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WATER, SANITATION AND HYGIENE FACILITIES, HEALTH CARE COST AND HEALTH SEEKING BEHAVIOR IN URBAN SLUMS OF HYDERABAD, PAKISTAN

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Abstract:

The cities in the developing world acquiring inadvertent and uncontrolled squatter settlements at their peripheries owing to swift escalation in population, coupled with the apparently irretrievable stream of people from rural to urban areas. These areas can be termed as Slums and apparently carry a high burden of communicable diseases. Since they are mobile populations, they general population is at a great risk. Present study aimed to explore water sanitation and hygiene (WASH) facilities in urban slum settlements of Hyderabad city and to identify the prevalence of waterborne diseases, healthcare costs and further to assess their health-seeking behaviors. Seventeen slum locations were identified using district social map. A structured questionnaire was designed and validated. The questionnaire included socio-demographic indicators, information on Water Sanitation and Hygiene facilities and related diseases, their health-seeking behavior and healthcare costs. Three households from each slum area were selected through simple random sampling and household head was considered as most relevant person for the interview. Total 51 households were interviewed and water samples were also collected from each household to analyze for fecal contamination. The analysis divulges that the majority (68%) of the population is using groundwater. Fecal contamination was found in 99% of the water samples, which is apparently the largest reported cause of diarrhea (56%). Majority of the respondents don't have toilet available in their house premises (51%). Therefore, they use any community toilet or practice open defecation (21%). Despite of wobbly source of income, slum dwellers were spending 20% of their monthly income for the treatment of diseases. Our findings revealed statistically significant association ($p<0.05$) between level of education and availability of toilet facility, health care cost and their health seeking behavior.

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INTRODUCTION:

The urban slums can be defined as the illegal settlements, where people live among a congested population, having poorly developed basic infrastructure and access to utilities including potable water and sanitation facilities [1]. Estimated slum population worldwide is shown in table 1. According to the economic survey of Pakistan 2010-2011, the total urban population is approximately 30 million, which is 37% of the population of Pakistan, and it is continuously increasing at the rate of 4% annually. The total slum population living in that urban area is approximately 13 million, which accounts for 48% of the urban population [2].

Approximately, 40 million people lack potable water, and 51 million people lack basic sanitation facilities, which cause water-borne diseases in 60% of the people, annually. If we talk about Pakistan, in Karachi alone, 30,000 deaths occur, out of which 20,000 children die, due to drinking contaminated water, annually. The majority of the deaths can be prevented by providing safe water and improved sanitation facilities [3]. Since there are various methods of water filtration at household level, chlorine and candle filtration were said to be the most cost effective methods and can reduce the diarrheal disease by 30%. Better and advance technologies can even reduce this proportion to 70% [4, 5].

Health also plays a key role in determining individual capital; better health provides efficiency and productivity for labor. According to the economic survey of Pakistan in 2006, the government is spending 0.75% of its gross domestic product (GDP) on the health sector, so that individual health might be improved. According to the WHO, Pakistan needs to spend US$ 35 per capita per day to achieve better health, but currently, 254 PKR is spent on health, which is approximately US$ 4.20, due to low budgets. Rural areas suffer the most, due to limited or non-available healthcare facilities [6].

Worldwide, the highest population of urban slums, in terms of percentage, are found in Sub-Saharan Africa; approximately 61.7% [7]. In the twentieth century, the most of the unplanned urbanization had been seen in developing countries; according to the survey conducted by UNICEF in 2012, about 33% of the world's population lives in slum areas, and more than 90% of slum inhabitants live below the poverty line [8].

People living in slums compose a large proportion of the population, which can be seen in this table:

Table 1 Estimated slum population worldwide

Region	Estimated slum population	Percent of urban population (%)
Developing regions	827,690,000	32.7
Sub-Saharan Africa	199,540,000	61.7
Southern Asia	190,748,000	35.0
Southeast Asia	88,912,000	31.0
East Asia	189,621,000	28.2
West Asia	35,713,000	24.6
Oceania	556,000	24.1
Latin America and the Caribbean	110,763,000	23.5
North Africa	11,863,000	13.3

SOURCE: UN-HABITAT estimates (Based on United Nations Population Division, World Urbanization Prospects: The 2007 Revision).

