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Household Poverty, Women Fertility and Child Nutritional Status in Tehsil Jahanian, Pakistan

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Abstract *This study measures the impact of household poverty on women fertility and the nutritional status of children. In this study, the poverty level is computed by the per capita income, while women fertility is measured by the number of children in a household. The Height- for-age Z-score (HAZ) method has been used to measure the nutritional status of children. A survey has been conducted to collect household data. The study uses the OLS method and finds that household poverty is positively correlated to women fertility rate but negatively related to the nutritional status of children. The study has suggested various policies measures for poverty, women fertility and the nutritional status of children.*

Key Words: Household Poverty, Women Fertility and Child Nutritional Status

JEL Classification: I32, J13

Introduction

In the world, the countries aim to increase the level of economic growth and development. Poverty is the main issue in developing countries. Poverty is the powerlessness of the people that they cannot maintain their living standard. It is a big phenomenon. In these countries, one of the major issues is the poor nutrition status of children due to poor living standard or low level of incomes. Children suffer from different problems related to health and food. Malnutrition is the big subject that causes child mortality. A high fertility rate accelerates the size of the population all over the world. Many pieces of research introduce the different factors of economic growth. Most of them are linked with human capital, investments in health and education, different choices of birth rates and size of the family by investigating the contribution of human capital in development (Becker, 2007).

All over the world, poverty is a big problem that is related to food security and nutrition (Sswanyana, 2003). The focus is mainly shifted to household-level food availability. Another view is that the fertility rate has declined day by day in developed countries through different family planning programs or by empowering the females

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(Odwe, 2015). The mortality rate is also declined due to the improved health status of the women (Nobles et al., 2015). To increase the country development, health is an important indicator as it increases the standard of life, decline the number of undernourished people, and so it is important to give priority to health status or malnutrition in Asia (Singh, 2019). In household affairs, the decisions of women are very vital to fall off the inequalities between girls and boys. For development purpose, equality in education is very significant to increase the level of outcomes (Saleemi and Kofol, 2020).

Child mortality is a great upshot all over the world. Mostly in developing countries, child mortality issues are high. Extra efforts in developing areas are needed to decline the inequalities of household socioeconomic factors related to child mortality (Cesare et al., 2015). To examine the quality of a child, people firstly use the indicator known as education but nowadays, health status is an important indicator to analyze the quality of children, relating the household business outcomes with the size of the family and children health status (Sarkar, 2020). Researchers estimate that child nutrition and determinants have a larger impact on fertility by applying different theories (Horton, 1986). In a household, there is a trade-off between the number of children and their quality through better education and good health. In recent year, the fertility rate has decreased in many developing countries and many parts of Asia (Islam and Nesa, 2009). The fertility rate has successfully declined due to many socioeconomic factors. In this decline, family planning has played an important role. One of the important factors is women education which has shown a strong impact on fertility. Moreover, in the nutritional status of the child, mothers' education has a great impact on better nourishment and for good health outcomes because educated mothers know the modern ways of health care and have better knowledge of health (Frost et al., 2005).

The World Bank report shows that higher inequalities in gender have a higher influence on growth level (Izraelov and Silber, 2019). Women empowerment in decisions about children health has a larger impact as highly educated mothers have a good status of children health. Educated mother equally pays attention to their children.

The incidence of the poverty level is very high in developing countries due to the low-income level of households. To reduce household poverty, women participation and empowerment are essential (Jones et al., 2019). In many regions, the availability of food is the prime responsibility of the women. Women play an important role in household budget decision making. Women influence on the nutritional status of children is very strong. The wealth index and maternal body mass index has a great impact on child health. Mother empowerment and freedom are very important as by these actions; mothers independently take decisions about their children health status (Arulampalam et al., 2019). Children's undernutrition is related to the lower body mass index, less economic growth, low level of schooling and stunting or wasting issues and mental health problems.

In many countries, the nutrition status of children is neglected. Household structure influences the child health, and it changes with the change in income level (Tinkew and Dejong, 2004). Economic resources of household or size of household change the child nutritional outcomes, and single parent or joint families increase the stunting rate and families with low-income level has a bad impact on children height. In developing countries, household needs to decide the size of household and decisions of nutrition health status (Horton, 1986). There are great effects of children rank into the family

according to their age and children quality is also affected according to their nutrition status they face many serious inequalities.

The paper is organized as: Section 2 portrays the review of the literature, Section 3 is about model specification, while section 4 shows the description and measurement of data. Section 5 explains the results and discussions, while section 6 concludes with policy implications.

