



**Punjab Urban Research Programme**



**Relationship between Community Health  
Behavior, Water & Sanitation Facilities  
in  
a peri Urban Area of Lahore, Pakistan**

**Principal Investigator: Abid Shah Hussainy**  
Water and Sanitation Specialist  
Urban Unit  
Planning and Development Department, Lahore  
Government of Punjab  
Pakistan

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## **Abstract**

*This research investigates the water and sanitation related health issues and behaviors in the poor urban locality of Lahore, Pakistan. In the sample population 73% population is illiterate. They have no access to government water supply and sanitation scheme. Poverty, illiteracy and absence of any health and hygiene programme have resulted in poor community health. 37 to 42 % adult and children from the sample were sick in last three month associated with water and sanitation diseases. 58% of the community was not satisfied with the quality of water, 73% never boiled the water and only 5 % knew the benefit of boiling water. The access to hygiene information is limited due to poverty, low literacy and low mobility. The only source of health and hygiene information is T.V and relatives which is always limited in scope.*

*The finding of this research concludes that there is association between community health, environment and health behavior. The gendered nature of health and hygiene issue clearly required a health and hygiene strategy which addresses women, their low literacy and means of communication to make an intervention of water and sanitation by WASA Lahore a success. It is essential to address the capacity of the water utilities to design and implement integrated water and sanitation programme in which health and hygiene education is integral part of it. As in this case WASA-L is having partnership with Union Council 60, Anjuman – Samaji Bahbood (ASB) of Faisalabad for community mobilization and Urban Unit, P&D department for strategic support.*

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## **1. Background**

The people of Union Council 60 have a population of approximately 22,000 in Lahore Pakistan. Lahore is second largest city of Pakistan and is provincial capital of Punjab with approximate population of 8 million people. According to the conservative estimates 40% of the population in the city of Lahore resides in slumps or peri urban with poor municipal and housing services (Urban Unit 2006).

The area under investigation is Badar Colony of UC 60. The community living in the area reported serious health related issues as a result of no provision of water supply and sanitation in the area by government agencies that is Water and Sanitation Agency Lahore (WASA-L) (WASA-L 2006, Urban Unit 2006). Scarcity and misuse of the fresh water resources pose a serious and growing threat to sustainable development, protection of environment and human health and welfare and food security (Dublin Statement 2006).

In most of the urban area in third World Countries environmental related diseases are common. According to WHO unsafe water, poor sanitation and hygiene kills an estimated 1.7 million people annually, particularly as a result of diarrhoeal diseases (Rahman 2006). Major water borne diseases such as cholera, typhoid, diarrhea, dysentery and other viral diseases (e.g Hepatitis A) are due to pathogens in drinking water contaminated with sewage (Low in Rahman 2006).

## **2. Need of the Study**

The National Drinking Water Policy of Pakistan<sup>1</sup> provides a framework for addressing the key issues and challenging facing Pakistan in the drinking water sector. The goals of the stated policy clearly articulated the need of ensuring the safe drinking water to the community and to ensure the reduction in the incidence of mortality and morbidity caused by water borne disease (EPA 2006).

The need for this study arose when the WASA –L submitted a proposal for provision of the water supply in the area for funding to the Government of Punjab. The Urban Unit, Planning and Development Department were directed to comment on the feasibility of the scheme. As a result, a water and sanitation specialist conducted a preliminary rapid assessment of the area.

The initial field survey revealed that people in the area do not have any water supply and sanitation system. The disposal of the excreta is unsafe, people are poor, toilets are improper and the literacy is low in the area. The excreta are disposed off through excavating a small sanitation well. The community disposes of or discharges their sewage in these wells. Anecdotal evidence from the discussion with communities suggests that

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<sup>1</sup> DRAFT

elders and children's health is affected as the sewage water is mixed with the drinking water. The existing water supply is through instillation of small motor pumps to extract ground water (Urban Unit 2006). The pictures of the toilets and drinking water pumps are provided in the Annexure 5.

A recommendation based on the field survey was presented to the Chairman, Planning and Development Board, Government of Punjab in October 2006. The recommendation by the Urban Unit was to design and implemented an integrated project for water supply and sanitation in the area with strong community participation and financing by the community for their internal component and WASA-L as external component.

### **3. Problem Statement and Rationale**

One billion people on this earth are without adequate and safe water supply and three billion without access to an appropriate means of excreta disposal (Helmer 1999). This situation is quite crucial in developing countries where water related diseases are the most widespread and dangerous. Perhaps half the population is suffering of diarrhoeal diseases, infections with internal helminthes, malaria, schistosomiasis and river blindness (Helmer 1999).

It is also estimated that more than 3 million people per year die from waterborne or hygiene related diseases due to unsafe drinking water, unclean domestic environments, and improper excreta disposal. The contamination of water by viruses, pathogenic bacteria, and other parasites, can occur either at the water sources itself or during conveyance of the water from source to consumer. According to Cairneross et. al (2005) inadequate water, sanitation and hygiene have been estimated to account for 2.2 million death annually or 4% of the global total, and 5.7% of the global burden of disease in disability adjusted life years.

Literature review and reading about the integrated approach to water and sanitation highlighted the importance of health and hygiene education (UNESCO 2006). Cairneross et. al. (2005) claimed that it is not enough to provide water supply and sanitation facilities to bring down the mortality and morbidity rates significantly, hygiene behavior has a greater impact on health. Similarly DeNormandle and Sunita (2002) concluded based on their work in India that widespread unhygienic practices during water collection and storage, poor hand washing, limited access to sanitation facilities perpetuate the transmission of diarrhea-causing germs through the faecal –oral route. There is an established link between the community health behavior, diseases and overall environment of the household and community which includes cleanliness, income level and their access to the knowledge and skills related to proper hygiene and awareness. This relationship is bases of research framework shown in Figure 1.

In order to design an integrated water supply and sanitation programme n UC 60, there was a need to understand the water and sanitation related diseases and its relationship

with health behaviors in the presence of unclean water and poor sanitation system. Government agencies and water utilities have not used the research tool to design their project and this will contribute to the process of designing an integrated project with strong component of health and hygiene promotion programme as per local conditions.

This study in Pakistan will contribute in development of water and sanitation projects in urban area with integrated approach by introducing health and hygiene education component addressing the need of National Water Policy and National Sanitation Policy of Pakistan. The design of the health component for behavioral change warranted the understanding of community practices and their behaviors. The need of the study has guided the research questions and methodology.

