

Knowledge, Attitude And Practice Of Mothers Regarding WASH And Its Impact On Children Under Five: A Study Of District Gujrat, Pakistan

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ABSTRACT

Mothers are the primary caregiver to their children's hence the care is dependent on their level of knowledge, attitude, and practice (KAP) in daily life activities. Within the family context, children are strongly associated with their parents especially mothers and the careless practices by mothers during the first thousand days have long term synergic impacts on physical growth and cognitive development of children. Normally mothers play multidimensional roles, as the care of family members especially under five children such as maintaining hygienic and sanitary conditions, feeding them, treating their faces, blowing their nostrils, among many others. On the other hand, they are responsible for general housekeeping as preparing meals, cleaning, ensure healthy food and safe drinking water, retaining sanitary and hygienic environment for the family members. Poor knowledge, attitude and practice of mothers regarding WASH are one of the most imperative causes for transmitting of infectious and respiratory diseases. The early years of a child are more sensitive and at risk every time. A vicious cycle of diseases related to unhealthy WASH practices can effect and even accelerate morbidity and can cause for sensational loss of potential and numerous valuable lives. In this context, the study examines the role of mother's knowledge, attitude and practices regarding WASH and its impacts on children less than five years of age. The primary data was collected from district Gujrat (Pakistan) through stratified random sampling. The hypotheses of the study were tested with smart PLS-3. Findings of overall sample of the study have revealed that the mother's knowledge, attitude and practices regarding WASH have significant impacts on child Health (CH).

Keywords: knowledge, attitude, and practice, stratified random sampling. Infectious and respiratory diseases, water and sanitation, hygiene, Child Health, smart PLS-3, Gujrat, Pakistan.

1. Introduction

Mothers are the primary caregiver to their children's hence the care is mostly dependent on their level of knowledge, attitude, and practice (KAP) in daily life activities. Within the family context children are strongly associated with their parents especially mothers and the careless practices by mothers during the first thousand days have long term synergic impacts on physical growth and cognitive development of children (WHO, 2019). Normally mothers play multidimensional role in their families as the care of family members especially under five children such as maintaining hygienic and sanitary conditions, feeding children, treating their faces, blowing their nostrils, among others. On the other hand they are responsible for general housekeeping as preparing meals, cleaning, ensure healthy food and safe drinking water, retaining sanitary and hygienic environment for the family among others (Gizaw et al. 2019). Poor knowledge and practice of water and sanitation, hygiene (WASH) among mothers play a vital role in transmitting infections and respiratory diseases which are the leading cause of morbidity and mortalities in under five children (Yazie et al., 2019). The early years of a child are more sensitive and at risk every time (WHO, 2019). A vicious cycle of diseases related to unhealthy WASH practices can effect and even accelerate mortality, along with health impacts; there is sensational loss of potential and numerous valuable lives (Hall et al., 2020).

Children under the age of five years generally spend most of their time at home with their guardians, especially mothers, even when they attend preschools or nurseries. These years involve primary socialization including social, physical, dietary habits along with behaviors and attitude regarding their daily life activities (Wichaidit et al., 2019). Poor knowledge, attitude and practice of mothers regarding WASH are one of the most imperative causes for transmitting of infectious and respiratory diseases (Almas et al., 2020). The knowledge and practice regarding WASH in families and the communities is poor even today (Chauque et al., 2021). Although people around the world claim that they are aware and adopted improved WASH practices, but the empirical evidence (Zywert, 2017; Martinez et al., 2017; Webb et al., 2018; Moreno, 2020; Ghosh et al., 2021) shows difference in their knowledge and practices. Water and sanitation, hygiene (WASH) related diseases continue to be the major contributor in health issues and stand at the second highest leading cause of global child morbidity and mortality (WHO, 2020). According to world health organization (WHO) estimated 5.2 million children less than five years died every year mostly from preventable causes (WHO, 2019). The leading causes of these deaths are infections, diarrhoea, malaria, pneumonia, congenital anomalies and all of which can be prevented with access to simple, affordable interventions including adequate nutrition, safe water and sanitation, improved hygienic and food practices (UNICEF, 2019).

Globally, there are billions of avoidable diarrheal and parasitic diseases reported and millions of children die every year before turning five years, due to unawareness of basic health care hygiene practices, unsafe drinking water and sanitary conditions, which are practiced by the individuals and families (WHO, 2019). Whereas one third out of total children's death cases occur in South East Asia, which is the highest child mortality and morbidity rate in the world (UNICEF, 2018). Inadequate access to drinking water combined with meager sanitation and unsafe hygienic

practices (personal, environmental, food) have detrimentally impacted the health of individuals and families. It is also the major source of transmission of number of chronic diseases such as, diarrhea, hepatitis, stunting, polio, typhoid, and skin infections among many others in the communities especially among the children below five years of age (WHO & UNICEF, 2019). Water and sanitation, hygiene (WASH) related diseases and infections continue to be the major contributor in health problems and stand the second highest leading cause of mortality & morbidity among the children. World Health Organization estimated about 5.2 million children below five years die every year, mostly from preventable viral and infectious diseases. Beside this, globally there are billions of (about 1.7 billion) cases reported only of diarrheal diseases which are responsible for at least 1.9 million under-five death reported due to this (WHO, 2019). The leading causes of these deaths are infections during & after birth, diarrhoea, malaria, cholera, hepatitis and typhoid among many others. This chronic condition can be controlled and improved by providing access to adequate nutrition, safe water, sanitation and dietary practices. Water and sanitation, practices (WASH) are also linked to many other diseases including malnutrition and stunting, internal & external infections, polio, trachoma, cholera, arsenicosis, giardiasis, ascariasis, and lead poisoning among others (Saroj et al., 2020).