Review of Literature

Table 1 exhibits the summary of studies on the impact of poverty on fertility and child nutrition status.

Table 1. Studies on Poverty, Fertility and Child Nutrition Status

Reference(s)	Country / Areas	Time Period/ Obs.	Methodology	Main Results
Birdsall and Griffin (1998)	Colombia, Malaysia, Brazil, India	1970-1882	OLS	A positive relationship between higher education, health, family planning and poverty.
Amin et al. (1994)	Bangladesh	1992	Logistic regression models	A positive impact of income-generating projects in lowering poverty and help women to control fertility.
Appleton (1996)	Uganda	1992	OLS, Logistic model	Negative impact on female-headed household due to the lower level of education.
Ainsworth et al. (1996)	14 African countries	The mid-1980s	OLS	Negative impact on fertility due to low female schooling.
Buvinić and Gupta (1997)	Developing countries	The 1970s	OLS	Female-headed household had a positive impact on reducing the poverty in developing countries.
Eastwood and Lipton (1998)	59 countries	59 obs.	OLS	Fertility reduction had a positive impact on poverty reduction.
Filmer and Pritchett (2001)	India	1992-1995	OLS, Probit regression	The negative impact of the wealth gap. On average rich Indian children, 31% enrolled in schools than the poor children.
Strulik and Sikandar (2002)	109 countries	1960-1985	Non-parametric Kernal regression	The finding of the study indicated that for a panel of countries, there is weak evidence for positive income fertility because the income threshold changes over time.
Angeles et al. (2005)	Indonesia	1993	OLS	Family planning programs and females' education had a larger positive impact on lowering the fertility rate.
Codjoe (2007)	Ghana	1987-1999	OLS	Education had a significant impact on fertility.
Kim et al. (2009)	Indonesia	1965-1997	OLS	A newly born child reduced consumption by 20% in four years, and the impact of a newly

				born child on household expenditure is negative as children education hurt fertility.
Bhasin et al. (2009)	Ghana	1998-1999	OLS	Good health is the best indicator and had a positive impact on reducing poverty in the country.
Baye and Fambon (2009)	Cameron	2001	OLS	A high parental literacy rate had a positive effect on child health, and the impact of better child health is also positive on economic wellbeing.
Islam and Nesa (2009)	Bangladesh	1975-2004	Poisson regression	A negative relation to the fertility level in the country.
Odwe (2015)	Kenya	1989-2009	Multivariate Poisson regression model	The fertility rate is high in low-level income women due to the high rate of child mortality, and education are a significant measure of fertility.
Nobles et al. (2015)	India, Indonesia	2000-2009	OLS, fixed effect method	Natural shocks or after the loss of children and other family member fertility of women are increased to rebuild the population and showed the positive relation.
Izraelov and Silber (2019)	Ghana	2008	MIMIC model	Women rights in decision making had a positive impact on children health, and it also indicated that mother with a higher educational level had a higher children health.
Singh (2019)	India	402 obs.	OLS	The health status of the tribal women was very bad. They had the problem of lack of nutritional Anaemia, Vitamin-A and vitamin-C.
Arulampalam et al. (2019)	India	2005-2006	OLS	Greater maternal autonomy had a positive impact on the health of children.
Clark et al. (2019)	Africa	2015	Intent-to-treat model	Women child care responsibilities reduce the economic activity in urban areas.
Shaukat et al. (2020)	Pakistan	2006-2007	Logistic regression	The large size of household and dependency burden has increased the level of poverty and they are negatively related.
Shriqui et al. (2020)	Washington, Los Angeles, Africa, America, California	2008-2012	Principal component analysis, logistic regression	Deprivation indices and other health indicator showed that a high percentage of Hispanic, foreign-born, dense household are spent more than 30% share of their incomes on housing cost.