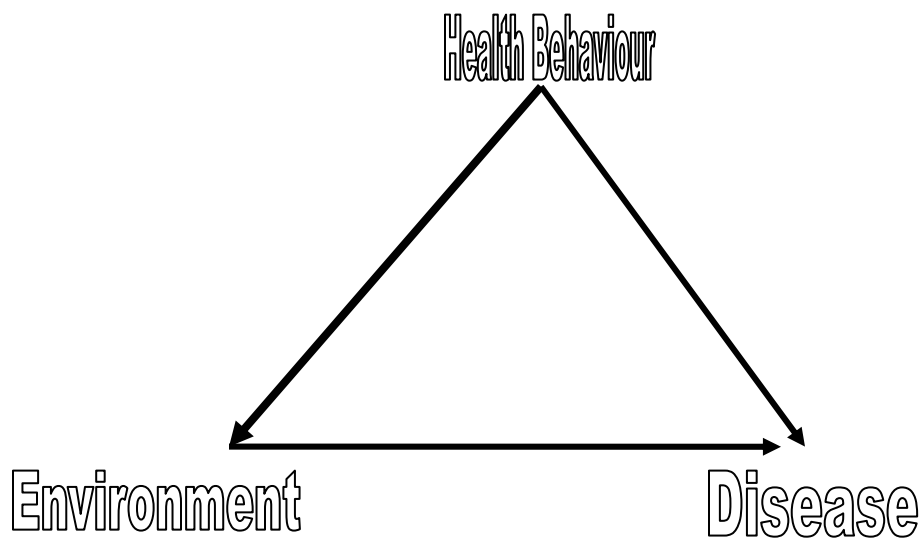


Figure 1. Relationship between Health Behavior with Diseases and Environment

#### **4. Aim, Objectives and Research Questions**

The aim of the research study was to learn about the relationship between the peri urban low income community's health behaviors, their knowledge and practices which contribute towards the water and sanitation related diseases. The specific objectives of the study are exploratory and emancipatory in nature given below.

- To find out what are the community health behaviors and hygiene practices
- To understand how health , income and environment in the household are related with the community predisposing knowledge

- What are the enabling factors and reinforcing factors related to health and hygiene practices
- How poor water and sanitation facilities are contributing to the community health and well being

**The study is guided by the following research questions**

1. What health behaviors contribute to the main water and sanitation related health issues in a low income urban community of Lahore?
2. What are the predisposing ( knowledge attitudes, values, self efficacy) enabling (resources, social norms) and reinforcing factors support or hindrances of important other such as health workers, teachers, elders) that influences these behaviors

## **5. Sample**

For this study Random Sampling through systematic sampling was done. The Method was for selection of lane (Street) for survey in which there are approximately 20 houses on both sides.

A fictitious household number was allocated to each household in each *lane* for random sample purposes. For selection of household from the selected houses for interview systematic sample was used. Systematic sample is a version of simple random sampling in which the sampling frame is arranged in order, and then every *n*th unit is selected. Survey was carry out survey in *Badar* Colony part of the Union Council 60 in which there are 19 lanes or streets. In each lane there are approximately 20 houses on both sides. Five lanes are selected through writing their numbers on papers and picking up randomly the lane numbers. For each lane same exercise was repeated and five numbers were randomly picked from 20 numbers. In each lane the household number were placed in order and first odd house number were selected for interview. The Result of the random sampling is given in Table 1.

Table 1: Random Sample of Households for Survey and Interview

Lane Number /Street Number	House Number selected for questionnaire	House Number selected for interview and observation - first odd number house hold
1	8, 12, 18, 9	9
15	3, 4, 12, 13	3
5	17,10, 4, 8	17
6- 10 ( replaced )	12, 15,5, 19	5
7 – 11 ( replaced )	11, p ,13,19	9
		Total = 19

The assumption behind the selection of these lanes was that that they do not have access to the sanitation facilities. However, in the field when data was collected it was revealed that the street 6 and street 7 is connected to the some internal sewerage system. Therefore, it was decided that these lane must be changes so the sample is uniform. Lane 6 was replaced by lane 10 and lane 7 was replaced by lane 11. The house number remained the same for survey and interview purposes.

## **6. Research Methods**

The focus on the research requires a mix of data collection tools and methods. The study was more challenging than was thought earlier in terms of designing survey tools. The challenge was to carried out actual field survey in a Muslim society where outsiders are seen with concern specially when women interaction is desired for interview and survey. The socio cultural barriers of working in a Muslim society are pre dominated in which access of male researcher for data collection from women residents (who are mostly at home and responsible of food cooking, sanitation and storage of water inside a house) in an area required various data collection strategies.

The data tools and instrument included questionnaires Survey from n=19 households, interview from five households, a resident doctor (health worker), who is running a private health clinic. The tools also included an observation sheets about the health and hygiene condition of the house in each lane, kitchen and toilets which was developed and administrated in 5 randomly selected households. Photographic observation was used to collect the data about the water related health issues, community socio economic conditions, water and sanitation facilities and uses.

The survey and detail interview was conducted from an adult person residing in the selected household and present at the home. The time of survey started from the morning and ended in the afternoon of a given day. The respondent of the survey included majority of women 74% and 24% male. 63% of the respondents were in the age bracket of 26-40 years followed by 18-25 range 16%. The detail interview was conducted from n=5 households which included 80% female and 20 % male. 100% respondents were illiterate in the interview sample.

### **6.1 Research Tools:**

#### **Survey Questionnaires**

A survey questionnaire for survey was developed and administrated is attached as Annex-1.

#### **Interview**

An interview guide was developed using semi structured interview to triangulate the data collected in the surveys questionnaire. Semi structures interview has predetermined

questions, but they can be modified based on the response. Interviews are also useful in the exploratory work. It is also useful to validate particular measure or illustrate the meaning of the findings. The interview was conducted from one survey respondent from each lane, a general physician (doctors) practicing in the area by visiting his clinic followed by observation in 5 houses one in each lane. The interview guide is presented in Annex 2, 3 and observation sheet in Annex 4.

### **Data Analysis**

The raw data from the survey questionnaires, interview schedule and observation check list was recorded analyzed and interpreted. The collected data was analyzed and evaluated. Data collected means very little until they are analyzed and evaluated. Each question from the survey sheet was recorded based on the categories and summary sheet were prepared for each questions. The information was categorized based on basic information about the respondent including basic well being and housing, water and sanitation facilities, health and hygiene related categories and information sources related to health and hygiene behavior. Average, frequency, bar and chart to analyzed and present data. Similarly, interview data and observation data were matched with the themes of the survey and presented in the findings section.

## **7. Findings**

There were n=19 respondents in the survey as 20<sup>th</sup> respondent could not available from the sample for survey due to socio cultural reasons. 26% of the respondents were male and 74 % were female in the study (refer Figure 2).

