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Socio-Economic Factors of Differences in Public Health-Related Variables among Women: A Cross-Sectional Study

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Abstract
This study examines the association of living areas (slum and non-slum) with the selected public health-related variables in the presence of socioeconomic variables among married women and also having a child. A total of 150 women aged 18 to 49 are selected of which 50 women from slums and 100 women are from non-slum areas of Multan by applying the cluster and random sampling techniques. The cross-tabulation method is used to find the results. The dependent variable is Body Mass Index (BMI) and it is analyzed with the socio-economic variables such as mass media index, household characteristics and education. The findings exhibit that the BMI of the women living in the slum areas is low due to a low level of education, lack of mass media access, bad household structures, and poor or ignorant area. The women of the slum area have fewer mass media access, poor status of household characteristics and less education as compared to the women living in the non-slum areas. BMI is significantly affected by area, women's education and household characteristics except for physical work, job status, mass media access and husband education. The findings of this study suggest that to provide health facilities or to reduce the gap in public health, education, mass media access and households characteristics might be considered while making any decision related to the slum and non-slum areas.

Keywords: BMI, Job Status, Education, Media Access, Slums

JEL Classification: I18, H51

1. Introduction
The world population is growing day by day and at present, about 7.8 billion people are living in the world. In developing countries like Pakistan, the urban areas are becoming more populated because of migration from rural areas to urban areas to find employment. The annual growth rate of the urban population is 2.53% in Pakistan. There is another community called the slum community that covered a large part of the urban population. More than 50 per cent of the major cities' population lives in slums and squatter settlements. Many of them are migrated from the rural poor for surviving their life and support their families but are unable to find an appropriate source of income that's why they are forced to live a life as slum dwellers. With the total population, the slum population is growing at high rates all over the world, especially in developing countries. Total1 billion people live in slums and are expected to grow to 2 billion by 2030 all over the world. This increases the slum population creating a big challenge for the health authorities. The main reason behind the emergence of the urban slum is poverty as they cannot afford houses to live in and settle themselves like other people living in the same place with a good standard of living. They are ignored by the high society of the urban population (UN, 2004). The slum population is increasing due to social exclusion and inappropriate policies of the government. The slum dwellers are characterized by some of the following stressful conditions i.e. insecurity of occupation, poorly structured houses crowded together, insufficient living area,

no access to safe drinking water or sanitation, severe overcrowding, poor or no lighting in their areas, no toilet facility, poor drainage system with excessive open sewers, lack of transport facilities, and the excessive amount of garbage around their areas (Padda and Hameed, 2018; Unger, 2007).

Being a developing country, Pakistan is suffering a lot of health issues. The slum community in urban areas of Pakistan has suffered from adverse health problems due to its socio-economic status. These health issues are listed for example fever, under-nutrition, diabetes, sexually transmitted diseases, low birth weight, lungs problem due to smoking, skin infections, eyes infection, premature birth and less vaccination coverage. These diseases were spread due to poor environmental management and less nutrition. The continuous negligence in the increase of the slum population leads to the diversion of health care resources and higher expenditures to the management of preventable diseases (Khan and Kraemer, 2009, 2008). In Pakistan, the slum community is ignored by the Pakistan Demographic and Health Survey (PDHS).

Despite the absence of infirmity or disease, good health is a state of the social, mental and physical well-being of a person (WHO, 1948). There has been a growing interest and main concern about women's health and well-being in developing countries. Women's health is different as compared to men's in many ways. Women bear the burden of inadequate health facilities living in different areas due to many factors.

The women of slum areas are unsure about their health status and diseases not due to unavailability of education but also because of the least diagnostic facilities. Their income was very low which is insufficient for basic needs so they are unable to get those diagnostic facilities. There is a huge gap in health between these two groups (slums and non-slums) of the society. Women were at a high risk of being obese and overweighted even they were belonging to both poorer and richest and also had a higher level of education (Tanwi et al, 2019). Wealthier women were more likely to be obese, and this association was stronger in rural areas. Conversely, more educated women were less likely to be obese, especially in urban areas. The distribution of obesity in Peruvian women is strongly related to socioeconomic position and differs whether measured as possession assets or by the level of education (Poterico et al, 2012).

Although various studies regarding slum communities are available in Pakistan those studies cover just one aspect. The objective of this study was to examine the socio-economic factors that create health differences between the selected public health-related variables among married women also having a child from non-slum urban society and livelihood slum dwellers in Multan. Public health-related variable Body Mass Index was compared with socio-economic variables such as area, mass media access, education level, physical work, job status and household characteristics.

2. Review of Literature

This section is related to the various empirical studies conducted in different countries. Many researchers worked on many variables that are in some way related to this study and presented their results and interpretation according to the method they had chosen. Table 1 exhibits studies on socio-economic factors of public health-related variables among women.

Table 1: Studies on socio-economic factors of Public health-related variables among Women

Author(s)	Country	Observations	Methods	Main Results
Tanwi et al.	Bangladesh	1701 ever-married non-	Descriptive analysis,	The study assessed the prevalence and socioeconomic determinants of