	and seven countries			
Saleemi and Kofal (2020)	Pakistan	2012-2014	Heckman selection model, logit model	Women are empowered and had rights in decision making about children education; there is a higher share of education expenditures on the education of girls.
Studies on Poverty and Child Nutrition Status				
Horton (1986)	Philippines	1978	OLS	A strong effect of birth order on nutritional status and positive impact of parent education on higher quality of children and less significant impact of higher maternal occupational status on lower child mortality rate.
Horton (1988)	Philippines	1978	Within-household regressions and pooled regression	The finding of the study indicated that there are greater negative or serious inequalities in long-run nutritional status.
Garcia and Alderman (1989)	Pakistan	1985-1987	OLS	The predicted income had a positive impact, and household size had a negative impact, and maternal education has a positive impact on child nutrition status while the impact of illness was negative.
Ssewanyana (2003)	Uganda	2000	OLS	The higher income level of urban may have a positive impact to overcome the problem of food insecurity, and parental education had a positive impact on the nutritional status of children.
Tinkew and Dejong (2004)	Jamaica	1996	Logistic regression model	The negative impact and single-parent families and cohabiting families increased the stunting for children, and single parents and extended families with sibling and low level of income children have low height for age.
Valdivia (2004)	Peru	1992, 1996 and 2000	OLS, random effect and fixed effect method	Significant positive impact only in urban areas.
Harpham et al. (2005)	India, Peru, Vietnam and Ethiopia	2002	Logistic regression	The negative link between the high common mental disorder of mother and the poor nutritional status of children in India and Vietnam but evidence from Peru or Ethiopia was not clear.
Bomela (2007)	South Africa	1993	OLS	The household patterns are important indicators of

				nutrition outcomes and person related or household related variables positively associated with malnutrition.
Chirwa and Ngalwa (2008)	Malawi	1997-1998	OLS	Anthropometric measures show that boys are more at risk than girls and child malnutrition is more in those children that fall into a low level of income household. The study showed a negative relationship between poverty and nutrition status.
Mariara et al. (2009)	Kenya	2003	Instrumental variable method	The maternal characteristics, rainfall, age, education, number of children ever born had significant effects of reducing child mortality.
Ajao et al. (2010)	Nigeria	2008	Binary logistic regression	The negative impact on a child with an uneducated mom was significant to be stunted, and food insecurity among household was high due to this country have more malnourished children.
Babatunde et al. (2011)	Nigeria	2006	OLS and Logit regression	Determinants of malnutrition gender, age of child, BMI, education of mother, clean water and availability of toilet had positively significant impact on reducing malnutrition.
Mariara et al. (2012)	Kenya	1993-2003	FGT approach	The assets and location had a positive impact on child survival, and rural children are poor than urban children.
Sarah and Ibrahim (2012)	Uganda	1995-2006	OLS	The household welfare status had a larger impact on child health status, and maternal education had positively enhanced the child health.
Harttgen et al. (2013)	Africa	1991-2009	Logistic regression and fixed effect method	The economic growth had a positive impact on the nutritional status of the child and helped to eliminate undernutrition.
Bbaale (2014)	Uganda	2016	Probit model	Maternal education, especially primary and secondary levels, significantly influence the child nutritional status by controlling the other socioeconomic factors. It showed a positive impact.
Frost et al. (2005)	Bolivia	1998	Logistic regression	60% of maternal education positively influence the

				nutritional status of the child in Bolivia.
Cesare et al. (2015)	Pakistan	2011	Mixed effect linear model	Wealthier families taller or higher weight or with 10 years education of mothers had a better-nourished child and food insecurities have worse nutritional outcomes for children and female. Education and wealth showed positive impacts on health.
Rashad and Sharaf (2019)	Egypt	2014	OLS, PSM, two-stage least square approach	A strong negative effect of mothers' job on the nutritional status of the children.
Jones et al. (2019)	East Africa	2011-2016	Structural equation models	Maternal BMI and wealth were positively associated with child health and had a significant effect on child nutrition.
Amare et al. (2019)	Ethiopia	2016	Logistic regression, bivariate analysis	The characteristics of the mother significantly associated with stunting, and the order household characteristics or environmental characteristics hurt the wasting and stunting of children.
Sarkar (2020)	India	2005-2011	Household optimization model	The number and nutrition status of the child is positive for a household in strenuous occupation and negative in non-strenuous occupation.
Soto et al. (2020)	A panel of 20 countries	2014-2016	Logistic regression	The children who have incomplete vaccination significantly highly underweight. All the countries showed a negative impact on children health due to poor vaccination status.
Sassi (2020)	Malawi	2014	Linear random effect model	The inequalities between household showed the negative long-term inequalities in the nutritional status of children. Inequalities in men headed household is larger than female-headed.

In this section, we have reviewed the different previous studies which are related to women fertility, nutritional status of children and poverty. These studies have shown that the impact of poverty has different results. To measure the impact of poverty on the women fertility rate and nutritional status of children, the literature has used different methodologies and methods. These include per capita income, logistic regression, OLS, anthropometric measures, passion regression, MIMIC model, Logit model, FGT

approach and random or fixed-effect method. These measures show both the negative and positive impact of poverty on nutrition status and fertility rate. These studies have focused on the impact of education, food, illness, gender, family planning programs, the wealth of the people, but we have emphasized the income level, age, sex of household head, area of residence, professional care, birth order, water source and distance to the health unit. These are the main variables that we have used to fill the literature gap, and we have used the ordinary least square method to measure the impact of these variables on fertility and child nutritional status.