Hyderabad is the second largest city of Sindh Province and the 5th largest city of Pakistan. A good chunk of people from interior Sindh were migrated owing to massive flood in 2010-2011. Some are still migrating with hope to achieve better facilities and earning opportunities, ending up living in slums having deteriorated basing infrastructure and facilities. Local governments do not have data regarding these settlements. The women in slums are mostly doing the odd jobs, such as housekeeping and that mobile population affects directly or indirectly the whole city. Many studies related to urban slums have been conducted in the United States of America (USA) and Europe and in other developed countries. However, few studies have been conducted in slums of low- or low-middle income countries with a few exceptions, such as India, Pakistan and Uganda [1, 9, 10, 11, and 21].

Inadequate knowledge and poor practices of storing drinking water can cause severe effects on health of the population. For reduction of water borne diseases, there is a need to understand the current trend of attitudes and practices of individuals living in urban slums [12]. Thus, there is a dire need to assess the status of WASH services, its disease burden and health-seeking behavior among people living in the slums of Pakistan. This will be helpful in identifying the key health-related issues and possible correlation with un-hygienic and inappropriate WASH practices. The current study aimed to assess WASH facilities, WASH-related disease burden and health-seeking behaviors in people living in the slum settings of Hyderabad, Sindh, Pakistan.

MATERIALS AND METHODS:

Study Area:

Hyderabad District is the second largest district of Sindh. According to the census of 2017, the population of the city is approximately 2 million and it is 100 miles away from Karachi. The district is divided into four parts i.e. Hyderabad Rural, Hyderabad City, Latifabad and Qasimabad.