In developing countries like Pakistan, unsafe safe water and sanitation hygiene are major challenges and the largest hindrance towards improving health and development (United Nation, 2020). Poor WASH conditions and practices expose a plethora of infectious and viral diseases that incapacitate and significantly affect the health and reduce productivity (WHO, 2017). Although Pakistan has shown some progress in recent decades in improving access to basic facilities of safe drinking water and provide improved sanitation, but the country still remains plagued by extremely low level of water, sanitation and hygiene conditions. Nearly 25 million individuals do not have access to basic facilities of drinking water which negatively impacts physical and cognitive growth of children (WHO, 2017). According to Demographic Health Survey in Pakistan, there is very little improvement observed in mortality rate during the last two decades as it has changed from 56 to 46 per 1000 live births. Pakistan is among the top three countries, where high incidences of child mortality and morbidity are reported annually. Less than five mortality rate is 74 deaths per 1000 live births. This means that approximately one in every 14 children in Pakistan do not survive to their fifth birthday (Naz et al., 2021). However, this irreversible loss of young lives could be reduced or saved every year if mothers have awareness, improved knowledge, attitude, practice and behaviour regarding WASH (Cooper, 2019). Nearly all of the most pressing community development issues could be prevented or improved if individuals change their behaviour in everyday life (Sands et al., 2021).

Improving health conditions and overall wellbeing of children is the utmost objective of families and countries. Despite huge socio-economic investment and utilization of resources over the years, the desired results could not be achieved, especially in developing countries. In Pakistan, the situation is more alarming, as a huge number of its population lives below the poverty line (Jabeen, 2020). Numerous communicable and non-communicable WASH related diseases affect communities in resource poor settings in both tropical and sub-tropical conditions (UNICEF,

2019). In addition to high death rate, there is also a major social and economic loss that can cause long lasting impacts and troubles to child health. Without better understanding, importance and complexities of mother's knowledge, attitude, practices (KAP) and behaviour change in daily life, desired results may be thwarted. Keeping in mind the above scenario, it can be assumed that the lack of basic knowledge and practices among mothers, have significantly affected children under-five and create largest hurdle towards sustainable community development. Therefore an in-depth evaluation is carried out to know, that the integrated behaviour change intervention can change the behaviour of individuals and can play its role in achieving the target of sustainable community development. This also encourages and moulds certain behaviours of individuals, families and communities related to their social, cognitive and physical health. Therefore, it is major objective of this study and researcher comprehensive analyzed the mother knowledge, attitude and practices regarding WASH and its impacts on child health. The prime objectives of this study are as following

- To assess the WASH situation and knowledge of mothers in the target communities.
- To examine the attitude and WASH practices of mothers in intervened and non-intervened communities.
- To understand the impacts of knowledge and practices of WASH on child health and sustainable community development.

2. Conceptual Framework

The conceptual framework was established and empirically tested in this study. Adequate knowledge, attitude & practice (KAP) of mothers regarding water and sanitation, hygiene (WASH) can change the behaviour and have significant impacts on child health. The following conceptual framework elaborates the flow relationships among background variables as geographical, demographic and economic factors that have impact on knowledge, attitude and practices of mothers at household level and also constitute direct link with WASH. It also directly influences child health especially under-five children and their psychological, cognitive health and socio-economic wellbeing.