Model Specification

We have specified two models in which we have investigated the impact of poverty on child nutrition status and women fertility. To estimate the nutritional status, we have used Height-for-age and to measure the fertility rate total number of children are being used, along with many other variables.

Model 1: Fertility-Poverty Model

The econometric form of the fertility poverty model can be shown as:

$$NC = \beta_0 + \beta_1 POV + \beta_2 AGEW + \beta_3 AGEW^2 + \beta_4 EW + \beta_5 MS + \beta_6 AREA + \beta_7 WATER + \beta_8 DIST + \varepsilon \quad (1)$$

Model 2: Child Nutritional Status-Poverty Model

The econometric form of child nutritional status-poverty model is expressed as:

$$HAZ = \beta_0 + \beta_1 POV + \beta_2 SEXC + \beta_3 BO + \beta_4 AGEC + \beta_5 AGEM + \beta_6 SEXHH + \beta_7 HZ + \beta_8 AGEH + \beta_9 EM + \beta_{10} MS + \beta_{11} PCARE + \beta_{12} AREA + \beta_{13} EH + \beta_{14} EC + \varepsilon \quad (2)$$

Data: Description and Measurement

To collect the data and information, we have conducted a household survey at tehsil Jahanian, Pakistan. We have taken 7 months to 12 years old child nutritional status determined by height-for-age Z-scores (HAZ). The women fertility aged categories are between 15-49 years. The income of the households in thousand rupees is used to measure the poverty level in household. The poverty line is fixed at rupees 6907 per capita per month.

To measure the health status of children, we have used the height-for-age z-score (HAZ) and measure those children who are inferior in size or quality by probability method following by Mariara et al., 2009; Harttgen et al., 2013; Abalo, 2009).

Children who are stunted their HAZ z-score can be explained by the following equation:

$$ZScores = \frac{h_i - h_{median}}{\sigma_h} \quad (3)$$

Where:

hi= height of the child i

h_{median}= height of the healthy child

∂_h= Standard Deviation

Table 2. Summary of the Variables for Fertility-Poverty Model

Description	Abbreviation	Coding	Expected Sign
Number of Children (Fertility Rate)	**NC**	**As it is**	**Dependent Variable**
Explanatory Variables			
Poverty	POV	As it is	(+)
Age of Women	AGEW	1 for 15-29 2 for 30-45 3 for 46-59 4 for 60 & above	(+)
Age of Women Squared	$AGEW^2$	1 for 15-29 2 for 30-45 3 for 46-59 4 for 60 & above	(-)
Education of Women	EW	1 for primary 2 for middle 3 for matric 4 for inter 5 for graduation 6 for master & above	(+)
Marital Status	MS	1 for married 2 for divorced 3 for widow 4 for single	(-)
Area of Residence	AREA	1 for rural 0 for urban	(+)
Water Source	WATER	As it is	(-)
Distance to a Health Unit	DIST	As it is	(-)

In the fertility-poverty model, the predictors mostly show the characteristics of the households and females. The child nutritional status and poverty model shows the independent variables, which include the characteristics of the children and characteristics of the mothers and household. 12 years old children are included in this study; birth order of the children, gender of the children, and education of the children also included. In Table 3, we have expressed the explanatory variables, their abbreviation, coding and expected sign.

Table 3. Summary of the Variables for Nutritional Status Poverty-Model

Description	Abbreviation	Coding	Expected sign
Height-for-age z-Scores	HAZ	As it is	Dependent Variable
Explanatory Variables			
Poverty	POV	As it is	(-)
Sex of Child	SEXC	1 for boy 0 for girl	(+)
Birth Order	BO	As it is	(+)
Age of Child	AGEC	As it is	(+)
Age of Mother	AGEM	1 for 15-29 2 for 30-45 3 for 46-59	(+)

		4 for 60 and above	
Sex of Household Head	SEXHH	1 for male 0 for female	(-)
Household Size	HZ	As it is	(-)
Age of Head	AGEH	1 for 15-29 2 for 30-45 3 for 46-59 4 for 60 and above	(-)
Education of Mother	EM	1 for primary 2 for middle 3 for matric 4 for inter 5 for graduation 6 for master & above	(-)
Marital Status	MS	1 for married 2 for divorced 3 for widow 4 for single	(-)
Professional Care	PCARE	1 for yes 0 for no	(-)
Area of Residence	AREA	1 for rural 0 for urban	(-)
Education of Husband	EH	1 for primary 2 for middle 3 for matric 4 for inter 5 for graduation 6 for master & above	(-)
Education of Child	EC	As it is	(+)

Results and Discussions

Descriptive Statistics and Correlation Analysis

A cross-sectional data is used to measure the effect of poverty on the women fertility rate and health status of children. Table 4 exhibits the descriptive statistics for the variables.