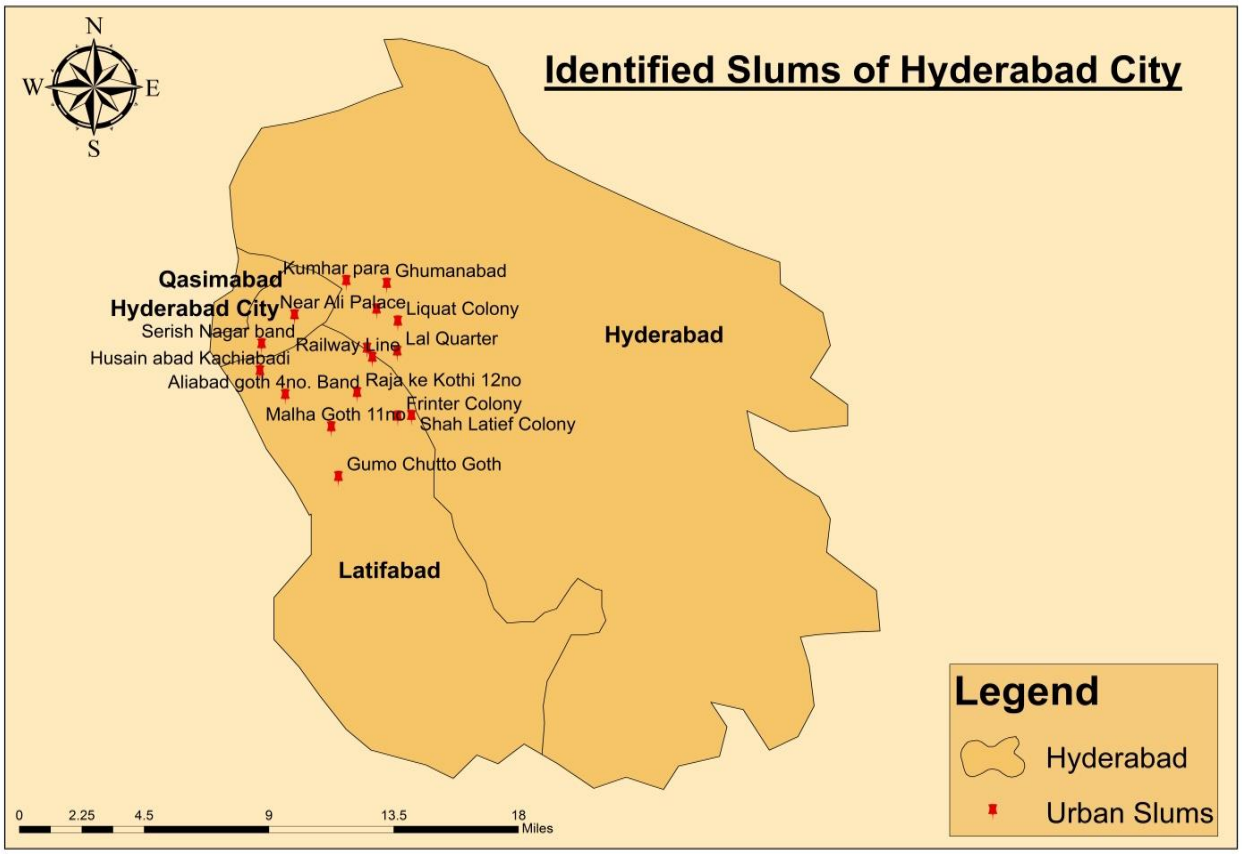

Figure 1 GIS map of the study area

Sampling, Analysis and Survey

A cross sectional study design was applied to conduct this study. Seventeen slum locations were identified using district social map (figure 1). A structured questionnaire was designed and validated. The questionnaire includes personal information, housing conditions, drinking water conditions, occurrence of water borne disease, health care cost and their health seeking behavior. Three households from each slum area were selected through simple random sampling and household head was considered as the most relevant person for the interview. Total fifty-one households were interviewed. 500 ml drinking water sample was also collected in sterilize bottles from each household and transported to the water quality laboratory of U.S Pakistan centers for advanced studies in water, MUET Jamshoro in an icebox at 4^0C and tested within 2 hours of sample collection. The collected samples were analyzed for microbial analysis using method described by [13, 14]. Briefly, 100 ml of drinking water was filtered through membrane filters of 0.45 micron. The filter papers were inoculated on petri dishes containing selective media (Eosin Methylene Blue agar; mFC agar Oxoid, USA) for the detection of total coliforms (TC) and thermo-tolerant fecal coliforms (TTC). The petri dishes with filters were incubated for 24-48 hours at 37^0C and 45^0C respectively. After incubation, the colony forming units (CFU) were counted for microbial analysis.

Secondly a structured questionnaire was also filled by the head of each household. The questionnaire contains six sections. First section have personal information of the respondents, second section focuses housing condition of the household, third section is about drinking water condition, fourth section for the occurrence of waterborne disease, fifth section is about their healthcare cost and sixth section contains their health seeking behavior. Direct and indirect costs for treating the diseases were determined through asking questions regarding how much money those people are spending for treatments and how many days the head of the household do not go to work, due to illness. Health care costs and health-seeking behavior is determined through how much money the head of the household is spending monthly in order to receive health care for their families in slum settlements.

Statistical analysis:

The collected data was analyzed using the Statistical Package for Social Sciences (SPSS) version 22 to demonstrate graphical representation of various data characteristics, descriptive analysis and Chi-square testing.

Ethical Considerations:

The study was approved by MUET, Jamshoro to be carried out during the year 2016-2017. The drinking water samples collected for the analysis were coded before taking them to the laboratory. Household participation in the questionnaire was a voluntary act. None of the respondent was forced to answer the questionnaire if s/he felt uncomfortable. Further, respondents were allowed to ask questions in case of any confusion before answering any question.

RESULTS AND DISCUSSIONS:

Study participation characteristics:

Table 2 reveals the characteristics of the study participants. The average age of the participants was 39 years (SD=7.3). Majority of the participants were males (90.2%, n=46) and majority were uneducated as well (45%, n=23). More than half of the study participants were laborer (60%, n=31). The average family income was in the range of 10,000 – 15000 PKR per month (Table 2). The similar type of study conducted in India that revealed the literacy rate as 16.8% and 5.6% respectively for both male and female with depletion from 27% and 9.7% respectively in 5 years [15].

Water, Sanitation and Hygiene Services:

The obtained results divulges that 64% (n=33) of the respondents were relying on ground water for their daily needs. Majority of the participants had to walk to a distance of $\leq$ 30 minutes to fetch water. 88% (n=35) of the study participants agreed that their water needs were met (in terms of quantity). The study also showed that the majority of the participants do not have toilet facility inside their house premises (72%). Therefore they either use the community shared toilets or practice open defecation (21%). Whereas, 31% (n=60%) use WC (either community latrine or personal) and 17% (n=6) have pit latrines. 65% (n=33) of the participants responded that their sewerage system is out of order, whereas remaining 35% (n=18) even don't have proper sewerage facility. Pools of the standing water can be easily located in the vicinity (Table 2).

