Habits and Practices Regarding Domestic Water Usage in Lahore City

Nazma Malik*
Muhammad Aboidullah**,
Muhammad Nawaz Chaudhry***

Abstract

Lahore, with a population of more than 11 million people, is a fast expanding urban center which owes its location and its very existence to the River Ravi. To gain access to the pattern of the habits and practices of the people of Lahore regarding domestic water usage, a survey was conducted by circulating a questionnaire to 800 respondents. These respondents were randomly selected from the five localities of the city, earmarked for this purpose. Each question offered 3-5 possible answers and a set of useful conclusion was drawn from these answers. The people living in big and large houses were found to spend more water on daily routines. It is particularly so in the older localities like Gulberg and Lahore Cantonment Board. It was found that the majority, up to 50 percent in large houses, keep water tap running while brushing teeth, shaving or washing face. The same habit persists during shampooing and soaping while showering. Only 40 percent of the respondents closed the showers, sometime during this process while up to 15 percent never did that. Washing of bathroom is another regular habit and up to 100 percent respondents wash their bathrooms daily especially in big and large houses. DHA seems to be the only exception where 80 percent bathrooms were washed daily. Dish washing is mostly

done by hand with only from 2-5 percent using dishwashers. Water used for car washing, washing of drive ins and lawn watering was found to be a regular routine and mostly done on daily or on an alternative day basis.

Introduction

It is predicted that urban water utilization by world population in the year 2050 will equal total global water utilization in 2004[1].These are disturbing predictions and presage an awesome burden on urban sources, particularly the water. Global urban water utilization by people increased over 20 times during the last century. In 1900 it was 200x 10^8 m^3, in 1950 it increased to 600 x 10^8 m^3, in 1975, it was 1500 x $10^8 m^3$ while in 2000, it jumped to 4400 x 108 m^3 [2]. Habits and practices are integral part of human nature. The man acquired these traits over a long period of time as a cultural heritage and development. Water consumption patterns and practices are highly variable amongst households due to the factors of climate, socio-demographics, house size, family size, and water appliances, cultural habits and personal practices.[3,4,5,6] These habits and practices can also be developed, modified and changed through education, grooming and environments as well. It also takes lot of effort, determination, coaching and grooming to eliminate a habit or practice. Habit is some time a product of inheritance and confined to an individual, while the practice is normally a collective way of behavior in a particular instance. Residential consumers' attitudes to water conservation have become more positive and this change is paralleled by habitual shifts in water use[7,8]. Despite the growing public awareness for water conservation practices, studies have shown that people's perceptions regarding water use are often not well matched with their actual water usage. [8, 9]

Water sources of Lahore

Lahore, like most other cities of the world, has two main sources of water; Surface Water and Ground Water. Both these

sources are equally important and complimentary to each another. Although Lahorites do not use surface water directly but, it's major contribution is recharging of ground water. Lahore has three surface water sources; River Ravi flows to the north of the city, Bambanwala Ravi Bedian Link (BRBL) is an irrigation canal located on the East and South of Lahore, while Lahore canal flows through the middle of the city. Lahore canal is also an irrigation canal along with a network of distributaries and water outlets.

In Lahore, domestic water consumption is the main use of ground water and most of the ground water is extracted and utilized solely for this purpose in it's urban limits. A large quantity of ground water, in the surrounding agricultural areas, is extracted to irrigate crops, farms and gardens. The industries in the peripheral areas of Lahore city extract water from the same aquifer from which the domestic water supply is obtained. The discharge of water has to be constantly replenished through a reliable recharging process to maintain its viability. Due to a drastic reduction in the flow of River Ravi and the explosion of population, combined with a rapid and unplanned urbanization and above all a rabid and unchecked extraction of ground water, have resulted in drastically lowering of the ground water table. Today, the difference between recharge and discharge is 0.67 MCM/day (247 MCM/year) which is likely to increase further. This condition can cause a drop of 55 cm/year in aquifer level, which is bound to increase with further increase in population or additional use of water particularly in the urban limits of Lahore.[10] Lahorites in their sixties and seventies, say ruefully that in their youth one bored thirty feet (9.14 m) into the underground aquifer and got clean and drinkable water.