(2019)		pregnant urban women aged 15–49 years	multiple binomial logistic regression analysis	overweight and obesity among urban women in Bangladesh.
Poterico et al (2012)	Peruvian	a multistage random sample of women aged 15–49 years and children aged 0–5 years	a multistage random sample of women aged 15–49 years and children aged 0–5 years	Wealthier women were more likely to be obese, and this association was stronger in rural areas. Conversely, more educated women were less likely to be obese, especially in urban areas. The distribution of obesity in Peruvian women is strongly related to socioeconomic position and differs whether measured as possession assets or by the level of education.
Laillou et al (2012)	Montpellier, France	2010 / 1526 reproductive-aged women and 586 children with the age of 7	Univariate Logistic regression models	Twenty per cent's women experienced a higher body mass index which highlighted a double load of starvation. Children had deficiencies of zinc, iron and anaemia and a high prevalence of marginal Vitamin A levels. The poorest groups had a high risk of iron, zinc and anaemia deficiency
Khan and Kraemer (2009)	Bangladesh	120 women living in slums (as cases) and 480 age-matched women living in other areas	Multiple regression analysis	Unadjusted results indicated that a significantly higher percentage of women living in slums came from the countryside, had a poorer status by household characteristics, had less access to mass media, and had less education than women not living in slums
Soares et al (2007)	Sweden	3591 observations	univariate analyses	Women with high burnout were faring poorly financially, emotionally and physically
Molarius et al (2007)	Sweden	36 048 observations	Multivariate odds ratios	The main findings were that lifestyle factors, material and psychological conditions were related to the low self-rated health statuses
Gordon-Larsen et al (2003)	United States	13,113 adolescents	logistic regression model	Adolescents in their same environments had a limited effect on the disparities in overweight prevalence. Ethnicity–SES–overweight differences were greater among females than males. The disparity was lessened at the highest SES for white, Hispanic, and Asian females. Among males, the disparity was lowest at the average SES level.
Wróblewska, (2002)	Poland	20,000 women	multivariate analysis	Economic status, lack of employment and low educational level obesity, lack of physical exercise and smoking create the adverse health problem
Wamala et al (1999)	Sweden	300 women	ANCOVA performed for univariate and	The associations of carbohydrate, protein and total fibre intake with hemostatic profile were not statistically

			multivariate analyses	significant. A poor social status engaged with poor health status
Matthews et al (1999)	England, Wales and Scotland	The 1958 birth cohort includes all children born in England, Wales and Scotland during one week in March 1958	logistic regression models	gender differences in the magnitude of health inequality were inconsistent across age and health measures and the social status effect these differences

The above-mentioned studies have revealed that many factors influence public health and create differences in health in different communities in which education, population, employment, socio-economic status of a person, access to mass media and households characteristics are the more important factors. According to the studies, due to the lack of education and mass media access people are unaware of many harmful diseases.

Similarly, the problem of depression is increases due to the low level of socio-economic status. And unemployment and population are the joint problems of an unhealthy society because when the population increases more people will become unemployed, especially in developing countries so due to this issue people cannot take necessary nutrition for the betterment of their health. These health issues may be overcome through some appropriate health policies and interventions. To reduce health differences most of the studies suggest that educational programs should be introduced.

They also suggest that employment opportunities should be created so that people will improve their lifestyle and live a healthy life. Mass media access must be provided to people so that they can be aware of health issues and also their effects on their physical as well as mental health. After the comprehensive review of various studies we have found that there are many studies on the slum and non-slum communities but according to our knowledge, this is the first study on the factors of differences in public health and the related variable among married women having children both in slum and non-slum communities in Multan city.

Table 2: Construction of Variables

Dependent Variables	**Abbreviations**	**Coding**	**Explanation**
Body Mass Index	BMI	1 for Underweight 2 for Normal weight 3 for Overweight 4 for Obesity	BMI stands for Body Mass Index and it is an indicator of body fat based on the weight and height of a person either a man or woman. We can calculate it by **kg/m2** where kg is the weight of a person in kilogram and m2 is mass in meters squared. **Ranges of BMI:** below 18.5 = Underweight between 18.5 and 24.9 = Normal weight between 25 and 29.9 = Overweight between 30 and 39.9 = Obesity
Area	AREAD	0 for Non-slum 1 for Slum	

Education	EDU	0 for illiterate 1 for primary 2 for middle 3 for matric 4 for intermediate 5 for graduation 6 for masters and above	
Physical work	PHYW	0 for No 1 for Yes	
Job Status	JOBS	0 for housewife 1 working women	
Husband Education	HUSEDU	0 for illiterate 1 for primary 2 for middle 3 for matric 4 for intermediate 5 for graduation 6 for masters and above	
Total Mass media composite Index	TMMCI	0 for No accessible mass media 1 for accessible mass media	The composite variable of mass media accesses is determined by adding three variables. The total score for the composite variable of mass media access varied from 0 to 3, where score 0 indicated that the women have not at all access to mass media while the score 1 to 3 indicated that women have access to at least one mass media
Watching TV	WATTV	0 for No 1 for yes	
Reading Newspapers	REDNEWS	0 for No 1 for yes	
Listen to Radio	LISRAD	0 for No 1 for yes	
Total Household Characteristics Composite Index	THCCI	0 for poor characteristics 1 for non-poor characteristics	The composite variable of household characteristics determined by adding six small variables. The total score for the composite variable of household characteristics varied from 0 to 6. Where score 0 indicated that the variable of household characteristics considered as poor, otherwise it considered as non-poor
Cooking fuel	COOKF	1 for gas (LPG) 0 for else	
Floor material	FLOM	1 for cement/concrete 0 for else	
Wall material	WALLM	1 for cement/brick 0 for else	
Roof material	ROOFM	1 for cement 0 for else	
Toilet facility	TOILF	1 for modern/sceptic 0 for else	
Piped water facility	PIPWF	1 for Inside dwelling 0 for else	

3. Data and Methodology

For this study, we have used a primary source of data. Both cluster and random sampling techniques are used to analyze the socioeconomics determinants of differences in public health-related variables among married women having. These clusters are selected from the different locations of Multan. The data are collected through a questionnaire survey from a sample of 150 (50 slum women and 100 non-slum women) married women aged 18 -50 and also had a child. To collect information from the women of slum areas, we have made 5 clusters from different slum areas of Multan and then interviewed 10 randomly selected women from each of the clusters. Similarly, we have made 10 clusters for collecting information from women of non-slum areas and then interview 10 randomly selected women by the house to house visits.