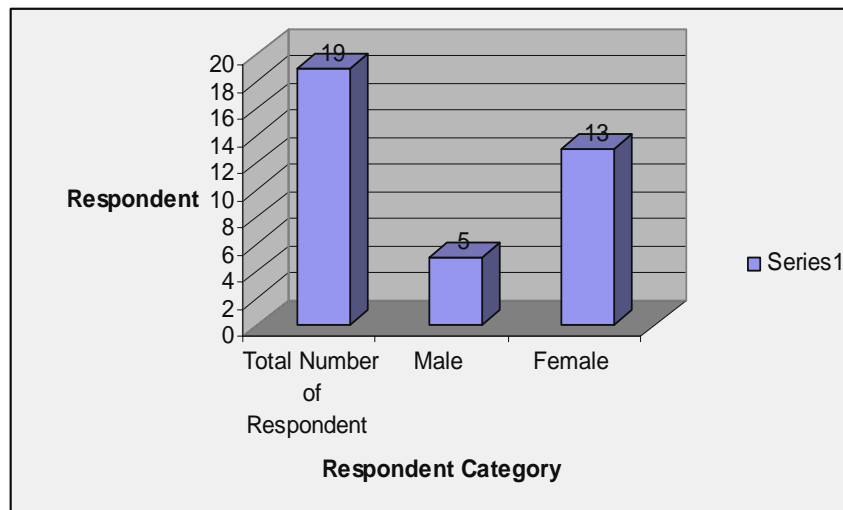


Figure 2: Respondent Category in the Research

### 7.1 Health Behavior and Health Issues

The literary profile of the respondent was evidence of poor human capital and access to the education in this community. 73% of the respondents were illiterate and 15 % have passed only their 5 grade with only 11 % have completed their middle (class 8) education (refer Figure 3). The community and pre dominantly women in the area are un-educated and have no access or poor access to education. Poor education is demonstration and evidence of poverty in the area. The poor education and illiteracy have shaped their health behavior and limited their access to the information and knowledge related to the proper health behavior and clean environment in the house.

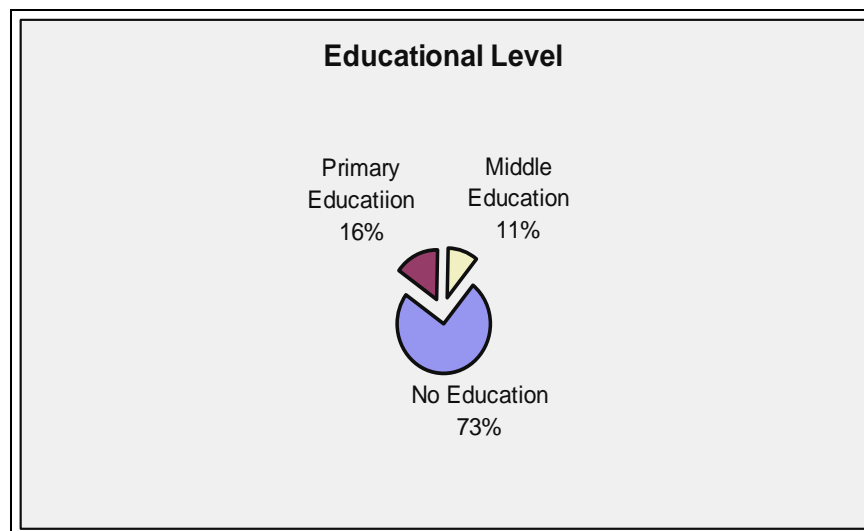


Figure 3 : Educational Level of the Respondent

The living condition of the community is also poor. The Table 2 below reads that more than 53% (n= 19) of the people live in a house which is less than 137.5 square meter in an average 7 persons lives in a house with only one toilet ( See Figure 4).

Table 2 Housing Area Profile

Average Area in Square Meter of House	Frequency	% round up to nearest whole number
37.5	1	5.
87.5	3	16
137.5	10	53
200	5	26

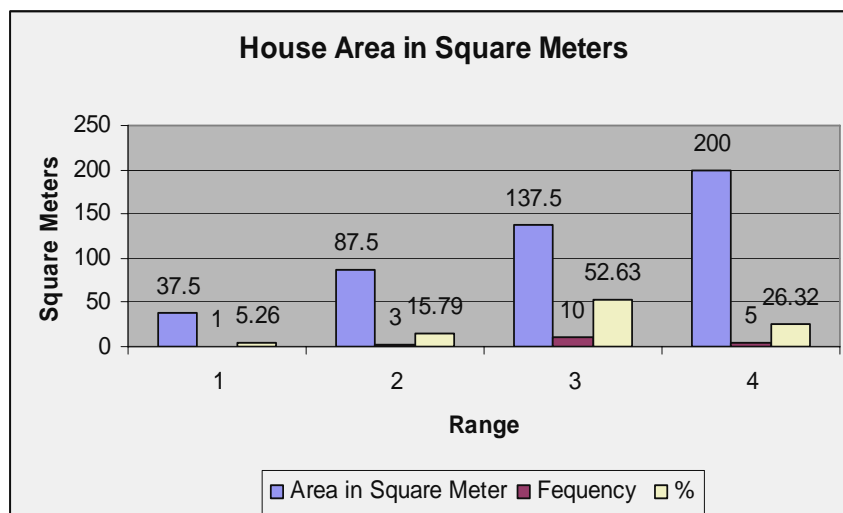


Figure 4 : Average Housing Area occupied by Respondent

The average age of the respondent is 31 years (see Table 3). The average number of the person living in the house is 7 per household which comes to approximately 20 square meters for a person.

Table 3 Average Age of the Respondent

Age	Frequency	Mid Point	F*M
15-17	2	16	32
18-25	3	21.5	64.5
26-40	12	33	396
41-55	2	48	96
56-70	0	0	0
Greater then 70	0	0	0
<b>Average Age in Years</b>			<b>30.97368</b>

## 7.2. Un-Healthy Practices of Food Preparation and Storage

The practice of cooking food in the community revealed that the food is mostly cooked in the open (79% of households) and only 11% is cooked in the kitchen (refer Figure 5). This is due to low literacy and poverty where people do not have kitchen to cook food. Consequently the food is vulnerable to the environmental contamination and disease transmission. They also do not take any measure to minimize contamination due to limited existing knowledge and low literacy.