Table 2: Study participants' characteristics

Socio-demographics n=51	
Variables	**Results**
Age (Years)	Mean=39, SD=7.3
Gender	
Female	9.8% (n=5)
Male	90.2% (n=46)
Education level	
Uneducated	45% (n=23)
Primary	29% (n=15)
Middle	10% (n=5)
Matric	16% (n=8)
Occupation	
Shop Keeper	26% (n=13)
Labour	60% (n=31)
Taxi Driver	14% (n=7)
Monthly family income (INR)	
10,000 - 15,000	53% (n=27)
15,001 - 20,000	26% (n=13)
20,001 - 25,000	10% (n=05)
25,001 - 30,000	11% (n=6)

Water, Sanitation and Hygiene attitudes and practices:
Majority of the participants (41.2%, n=21) perceived Diarrhea that is the most important outcome of consuming contaminated drinking water. Majority of the participants were spending 1000-1500 rupees per month for treatment of illness (51%). There was a common perception among the most of the participants (60.8%, n=31) that the handwashing with soap is mandatory after using toilet. Majority of the participants (47%) don't go anywhere for treatment of illness. Majority of the participants respond that there is no change in their health condition in last five years (Table 3 and 4).

The study results also disclosed that mostly uneducated person practice open defecation (43%) as compared to the educated people. The study also found significant association between level of education and defecation practices.

Water Quality available:
Approximately 100% of the water samples were found contaminated with thermo tolerant coliforms (TTC) ranging from 2 colonies forming units (CFU) to 42 colonies forming units (CFU), and total coliforms (TC) ranging from 42 colonies forming units (CFU) to 98 colonies forming units (CFU). Whereas, the WHO limits for the thermo tolerant coliform bacteria and total coliforms are zero per

100ml of drinking water samples. The results are shown in figure 2.

Table 3: Water Sanitation and Hygiene facilities

Main source for water procurement	Frequency	Percent (%)
Hand Pump	33	64.7
Pipe Line	18	35.3
Do you have a public piped-line water supply system		
Yes	22	43.1
No	29	56.9
Water_Requirment		
16 hours	24	47.1
12 hours	7	13.7
10 hours	5	9.8
8 hours	7	13.7
6 hours	8	15.7
Water_Storage		
Drum	39	76.5
Covered Pot	12	23.5
Sanitation facility		
No_Of_Toilets (Inside the house premises)		
One	14	27.5
Zero	37	72.5
Toilet_Type (Including community toilets)		
WC	31	60.8
Open_Defication	11	21.6
Pit_Latrine	9	17.6
Sewrage_System		
Out of Order	33	65.0
Not installed properly	18	35.0

Table 4: Water and sanitation hygiene attitudes and practices

Family_Disease	Frequency	Percent
Diarrhea	21	41.2
Typhiod	12	23.5
Both	7	13.7
No disease	11	21.6
Expenditure_Illness		
1000 – 1500	26	51.0

1501 – 2000	15	29.4
2001 – 2500	10	19.6
Use soap for washing your hands after using toilet		
Some times	10	19.6
Yes	31	60.8
No	10	19.6
Health_Seeking_Behaviour		
Hakeem or Traditional method	10	19.6
Nearest Hospital	17	33.3
Don't go any where	24	47.1
Family health condition in last 5 years		
Improved	13	25.5
Worse	12	23.5
No change	26	51.0

Table 5: The level of education and defecation practice in urban slums

			Toilet Type			
			WC	Open Defecation	Pit Latrine	Total
Education	Uneducated	Count	9	10	4	23
		% within Education	39.1%	43.5%	17.4%	100.0%
	Primary	Count	13	1	1	15
		% within Education	86.7%	6.7%	6.7%	100.0%
	Middle	Count	3	0	2	5
		% within Education	60.0%	0.0%	40.0%	100.0%
	Matric	Count	6	0	2	8
		% within Education	75.0%	0.0%	25.0%	100.0%
Total		Count	31	11	9	51
		% within Education	60.8%	21.6%	17.6%	100.0%