Further, information has been gathered about the household characteristics such as cooking fuel, whether the household is located in a slum area or not, which material is used for the construction of the house, and whether they have a toilet facility and source of water. The information about women's characteristics has also been included in this questionnaire such as religion, age, education, height & weight, mass media access.

The construction of independent variables and the construction of dependent variables have been explained in Table 2.

4. Results and Discussions

As we have discussed earlier, the dependent variable is BMI (Body Mass Index) and we have compared it with the other six independent variables (socioeconomic variables) such as area, education level of women, physical work, job status, husband education, mass media access and households characteristics. Following are the outcomes of our study.

4.1 Body Mass Index and Area

In Table 3, cross-tabulation of BMI and Area is shown. Total 100 women (66.70 % in total) from the non-slum area in which 14 women (14.00% in total) are underweighted, 45 women (45.00% in total) are normally weighted. Similarly, a total of 50 women (33.30% of the total) from the slum area in which 1woman (2.00% in total) is underweighted, 33 women (66.00% in total) are normal weighted, 11 women (22.00% in total) are overweighed and 5 women (10.00% in total) are in obesity.

Table 3: Body Mass Index and Area

			AREAD		
			Non-slum	**Slum**	**Total**
BMI	**Underweight**	Count	14	1	15
		Expected Count	10	5	15
		% within BMI	93.30%	6.70%	100%
		% within AREAD	14.00%	2.00%	10.00%
		% of Total	9.30%	0.70%	10.00%
		Std. Residual	1.3	-1.8	
	Normal weight	Count	45	33	78

		Expected Count	52	26	78
		% within BMI	57.70%	42.30%	100%
		% within AREAD	45.00%	66.00%	52.00%
		% of Total	30.00%	22.00%	52.00%
		Std. Residual	-1	1.4	
	Overweight	Count	35	11	46
		Expected Count	30.7	15.3	46
		% within BMI	76.10%	23.90%	100%
		% within AREAD	35.00%	22.00%	30.70%
		% of Total	23.30%	7.30%	30.70%
		Std. Residual	0.8	-1.1	
	Obesity	Count	6	5	11
		Expected Count	7.3	3.7	11
		% within BMI	54.50%	45.50%	100%
		% within AREAD	6.00%	10.00%	7.30%
		% of Total	4.00%	3.30%	7.30%
		Std. Residual	-0.5	0.7	
	Total	Count	100	50	150
		Expected Count	100	50	150
		% within BMI	66.70%	33.30%	100%
		% within AREAD	100%	100%	100%
		% of Total	66.70%	33.30%	100%

In this table, eight standardized residuals of BMI categories (underweighted, normal weighted, overweighed, and obesity) are insignificant both for the slum and non-slum areas. The plus or minus values of the standardized residuals and “counts and expected counts" in this table show that in the non-slum area, there are more women than expected are underweighted and overweighed while fewer women than expected are normal weighted and in obesity. In the slum area, more women than the expected are normal weighted and in obesity while less than expected women are underweighted and overweighed.

Chi-Square test statistics of BMI and area are represented in Table 4. Pearson Chi-Square statistic value indicates that there is a significant association between Body Mass Index and area. Table 5 shows the symmetric measures of Body Mass Index and Area. The value of Cramer’s V statistics shows that there is a moderate association of two variables BMI and Area.

Table 4: Chi-Square Test of BMI and Area

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
.	10.191a	3	0.017	0.015	---	---
Likelihood Ratio	11.564	3	0.009	0.013	---	---
Fisher's Exact Test	10.522	---	---	0.013	---	---
Linear-by-Linear Association	.282b	1	0.595	0.65	0.338	0.078
N of Valid Cases	150					

Table 5: Symmetric Measures of BMI and Area

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.261	0.017	0.015
	Cramer's V	0.261	0.017	0.015
	Contingency Coefficient	0.252	0.017	0.015
N of Valid Cases		150		

4.2 BMI and Education

Cross Tabulation of BMI and Education is shown in Table 6. In this table, there are 68 illiterate women (45.30% in total) in which 4 illiterate women (5.90% in total) are underweighted, 39 illiterate women (57.40% in total) are normal weighted, 18 illiterate women (26.40% in total) are overweighed and 7 illiterate women (10.30% in total) are in obesity. As in the case of Primary education, a total of 20 women (13.30% in total) fall in this category which of these 3 women (15.00% in total) are underweighted, 9 women (45.00% in total) are normally weighted, 8 women (40.00% in total) are overweighed and there are no obese women.

Likewise, the number of women with middle education is 8 (5.30% in total) which of these there are no underweighted women, 3 women (37.50% in total) are normal weighted, 3 women (37.50% in total) are overweighed and 2 women (25.00% in total) are in obesity. In the case of matriculation, there are 9 women (6.00% in total) which of this one woman (11.10% in total) is underweighted, one woman (11.10% in total) is normally weighted, 7 women (77.80% in total) are overweighed while there no women in obesity. Similarly, there are a total of 9 women who studied up to intermediate which of these 2 underweighted women (22.30% in total), 4 women (44.40% in total) are normally weighted, 3 women (33.30% in total) are overweighed and no women in obesity.

In the case of Graduation level study, there is a total of 9 women (6.00% in total) who studied up to graduation which of these there are no underweighted women while there are 7 normal weighted women (77.80% in total), 2 women are overweighed (22.20% in total) and no women in obesity. There are 27 women (18% in total) whose education is master and above which of these 5 women (18.50% in total) are underweighted, 15 women (55.60% in total) are normal weighted, 5 women (18.50% in total) are overweighed and 2 women (7.40% in total) are in obesity.