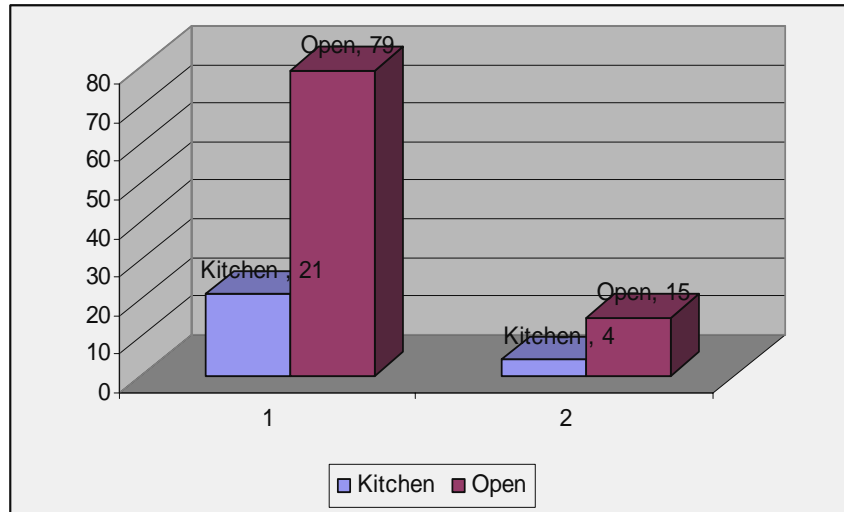


Figure 5 Food Cooking System in a Household.

The food after cooking is stored through various methods (Figure 6). The storage is unhygienic and demonstrated low level of understanding of the safe storage and health issues associated with is unsafe storage. The storage is 74% in open followed by 16% in fridge. The remaining household either keeps it in a wooden cupboard or leaves it in the kitchen. This increases the risk of food contamination.

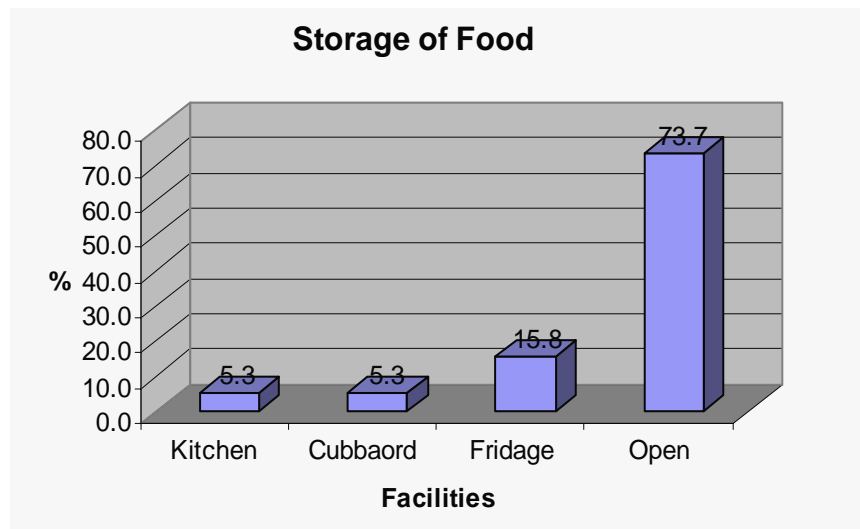


Figure 6 Food Storage Practices and Facilities

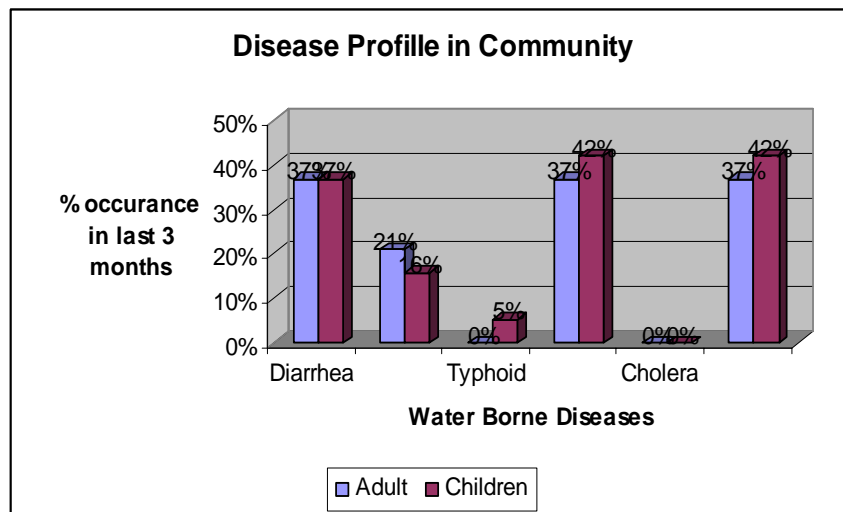
### **7.3 Diseases Profile**

Extremely Low literacy rate, poor hygienic knowledge about the safe storage of water has impacted the community health. According to the Bachanan (2007) 80% of all diseases in developing countries can be traced to the use of polluted water. A separate disease

profile for the adult and children (Table 4) was taken for each household for the last three months. The respondent were explained the names of the diseases in local language. It is reported that in children Gastro is mostly reported diseases followed by Diarrhea and Jaundice. Similar pattern for adult is also evident where most occurring disease is Diarrhea and Gastro (37%) followed by Jaundice 21%. (Figure 7) Doctor in the area also agreed that most of the diseases are related to the water and drinking water is the main cause of diseases. Doctor added allergy as one major disease due to poor hygienic condition in the houses and poor sanitation.

**Table 4 Disease Profile Last Three Months**

<b>Diseases</b>	<b>Adult</b>	<b>Children</b>
Diarrhea	37%	37%
Jaundice	21%	16%
Typhoid	0%	5%
Gastro	37%	42%
Cholera	0%	0%
None	37%	42%



**Figure 7 Disease Profile in the Community**

## 8. Health Behavior predisposing, enabling and reinforcing Factors

### 8.1 Knowledge about Quality and Storage of Water

The respondents were aware about the importance of the quality of water based on the indicators of taste, color and smell. 58% were not satisfied with the quality of water based on the indicators (Figure 7). However, there un-satisfaction was not translated into concrete positive health behavior.

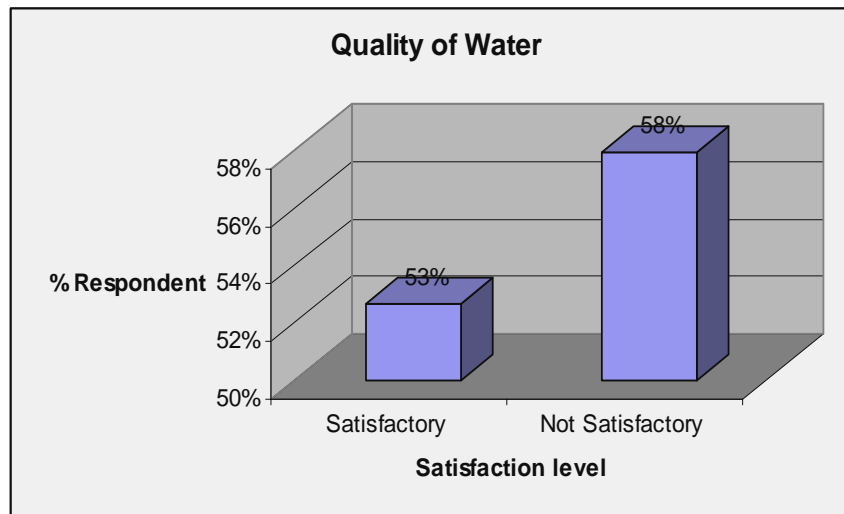


Figure 7 Knowledge about quality of water

100 % respondent was using motor pumping to extract the ground water. There was one respondent getting water occasionally from another source, which was 2 kms away from the residence. The community mostly stored water in closed container 80%. However, 20% store water in open container which makes the water prone to contamination (Figure 8).