Table 4. Descriptive Statistics of Main Variables Used in the Models

	Mean	Median	Max	Min	SD	Skewness	Kurtosis	JB	Prob.
POV	0.16	0.28	0.73	-2.08	0.43	-1.81	7.35	633.50	0.00
AGEM	34.91	35.00	49.00	21.00	5.17	0.09	3.30	2.44	0.29
EM	9.16	10.00	14.00	0.00	2.45	-0.29	4.55	53.99	0.00
MS	1.08	1.00	3.00	1.00	0.38	4.60	22.83	9443.30	0.00
AREA	0.47	0.00	1.00	0.00	0.50	0.11	1.01	79.00	0.00
SEXC	0.50	1.00	1.00	0.00	0.50	-0.01	1.00	79.00	0.00
BO	2.64	2.00	7.00	1.00	1.41	0.67	2.70	37.17	0.00
AGEC	7.23	7.00	12.00	1.00	3.10	-0.10	1.95	22.66	0.00
SEXHH	0.96	1.00	1.00	0.00	0.20	-4.69	22.99	9628.55	0.00
HZ	6.49	6.00	14.00	3.00	1.96	0.77	3.79	59.56	0.00

WATER	6.16	5.00	10.00	2.00	2.05	0.60	2.39	35.90	0.00
DIST	3.16	1.00	7.00	1.00	2.28	0.18	1.17	68.77	0.00
AGEH	43.72	40.00	90.00	24.00	11.6	1.68	6.36	445.32	0.00
PCARE	0.69	1.00	1.00	0.00	0.46	-0.82	1.67	87.97	0.00
EH	9.48	10.00	16.00	0.00	3.05	-0.25	3.45	9.00	0.01
EC	1.37	1.00	5.00	0.00	1.33	0.81	2.71	53.31	0.00

Source: Authors' estimations based on Survey data

Table 5 points out the correlation between variables that we have used in the analysis.

Table 5. Correlation Analysis for Main Variables Used in the Models

	POV	AGEM	EM	MS	AREA	SEXC	BO	AGEC	SEXHH	HZ	WATER	DIST	AGEH	PCARE	EH	EC
POV	1.00															
AGEM	-0.07	1.00														
EM	-0.13	-0.10	1.00													
MS	0.04	0.18	0.14	1.00												
AREA	0.42	-0.11	-0.14	-0.12	1.00											
SEXC	-0.01	0.03	-0.03	-0.01	0.02	1.00										
BO	0.02	0.06	-0.08	-0.09	0.02	0.02	1.00									
AGEC	0.07	0.02	-0.16	0.02	-0.06	0.05	-0.12	1.00								
SEXHH	-0.07	-0.15	-0.13	-0.44	0.11	-0.01	0.01	-0.04	1.00							
HZ	0.25	0.08	0.03	-0.07	-0.08	-0.02	0.00	0.02	0.19	1.00						
WATER	0.03	-0.03	0.12	-0.06	-0.24	-0.03	0.06	0.04	0.08	0.13	1.00					
DIST	0.37	-0.12	-0.15	-0.12	0.95	0.01	0.00	-0.06	0.12	-0.08	-0.21	1.00				
AGEH	0.20	0.05	0.00	-0.05	0.13	0.00	0.01	-0.05	-0.02	0.39	-0.03	0.11	1.00			
PCARE	-0.16	0.00	0.22	0.00	-0.32	-0.09	-0.07	0.00	-0.11	-0.08	0.09	-0.30	0.01	1.00		
EH	-0.17	-0.18	0.58	-0.09	-0.15	-0.04	-0.07	-0.09	-0.13	-0.04	0.10	-0.17	0.00	0.38	1.00	
EC	0.09	0.05	-0.12	0.08	-0.11	0.06	-0.16	0.88	-0.08	0.04	0.00	-0.11	0.00	0.05	-0.09	1.00

Source: Authors' calculation based on survey data

Poverty, Fertility and Nutritional Status of Children Models: OLS Results

This section shows the results and discussions to probe the impact of poverty on women fertility and the nutritional status of children.