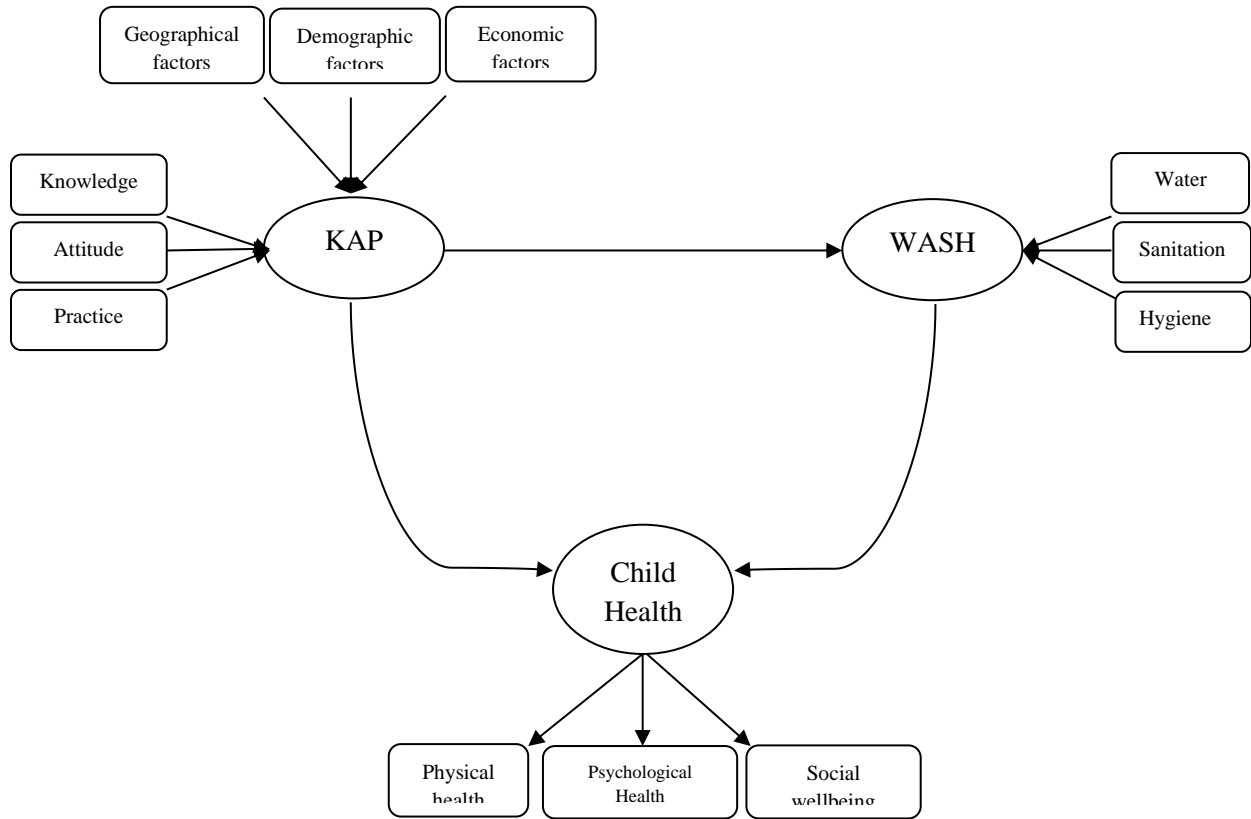


Figure 1: Conceptual framework of the study

3. Hypotheses of the Study

Throughout the world, especially in poor countries mothers are the primary caregiver to their children, and the care depended on their knowledge attitude and practice in daily life. In general, mothers are observed to put their best efforts and form a positive attitude towards safe WASH practiced and tried to follow according to their knowledge and socio-economic conditions. However, in reality the issue revolves around the behaviours as at first mothers have appropriate knowledge regarding safe water and sanitation, hygiene practice and its relation with the health of family members especially with children under five. Secondly if she have improved knowledge, whether her attitude practices and behaviour is according to the knowledge or there is a gap between knowledge and practices. As such, existing studies elaborated the significant difference between knowledge and behavioral practice of mothers in daily life and child health perceptive. By retaining the focus on mother's knowledge, attitude and practice regarding water and sanitation, hygiene and child health following hypothesis were proposed.

H1. Higher the level of knowledge, attitude and practices higher the level of safe water and sanitation, hygiene (WASH) practices

H2. Higher the levels of safe water and sanitation, hygiene (WASH) practice, higher level of child health

4. Methods and Material

An explanatory research designed with quantitative techniques to investigate the relationship among KAP of mother regarding WASH and its impacts on child health. The survey technique and method were adopted to collect primary data from target communities, to check underlying factors contributed for mother knowledge, attitude and practices. A structured questionnaire was developed with the questions regarding demographic or background characteristics and by incorporating of knowledge, attitude and practice (KAP), water and sanitation hygiene (WASH) and child health (CH). Population of the study was comprised of the mothers living in the area (Urban & Rural) of district Gujrat. Unit of analysis was those mothers who have minimum one child below the age of five years and these mothers living in urban or rural areas of district Gujrat since one year.

The sampling frame was developed after obtaining the list regarding child birth registration with the name and home address. That list was obtained from Local Government and Community Development Department Gujrat (LG & CD, 2022) and contained complete registration record of last five years (January 2016 to December 2021). According to the birth registration record, there are 2, 96, 720 child birth registered in the district, during the period of last five years. Available birth registration data explains that there are large numbers of women who have more than one during the period of last five years. After complete scrutiny, there were 1, 73, 169 mothers from whole district Gujrat, who were considered for this study.

A stratified multistage random sampling strategy was used for selection of sample in the present study. For this purpose, total 129 union councils (UCs) of district Gujrat are stratified into three strata according to their characteristics. Stratum one contains 26 rural union councils where Government of the Punjab and its alliance international organization (UNICEF) carried out awareness and behaviour change program (PATS) regarding water and sanitation, hygiene (WASH). Stratum two contains 28 urban union councils of the district while stratum three contains remaining 75 union councils of rural areas of the district. In stratum two and three, no awareness and behaviour change programs have been carried out with respect to WASH. A sample of 13 union councils is proportionally allocated, to each stratum, three UCs from stratum one, three UCs from stratum two and seven UCs from stratum three were selected respectively. From the selected 13 union councils, the wards of these union councils were considered as secondary units and a sample of randomly one ward from each union council were selected and completely investigated by the lists of children (Mothers) below the age of five years.

