

## THE EFFECTS OF HOUSEHOLD SOCIOECONOMIC CHARACTERISTICS ON CHILDREN UNDER 5-YEARS MORTALITY IN AFGHANISTAN

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### ABSTRACT

*Households Socioeconomic conditions in most cases directly affecting the lives of children at the age of under 5-year. Accessibility of Afghan households to improved drinking water, household sanitation, households head characteristic, paternal and maternal occupation, and household children population size are the targets variables which are examined to find the effects of household's socioeconomic condition on children under 5-year mortality in Afghanistan. In this study, data has extracted from (2015afdh) and logistic regression by calculating the marginal effect was applied to find the effect of explanatory variables on the three dependent variables (neonatal mortality, infant mortality, and under 5-year mortality). The result shows that the neonatal period is more vulnerable rather than infant and under a 5-year age period in Afghanistan. Accessibility of households to clean water and protected toilet decreasing neonatal mortality by (1.6 % and 1.9%), good sanitation decreased infant mortality by 4% and in under 5-mortality by 2.21% respectively. household wealth index, father and mother occupation are strongly affecting the lives of children in all stages of life. A male child is more likely to die in the age of the neonatal period and female in the age of the infant period. In this study, we approached that, households drinking water sources strongly affecting the lives of children under 5-year. Furthermore, protected toilets significantly decreasing the mortality rate of children under 5-year. By improving the household's lives standard and increasing the awareness of household members about the role of hygiene and sanitation the probability of children died at the age of under 5-year significantly will reduce.*

**Key word:** mortality, socioeconomic, sanitation, household, Afghanistan.

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## Introduction

Households life condition directly effecting the lives of children under 5-year. Poor sanitation and unimproved drinking water sources causes many diseases and increase the risk of dying at the age of childhood. Qualified education and appropriate job opportunities have strongly associated with awareness of household's member to care about sanitation, hygiene and nutrition. Unfortunately, developing countries rapidly struggling with weak sanitation, unappropriated hygiene and weak nutrition system because of uneducated household's members and lack of income sources to cover the expenses of households. Afghanistan as an extremely poor nation badly facing with all types of disease and has the highest mortality rate in the region. Despite of descending billions \$ as international aids in Afghanistan, the poverty line is much higher than every country in the region. Despite of all these international financial and humanitarian aids to Afghanistan, nearly 96% of households headed by male and the only 4% headed by female, approximately 75 % of households lives in rural area, seventy percent of women but slightly less than half of men never attended school. Sixty percent of the urban population had ever attended school, compared with 35.8% of the rural population. Younger age groups have higher percentages in having ever attended school, with 65.6% of children between 10 - 14 years of age having ever attended school. In urban areas, the most common source of drinking water is piped water into dwelling (29.7%). In rural areas, this is most commonly a hand pump (11.0%) or a covered well (15.0%) in the yard or plot. In urban areas, over three quarters of households have access to water inside their house or plot, but for 19.1% it takes less than thirty minutes to get water and return. In rural areas, 45.9% of households have water inside their house of plot, 42.6% have to travel less than thirty minutes to get water and return. For 10.2% of the rural population it takes thirty minutes or longer to retrieve water (KIT, MoPH and NSIA.2018). This study designed to calculate the influences of household characteristics such as household head (gender, education and age), the number of children living in the household, household economic condition, residency area, paternal and maternal education, age and occupation status, children birth order in the household and gender of child on children under 5-year mortality.