The main water provider agency for Lahore is Water and Sanitation Agency (WASA). It provides water to most of the city, which is more than 6.5 million people including Gulberg (a locality part of this study).WASA operates 492 tube-wells, extracting 3800 cusecs of water daily by operating them for 18 hours a day. Lahore Cantonment was just one entity till 1998 when it was bifurcated into two parts namely; Lahore Cantt Board

(LCB) and Walton Cantt Board (WCB). Defence Housing Authority (DHA) is a recent addition and Model Town Society (MTS) came into being a few years before the partition of India in 1947. The Cantonment Boards, DHA and MTS have their own water provision and supply systems

Materials and Methods

Selected localities of Lahore namely Gulberg, LCB, MTS, WCB and DHA were the target for this study. An equal number of residents from these localities were examined to obtain their views and comments on various aspects of water consumption. The results obtained revealed that education and habits are the prime factors affecting the mode of water consumption. Responses of about 800 respondents contacted for this study indicate an interesting disparity of habits and education vis-à-vis water consumption. A questionnaire pertaining to various water usages as well as the category of respondents divided by education level and house hold sizes was circulated by hand to obtain the required information. Selection of the respondents was made randomly in each locality. These localities consist of various plot size houses and differences in habits, attitudes and life styles. A bigger size of plot means a more affluent owner or occupant. It was not very surprising to find that majority of better educated persons live in comparatively bigger and larger houses. Bigger and larger houses are signs of affluence and the affluence and education have definitely a strong relationship in our part of the world.

Results and Discussion

For the purpose of this study, the sizes of houses are divided into four categories of Small, Medium, Big and Large. These sizes comprise of Small upto 10 Marlas (209m^2) Medium, 10 to 20 Marlas (209m^2- 418m^2), Big, 20 to 40 Marlas (418m^2-836m^2) and large above >40 Marlas (>836m^2) (1 Marla comprises of 25 square yards or 20.9m^2 in urban area). The percentagewise location of similar category of houses chosen for this study are depicted in table 1.

Table 1
Sizes of Households viz a viz Localities

Household size	Localities of Lahore				
	Gulberg	LCB	MTS	WCB	DHA
Small	45.2%	52.1%	40.5%	30.2%	33.3%
Medium	43.7%	31.5%	35.9%	48.8%	41.4%
Big	6.7%	10.5%	14.5%	14.0%	19.0%
Large	4.4%	5.9%	9.2%	7.0%	6.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2
Sizes of Houses vis-a- vis Level of Education of Respondents

	Education					
House size	Middle	Matric	Intermediate	Graduate	Master	Total
Small	8	48	48	24	-	128
Medium	8	40	48	32	8	136
Big	0	16	144	88	48	296
Large	8	24	64	112	32	240
Total	24	128	304	256	88	800

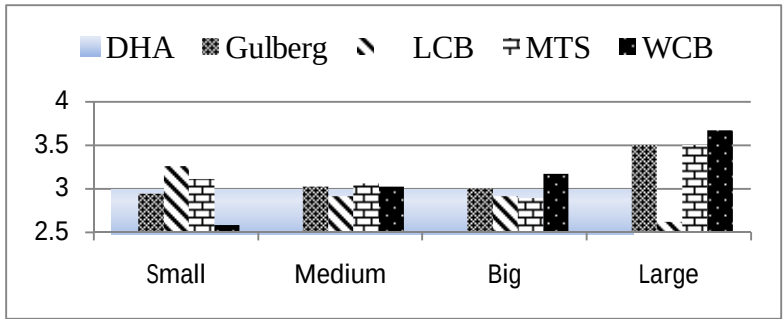
Table 2 is a reflection of the level of education of 800 respondents divided into the sizes of their household plots. As expected better educated category lives in big and large houses. When we consider the percentage of houses of various categories studied, it stands out that the people living in large houses have not only a higher level of education but, also are more in number.