Table 1: Sampling flowchart

26 UCs with WASH interventions (Intervened)	Total 129 UCs		Strata
	28 UCs from urban areas	75 UCs from remaining rural areas (non-intervened)	
3 UCs	3 UCs	7 UCs	1st stage/Primary sampling units, through proportional allocation
3 Wards	3 Wards	3 Wards	Secondary sampling units

For accurate determination of sample size Taro Yamane (1976) formula and sample was drawn by using confidence level of 95% and 5% sampling error. Various survey experts as Thomas (2001) opine that there is the issue of non-response (Approximately 30%) observed in life and health surveys, which reduced the sample size of studies and badly impacted on result outcomes. To deal the issue of non-response researcher include over sample size by 30%.

$$n = \frac{N}{1 + Ne^2}$$

Where

$$n = 173169 / (1 + 173169 (0.05)^2)$$

$$n = 173169 / (1 + 173169 (0.0025))$$

$$n = 173169 / (1 + 43.92)$$

$$n = 173169 / (43.92)$$

$$n = 400$$

Total sample size + 30% Non-response

$$400 + 120 = 520$$

A pre-coded structured questionnaire was the main research instrument for collection of primary information. The questionnaire covered close-ended questions for gathering information regarding KAP of mothers regarding WASH in its relationship with child health. The pre-testing of research instrument was done to assess the validity and reliability. For this 45 respondents were approached. After pre-testing the collected data was entered in SPSS, and to check the instrument reliability Cronbach's Alpha was applied.

Table no 2. Values of Cronbach's Alpha test

Name of Factors	Cronbach's Alpha	No of Items
Knowledge, attitude and practice	0.900	21
Water and sanitation, hygiene	0.960	19
Child health	0.859	14
Overall Reliability	0.924	77

The results in above table present the overall reliability of coefficient was 0.924 that was greater than 0.8. The results reflect very good reliability coefficient suggesting that data was reliable.

For the collection of primary data, this study employed household survey methods and techniques. The list of respondent mother has already obtained from LG & CD department Gujrat. In rural areas female respondents usually feel hesitated or shy to sit for interview and response properly especially in case of male enumerator. To avoid the said situation, researcher got helped from the field staff of population welfare department (PWD), Gujrat and opted three teams for data collection. Each team was consisted on three persons as two female and one male member. The whole process of data collection was completed during the period of December 2021 to May 2022. The proposed sample size of this research study was 520; however, researcher got 502 completed or acceptable questionnaires, which is highly acceptable response in social survey research. Overall response rate was very positive and respondents cooperated in maximum cases, while some minor issues were also faced by the field teams as the rejection or leaving the interview incomplete or skipping questions by some respondents.

Subsequent to the completion of data collection procedure, collected data was edited coded and entered into SPSS for further descriptive and inferential analysis. Descriptive results presented in tabulation form which shows percentages and frequencies for easy understanding and discussions. Furthermore, numerous bivariate and multivariate analyses were run to predict the impacts of dependent and independent variables. For imperial results this study has resorted to applying advance statistical analysis used variance based structural equation model (VBSEM) by using smart partial least square (PLS-3.0) software.

5. Data Analysis

The prime objective of this study is to examine the association between knowledge, attitude and practice (KAP) of mother regarding water and sanitation, hygiene (WASH) and its impacts on child health. To understand the actual situation, researcher has used descriptive, univariate and bivariate analysis, through advance statistical software's as SPSS 21, smart PLS-3 among others. For the rational discussion and coherent explanation of the study findings, it is necessary to have deep understandings regarding the responded socio-demographic profile. Table 3 highlighted that out of total 502 respondents' maximum mothers who have one or more under five children fall in between the ages of 25 to 44 years.

Based on collected data maximum respondent 310 (61.7%) were possess educational qualification of up to matriculation to intermediate level. As far as the income level and occupation of respondents were concerned the large portion of respondents 363 (72.3%) were housewives. As most of the respondents spend their daily life as housewives and perform domestic responsibilities, so they do not have their personal monthly income. Thereafter, the highest number of respondents 454 (90.4%) were married and lived with their husbands and there are 289 (57.6%) respondents who belong to joint family systems and a big portion as 169 (33.7%) belonged to nuclear family system.

Table 3: Distribution of age, education, occupation and monthly income of respondents

Demographic characteristics	Description of Characteristic	N	%
Age of Respondents in years	18-24	54	10.8
	25-34	254	50.6
	35-44	165	32.9
	45-54	29	5.8
	Total	502	100
Respondents Qualification in years attend school	1-5	56	11.2
	6-10	190	37.8
	11-12	120	23.9
	13-14	81	16.1
	15-16 or Above	55	11.0
Total	502	100	
Occupation of respondent	House Wife	363	72.3
	Job (Govt/Private)	98	19.5
	Agricultural/ Labour	29	5.8
	Personal Business	12	2.4
	Total	502	100
Respondent's Monthly income in rupees per month	Nil	363	72.3
	Below 10000-20000	56	11.2
	20001-40000	58	11.6
	40001-60000	25	3.0
	60001 or above	20	2.0
Total	502	100	
Marital Status	Married	454	90.4
	Widowed	33	6.6
	Divorced	15	3.0
	Total	502	100
Family System	Nuclear	169	33.7
	Joint	289	57.6

Extended	24	4.8
Single Parent	17	3.4
Any other	3	0.6
Total	502	100

As the results in above table 3 show that the largest portion of respondents belong to joint family system, further table 4 explains that there are 295 (58.8%) respondents reported they have 4-7 family members. Similarly 455 (90.6%) respondents have one or two child below the age of five years. The number of family members and number of children play a vital role in performing daily life activities of a mother and have direct impact with her personal and family life. To conduct the study on knowledge, attitude and practice regarding water and sanitation, hygiene researcher tried to describe the existing situation of health and asked regarding last 12 months health conditions. Out of total 502 respondents 304 (60.5%) respondents reported that their children had health issues during the period of last 12 months. There are 282 (56.1%) respondents who have 10000 – 50000 expenditure on medication during the last 12 months.