OLS based Results of Fertility and Poverty Model

In Table 6, we explain the estimates of the fertility poverty model. Poverty shows a positive and statistically significant association. The reasons for the positive association between poverty and fertility may be justified on the following grounds. Firstly, mostly poor families have a large number of children, and the size of the household is very large in these types of families. If the household is wealthier, they have a small size of the family, but if the household is not wealthier, they have many children because they are not choice conscious. Secondly, the mentality of the people also affects the fertility rate as they think if they have more children, they may have more earners or breadwinners. Thirdly, the reason is that poverty enhances the fertility rate due to the fact that most women are housewives and they do not take part in economic activities, so resultantly poverty level increases the fertility rate. Fourthly, in those households where the income level is low, the fertility rate is high due to the high mortality rate of children. Fifthly, fertility increases in poor families due to the loss of family members or loss of children

or some natural shocks. The results of our study are in link with Odwe, Nobles et al., 2015 and Gauthier et al., 2004.

The age of women displays a positive sign, and it is significant. Age is an important determinant that affects the fertility rate. If the women are older, they have fewer children. As compared to young women at the age of fertility, young women have more children. As the age of women increases, the fertility rate decreases. Our results are related to Bhasin et al.,2009

Table 6. Estimates of Fertility-Poverty Model

Dependent Variable: NC				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.956794	1.290723	-1.516045	0.1302
POV	0.225760	0.128078	1.762679	0.0786
AGEW	0.201362	0.073089	2.755015	0.0061
$AGEW^2$	-0.001154	0.001024	-1.127220	0.2602
EW	0.076252	0.019942	-3.823691	0.0001
MS	-0.583014	0.125440	-4.647743	0.0000
AREA	0.648191	0.234686	2.761946	0.0060
WATER	-0.004195	0.031047	-0.135105	0.8926
DIST	-0.145734	0.049991	-2.915211	0.0037
R-squared	0.23	Prob (Wald F-statistic)	0.000000	

Source: Author's estimates based on survey data

The age of women squared turns out to be a negative sign. The two reasons behind this negative association are: firstly, in the starting years of the reproductive period, women have a high fertility rate, but when the women age increases, their reproductive cycle decreases. Secondly, as the women age increases, the different diseases and risks also increase with age. The results are consistent with American reproductive medicine, 2008 and Bhasin et al., 2009.

The education of women has a positive sign and statistically highly significant. Some important reasons for this positive association are: education of the women is very important especially primary level because women education affects the fertility rate. Educated women have fewer children, but uneducated women have a large family size due to lack of knowledge, but educated women know the problem of large families. They know about family planning, child spacing, and they know their rights in decisions about their children. Our results are compatible with Mariara et al., 2009 and Gordon et al., 2011.

Marital status has appeared with a negative sign, and it is highly significant. Currently, married women have more children, and they increase the fertility rate, but those women who are divorced, widow or single have fewer children. Some social factors also affect women fertility. Many times, married women are required by their husbands or other family members to enhance their family size. But divorced, widow or single women have no family pressure. Our results are supported by Moultrie and Timaeus, 2001.

The area shows a positive sign, and it is significant as well. The possible reasons for the positive connection between area and fertility are: firstly, women in rural areas have more children, but women in urban areas have fewer children. In urban areas, women

have more wealth than rural women. The urban women work in the industries and some other jobs, which restrict them to have more children. Secondly, women in rural areas do not know about family planning programs. Due to the lack of other facilities in rural areas, women have large family sizes. The results are linked with Ainsworth et al., 1996.

The water source demonstrates a negative association, but it is statistically insignificant. Women spend more time bringing clean water in the rural areas, which lower the wealth of the poor household. The reason behind this is the limited availability of facilities and poor infrastructure, which affect the poorer as compared to the richer. The results are matched with Brook and Smith, 2001.

'Distance to a health unit' is negative, and it is statistically significant. In the rural areas, women face poor facilities regarding their health. They live in those areas where there is no proper source of transportation to reach the long-distance health units. These types of problems mostly face by the poorer families, which affect the fertility rate in these areas. The results are matched with Kiwanuka et al., 2008.

OLS based Results of Child Nutrition and Poverty Model

In Table 7, we explain the estimates of the nutritional status of the children in tehsil Jahanian Pakistan. Poverty is Negative, and it is highly significant. The possible reasons for the Negative srelationship between poverty and HAZ are: firstly, the poor families are not able to afford healthy food for their children, so due to the unavailability of basic foodstuff and goods, children are undernourished. Secondly, an increase in the poverty level in a country affects the growth of the children and development of the children. Thirdly, household patterns are very important because those households who are poor for a long period had a greater impact on the nutrition outcomes of their children. Fourthly, children wellbeing is measured by the wealth and assets of their parents. If they belong to a wealthy family, they are less stunted, but children who belong to those families who had no assets are more stunted. Our results are compatible with Bloom and Canning, 2000; Garcia and Alderman, 1989; Bomela, 2007; Mariara et al., 2012; Cesare et al., 2015 and Jones et al., 2019.