Habits and Practices

Domestic Use - Indoor

The selected residents were asked simple questions, easy to answer, with minimum time and effort. Mostly, the questions asked were confined to daily domestic routines to gain basic information. The respondents were given a wider choice of five possible responses so that they could reach an answer quickly and instantly. The first question was to inquire whether the users keep water tap running while brushing teeth, shaving or washing face. The results obtained are given in figure 1. Brushing teeth, shaving and face washing is such an activity where a lot of water can be saved if the tap is not left running during the whole process.

Figure 1:
Water Usage While Brushing teeth, shaving and face washing



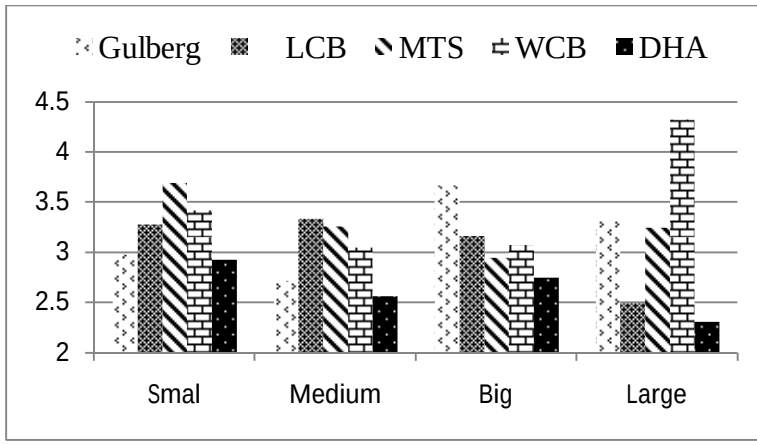
.

The actual numbers have been converted into percentage depicted through bar charts to provide an instant picture and comparison at a glance. While the results obtained from three areas of study and three categories of houses are almost similar, Gulberg and MTS pronounce a distinctive difference from others in large type of houses. Gulberg and MTS are the oldest societies in this group and so is the WCB. The elites of the city were the initial owners and dwellers of large houses in these areas. Some of them still live in large houses with their original style and habits. Most of the residents of large houses in these areas seem to be

unconcerned or least concerned with water wastage. But, since they are better educated and sensible, they can be motivated to overcome this tendency.

Bathing. Most of the people all over the world, keep water running while applying soap or, shampoo during bath. The respondents when confronted with this query had answers produced are in Figure 2.

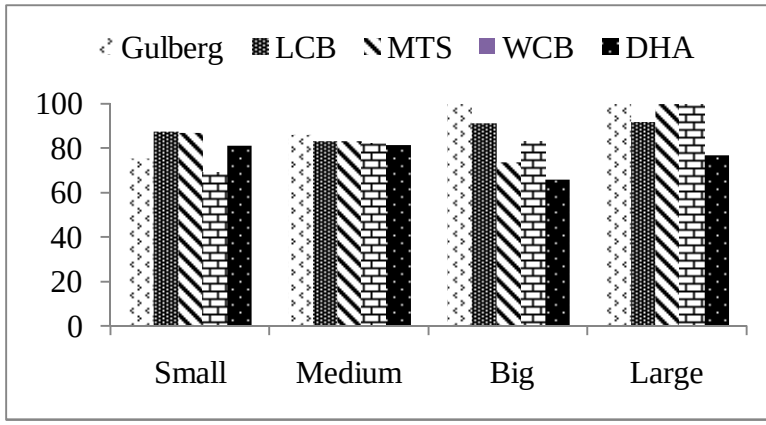
Figure 2
Water Usage While Applying Soap/Shampoo



Results are almost identical to that of previous questions. The similarity points towards some fixed and old habits of a section of population. But since it is identifiable, it can easily be corrected. Large households consume large quantity of water and hence could save a lot by rectifying their extravagant habits.

Washing Bathrooms is a regular practice. To find out how often it was done respondents were asked whether they wash their Bath rooms daily or otherwise. The answers are compiled as shown in Figure 3.