The mothers were asked regarding physical condition of their children, whether height and weight of their children is according to their age. A large portion of respondents 348 (69.3%) reported that according to their understanding the height and weight of their children were according to their age. When respondents were asked for more details regarding physical issues of their children, there are 71 (20.4%) reported weight issues, 173 (49.7%) reported height issue. While 65 (18.7%) respondents felt that their children faced both height and weight issues. The findings of the studies are in line with the findings of Pakistan demographic and health survey 2017-18, which indicate that every third child in Pakistan is stunted and does not reach appropriately according to their height and weight (PDHS, 2017-18).

Table 4 Total family members and total children under five years of age in respondent family

Demographic characteristics	Description of characteristics	N	%
Total Family Members	2-3	71	14.1
	4-5	158	31.5
	6-7	137	27.3
	8-9	72	14.3
	10 or above	64	12.7
	Total	502	100
Children under five years of age	1	243	48.4
	2	212	42.2
	3	45	9.0
	4	2	0.4
	Total	502	100
		Nil	67

	Children	304	60.5
Health issues faced by family members during last 12 month	Elder Family Member (Male, Female)	78	15.5
	Adult Family Member (Male, Female)	48	9.6
	Any other	5	1.0
	Total	502	100
Expenditures on family medication in rupees over 12 months	Nil	194	38.6
	10000-25000	196	39.0
	25001-50000	86	17.1
	50001-100000	16	3.2
	100001 or above	10	2.0
	Total	502	100
Is physical condition (Height & weight) of your child according to age	Yes	154	30.7
	No	348	69.3
	Total	502	100.0
If no, than what is the problem do you feel	Under Weight	71	20.4
	Under Height	173	49.7
	Both Height and weight issue	65	18.7
	Weakness	39	11.2
	Total	348	100.0

The results of descriptive statistics presented in table 5 shows that the education as background variable has its impacts on all dependent variables of the study. With the higher level of education mothers has better knowledge, attitude and practices regarding in daily life activities. The results indicates that with higher education level the knowledge, attitude and practices of mother have improved and have significance (0.000) relationship. The findings present that water and sanitation, hygiene have positive relation with education level of the respondents and have significance (0.013) impacts. Similarly the education level of respondents has impacts on child health (CH). The result indicates that the increase of education level of respondents have positive significance (0.036) relations with the child health.

Table 5 Education (background variable) of the respondents and its relationship with dependent variable of the study

		1-10		11-14		15 or above		Total		Asymp. Sig. (2-sided)
		N	%	N	%	N	%	N	%	
<hr/>										

KAP	High	111	45.1	131	65.2	41	74.6	283	56.4	0.000
	Medium	81	32.9	63	31.3	13	23.6	157	31.3	
	Low	54	22.0	7	3.5	1	1.8	62	12.3	
	Total	246	100	201	100	55	100	502	100	
Pearson χ^2 (14.790), significant at $p < .05$										
WASH	High	103	41.9	102	50.7	34	61.8	239	47.6	0.013
	Medium	101	41.0	69	34.4	12	21.8	182	36.3	
	Low	42	17.1	30	14.9	9	16.4	81	16.1	
	Total	246	100	201	100	55	100	502	100	
Pearson χ^2 (12.342), significant at $p < .05$										
CH	High	73	29.7	121	60.2	41	74.5	235	46.8	0.036
	Medium	136	55.3	77	38.3	13	23.7	226	45.0	
	Low	37	15.0	3	1.5	1	1.8	41	8.2	
	Total	246	100	201	100	55	100	502	100	
Pearson χ^2 (16.444), significant at $p < .05$										

The respondents of the study were from three different strata and it is assumed that these background variables have direct impacts on dependent variable of the study. The statistical distribution of data shows that respondents from urban areas of district Gujrat have high understandings regarding knowledge, attitude and practice. The finding shows the positive significance (0.006) relationship among the knowledge attitude and practice of the respondents and their area of living. Living areas of the respondents also have impacts on water and sanitation, hygiene (WASH). This relationship has very strong and positive significance (0.000) and also supports the hypothesis of the study. Similarly respondents reported regarding the health conditions of their under five children, the response from urban areas and from rural intervened areas were very close as compared to the respondents from non-intervened rural areas. The significance (0.000) relation of these variables also strongly supported the hypothesis of this study.