The sex of the child is positive, and it is highly significant. Characteristics of the children influence the nutrition status of the children. According to their characteristics, boys are more stunted than girls. It can be justified on the following grounds: firstly, it is a fact that according to biological studies, boys grow slower than girls. Secondly, due to our social behaviours, mostly girls spend their time in houses, and they have more availability of food than boys, so girls are more nourished. The results are related to Ssewanyana, 2003 and Abalo, 2009.

Birth order is positive, and it is statistically highly significant. If the number of births increases, the number of undernourished children also increase in low-income families. The possible reasons may be that firstly if there is a single child in a family, he or she is well-nourished than the multiple births. Secondly, it also explains those children who have low weight at the time of birth and have no proper breastfeeding, which may cause the children less in size. The results are associated with the study of Mariara et al., 2009 and Horton, 1986.

The age of the child is positive and highly significant. There are some reasons behind this fact. Firstly, as children grow, they need more food, but due to unavailability of food or facing malnutrition, children are shorter as compared to their age. Secondly, we know that when children are growing, they are suffering malnutrition because, at that time,

there is no availability of breastfeeding. The results are related with Sahn and Stifel, 2002; Babatunde e al., 2011 and Adewara and Visser, 2011.

The age of the mother shows a positive sign, and it is highly significant. The positive association between the age of the mother and child nutrition may be justified on the following lines: firstly, if the mother is young, it means that children are more stunted. But if the mother age is more or the mother is older, they have less malnourished or stunted children. Secondly, as the mother age increases, the nutritional status of children also increases especially underweight children in both rural and urban areas. The results are matched with Mariara et al. 2009; Abalo, 2009.

The sex of the household head has appeared with a negative sign, and it is highly significant. The possible reasons for the negative association are: firstly, in those families where the sex of the household is male, children are in good health, and their nutrition status is better. In male-headed families, children are less malnourished. The reason is male have better and more jobs opportunities, so the impact on the nutritional status of children is positive. Secondly, in the households where males go to jobs and female remain in the houses to take care of the children, we find better accessibility to mother care over there. In these families, the number of stunting children is low. The results are in contrast with Mariara et al., 2009; Babatunde and Martinetti, 2010.

Household size has turned out with a negative sign and is highly significant as well. The negative link between the size of household and children health status has the following reasons: firstly, if the families have a low level of income and they extend their family size, children in these families grow with low height-for-age. Secondly, if the size of the household increases and children have a large number of siblings so resultantly, the availability of food is very low among sibling, and they have to face malnutrition. The study is related to (Tinkew and Dejong, 2004; Garcia and Alderman, 1989).

The age of the head has appeared with a negative sign, and it is highly significant. If the head of the household is young, the children in the household are less malnourished, but if the head is older, the children are more stunted because a young male is physically fit to do more work than the older head of household. A young head earns more than an older head and can purchase more food items for the children, so children are less malnourished. Our results are associated with Mariara et al., 2009 and Harttgen et al., 2013.

Education of the mother shows a positive sign, and it is statistically highly significant. Some reasons for this positive relationship are: firstly, if the education of the mother increases, the better nutritional status of children also increases. The mothers who are educated know how to facilitate their children. Educated mothers know how to detect the illness, and they know how to take care of their children during illness, but mothers who have even no basic education, they do not know how to treat malnourished children. Secondly, the basic education of the mother is very important. Educated women know about general health and can improve the health of the children. Thirdly, the uneducated mother hurt children health. In those households where mothers are uneducated, the number of stunted children is higher. Fourthly, some socioeconomic factors and maternal education reduce the HAZ, especially in primary or secondary level education of mothers. Our results are associated with Babatunde et al., 2011; Ajao et al., 2010; Bbaale, 2014; Mariara et al., 2009; Glewwe, 1999.

Marital status demonstrates a negative sign, and statistically, it is highly significant. Those women whose marital status is married, widowed or divorced have a

low level of income, but single women are wealthier than married women. As the women who are married, they have a large family size, and they have to spend on their children to provide them food items and many other goods due to the large size of the family. They have less money, and children are undernourished due to lack of food; that's why they have more malnourished children who are lower in their sizes. Our results are in contrast with Aidoo et al., 2013.