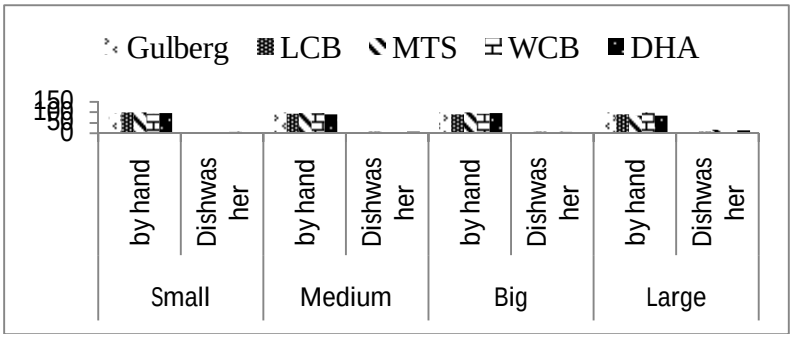
Figure 3
Frequency of Washing Bath Rooms



Pattern is constant. People with big and large houses still provide the lead and in this case 100 percent of them wash their bathrooms daily. In the case of medium houses almost all the localities share the same trend with Gulberg taking a slight lead of 5%. MTS shows the least amount of daily bathroom washing in the category of small houses up to 15% less than Gulberg and WCB. It is only the LCB and DHA where one finds some restrain in the usage of water which can be attributed to better management or better sense of awareness.

Dishwashing is an important indoor water usage. It is resorted to at least three times a day after the meals. Moreover, there is more than one method prevalent in our society to do this job alongside the availability of some modern gadgetry. The question on the subject was "which of the method is used to wash dishes". The results are shown in Figure 4.

Figure 4
Methods of Dish Washing



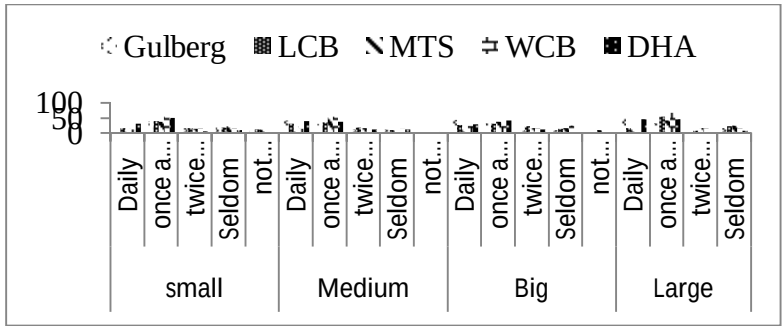
Most of households, irrespective of their sizes, wash dishes by hand. In the case of large houses, only DHA and MTS show some inclination towards using of dishwasher, that is up to 15 % to 18 % respectively. It is because use of dishwasher is not a very popular method as yet. Almost 100 percent hand washing of dishes is done in all the houses irrespective of sizes in the selected localities. Houses in affluent areas can afford to engage domestic kitchen help for all their household chores and so long as this tradition continues and help is available, the dishwasher culture will not prevail. Dish washing by hand consumes a large quantity of water because of the normal practice of leaving the water tap running during the soaping and wiping process. Water can be saved by soaking all dishes, at one time, in a bucket or tub to soap and wipe and then use tap water to rinse only. As compared to this a dish washer consumes a fixed quantity of water according to a measured scale and thus, ensures economy in the use of water.

Domestic Use – Out door

Only three types of outdoor water usages were included in this study. The first was to find out the frequency of car washing. The subsequent two questions concerned washing the drive in and

watering of lawns. The response to the first question concerning the frequency of car washing are compiled as shown in Figure 5.