Table 6 Relationship among living area of respondents and its impacts on different variable of the study

		Urban		Rural (Intervened)		Rural (Non-intervened)		Total		Asymp. Sig. (2-sided)
		N	%	N	%	N	%	N	%	
KAP	High	86	67.1	77	56.2	117	49.4	280	55.8	0.006
	Medium	42	32.9	58	43.3	109	46.0	209	41.6	
	Low	0	0	2	1.5	11	4.6	13	2.6	

	Total	128	100	137	100	237	100	502	100	
		Pearson χ^2 (14.509), significant at $p < .05$								
WASH	High	94	73.4	102	74.5	23	16.1	219	43.6	0.000
	Medium	33	25.8	35	25.5	129	54.4	197	39.3	
	Low	1	0.8	0	0	85	35.8	86	17.1	
	Total	128	100	137	100	237	100	502	100	
		Pearson χ^2 (236.812), significant at $p < .05$								
CH	High	111	86.7	109	79.6	137	57.8	357	71.1	0.000
	Medium	17	13.3	28	20.4	58	24.5	103	20.5	
	Low	0	0	0	0	42	13.7	42	8.4	
	Total	128	100	137	100	237	100	502	100	
		Pearson χ^2 (70.939), significant at $p < .05$								

Below table 7 presents the frequency distribution of all considered variable and presents in three categories as high, medium and low. Out of total 502 respondents 47.2% respondents have high level of knowledge, attitude and practice, 32.0% medium and 21.8% fall low category. Similarly water and sanitation, hygiene related condition and practice there are 43.6% respondents who have high level WASH practice, 39.2% medium and 17.1% reported low. When the respondents were asked about their child's health condition there are 32.5% respondents having high level understandings and 39.2% medium and 20.1% reported low level of child health conditions and practices.

Table 7 Overall frequency distribution of respondent's of the study

	High	Medium	Low
KAP	47.2%	31.0%	21.8%
WASH	43.6%	39.2%	17.1%
CH	32.5%	47.4%	20.1%

5.1 Association Analysis of the study

The study has multiple variables which have impacts on each other. To check their impacts association checked among independent and dependent variable and results presented in table 8 below as this defines a rectangular array of different numbers which provide association among knowledge, attitude and practice of mother with water and sanitation, hygiene (WASH) and child health (CH) in the study. Association test runs through cross tabulation by statistical package of social science (SPSS) and results shows the estimating values between various variables and with the significance value (2-sided). The main hypothesis of the association test is considered that if

the observed significance values of the variable are less than 0.05, we can say that association exists between the tested variables.

The findings in below table presents the measurement as knowledge, attitude and practice (KAP) has association with water and sanitation, hygiene (WASH) the significance value among both variables is 0.000 which shows there are high association exists between both considered variable and similar results were found with child health (CH). On the basis of association test we can say that the KAP is highly associated with WASH and CH as presented in table with significance level at 1%. While water and sanitation, hygiene also have association with CH and these variables are significant at the level of 5%. The results of association test as mentioned in table indicates that all variables are interrelated and change in single type of variable can have direct and indirect effects on others.

Table no 8. Association among various variable (Pearson Chi-Square, Value and Asymp.sig-2sided)

	KAP	WASH	CH
KAP			
WASH	27.757**		
CH	55.984**	40.109*	

i. * Significance value at 5% level ii. ** significance value at 1% level

5.2 Test of ANOVA

In most of the cases the test of anova was used to check and compare the equality of three or more than three means, however when the anova test is used for the means from only two samples, it is considered a t-test and compare means of independent variables. In this study anova test is used to understand that whether all variables considered in this study are equally important according to the living areas of the respondents or not. The hypothesis of anova test is “Ho” is considered that all the types of living areas have equal effect on considered variables and “Ha” is that there is different effect on overall variables. The below table 9 presents the significance value of all considered variable which is less than assumed “P” value so the “Ho” is rejected and the “Ha” is considered accepted. On the basis of this statistical test we conclude that the observed averages of different areas are not same and also don’t have equal impacts on all KAP, WASH and CH.

Table no 9 Test of ANOVA with living area of respondents as predictor

Area of respondents		Urban	Rural	Rural (Non-	F	P
		Mean (SD)	(intervened) Mean (SD)	intervened) Mean (SD)		
Area of respondents	KAP	1.4 (0.42)	1.6 (0.52)	1.6 (0.49)	5.86	0.003
	WASH	1.5 (0.51)	1.6 (0.35)	2.9 (0.73)	312.82	0.000
	CH	1.6 (0.50)	1.8 (0.54)	1.7 (0.52)	5.63	0.004

5.3 Confirmatory Factor Analysis

Before the testing of model and run inferential statistical test as structure equation model, confirmation of factors is compulsory. Through confirmatory factor analysis researcher confirm the most suitable indicator for considered variables and remove all indicators which have less or weak relationship. In present study researcher selected smart PLS 3.0 software for this purpose and try all indicators of variable one by one. Only the most appropriate indicators which have strong impacts as consider for further analysis.

5.4 Structure Equation Model (SEM)

In social science research variance based structure equation model is one among the most suitable method for measuring complex relationship among variables. Structure equation model approach also assists in calculating results and hypothesis testing from the proposed theoretical model of the study. For the measurement of complex models smart PLS is one of the suitable tool, as the researcher test this study model with the help of smart PLS. The results of fitted model are presented in below graph that indicated that knowledge attitude and practice of mothers have significance positive impacts in water and sanitation, hygiene practice in daily life activities. Similarly the measurement of all other variables and their impact level upon other also presented in given graph.