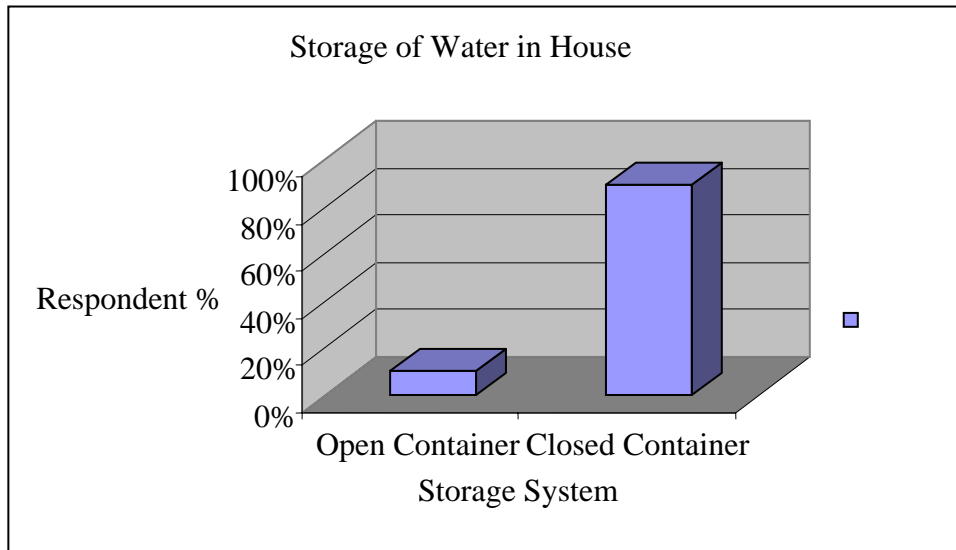


Figure 8 Storage of Water

### 8.2 Knowledge about Benefit of Water Boiling Before Use

Respondents were unaware of the importance and need of boiling of water before drinking. 79% agreed that they never boiled the water before and 11 % responded that they sometimes boiled that water. 11 % responded claimed that they always boil the water. It was also reported that when asked about their knowledge of water boiling water 11 % mentioned 10 minutes, 5%, 15 minutes and 30 minutes respectively (Figure 9).

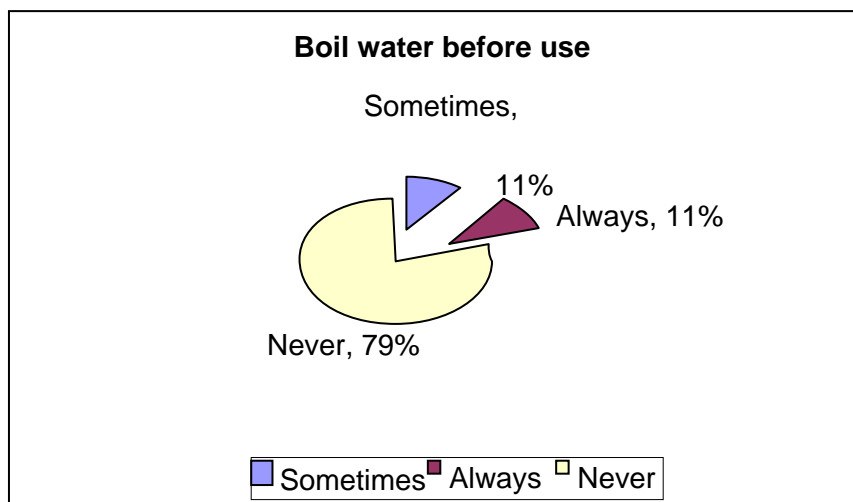


Figure 9 Practices about Boiling Water

Respondent had very little knowledge about the benefits of boiling water. 16% of the responses were based on miss conception that boiling of water takes out bad smell from water. 68% gave no response and 11% did not know. 31.5 % gave more then one response, which makes the aggregate of responses more then 100% (Figure 10). The community low literacy rate as well as no means of information providing by any social actors or government agency health and hygiene awareness explains the miss perception and knowledge about the hygiene practices.

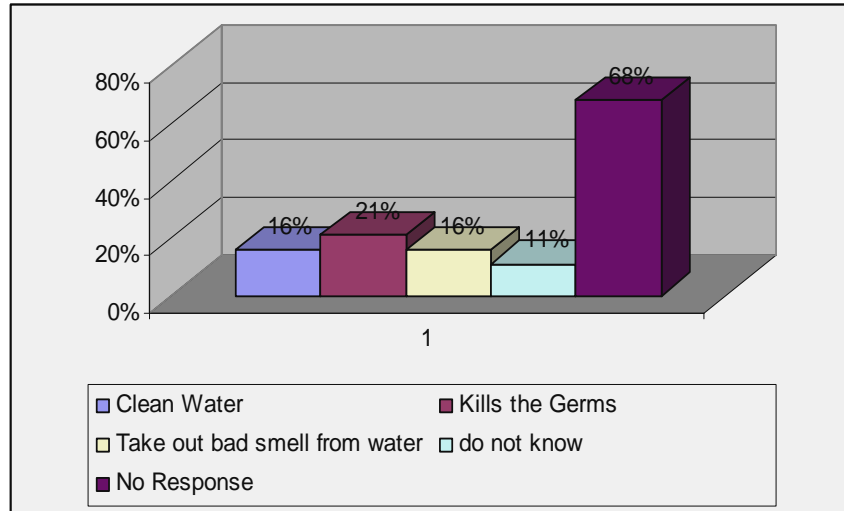


Figure 10 Misconceptions about Benefits of Boiling Water

As women have low mobility in this part of the world especially when they have low or no literacy as well, their sources of information thus also become limited. 68% has no response towards source of information related to the health and hygiene practices. Respondent had greater influence from the media as 16% (TV and Radio) and 11 % from relatives (Figure 11). Teachers also play some role in information dissemination. It is important to mention that health education is poorly integrated in the national curriculum and textbooks and therefore have insignificant influence on the behavior of the community. One respondent during interview admitted that when some one is sick they boil water on the advice of doctor.