Table 6: Body Mass Index and Education

			EDU							
			Illiterate	**Primary**	**Middle**	**Metric**	**Intermediate**	**Graduation**	**Master & above**	**Total**
BMI	Under weight	Count	4	3	0	1	2	0	5	15
		Expected Count	6.8	2	0.8	0.9	0.9	0.9	2.7	15
		% within BMI	26.70%	20.00%	0.00%	6.70%	13.30%	0.00%	33.30%	100%
		% within EDU	5.90%	15.00%	0.00%	11.10 %	22.20%	0.00%	18.50%	10.00%
		% of Total	2.70%	2.00%	0.00%	0.70%	1.30%	0.00%	3.30%	10.00%
		Std. Residual	-1.1	0.7	-0.9	0.1	1.2	-0.9	1.4	
	Normal weight	Count	39	9	3	1	4	7	15	78
		Expected Count	35.4	10.4	4.2	4.7	4.7	4.7	14	78
		% within BMI	50.00%	11.50%	3.80%	1.30%	5.10%	9.00%	19.20%	100%
		% within EDU	57.40%	45.00%	37.50 %	11.10 %	44.40%	77.80 %	55.60%	52.00%
		% of Total	26.00%	6.00%	2.00%	0.70%	2.70%	4.70%	10.00%	52.00%
		Std. Residual	0.6	-0.4	-0.6	-1.7	-0.3	1.1	0.3	
	Over weight	Count	18	8	3	7	3	2	5	46
		Expected Count	20.9	6.1	2.5	2.8	2.8	2.8	8.3	46
		% within BMI	39.10%	17.40%	6.50%	15.20 %	6.50%	4.30%	10.90%	100%
		% within EDU	26.50%	40.00%	37.50 %	77.80 %	33.30%	22.20 %	18.50%	30.70%
		% of Total	12.00%	5.30%	2.00%	4.70%	2.00%	1.30%	3.30%	30.70%
		Std. Residual	-0.6	0.8	0.3	2.6	0.1	-0.5	-1.1	
	Obesity	Count	7	0	2	0	0	0	2	11
		Expected Count	5	1.5	0.6	0.7	0.7	0.7	2	11
		% within BMI	63.60%	0.00%	18.20 %	0.00%	0.00%	0.00%	18.20%	100%
		% within EDU	10.30%	0.00%	25.00 %	0.00%	0.00%	0.00%	7.40%	7.30%
		% of Total	4.70%	0.00%	1.30%	0.00%	0.00%	0.00%	1.30%	7.30%
		Std. Residual	0.9	-1.2	1.8	-0.8	-0.8	-0.8	0	
	Total	Count	68	20	8	9	9	9	27	150
		Expected Count	68	20	8	9	9	9	27	150
		% within BMI	45.30%	13.30%	5.30%	6.00%	6.00%	6.00%	18.00%	100%
		% within EDU	100%	100%	100%	100%	100%	100%	100%	100%
		% of Total	45.30%	13.30%	5.30%	6.00%	6.00%	6.00%	18.00%	100%

In Table 6, there are a total of 28 standardized residuals that are significant for overweighed women whose education is up to matriculation while other standardized residuals for all categories of education are insignificant. In this table less, underweighted women than expected are illiterate and are also for those who are educated up to the middle, matric, intermediate, and graduation. The plus or minus values of the standardized residuals and "counts and expected counts" in this table shows that there are more underweighted women than expected who are primarily educated and up to masters and above education. More normal weighted women than expected fall in the education category of illiterate, graduation and masters or above while less normal weighted women than expected are in the education category of the primary, middle, matric and intermediate. Less over weighted women than expected fall in the education category of illiterate, graduation and masters or above while in the education category of the primary, middle, matric, and intermediate there are more overweight women than expected. More obese women than expected are illiterate and studied up to middle while less obese women than expected are in the education category of primary, metric, intermediate, and graduation, and the case of masters and above education counts and expected counts of women in obesity are equal.

Table 7: Chi-Square test of BMI and Education

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	28.551a	18	0.054	.b	---	---
Likelihood Ratio	31.164	18	0.028	.b	---	---
Fisher's Exact Test	.b		---	.b	---	---
Linear-by-Linear Association	2.229c	1	0.135	0.137	0.07	0.006
N of Valid Cases	150					

Table 7 exhibits the chi-square test of BMI and education. In this table, it is shown that either there is an association between two variables or not. The results show that these two variables are significantly associated with each other and are in some way related. These results indicated that education has a significant effect on BMI.

Table 8: Symmetric Measures of BMI and Education

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.436	0.054	.a
	Cramer's V	0.252	0.054	.a
	Contingency Coefficient	0.4	0.054	.a
N of Valid Cases		150		

Symmetric Measures of Body Mass Index and Education are shown in table 8. Cramer's V test value shows that there is moderate strength of association between BMI and education.

4.3 BMI and Job Status

Table 9 shows the cross-tabulation results of BMI and job status. The results display that there are 92 women (61.30% of the total) who are not doing any job which of these 12 housewives (13.00% of the total) are underweighted, 45 housewives (49.90% of the total) are normal weighted, 27 housewives (29.30% of the total) are overweighted and housewives in obesity are 8 in numbers (8.70% of the total).

Correspondingly, there are 58 working women (38.70% of the total) and of these 3 women (5.20% of the total) are underweighted, 33 working women (56.90% of the total) are normal weighted, 19 working women (32.80% of the total) are overweighted and in obesity there are only 3 working women (5.20% of the total).