Table 7. Estimates of Child Nutritional Status-Poverty Model

Dependent Variable: HAZ				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.726261	0.006936	-248.8926	0.0000
POV	0.112497	0.001256	89.57626	0.0000
SEXC	0.040357	0.000588	68.59094	0.0000
BO	0.010503	0.000158	66.48400	0.0000
AGEC	0.206305	0.000171	1203.802	0.0000
AGEM	0.003749	3.73E-05	100.5170	0.0000
SEXHH	-0.088284	0.003004	-29.39278	0.0000
HZ	-0.005592	0.000266	-20.98696	0.0000
AGEH	-0.000386	3.72E-05	-10.36288	0.0000
EM	0.011685	0.000115	102.0117	0.0000
MS	-0.133240	0.003634	-36.66321	0.0000
PCARE	0.031324	0.000942	33.26820	0.0000
AREA	-0.017279	0.000536	-32.23930	0.0000
EH	0.006021	0.000129	46.69044	0.0000
EC	0.181760	0.000376	483.0089	0.0000
R-squared	0.72	Prob (Wald F-statistic)	0.000000	

Source: Authors' compilation based on survey data

Professional care turns out to be positive, and statistically, it is highly significant. It means that if mothers do not use professional care at the time of childbirth, it negatively affects the nutritional status. If a mother uses professional care, it is very beneficial for the household as it improves the health status of the children. Similarly, we may argue that mothers use modern source of health care and obtain proper information about children health; they have fewer malnourished children because mothers are the first caretakers, and they have the rights to make decisions about their children health. Those children whose mothers do not use professional care are smaller than the other children. The impact of illness is negative on the child nutrition status. Our results are related to Garcia and Alderman, 1989 and Mariara et al., 2009.

The area exhibits a negative sign, and it is highly significant. There are some reasons behind this negative relationship: firstly, there is a comparison between rural and urban areas. In the rural areas, children are more stunted than in the urban areas. The nutritional status of children is better in urban areas, and the child mortality rate is very low in these areas. Secondly, in urban areas, children had more facilities in urban areas than children in rural areas. There are many hospitals and other health facilities available in urban areas, so the numbers of stunted children are very low. Our results are associated with Mariara et al. and Abalo, 2009.

The education of the husband shows a positive sign, and it is highly significant. It means that if the husband is uneducated, it negatively affects the health status. Due to lack of education, he does not know their health of children. Children health is very important, but if the fathers are illiterate, they do not know the importance of health care. For the better nutritional status of children, the education of fathers plays an important role. It also increases the wealth of the household. We observe that in those households where husbands are more educated, they have fewer stunting rates. Our results are in line with Alderman and Headey, 2017; Baye and Fambon, 2009.

The final explanatory variable is the education of the child, which shows a positive sign and statistically, it is highly significant. It means that if the education of the children increases, the health status of the children also increases. They know the importance of their health. In the age group of school-going, better nourishment and food are essential to improve the child health status, so children have to suffer more from various diseases. They face a deficiency of different vitamins and iron, and they are underweighted. Therefore, the role of education is very important for the health of children. Education provides self-knowledge to children, and they make decisions about their health problems. Our results are associated with Alder, 2015.

Conclusions and Policy Implications

The study investigates the impact of household poverty on the women fertility rate and nutritional status of children in tehsil Jahanian Pakistan by applying the OLS method. The results indicate that poverty is positively related to women fertility negatively related to the health status of children. The study suggests some policies which may affect the fertility rate and nutritional status of children.

- The findings suggest that if the policymakers introduce poverty alleviation programs or provide different job opportunities to the people and reduce unemployment, it may positively affect the health status of the people because by enhancing the income level, they have more income to spend on food items, and they participate in the growth of the country. By increasing the income level, planners may reduce the fertility level in a country.
- If government invest in the education of women and men and promote education in rural and urban areas, it may reduce the fertility rate in the country because, in those areas where education is costly, and women are uneducated, the fertility rate is high.
- If government provides a large number of health units and improve professional care at the time of childbirth, it may play an important role. Through health workers in all the areas encourage females to use professional care, which may help to control fertility and improve the health status of their children.
- The government may improve the health status of children and reduce the fertility rate by developing or providing the same public services or nutritional care to women in rural areas as in urban areas.
- If government provides a clean water source to the people, it improves the health of the people, and it may increase the growth of the country due to better health.
- Planners may increase the health status of children by investing in the education of children and by improving the quality of the children through different health facilities, which may contribute to enhance the economic growth of the country.

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