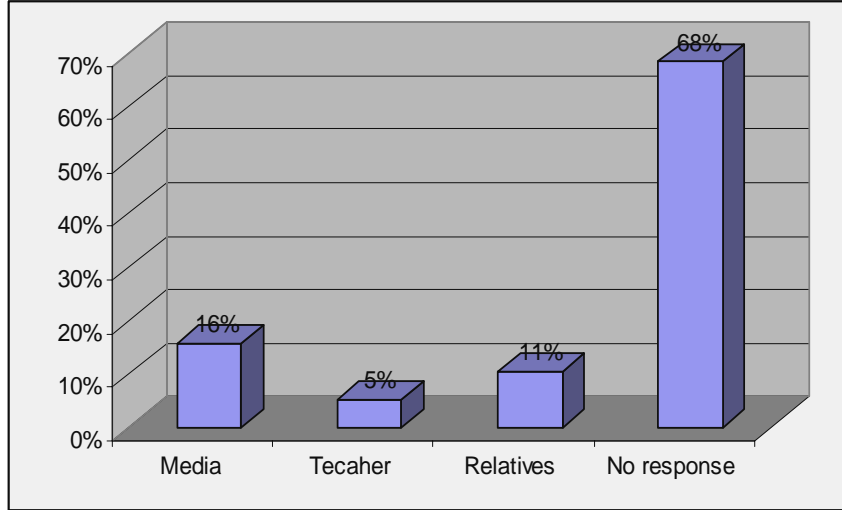


Figure 11 Sources of Knowledge about Boiling Water

### 8.3 Health Attitude

Despite the occurrence of diseases in the household and un safe practices of cooking and storing food, not boiling water the attitude of the respondent about environmental cleanliness is positive as 68% agreed that clean house is related to be healthy 68% and for healthy life 63%. 5% felt that clean house is for the rich people and 5% did not know (Figure 12). These are important health attitudes which need to be addressed in the health and hygiene programme. During observation of the houses it was observed that most of the houses and toilets were generally clean except one place where house and toilet was dirty. The donkey was also residing inside the house and animal faeces were also present in the house. In the absence of sanitation system people dispose off human excreta in the open drain or in open plot near their house.

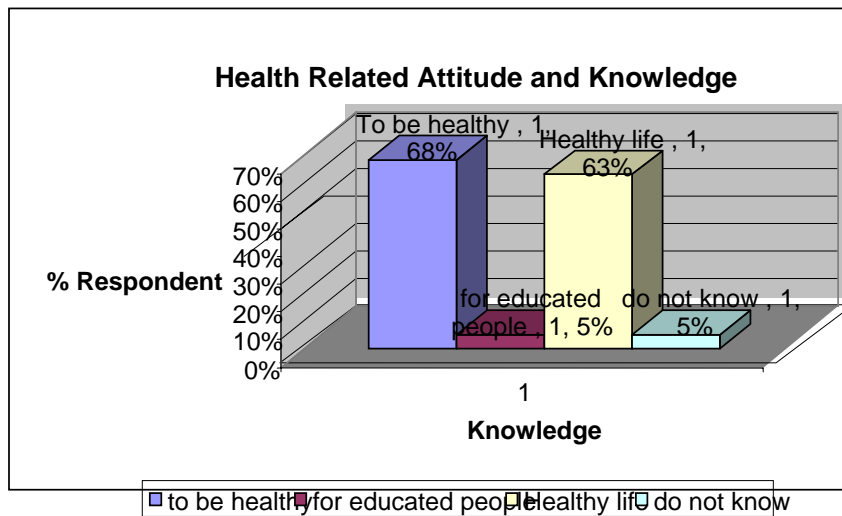


Figure 12 Health Related Attitude and Knowledge

### 8.4 Knowledge about Benefit of Toilet

Respondent are well aware of the benefits of the toilets for good health 79% (Figure 13). However, there were 21% who felt that toilet is necessary but very much related to affordability. 5% respondent did not know the benefits of the toilets.

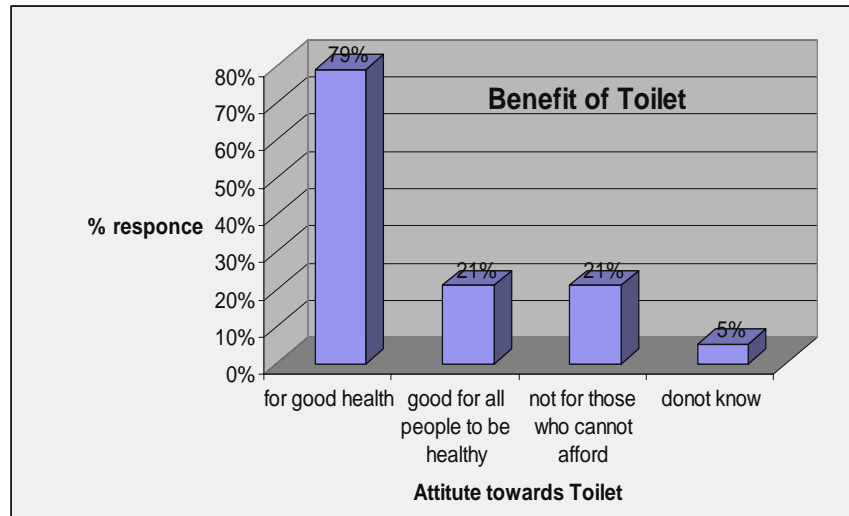


Figure 13. Knowledge about Benefits of Toilet

### 8.5 Hindrance Factors

The enabling and hindrance factors which shape community behavior is their educational level and access to the information nodes (Figure 14). In the absence of any formal community health programme in the area the community rely on T.V (53%) for the information they receive is from T.V. The other significant medium is family and friends (others 58%) for information dissemination. Gender profiling of the respondent suggests that the women have limited access to the information and exchange.

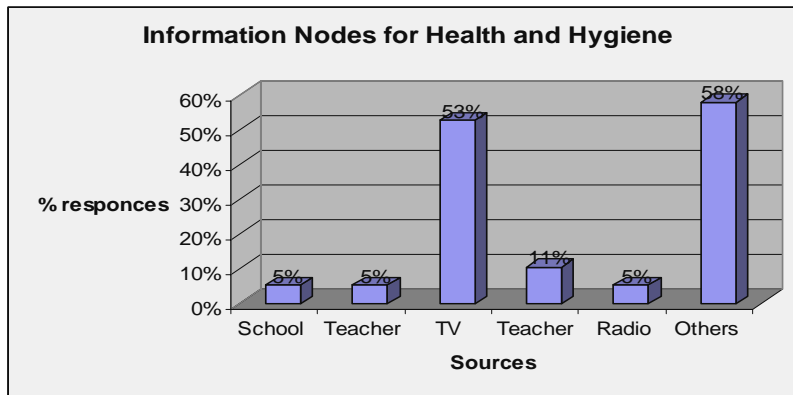


Figure 12 Information sources of Education

### 8.6 Information Learning

Arena of learning is important factor in the community education and learning about health and hygiene. Community is well aware of the benefits of toilets and is aware of the benefits of hand washing (Figure 13). However, their awareness is not demonstrated into their practices. This was also confirmed during interview when respondent emphasized that even a child of 5 years do the hand washing with soap. It is interesting to note that respondent 37% claimed that they are aware of the benefits of boiling water but very few actually practice it.