Table 9: BMI and job status

			JOBS		
			Housewife	**Working woman**	**Total**
BMI	**Underweight**	Count	12	3	15
		Expected Count	9.2	5.8	15
		% within BMI	80.00%	20.00%	100%
		% within JOBST	13.00%	5.20%	10.00%
		% of Total	8.00%	2.00%	10.00%
		Std. Residual	0.9	-1.2	
	Normal Weight	Count	45	33	78
		Expected Count	47.8	30.2	78
		% within BMI	57.70%	42.30%	100%
		% within JOBST	48.90%	56.90%	52.00%
		% of Total	30.00%	22.00%	52.00%
		Std. Residual	-0.4	0.5	
	Overweight	Count	27	19	46
		Expected Count	28.2	17.8	46
		% within BMI	58.70%	41.30%	100%
		% within JOBST	29.30%	32.80%	30.70%
		% of Total	18.00%	12.70%	30.70%
		Std. Residual	-0.2	0.3	
	Obesity	Count	8	3	11
		Expected Count	6.7	4.3	11
		% within BMI	72.70%	27.30%	100%
		% within JOBST	8.70%	5.20%	7.30%
		% of Total	5.30%	2.00%	7.30%
		Std. Residual	0.5	-0.6	
	Total	Count	92	58	150
		Expected Count	92	58	150
		% within BMI	61.30%	38.70%	100%
		% within JOBST	100%	100%	100%
		% of Total	61.30%	38.70%	100%

In this table, there are a total of eight standardized residuals that are insignificant for both working women and housewives. The plus or minus values of the standardized residuals and "counts and expected counts" in this table tells us that more housewives than expected are underweighted and in obesity while fewer housewives than expected are normal weighted and overweight. Furthermore, less working women than expected are underweighted and in obesity while more working women than expected are normal weighted and over weighted.

Table 10: the Chi-Square Test of BMI and Job Status

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.377a	3	0.337	0.351	---	---
Likelihood Ratio	3.618	3	0.306	0.323	---	---
Fisher's Exact Test	3.231	--	---	0.364	---	---

Linear-by-Linear Association	.110b	1	0.74	0.743	0.412	0.083
N of Valid Cases	150					

Table 10 shows the chi-square test of BMI and the job status of women. Pearson Chi-Square shows that there is no association between Body Mass Index and job status because the job does not affect Body Mass Index significantly.

Table 11: Symmetric Measures of BMI and Job Status

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.150045	0.337065579	0.350557996
	Cramer's V	0.150045	0.337065579	0.350557996
	Contingency Coefficient	0.148384	0.337065579	0.350557996
N of Valid Cases		150		

In Table 11, the symmetric measures of Body Mass Index and Job status are shown. For this data set Cramer's V statistics has the value 0.15out of the maximum conceivable value of 1which represent the weak association between BMI and job status.

4.4 BMI and Physical Work

Table 12 is the cross-tabulation of BMI and physical work which shows how much BMI is affected by physical work. In this table, we can see that in total 90 women who are not doing physical work (60.00% of the total) which of these 11 women are underweighted (12.20% of the total), 45 women are normally weighted (50.00% of the total), 25 women are overweighted (27.80% of the total) and 9 women are in obesity (3.30% of the total). Further, 60 women who are doing physical work (40.00% of the total) which of these 4 women are underweighted (6.70% of the total), 21 women are overweighted (35.00% of the total) and only 2 women are in obesity (3.30% of the total). In this table, there are eight residuals: one for each combination of BMI categories (underweight, normal weight, overweight, and obesity) and whether the women doing physical work or not. Standardized residuals in the case of all categories of BMI are insignificant for both those who do physical work or do not do any physical work because all values are less than 1.96 even by ignoring the minus sign.

Table 12: BMI and physical work

			PHYWORK		
			No	**Yes**	**Total**
BMI	**Underweight**	Count	11	4	15
		Expected Count	9	6	15
		% within BMI	73.30%	26.70%	100%
		% within PHYW	12.20%	6.70%	10.00%
		% of Total	7.30%	2.70%	10.00%
		Std. Residual	0.7	-0.8	
	Normal Weight	Count	45	33	78
		Expected Count	46.8	31.2	78
		% within BMI	57.70%	42.30%	100%
		% within PHYW	50.00%	55.00%	52.00%
		% of Total	30.00%	22.00%	52.00%
		Std. Residual	-0.3	0.3	
	Overweight	Count	25	21	46

		Expected Count	27.6	18.4	46
		% within BMI	54.30%	45.70%	100%
		% within PHYW	27.80%	35.00%	30.70%
		% of Total	16.70%	14.00%	30.70%
		Std. Residual	-0.5	0.6	
	Obesity	Count	9	2	11
		Expected Count	6.6	4.4	11
		% within BMI	81.80%	18.20%	100%
		% within PHYW	10.00%	3.30%	7.30%
		% of Total	6.00%	1.30%	7.30%
		Std. Residual	0.9	-1.1	
	Total	Count	90	60	150
		Expected Count	90	60	150
		% within BMI	60.00%	40.00%	100%
		% within PHYW	100%	100%	100%
		% of Total	60.00%	40.00%	100%

Table 13: Chi-square Test of BMI and Physical Work

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	4.078a	3	0.253	0.251	---	---
Likelihood Ratio	4.376	3	0.224	0.235	---	---
Fisher's Exact Test	3.889			0.264	---	---
Linear-by-Linear Association	.002b	1	0.965	1	0.527	0.087
N of Valid Cases	150					

Table 14: Symmetric Measures of BMI and physical work

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.16489	0.253129703	0.250742065
	Cramer's V	0.16489	0.253129703	0.250742065
	Contingency Coefficient	0.162693	0.253129703	0.250742065
N of Valid Cases		150		

Table 13 is drawn for the chi-square test of BMI and physical work of women. Pearson Chi-Square value of 0.253 shows that the physical work of women has no significant effect on BMI. In Table 14 the symmetric measures of Body Mass Index and physical work are shown. For this data set, Cramer's V statistics has the value of 0.164out of the maximum possible value of 1 which represent the weak association between BMI and physical work.

