not have been verified by the doctor's case notes available with the patient. SATHIs revisited those homes in which surgical problems were identified and counseled patients with unmet needs regarding government-funded health benefits and navigation of the healthcare system, and provided social support. SATHIs also assisted patients in obtaining government-funded UHC—*Ayushman Bharat* benefits.[11] They were supervised by a licensed social worker and clinicians from the Indian Institute of Public Health, Gandhinagar.

The met need refers to the surgical care that has been provided and the unmet need refers to potentially treatable disability and death due to surgical conditions.[12] An unmet needs case that eventually accessed surgical/medical care is defined as the success rate of the SATHI intervention.

A tablet-based application was used for data collection. Data were analysed using IBM SPSS version 25. We used descriptive data analysis to detect differences between the groups. We calculated p-values for 95% and 90% confidence intervals to find the difference between met and unmet need groups and the groups that converted and did not convert after the SATHI intervention.

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Table 2. Comparison between unmet needs and met needs (N=293)

	Met need (N=126)		Unmet need (N=167)		
	n	%	n	%	p-value
Age (years)					
1–18	5	4.0	14	8.4	0.340
19–30	13	10.3	31	18.6	
31–40	26	20.6	28	16.8	
41–50	28	22.2	36	21.6	
51–60	28	22.2	31	18.6	
>60	26	20.6	27	16.2	
Education					
Illiterate	32	25.4	59	35.3	0.043**
Less than 5th grade	21	16.7	14	8.4	
5th to 8th grade	31	24.6	52	31.1	
More than 8th grade	42	33.3	42	25.1	
Marital status					
Married	93	73.8	112	67.1	0.382
Unmarried	33	26.2	55	32.9	
Earning member					
Yes	48	38.1	52	31.1	0.069*
No	78	61.9	115	68.9	
Occupation					
Daily wages	43	34.1	43	25.7	0.456
Salaried	5	4.0	8	4.8	
Housewife	36	28.6	56	33.5	
Old age/not working	38	30.2	45	26.9	
Student/child	4	3.2	15	9.0	
Yearly family income in US$ (US$@80 INR)					
<1250	48	38.1	78	46.7	0.202
1251–2500	53	42.1	68	40.7	
>2500	25	19.8	21	12.6	
Area of surgery					
Face/head/neck	5	4.0	19	11.4	0.064*
Back/spine problem	5	4.0	6	3.6	
Abdomen	30	23.8	42	25.1	
Extremities	12	9.5	19	11.4	
Women's health	8	6.3	14	8.4	
Chest issues	21	16.7	10	6.0	
Cataract	30	23.8	39	23.4	
Any tumor	15	11.9	18	10.8	

Results

Table 1 describes the sociodemographic details in which 56% of houses were made of brick, 87% of houses were owned and 98% had an indoor toilet. Of the family's main income, 77% was from daily labor and half of these had less than US$1250 of yearly income. Also, 59% of respondents had knowledge of the *Ayushman Bharat* scheme, which aims at providing cover of INR0.5 million per family per year for hospitalisation to vulnerable families, but only 15% had enrolled. We found 10% surgical needs, of which 57% had unmet surgical needs.

As shown in Table 2, out of 293 surgical needs, 78% were more than 30 y of age. Also, 35% of surgical needs were in the earning member and most of them were daily laborers. Out of total surgical needs, about half were cataracts and abdominal followed by extremities and chest conditions. People who underwent surgery were similar to those who did not undergo surgery concerning age and marital and earning status. Educated people were more likely to undergo surgery vs uneducated people ($p<0.05$). The percentage of housewives was higher in the unmet category (34%) vs the met category (29%). There were also high unmet needs for cataracts and abdominal (gastrointestinal/genitourinary) conditions.

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Table 3. Sociodemographic and surgical need characteristics of converted (unmet to met needs) (N=99)

	Frequency	Percent
Age (years)		
<19	9	9.1
19–30	23	23.2
31–40	18	18.2
41–50	19	19.2
51–60	12	12.1
>60	18	18.2
Marital status		
Married	65	65.7
Education		
Illiterate	30	30.3
Less than 5th grade	9	9.1
5th to 8th grade	28	28.3
More than 8th grade	32	32.3
Occupation		
Daily wages	27	27.3
Salaried	4	4.0
Housewife	31	31.3
Old age/not working	27	27.3
Student/child	10	10.1
Yearly family income in US$ (US$@80 INR)		
<1250	43	43.4
1251–2500	42	42.4
>2500	14	14.1
Earning member		
No	68	68.7
Area of surgery		
Face/head/neck	12	12.1
Back/spine	6	6.1
Abdomen	29	29.3
Extremities	9	9.1
Women's health	8	8.1
Chest	8	8.1
Cataract	17	17.2
Any tumor	10	10.1
Reason for unmet need		
No time	45	45.5
No money	72	72.7
No one to accompany	4	4.0
Afraid of surgery/no trust in hospital/doctor	38	38.4

SATHIs were able to convert 99 patients (60%) from unmet to met needs who underwent surgery or received medical treatment. Table 3 shows the sociodemographic details of the converted people; 70% were below the age of 50 y and literate. We found that 73% of unmet needs in this converted group were due to lack of money followed by lack of time (44%) and fear of surgery/no trust in the hospital/doctor (35%). The conversion from unmet to met needs from all surgery needs was highest for abdominal problems (29%) followed by cataracts (17%).