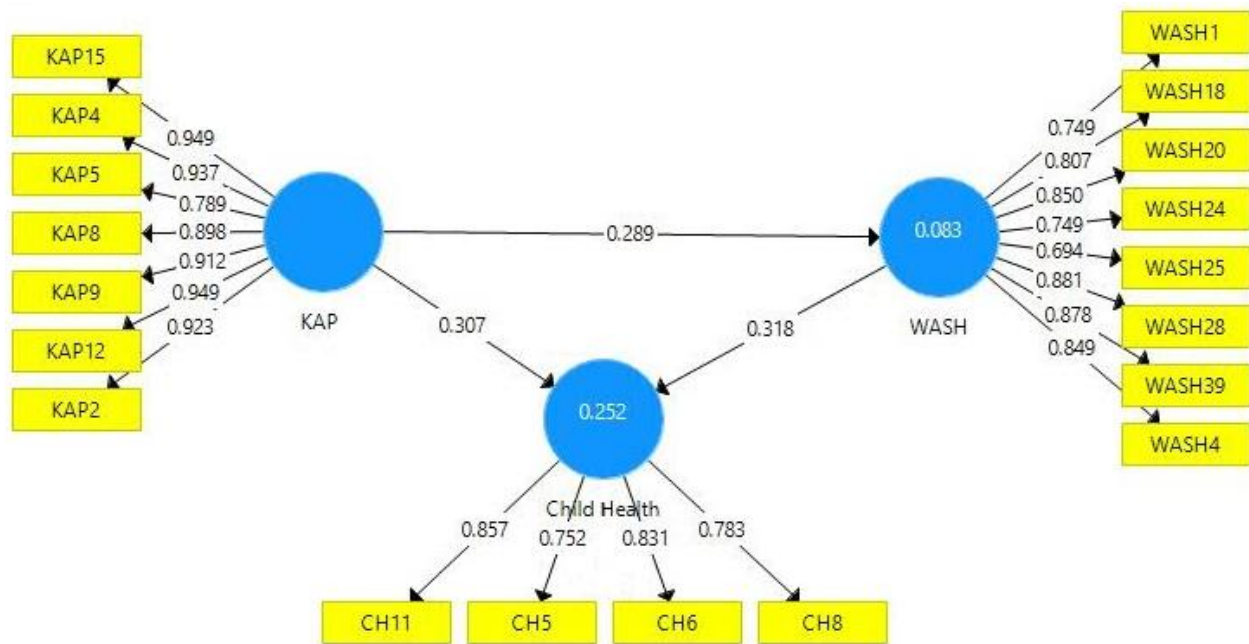


Figure 02: Fitted model and path results (β-values)

The above figure presents the calculated values of all indicators which are most suitable (β-values more than 0.60) for each variable of the study. This also highlights the appropriate loadings of related indicators which are theoretically advised with the variables. The model of the study is

calculated for confirmation that item measures the variable they were expected to measure and ascertaining the study instrument is reliable. Furthermore the basic objective of model testing is to assess and diagnose the relationship between underlying and observable variables. It becomes very important to finalize the most suitable indicators for ensuring accuracy of study variables which include for further validity and justification.

Finding of this study approved and strongly supported the assumptions of considered theoretical model of the study. The results of structural equation model endorsed that knowledge; attitude and practice of mothers have positive influence on water and sanitation, hygiene practices. Similarly, the study finding explains that there is very strong and positive relationship between knowledge, attitude and practices of mother and child health. The study findings also in line with the existing literature (Sarah et al., 2018; Hussain et al., 2020; Sharma, 2021) that The mothers are primary care giver to their children; hence the caring practice of mother depends on the knowledge, practices and behaviour in daily life activities. This leads to suggest that individuals who have knowledge, awareness and positive attitude can practice more safe WASH activities in their daily life and can prevent their children from various viral/infectious diseases.

Smart PLS facilitates the variance based structural equation modeling, deriving the model fit statistics from the discrepancy existed among the approximated and observed values of the dependent variable of the study and with the values predicted by the model. The findings for estimating the goodness of fit value which was found within prescribed limits as Chi-square (2425.881), d_ULS (1.173), d_G (0.923), NFI (0.825) and SRMS (0.052). On the basis of these findings, it is suggested that the higher level of knowledge, attitude and practice of mother regarding WASH can improve health conditions of children under five.

5.5 Direct Hypotheses testing analysis

To generate the path coefficients and testing the study hypothesis algorithm was processed on smart PLS-3. Bootstrapping method with 5000 bootstrap was applied which is basically larger than actual sample size of study for meeting the suggested conditions and generating t-values by Squillacciotti et al (2008) Hair et al. (2012), Ahmad (2012). The bootstrapping technique presented in table 10 which explains that the first hypothesis (H1) have positive significant relationship among knowledge, attitude and practice of mother with water and sanitation, hygiene at 0.000 significance level with ($\beta=0.250$, $t=4.746$, $p<0.000$). Study model presents the flow diagram and results proved that improved mother knowledge positively impacted attitude that leads safe practice regarding drinking water, sanitary and hygienic. It also claimed that this sort of relationship is life-changing and behaviour making in some cases and definitely impacting on the life of whole family especially on the children less than five years of age.

Similarly the second hypothesis (H2) was also have positive relationships and supported our assumptions as water and sanitation, hygiene and direct impacts on child health at 0.002 significance level with ($\beta=0.158$, $t=3.066$, $p<0.002$). Findings endorsed the flow relationship presented in conceptual model of the study and revealed that WASH has direct and significant relation with child health and the change in one variable have significantly impacted the other one.