4.5 BMI and Husband Education

In table 15 the cross-tabulation of BMI and husband education is shown. In this table, there are 71 women (47.30% of the total) whose husbands are illiterate which of these 5 women are underweighted (7.00% of the total), 39 women (54.90% in total) are normal weighted, 20 women (28.20% in total) are overweighted and 7 illiterate women (9.90% in total) are in obesity. As in the case of husband's Primary education, a total of 16 women (10.70% in total) fall in this category which of this 1 woman (6.20% in

total)is underweighted, 7 women (43.80% in total) are normally weighted, 7 women (43.80% in total) are overweighted and there is only 1 woman (6.20% of the total) in obesity. Likewise, the number of women with middle education of their husbandis9 (6.00% in total) which of these there are 1 underweighted women (11.10% of the total), 5 women (55.60% in total) are normal weighted, 3 women (33.30% in total) are overweighted and zero women in obesity. In the case of husband's education up to matriculation, there are 7 women (4.70% in total) which of this one woman (14.30% in total) is underweighted, 3 women (42.90% in total) are normally weighted, 3 women (42.90% in total) are overweighted while there no women in obesity.

Similarly, there are a total of 10 women whose husbands studied up to intermediate (6.70% of the total) which of these 5 underweighted women (50.00% in total), 4 women (40.00% in total) are normally weighted, 1 woman (10.00% 0f the total) are overweighted and no obese women. In the case of husband's Graduation level study, there is a total of 15 women (10.00% in total) of these there is only one underweighted woman (6.70% of the total) while there are 8 normally weighted women (53.30% in total), 4 women are overweighted (26.70% in total) and 2 women in obesity (13.30% of the total). There are 22 women (18% in total) whose husband's education is master and above which of this one woman (4.50% in total) are underweighted, 12 women (54.50% in total) are normally weighted, 8 women (36.40% in total) are overweighted and 1 woman (4.50% in total) is in obesity. In table 15 there are 28 standardized residuals: for each combination of all categories, (underweighted, normal weighted, over-weighted, and obesity) of BMI of women and education. These residuals are insignificant for all 7 categories of education. This table tells us that the women whose husbands are illiterate are less underweight than expected and are also those women whose husband's education is intermediate, graduation and master and above.

There are more underweighted women than expected are those women whose husband's education is primary, middle, and matriculated. More normal weighted women than expected fall in the husband's education category of illiterate, middle, graduation, and masters or above while less normal weighted women than expected are the women whose husband's education is primary, metric, and intermediate. Less over weighted women than expected are those women whose husbands are illiterate, intermediate, and graduated while in the education category of the primary, middle, matric, and, master and above these women are more overweighted women than expected. Women whose husband education category is illiterate and graduation are more obese women than expected while less obese women than expected are those women whose husband education category is primary, metric, intermediate, and masters or above education.

Table 15: BMI and Husband Education

			HUSEDU							Total
			Illiterate	primary	middle	metric	intermediate	graduation	master & above	
BMI	Under Weight	Count	5	1	1	1	5	1	1	15
		Expected Count	7.1	1.6	0.9	0.7	1	1.5	2.2	15
		% within BMI	33.30%	6.70%	6.70%	6.70%	33.30%	6.70%	6.70%	100%
		% within HUSEDU	7.00%	6.20%	11.10%	14.30%	50.00%	6.70%	4.50%	10.00%
		% of Total	3.30%	0.70%	0.70%	0.70%	3.30%	0.70%	0.70%	10.00%
		Std. Residual	-0.8	-0.5	0.1	0.4	4	-0.4	-0.8	
	Normal Weight	Count	39	7	5	3	4	8	12	78
		Expected Count	36.9	8.3	4.7	3.6	5.2	7.8	11.4	78

		% within BMI	50.00%	9.00%	6.40%	3.80%	5.10%	10.30%	15.40%	100%
		% within HUSEDU	54.90%	43.80%	55.60%	42.90%	40.00%	53.30%	54.50%	52.00%
		% of Total	26.00%	4.70%	3.30%	2.00%	2.70%	5.30%	8.00%	52.00%
		Std. Residual	0.3	-0.5	0.1	-0.3	-0.5	0.1	0.2	
	Over weight	Count	20	7	3	3	1	4	8	46
		Expected Count	21.8	4.9	2.8	2.1	3.1	4.6	6.7	46
		% within BMI	43.50%	15.20%	6.50%	6.50%	2.20%	8.70%	17.40%	100%
		% within HUSEDU	28.20%	43.80%	33.30%	42.90%	10.00%	26.70%	36.40%	30.70%
		% of Total	13.30%	4.70%	2.00%	2.00%	0.70%	2.70%	5.30%	30.70%
		Std. Residual	-0.4	0.9	0.1	0.6	-1.2	-0.3	0.5	
	Obesity	Count	7	1	0	0	0	2	1	11
		Expected Count	5.2	1.2	0.7	0.5	0.7	1.1	1.6	11
		% within BMI	63.60%	9.10%	0.00%	0.00%	0.00%	18.20%	9.10%	100%
		% within HUSEDU	9.90%	6.20%	0.00%	0.00%	0.00%	13.30%	4.50%	7.30%
		% of Total	4.70%	0.70%	0.00%	0.00%	0.00%	1.30%	0.70%	7.30%
		Std. Residual	0.8	-0.2	-0.8	-0.7	-0.9	0.9	-0.5	
	Total	Count	71	16	9	7	10	15	22	150
		Expected Count	71	16	9	7	10	15	22	150
		% within BMI	47.30%	10.70%	6.00%	4.70%	6.70%	10.00%	14.70%	100%
		% within HUSEDU	100%	100%	100%	100%	100%	100%	100%	100%
		% of Total	47.30%	10.70%	6.00%	4.70%	6.70%	10.00%	14.70%	100%