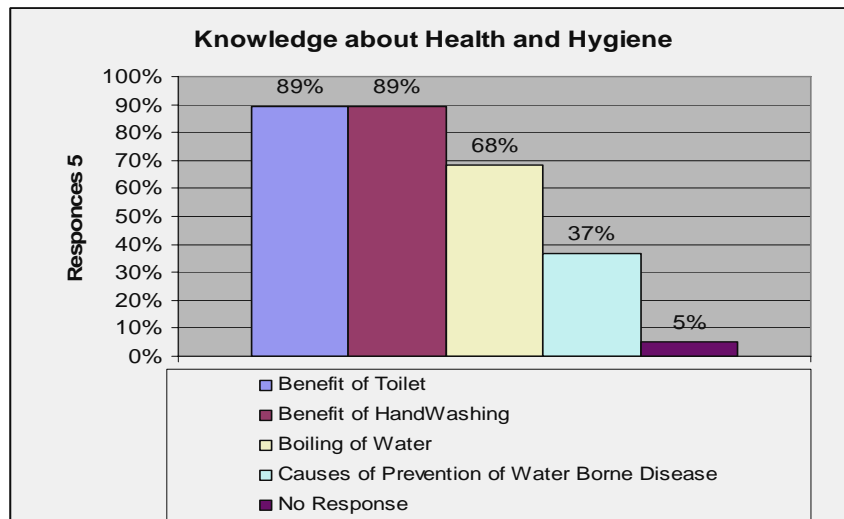


Figure 13 Knowledge about Health and Hygiene

## 9. Discussion and Conclusion

The small poor peri urban community in Lahore, provincial capital of Punjab, Pakistan is faced with multiple challenges related to the health behaviors, diseases, and their access to the facilities of water supply and sanitation. This research set out to examine two main research questions and through analysis of the primary data in the previous sections this research responds to the research questions as follows.

- *What health behaviors contribute to the main water and sanitation related health issues in a low income urban community of Lahore?*

The health behaviors of not boiling the drinking water and not cooking food in the kitchen and storing the food and water in proper place have contributed to the water related diseases in the adult and children. Despite more than 40% adults and children got sick in the last three months due to poor hygiene conditions and water related diseases, the safe hygienic practices is not used. Although people have toilet built in the houses and most

of the houses were clean, the disposal of human excreta in the open or in the house has also caused considerable issues related to the health.

- *What are the predisposing ( knowledge attitudes, values, self efficacy) enabling ( resources , social norms) and reinforcing factors support or hindrances of important other such as health workers, teachers, elders) that influences these behaviors*

The poor community has a very low literacy rate. 73% people are illiterate and 15% have only passes their grade 5 in their mid 40s which is the average age of the respondent. The literacy and the exposure to the information and mobility are hindrance factors in the health and hygiene knowledge, attitude and value development. In the absence of health programme the knowledge about the hygiene and health related aspect is very limited. Community has some knowledge about hand washing and importance of toilet; however, this knowledge is limited and acquired only through Media, T.V and relatives. The observation in sample houses has demonstrated general cleanliness but in the absence of proper water supply and sanitation the risk associated with the water borne diseases is significant.

Government agencies have planned interventions in water supply and sanitation in the area, in which community is being mobilized. Hygiene promotion can change hygiene behavior (Carirncross et al. 2005). However, hygiene as in other fields, knowledge alone does not determine practices ( Pitter et al, 2004) In this area where literacy is low the health and hygiene education should start with general mobilization for three months with range of activities such as group meetings, exhibitions, street dramas and TV and cable TV. The second phase on specific educational component on latrine installation, water boiling, safe storage and hand washing. Women need to be focused through small group mobilization as women have low mobility.

The sustainability of these initiatives as found in Ghana, Kenya, Nepal and Uganda found that it has to be treated as continuous activity. Promotion programme benefits are continuous for many years. The evidence suggests that the water utilities can play an important role in implementation of hygiene promotion programme. However, WASA in Lahore never design a programme with this integrated approach neither have the capacity to design nor monitor health and hygiene programme. It is important policy recommendation that Water Utilities in the Punjab Province and the Public Health Engineering Department also develop their capacity for integrating health and hygiene promotion in the water supply and sanitation programme. This will help them out to reduce poverty as well as improve the health and well being of the community.

There is a need to carry out detail study on the health and hygiene factors impacted by the health programme and interventions in the water and sanitation in the area. This baseline in a small sample needed to replicate in a wider sample in UC 60 for designing a comprehensive programme for health and hygiene promotion programme and looking at the impacts of the water and sanitation interventions in UC 60.

## References

Buchanan, M.K. (2006). Water Privatization and Infant Mortality in the Developing Countries, Honors Thesis, Washington State University: Washington

Cairncross, S., Shordt, K., Zacharia, S. and Govindan, B.K. (2005). What causes sustainable changes in hygiene behaviour? A cross –sectional study from Kerla, India, *Social Science & Medicine*, 61.2212-2220.

DeNormandie and Sunita, J. ( 2002). Combating Diarrhoeal disease in India through safe drinking water, WHO available at [www.who.int/mediacentre/multimedia/2002/ind\\_sanitation/en/index.html](http://www.who.int/mediacentre/multimedia/2002/ind_sanitation/en/index.html) access on 3/17/2007

EPA (2006). Draft Drinking Water Policy, Pakistan, Ministry of Environment, Islamabad.

GHK ( 2002). Effective Strategic Planning for Urban Sanitation Services: Fundamentals of Good Practices, DFID, London

Helmer, R. (1999). Water quality and health, *the Environmentalist*, 19,11-16

Urban Unit ( 2006). *UC 60 Preliminary Report*, P&D, Govt. Of Punjab, Lahore.

UNESCO (2006). Health and Hygiene Education. Online. Available <http://www.unesco.org/iiep/eng/focus/emergency/guidebook/Chapter21.pdf> (accessed 10 April 2007)

Ludwig.H, Mohit.K, and Gunaratnam .D. (2003) The Truth about Public Health and Community Sewerage and Water Supply Sanitation in Developing Countries. *The Environmentalist*, 23. pp151-157.