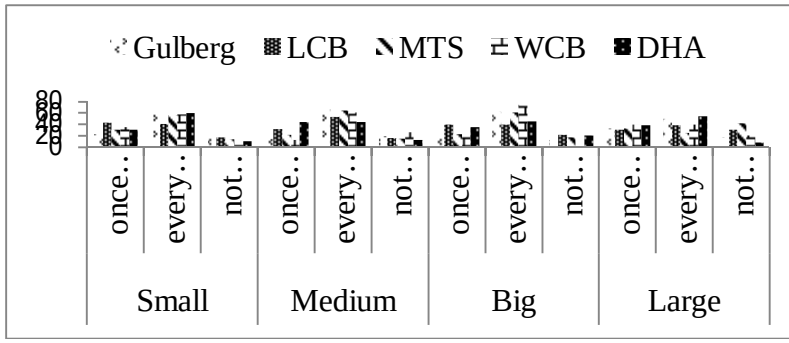
Figure 5
Frequency of car washing



A comparison between the localities and the size of household shows, that car washing is more often done daily or once a week in all localities, particularly in the DHA. 81 percent people in DHA, wash cars daily or once a week in small houses whereas, 66.7 percent do so in WCB, 51.9 percent are from MTS, 54.8 percent in LCB and 51.8 percent in Gulberg. In case of large houses, DHA again provides the lead by 92.4 percent washing their cars daily or once a week, 66.7 percent in WCB, 58.4 percent in MTS, 69.2 percent in LCB and 83.3 percent in Gulberg Big and large households practice it more often. Residents of medium category, also seems to be quite interested to keep their cars clean and tidy particularly in DHA and LCB. It could be due to large presence of Army Personals, who are known to be keen to keep their vehicles clean. Such people normally, do not own more than one vehicle.

Washing of drive ins gives a cleaner look to the house. Our people are generally more concerned to enhance and improve the entrances to their houses. When asked how often they wash their drive- ins, their response was as shown in Figure 6.

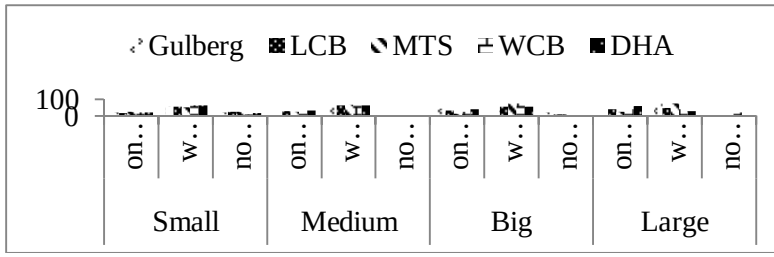
Figure 6
Frequency of Washing Drive-In



Drive- ins are essential part of the design of houses in our study area. All 10 Marla and above size houses have a drive- in built in their designs. It could vary in size and length as the size of the household increases or decreases. Washing of drive- in is normally resorted to along with washing of cars or as an aftermath of rain or storm. LCB provides lead up to 20 % in small and big houses and seems to be quite regular in washing the drive-ins of their houses, whereas DHA shows a more regular trend of washing drive -ins daily in medium and large category houses. Gulberg is at the tail with the slight exception in large houses. It could be due to the fact that large sized houses in this locality have wide and vast drive- ins, some of them served by two gates. Such vast drive- ins are normally swept only but left for the rain to wash.

The last question regarding outdoor water use was about watering of lawn. It has the same importance as washing the drive in. How often the respondents watered their lawns is given in Figure 7.

Figure 7
Frequency of Watering lawns



The observations listed under Figure 7 are almost identical to those obtained in response to the earlier question. Small houses have small lawns which do not require much watering and looking after. People from bigger size houses are more keen and concerned about the appearances of their lawns. They also use exotic species of grass and ornamental plants which use large quantity of water. The encouraging news is that only about ¼ of the total respondents water their lawns once daily, according to the answers. 2/3 of all respondents in all type of houses maintain that they water their lawns only when required. At the same time a large number from 8 to 25 percent have no lawns. Surprisingly, over here, the DHA and LCB seems to be providing the lead. However, MTS is in the lead in the large house size category. People still living in the large houses of MTS belong to the old stock of elites of Lahore who founded this society. They seem to be living in the old style and maintaining their lawns extravagantly. They leave the water pipes running in lawns over night and all days.