Table 16: Chi-square of BMI and Husband Education

	Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	25.198a	18	0.12	.b	---	---
Likelihood Ratio	19.705	18	0.35	.b	---	---
Fisher's Exact Test	.b	---	---	.b	---	---
Linear-by-Linear Association	.511c	1	0.475	0.482	0.246	0.014
N of Valid Cases	150					

The Chi-square test of BMI and husband education is represented in table 16. The value 0.12 of Pearson chi-square shows that the BMI and husband education are independent of each other and unrelated because the p-value is greater than our chosen significance value which is 0.10.

Table 17: Symmetric Measures of BMI and Husband Education

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.41	0.12	.a
	Cramer's V	0.237	0.12	.a
	Contingency Coefficient	0.379	0.12	.a
N of Valid Cases		150		

Symmetric Measures of Body Mass Index and husband education are shown in table 17. Cramer's V has a value near 0 indicating the weak association of BMI and husband education.

4.6 BMI and Total Mass Media Composite Index

Cross-tabulation of BMI and total mass media access composite index is drawn in table 18. In total 47 women have no access to mass media (31.30% of the total) which of these 3 are underweighted (6.40% of the total), 28 are normally weighted (59.60% of the total), 13 are overweighted (27.70% of the total), and 3 are obese women (6.40% of the total). Correspondingly, in total 103 women (68.70% of the total), and of these 12 are underweighted (11.70% of the total), 50are normally weighted (48.50% of the total), 33 are overweighted (32.00% of the total), and 8 are in obesity (7.80% of the total).

Table 18: BMI and Total Mass Media Composite Index

			TMMCI		
			Not at all	**Accessible Media**	**Total**
BMI	**Underweight**	Count	3	12	15
		Expected Count	4.7	10.3	15
		% within BMI	20.00%	80.00%	100%
		% within TMMCI	6.40%	11.70%	10.00%
		% of Total	2.00%	8.00%	10.00%
		Std. Residual	-0.8	0.5	
	Normal Weight	Count	28	50	78
		Expected Count	24.4	53.6	78
		% within BMI	35.90%	64.10%	100%
		% within TMMCI	59.60%	48.50%	52.00%
		% of Total	18.70%	33.30%	52.00%
		Std. Residual	0.7	-0.5	
	Overweight	Count	13	33	46
		Expected Count	14.4	31.6	46
		% within BMI	28.30%	71.70%	100%
		% within TMMCI	27.70%	32.00%	30.70%
		% of Total	8.70%	22.00%	30.70%
		Std. Residual	-0.4	0.3	
	Obesity	Count	3	8	11
		Expected Count	3.4	7.6	11
		% within BMI	27.30%	72.70%	100%
		% within TMMCI	6.40%	7.80%	7.30%
		% of Total	2.00%	5.30%	7.30%
		Std. Residual	-0.2	0.2	
	Total	Count	47	103	150
		Expected Count	47	103	150
		% within BMI	31.30%	68.70%	100%
		% within TMMCI	100%	100%	100%
		% of Total	31.30%	68.70%	100%

In this table, there are eight residuals: one for each combination of BMI categories (underweight, normal weight, overweight, and obesity) and whether the women have mass media access. Standardized residuals in the case of all categories of BMI are insignificant for both who have mass media access or not because all values are less than 1.96 even by ignoring the minus sign. The signs (plus or minus) and counts and expected counts within the cells of the table tell us that more women (without mass media access) than expected are normally weighted, while fewer women (without mass media access) than expected are underweighted, overweighted and obese. Likewise, fewer women (with mass media access) than expected are normally weighted while more women (with mass media access) than expected are underweighted, obese, and overweighted.

Table 19: Chi-Square Test of BMI and Total Mass Media Composite Index

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.937a	3	0.586	0.598	---	---
Likelihood Ratio	2.002	3	0.572	0.576	---	---
Fisher's Exact Test	1.769	---	---	0.637	---	---
Linear-by-Linear Association	.020b	1	0.888	0.909	0.492	0.091
N of Valid Cases	150					

Table 19 is drawn for Chi-square test statistics of BMI and total mass media composite index. The value 0.59 of Pearson chi-square shows that the BMI and mass media index has not a statistically significant association because the p-value is greater than our chosen significance value of 0.10.

Table 20: Symmetric Measures of BMI and Total Mass Media Composite Index

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.114	0.586	0.598
	Cramer's V	0.114	0.586	0.598
	Contingency Coefficient	0.113	0.586	0.598
N of Valid Cases		150		

Symmetric Measures of Body Mass Index and mass media composite index are shown in table 20. Cramer's V has a value of 0.11which indicates that there is a weak strength of association between BMI and mass media access.

4.7 BMI and total household characteristics composite index

Table 21 explained the relationship between BMI and household characteristics. In this table there are 51women (34.00% of the total) who belongs to the poor category which of this 1 woman is underweighted (2.00% of the total), 34 (66.70%of the total) are normal weighted, 11 are overweighted (21.6% of the total) and 5 are obese women (9.80% of the total). Further, there are 99 women (66.00% of the total) who belongs to the not poor category, and of these 14 women (14.100% of the total) are underweighted, 44 women (44.40%of the total) are normally weighted, 35 women (35.40% of the total) are overweighted and in obesity, there are only 6 women (6.10% of the total).