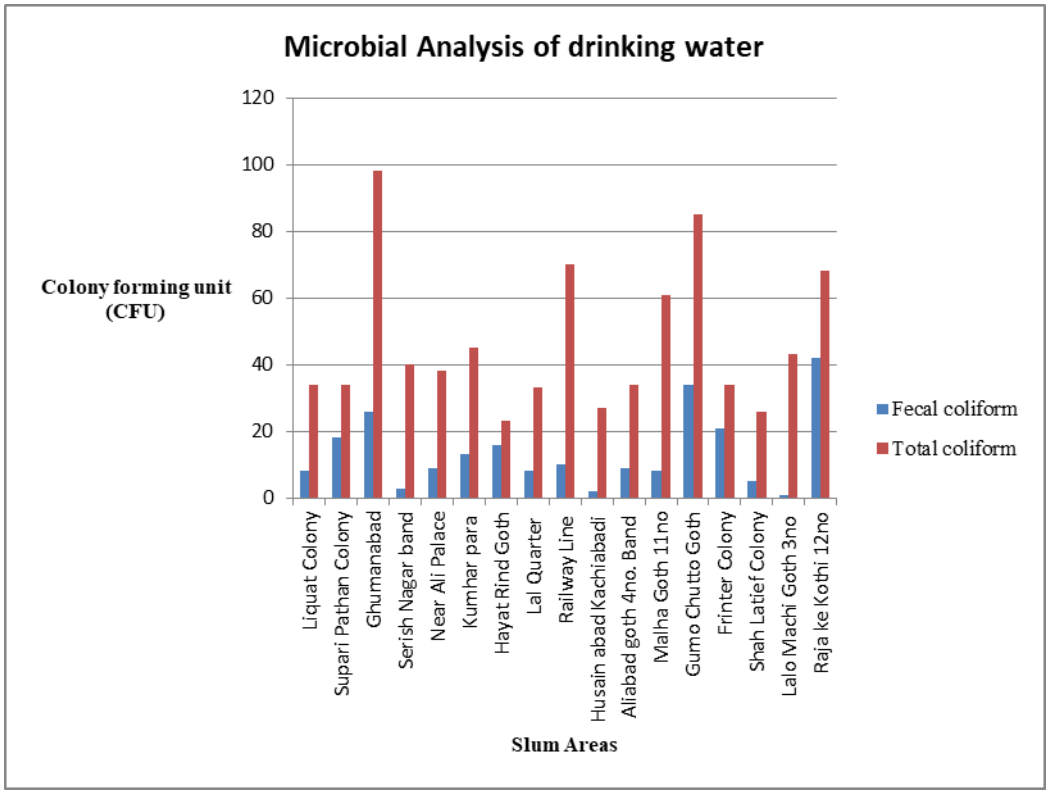

Figure 2: Average TTC and TC results:

Association between the level of education and defecation practices, sanitation availability, health care cost and health seeking behavior:

The results were further analyzed for the association between level of education of the respondents and toilet availability, health care cost and their health seeking behavior using Chi square test. The results revealed significant association between the persons having higher education and toilets availability, health care cost and their health seeking behavior (P = 0.15, 0.30 and 0.041; table 6). It divulges that the person with higher education have has less chances of open defecation, better toilet facilities, spending good amount on health and go to the nearest hospital or hakeem for the treatment of diseases (table 6).

Table 6: Association between level of Education and Toilets availability, Health care cost and health seeking behavior

		p-value
Level of Education v/s	Defecation practices	0.0150**
	Toilets availability (inside the house premises)	0.0150**
	Health care cost (expenditure on health)	0.0305**
	Health seeking behavior (go for the treatment of disease)	0.0411**

CONCLUSIONS:

The local government of Hyderabad does not have necessary data regarding the slum settlements; some settlements have dozens of houses having fewer than 100 people. Most urban slums have congested populations with thousands of people living in a close proximity. The mapping of urban slum areas has been done through GIS software. That data demonstrated that there are approximately 17 slum locations in Hyderabad, Sindh Pakistan.

The slum dwellers are lacking adequate drinking water, sanitation and hygiene facilities; according to them, it is the responsibility of the government to provide them basic needs of life. But, on the other hand, the majority of the settlements have been built by occupying government land and according to the government, facilities could not be provided because of their illegal status.

Waterborne diseases were common in the major portions of the slum population. In some settlements open defecation is a cultural practice being followed since their ancestors; this behavior takes a long time to change. Health education should be provided by conducting community gatherings; distributing brochures which criticize open defecation could make them change their behavioral practice.

Most women of the slum dwellers are working as housekeeping in the posh areas of the city. It divulges that the entire city is exposed to the risk posed by unhealthy workers owing to deteriorated conditions of WASH facilities in slum areas. This study also revealed significant association between the level of education and availability of WASH facilities and their behavior towards health. Therefore, in order to prevent them from greater contagion, interventions should be made by developing basic infrastructure and educational support.

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