Table 10 Direct hypothesis relationships (H1, H2)

Sr. No	Hypothesized Effect	Path coefficient	Standard Error	T-Value	P-Value	Decision
H1	KAP>WASH	0.250	0.053	4.746	0.000** *	Supported
H2	WASH>CH	0.158	0.051	3.066	0.002** *	Supported

i. ***: P<0.01, ii. **:P<0.05, iii *:P<0.1

6. Discussion and Conclusion

This primary stud investigates the knowledge, attitude and practice of mother regarding WASH and its impacts on children under the age of five years. Basically this study is the part of comprehensive study on integrated behaviour change intervention for sustainable community development; a KAP study of WASH in district Gujrat, Pakistan. Overall findings of the study highlighted that there is a positive significant relationship between mother’s knowledge, attitude and practice regarding water and sanitation, hygiene. These findings of the study are in line with previous findings (Mshida et al., 2018; Berhe et al., 2020). These findings aligns with the theory of planed behaviour (TPB) and theory of reasoned action (TRA), which support the arguments that knowledge, attitude and practice of mothers may affiliate with the behaviour and practice of WASH in daily life. Results also indicate that knowledge, attitude and practice (KAP) of mother regarding WASH have significant impact on child health (Seymour et al., 2021; Moreno, 2020; Andreas et al., 2018)

After the testing of conceptual model of the study, the results are similar to the findings reported for the overall sample. For example significant relationship emerged with respect to Knowledge attitude and practice with water and sanitation, hygiene. The effect of WASH as mediation factor between knowledge, attitude and practice with child health was found. This shows that there are certain amount of KAP related factors that contribute in attaining the improve conditions of child health. Therefore the findings of the study are contrary to the existing available literature (Buda et al., 2018; Yazie et al., 2019) that argued the importance of improved knowledge and practices at individual level have significant impacts on the health of individual’s especially on children under five. On the contrary, the results of the study verify that there is universality in certain factures, virtues, traits, norms among others and these are equally relevant among the population of all considered stratum.

Nonetheless, the significance values in overall results differ from one another, and the difference of impacts of knowledge, attitude and practices on child health linked with the mediating as water and sanitation hygiene. The difference of impacts on said factors arises from each subsample to overall sample of the study and the aggregation effects makes the significant impacts when all responses considered together. For example the relationship of knowledge, attitude and practice are found poor significance with WASH and CH in non-intervened stratum, while it was found highly significant in intervened village and in overall results of the study. The integrated behaviour

change interventions in intervened stratum may enhance the significant level among factors. More precisely it is well known fact that behaviour change awareness has direct impacts on individual's daily life behaviour and practices regarding water and sanitation, hygiene and child health.

7. Scope, Limitation and Delimitation of the Study:

Alongside the strengths, there are certain limitations observed in every research activity. Government of the Punjab and UNICEF carried out behaviour change intervention regarding water and sanitation (WASH) in 36 districts of Punjab. This study was limited and covered only district Gujrat; because the behaviour change intervention was carried out only in far away rural areas where open defecation ratio is supposed to very high. Being a student, and due to financial, time and resources constrains it was not possible to cover large area. Furthermore, other important limitation was the rural cultural conditions i.e., male dominating patriarchal structure in remote rural areas the researcher could not interview mothers personally, and hiring qualified female enumerator was also a difficult task due to said constrains.

Researcher used structure questionnaire as the instrument of collecting primary information from the respondents. Though structure questionnaire proved to be very useful tool for collecting information, but sometime researcher felt significant gap among the answers and the actual conditions of respondents. Keeping in consideration the cultural norms and values researcher is not able to observe the sanitary conditions inside the responds houses.

8. Implications

As far as the theoretical implication of this study is concerned, it contributes to our understanding of relevant constructs that have not been investigated in existing research studies specially the role of integrated behaviour change interventions and its impacts on WASH knowledge and practices in daily life. Hence, helping in developing a better knowledge and understanding regarding the ground realities of awareness and knowledge, attitude and practices impacts on child health this research study is the key theoretical contribution.

The stud makes a comprehensive effort to assess the role of water and sanitation, hygiene (WASH) practices and its relationship with child heath. In this regard, the findings of the current study suggests that the improved WASH conditions and practices by mother have direct impact on the health of family members especially on the health of children under five. Therefore improved knowledge, attitude and practice of mothers regarding WSH can deal as a strategic tool, that individual; families and communities take advantages and become sustainable in health and wellbeing of people.

This study also provides the minute details how unsafe WASH practice by individuals can lead to chronic health and economic conditions, which have long lasting impacts for life time on children under the age of five years. The study also provides a framework which will assist for better understanding, management, deals with behaviour based on their perceptions appropriately for mothers individually or at family level.

Academicians, researcher and policy makers can benefit from these findings to understand how improved WASH conditions and practice can impact on human health and economic system of any country and how effective is integrated behaviour change interventions for enhancing knowledge, attitude and practices to deal with complex issue.

This is especially more relevant for under developing countries with poor economic conditions, where importance of improved KAP and behaviour change has not yet adopted as professionally. It is universally accepted phenomenon (Lai et al., 2020; Domini et al., 2020) that without social awareness among individual, families and communities, modification in existing behaviour and development of new habits is a very difficult task and the largest hindrance in sustainable community development.

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