Table 21: BMI and Total Household Characteristics

			THCCI		
			Poor	**Not Poor**	**Total**
BMI	**Underweight**	Count	1	14	15

		Expected Count	5.1	9.9	15
		% within BMI	6.70%	93.30%	100%
		% within THCCI	2.00%	14.10%	10.00%
		% of Total	0.70%	9.30%	10.00%
		Std. Residual	-1.8	1.3	
	Normal Weight	Count	34	44	78
		Expected Count	26.5	51.5	78
		% within BMI	43.60%	56.40%	100%
		% within THCCI	66.70%	44.40%	52.00%
		% of Total	22.70%	29.30%	52.00%
		Std. Residual	1.5	-1	
	Overweight	Count	11	35	46
		Expected Count	15.6	30.4	46
		% within BMI	23.90%	76.10%	100%
		% within THCCI	21.60%	35.40%	30.70%
		% of Total	7.30%	23.30%	30.70%
		Std. Residual	-1.2	0.8	
	Obesity	Count	5	6	11
		Expected Count	3.7	7.3	11
		% within BMI	45.50%	54.50%	100%
		% within THCCI	9.80%	6.10%	7.30%
		% of Total	3.30%	4.00%	7.30%
		Std. Residual	0.7	-0.5	
	Total	Count	51	99	150
		Expected Count	51	99	150
		% within BMI	34.00%	66.00%	100%
		% within THCCI	100%	100%	100%
		% of Total	34.00%	66.00%	100%

In this table, there is a total of eight standardized residuals that are insignificant for both poor and not poor women because all these values (in case of underweight, normal weighted, over-weighted, and women in obesity) are less than 1.9 even ignoring the minus. The signs (plus or minus) and counts and expected counts within the cells of the table tells us that more poor women than expected are normal weighted and in obesity while fewer women from the poor category than expected are underweighted and overweighted. Furthermore, fewer not poor women than expected are normal weighted and in obesity while more not poor women than expected are underweighted and overweighted.

Table 22: Chi-square of BMI and Total Household Characteristics Composite Index

	Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	10.920a	3	0.012	0.011	---	---
Likelihood Ratio	12.352	3	0.006	0.009	---	---
Fisher's Exact Test	11.279	--	---	0.009	---	---
Linear-by-Linear Association	.201b	1	0.654	0.735	0.368	0.081
N of Valid Cases	150					

The Chi-square test of BMI and household characteristics are represented in table 22. The value 0.012 of Pearson chi-square shows that the BMI and household characteristics have a statistically significant association because the p-value 0.01 is less than our chosen significance value which is 0.10. Thus, BMI is significantly influenced by household characteristics.

Table 23: Symmetric measures of BMI and Total Household Characteristics Composite Index

	Symmetric Measures			
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	0.27	0.012	0.011
	Cramer's V	0.27	0.012	0.011
	Contingency Coefficient	0.26	0.012	0.011
N of Valid Cases		150		

Symmetric Measures of Body Mass Index and household characteristics are shown in table 23. For these data, the moderate value of Cramer's V statistics indicates that there is moderate strength of association between BMI and household characteristics.

5. Conclusions and Policy Implications

In the cross-sectional study of married women living in slum and non-slum, many factors create differences in the health of these two groups. Women in slum areas face adverse health issues than women in the non-slum area because all slum areas are surrounded by rubbish which produces germs that adversely affect their health. By considering the factors of health differences, the area show insignificant results for non-slum women while significant results showed for slum women. The level of education is very low in women living in slum areas than those women living in the non-slum area and BMI is significantly affected by education level. Similarly, the husband education of women is very low in slum areas than women in non-slum areas. Household characteristics of women living in both slum and non-slum areas show that women of slum areas had lower BMI than women of non-slum areas because of the bad structure of their houses, no access to toilet facility, cooking fuel, lack of access to safe drinking water which may lead to lungs infection and other harmful diseases. Mass media access indicated by watching TV, listening to the radio and reading newspapers is significantly lower in slum women than non-slum women.

The socio-economic status of women living in slum areas remains the same even if the economy goes up. There is a huge gap between the women of slum areas and non-slum areas. When we combine the selected dependent variable Body Mass Index (BMI) with socio-economic variables, unadjusted differences were shown in our results. BMI of the women living in slum areas was affected low level of education, lack of mass media access, bad household structures, and poor or ignorant area while BMI does not affect by physical work and job status. Day by day increase in slums weakens the roots of the economy because they are not participating in the economic growth and here are many reasons behind the increasing number of slum and lack of their participation in which health is one of them. During the visit to the slum area, we observed that the women of the slum area are most dedicated than men if they have gotten the best opportunities and special guides regarding employment and health, they can be a good part of the society. The women's health in the slum as well as in non-slum areas is an important factor for a strong economy so there is a need to adopt some necessary steps to improve women's health. This study concluded that the slum women had lower BMI status as compared to the non-slum women. As a part of the society, they also needed health care and attention so there should be proper planning and programs to be aware of the current health issues. Following are some policies to overcome these issues and help to become slum women a stronger part of the economy.

- As we have discussed earlier the slum areas are full of rubbish or garbage which is the main cause of dangerous germs so the cleanliness of those areas may reduce the health problems. The government may promote organizations for check and balance regarding health issues in slum areas.
- Awareness programs are the optimal strategies to overcome the health issues so they should be promoted.
- Mass media campaigns are another way to aware people in non-slum women so they can improve their lifestyle.
- Inequalities in health policies may be controlled by government interventions

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The data that support the findings of this study are available from the corresponding author upon reasonable request.

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