Conclusions and Recommendations

This study has provided ample ground and material to draw some useful conclusions and formulate a set of recommendations for the consumers in order to obtain an amicable solution and sustainability in the use of water. We will conclude the result of seven questions based on the responses, to our questionnaire

floated in this regard. Most of the consumers in certain localities, particularly in Gulberg and MTS were found wasting water by keeping the water tap running while brushing teeth, shaving or washing face as well as keeping the showers on when applying soap and shampoo. A large quantity of water can be saved by avoiding this practice. The majority of these people is educated and sensible and can be motivated. Some new water saving gadgets are also available in the market. These gadgets, fitted with sensors, are easily affordable by these people. Any change in the rate of water rent may not affect them too but, it could however, provide a useful incentive for less affluent consumer. It has been established that people with large houses are more regular to wash their bathrooms daily. Again these people are found to be better educated and can be motivated. A large quantity of water can be saved by adopting a more economical method of washing the bath rooms. Instead of using running pipes to do the job, a more economical method of mopping or wiping with wet cloth could be adopted. Dish washing consumes plenty of water by doing the job in the traditional way of using the running tap. If a bucket or tub full of water is used for initial soaking and only the final rinsing is done in the running water, would be a very useful proposition. Dishes should also be washed maximum twice a day. This change in the habit and practice will go a long way to save the useful supply of water. Cars are washed quite regularly and normally a running pipe is used for this purpose. Use of bucket and sponge would provide a good water saving solution. Drive in are also washed along with the car washing. As small and medium type houses do not have large size drive ins therefore, not much water is consumed for this purpose. However, using bucket and wiper for this purpose can be very helpful in saving water. Lawns do require plenty of water to keep them green and some people also grow exotic plants and grass which need a large amount of water in Lahore climate – hot and semi arid. However, the practice of leaving water pipes running over night in the lawns or most part of the day amounts to large wastage. The horrendous wastage of the natural resource shows that we falsely assume that it is

limitless. Such an assumption is further augmented by the nominal water supply charges. Water sprinklers, whether timed or otherwise, are useful gadget to keep the lawns green and well watered at a much lesser expenditure of water. All these motivational measures can be easily introduced to the residents of our area of study because with their educational backgrounds and sensibility, they are expected to be more cooperative and receptive.

Notes and References

* Ms. Nazma Malik, Assistant Professor, Department of Housing, Home Management and Interior Design, College of Home Economics, Lahore

** Dr. Muhammad Aboidullah, Associate Professor, Institute of Education and Research, University of the Punjab, Lahore, Pakistan

*** Prof. Dr. Muhammad Nawaz Chaudhry, Professor Emeritus,

College of Earth & Environmental Sciences, University of the Punjab, Lahore, Pakistan

1. Song, Q., Q, Zuo and F. Yang (2004). Water Problems Brought out by Citifying Construction of Measures. Journal of Water Resource and Water Engineering, 15, 56-8

2. Bao, C. and C. Fang (2007). Water Resource Constraint Force on Urbanization in Water Deficient Regions. A Case Study of the Hexi Corridor, Arid Area of NW China. *Ecological Economics* 62,508 – 17. doi:10.1016/j.ecolecon. 2006.07.013

3. Russell, S., Fielding, K., 2010. Water demand management research: A psychological perspective, Water Resources Research, 46, W05302, doi10.1029/ 2015WR008408.

4. Juárez-Nájera, M., Rivera-Martinez, J., Hafkamp, W., 2010. An explorative socio-physcological model for determining sustainable behavior: Pilot study in Germany

and Mexican Universities. Cleaner Production 18, 686-694.

5. Arbues, F., Garcia-Valinas, M., Martinez-Espineira, R., 2003. Estimation of residential water demand: a state-of-the-art review. Journal of Socio-Economics 32, 81-102. doi:10.1016/S1053-5357(03)00005-2.
6. Loh, M., Coghlan, P., 2003. Domestic water use study in Perth, Western Australia 1998 to 2000. Water Corporation of Western Australia
7. Beal, C., Stewart, R., Huang, T., Rey, E., 2011. SEQ residential end use study. Australian Water Association Journal, 38(1), 80-84.
8. Millock, K., Nauges, C., 2010. Household adoption of water-efficient equipment: the role of socio-economic factors, environmental attitudes and policy. Environmental Resource Economics, 46, 539-565
9. Hamilton, L., 1985. Self-reported and actual savings in a water conservation campaign. Environment and Behavior 17(3), 315-326. doi:10.1177/ 0013916585173003
10. Qureshi, D. A., author, C., & Sayed, A. H. (2014). Situation analysis of water resources of Lahore Etablishing a case for water stewardship