Rehman, A. ( 2006). Assessing income-wise household environmental conditions and disease profile in urban areas: Study of an Indian city. *GeoJournal* 65 pp 211-227

USAID: Strategic Planning of USAID Water and Sanitation Activities in Africa. Online. Available <http://www.state.gov/documents/organization/67720.pdf> (accessed 10 April 2007)

WASA L ( 2006). *Provision of UC 60 Water Supply Schemes* , LDA, Lahore.

WHO ( 2007). Lack of water and inadequate sanitation available at [www.who.int/ceh/risks/cehwater/en/print.html](http://www.who.int/ceh/risks/cehwater/en/print.html) access on 3/17/2007

WHO (2004). Guidelines for Drinking –Water Quality, Third Edition, Volume 1, Recommendations, WHO. Geneva

WHO (2005). Sanitation and Hygiene Promotion: Programming Guide, Water Supply and Sanitation Collaboration Council, Geneva

World Health Organization.2004.Guidelines for Drinking –water Quality. Vol. 1: 3<sup>rd</sup> ed. Geneva: WHO.

## **Annexure**

## Annex 1

### Survey Questionnaire

Lead Researcher: Abid Hussainy,  
Water and Sanitation Specialist  
Urban Unit, Planning and Development Department,  
Government of Punjab

### Survey form for Urban WSS Research

*Please introduce your self as well as explain the purpose of the survey*

#### Purpose

*Finding out about the water and sanitation related health issues and behaviors in your community*

#### Sample

Lane Number	House Number selected for questionnaire	House Number selected for interview- first odd number house hold for interview
1	8, 12, 18, 9	9
15	3, 4, 12, 13	3
5	17,10, 4, 8	17
6	12, 15,5, 19	5
7	11, 9 ,13,19	9

House Identification Number .....

Number of Lane .....

House Number from the Sample .....

Date and Time of Survey .....

Name of Data Collector .....

#### Respondent detail

1. Gender

a. Male .....

b. Female .....

**2. Educational Qualification**

None ..... Primary..... Under Metric .....

Graduate..... Masters ..... Others

<b><i>Household Socioeconomic Profile</i></b>
---

	a. Household socio economic and living condition
--	--

1. How many people live in the house?
---------------------------------------

- |  |   |
|--|---|
|  | <ol style="list-style-type: none"> <li>1. less then 5</li> <li>2. 6 to 8</li> <li>3. more than 8</li> </ol> |
|--|---|

Age	
-----	--

- |  |   |
|--|---|
|  | <ol style="list-style-type: none"> <li>1. 18-25</li> <li>2. 26-40</li> <li>3. 41-55</li> <li>4. 56-70</li> <li>5. others</li> </ol> |
|--|---|

2. What is the size of your house?
------------------------------------

- |  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>1. less then 2 marla<sup>2</sup></li> <li>2. 3 marla</li> <li>3. 5 marla</li> <li>4. greater 7 marla</li> </ol> |
|--|--|

3. Where do you cook food in the house?
---

- |  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>1. Kitchen</li> <li>2. in the open courtyard</li> </ol> |
|--|--|

4. How do you keep the food after cooking ?
---

- |  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• in the kitchen</li> </ul> |
|--|--|

- |  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>• in cupboard</li> </ul> |
|--|---|

- |  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>• in Fridge</li> </ul> |
|--|---|

- |  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• open</li> </ul> |
|--|--|

Please also use your observation and see how food is kept
---

<sup>2</sup> Plot size in local language

**Quality of Water supplied to the house hold**

What is the source of water for drinking purpose?

1. Hand pump
2. motor pumping from ground water
3. government scheme
4. neighbor
5. private vendors

How you will rate the quality of water (using what criteria??)

1. satisfactory – taste , colour , smell
2. Not satisfactory- taste , colour , smell

Write comments

Do you store water in?

1. open container
2. in a closed container

Do you boil water before use? Why should they tell you the truth – can you triangulate and cross check?

1. some times
2. always
3. never

if yes : how long your boil in minutes

what is the benefit of water boiling

1. it clean the water
2. it kills the germs
3. it take out the smell

how did you learn about the benefits of water boiling

- media
- lady worker
- neighbor
- school
- teacher
- peer
- other

**Most common diseases related to water quality – you need to interview the local health worker to get data on this**

*What diseases you have in last three months?*

Please tick which, if any, of these disease you have had in the last 3 months-

1. Diarrhea –runny stools *Dust in Punjabi*
2. Jaundice- yellow eyes *Yarqan in Punjabi*
3. typhoid- *Typhoid in Punjabi*
4. Gastroenteritis – *Pate kee bemari , pade kay dard- maroor*

Please tick which disease your children have mostly in order in last 3 month

1. Diarrhea –runny stools *Dust in Punjabi*
2. Jaundice- *Yarqan in Punjabi*
3. typhoid- *Typhoid in Punjabi*
4. Gastroenteritis– *Pate kee bemari , pade kay dard- maroor*
5. cholera

Health Attitude

Clean house is good for

1. for all people to be healthy
2. only for rich people
3. only for educated people
4. healthy life

Better and Proper Toilet is

1. for good health
2. rich people
3. good for all people to be healthy
4. not for those who can afford

Hindrance factors

Do you get information about health and healthy life from

School

Teacher

TV

Radio

Other

What did you learn/get information from these sources

1. benefit of toilet
2. benefit of hand washing
3. boiling of water
4. causes and prevention of water borne diseases

5. Other
----------

## Annex 2

### *Interview Guide*

Interview one person /household from each lane

Please introduce your self and tell them the purpose of interview

Basic information of the interview

Age ----- approximate

Educational qualification

Gender

Lane number

House number .....

- Water use in the house and how it is being use
  
- Health issues due to water
  
- What about safe disposal of feces
  
- How hand washing is practiced and how ?

## Annex 3

### Observation Tool

*Observation\_ you will need to visit one household in each lane in the community to observe standards of hygiene related to water and sanitation - including hand washing with soap and then triangulate this data with the interview data.*

1. What is the state of cleanliness of the latrine and its condition
2. What is the overall environmental and hygienic conditions in the house?
3. Overall environmental conditions in the house

What did you observe ?

- Are they putting all faeces in a toilet or latrine;

-----  
-----  
-

- Evidence if washing hands with soap and water or ash and water
- (i) after defecating
- (ii) handling children's faeces,
- before feeding children or touching food

-----

- Are they ensuring that animal faeces are kept away from the house, paths, wells and children's play areas.

-----

## **Annex 4**

### ***Interview with Doctor***

- What are the main health diseases in the area
- Which of these are related to water and sanitation
- What are the main causes of health related problems? All or just those related to water and sanitation?
- What are the behaviors which causes these health issues?
- Who is most affected and why?

## **Annex 5**

### ***Photographs***