Table 4 shows the comparison between people who converted unmet to met needs after SATHI intervention and people who were still in the unmet category. We found that patients who were younger and educated converted from unmet to met needs more than patients who were older and uneducated. There was no significant difference between conversions from unmet to met at the level of a 95% confidence interval.

Comparing the areas of surgeries, all the spine conditions received surgery and 80% of chest conditions were treated. The lowest conversion to met surgery needs was for cataracts. Table 5 shows the comparison between the area of surgery and the conversion from unmet to met needs. There was no difference at the level of 95%.

Discussion

The Alma Ata Declaration resolved to use the 'bottoms-up' approach of CHWs in which they are at the center of healthcare delivery.[13] Local partnerships between community-based organisations and governments are an important step for community engagement.[14] To ensure SDG 3 (ensure healthy lives and promote well-being for all at all ages), surgery must be one of the critical components of public health.[15,16]

In our study, we found that a significant proportion of the target population had knowledge of the *Ayushman Bharat*, but did not possess documentation to avail benefits. Similar findings have been documented in the literature.[17] It was interesting to note that the less educated and unemployed people were more likely to have unmet surgical needs. In our study, we found that 10% of the households had surgical needs and more than half had unmet needs. SATHIs were able to convert 99 patients (60%) from unmet to met needs, who underwent surgery. The conversion was due to improved awareness about government benefits and help in the navigation of the hospital systems for admission, surgery and discharge. Surgical care has to start at the community level where CHWs connect patients to the providers and help in post-surgical follow-up. A review showed that CHWs were essential for maneuvering medical, cultural and social barriers to surgical care.[18]

We have shown that deployment of CHWs specifically trained for this purpose can reduce the burden of surgical diseases in an urban slum in a metropolitan city in India. SATHIs were also trained to measure BP and blood sugar, and perform wound care. A key element of success was trust building by working with NGOs and political leadership. The people who refused surgery despite SATHI intervention did so due to co-morbid conditions and lack of documentation due to migration from distant parts of India to the city.

The limitations of our study are the relatively small pilot comprising 6 SATHIs and 3000 households and the use of the SOSAS instrument, which is patient-reported.

The strengths of our study are the detailed household survey, standardised curriculum, SATHIs recruited and living within the community and a high response rate due to collaboration with local NGOs and political leadership.

Surgical unmet needs have been highlighted by the WHO and Lancet Commission as an important public health issue. India has been striving to achieve UHC by the implementation of *Ayushman Bharat* since 2018 with limited success due to sparse community engagement. The SATHI project demonstrated that CHWs with

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Table 4. Comparison between converted to met needs and persistent unmet needs

	Unmet to met (N=99)		Still unmet after counseling (N=68)		
	n	%	n	%	p-value
Age (years)					
1–18	9	9.1	5	7.4	0.076
19–30	23	23.2	8	11.8	
31–40	18	18.2	10	14.7	
41–50	19	19.2	17	25.0	
51–60	12	12.1	19	27.9	
>60	18	18.2	9	13.2	
Education					
Illiterate	30	30.3	29	42.6	0.058
Less than 5th grade	9	9.1	5	7.4	
5th to 8th grade	28	28.3	24	35.3	
More than 8th grade	32	32.3	10	14.7	
Marital status					
Married	65	65.7	47	69.1	0.640
Unmarried	34	34.3	21	30.9	
Earning member					
Yes	31	31.3	21	30.9	0.953
No	68	68.7	47	69.1	
Occupation					
Daily wages	27	27.3	16	23.5	0.876
Salaried	4	4.0	4	5.9	
Housewife	31	31.3	25	36.8	
Old age/not working	27	27.3	18	26.5	
student/child	10	10.1	5	7.4	
Yearly family income in US$ (US$@80 INR)					
<1250	43	43.4	35	51.5	0.547
1251–2500	42	42.4	26	38.2	
>2500	14	14.1	7	10.3	

Table 5. Comparison surgical need for unmet need and conversion by site of disease (N=167)

	Unmet to met (N=99)		Still unmet after counseling (N=68)		
	n	%	n	%	p-value
Face/head/neck	12	63.2	7	36.8	0.075
Back/spine conditions	6	100.0	0	0.0	
Abdominal conditions	29	69.0	13	31.0	
Extremities	9	47.4	10	52.6	
Women's health	8	57.1	6	42.9	
Chest conditions	8	80.0	2	20.0	
Cataract	17	43.6	22	56.4	
Any tumor	10	55.6	8	44.4	

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8 y of schooling and trained for a short time can reduce unmet surgical needs. Scaling up could help in the achievement of equitable healthcare across India and other LMICs.

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