## Literature Review

Developing countries due to spread of infectious diseases, careless public health services, poor sanitation, unsafe water sources and lack of enough education significantly increasing the death of children under age of 5 years. In 2003, it was estimated that 4% (60.7 million DALYs) of the global burden of disease and 1.6 million deaths per year were attributable to unsafe water supply and sanitation, including lack of hygiene (Guy Hutton and Laurence Haller, 2004). Observing to health guidelines and increasing the public awareness will reduce the probability of child death in all risky periods, good nutrition and healthy hygiene will improve the

immune system of child against diseases. Consumption of safe drinking water and improved sanitation by handwashing with soaps the risk of children mortality significantly decreased (Cairncross et al., 2010). Wealth and distribution of national wealth among to society and households directly effecting the lives of people who are living in the society and indirectly associated to children mortality. A research has appealed that, national income and child mortality in developing countries are associated directly to each other, it means that a 10% increase in GDP was associated with a 10% decrease in infant mortality (O'Hare B et al., 2013). Life expectancy influencing by income distribution, countries with big differences in income distribution will reduce the life expectancy and has adverse consequences on public health (Wilkinson RG,1992). A study in low and middle income countries revealed; that government policies to adjust income inequality in the society and increasing the economic growth negatively associated with communicable and non-communicable diseases mortality in all age of male and female groups (Joseph L. Ward and Russell M. Viner,2017).

Observing to public health care system and vaccination against diseases improves the immune system of child and will reduce the mortality rate of children under 5-year. Recently the mortality rate of children decreased by implementing of vaccination program in world (WHO,2018). A study conducted that vaccination and control of communicable diseases associated to each other and has positive effect on diseases control (Mokhayeri et al. 2016; Noh et al. 2018; Sheikh et al. 2018). the United Nations Inter-Agency Group for Child Mortality Estimation approached that the death of children under 5 years' age decreased globally, the number of deaths declined from 12.6 million in 1990 to 5.4 million in 2017 by 58% reduced (You et al. 2015). The vaccination provided in all public health centers for free of charges under the Expanded Program on Immunization (EPI) of world health organization (WHO, 2017). The EPI in afghanistan was initiated in 1978, The number of health facilities in afghanistan that provide vaccination services has increased from 1,575 in 2015 to 2,926 in 2018 (World Health Organization 2018). An investigation about vaccination effects on children in afghanistan shows that maternal age, place of delivery, health facilities, paternal occupation, wealth index, and residence area are influencing child's vaccination status in Afghanistan (Aalemi, A.K, Karimullah Shahpar, and Mohammad Yousuf Mubarak. 2019).

Previews study related to children mortality in Afghanistan investigated, unfortunately a few study has been done on household's socioeconomic association with children under 5-year mortality. In this study we examined the household's socioeconomic characteristics derivatives such as household head age, gender, education, number of children under 5 years lives in household, household wealth index, household residence region, maternal age at birth, education, occupation, ethnicity, paternal age, education, occupation, household sanitation and drinking water sources, maternal health care condition and habits such as smoking cigarettes, taking

alcohol and drugs, children status such as birth order in the household and gender on the death of children at neonatal, infant and children under 5-year age periods.

## **Research Methodology**

### **Data information**

Data has extracted from 2015 afghanistan demographic and health survey(2015afdhs) to examine the effects of households socioeconomic conditions on the death of children under 5 years' age in afghanistan. 2015afdhs project was funded by united states agency for international development (USAID) and implemented by the ministry of public health (MoPH) with the central statistic organization(CSO) of afghanistan from June 15, 2015 to February 23, 2016 (DHS, 2017). The survey project was designed to collect data from households who are living in 34 provinces of afghanistan using by multi-stage sampling method all ever married women from rural and urban area selected as the population of the survey. The survey was conducted in 34 provinces of Afghanistan to collect information on different indicators such as sociodemographic status of households, maternal and paternal education and occupation condition, children's status, and household characteristics. The 2015 AfDHS is a national sample survey that provides up-to-date information on fertility levels; marriage; fertility preferences; awareness and use of family planning methods; child feeding practices; nutrition, adult, and childhood mortality; awareness and attitudes regarding HIV/AIDS; women's empowerment; and domestic violence. The target groups were women and men age 15-49 in randomly selected households across Afghanistan. In addition to presenting national estimates, the report provides estimates of key indicators for both the urban and rural areas in Afghanistan and the provinces (CSO, MoPH and DHS,2015)

### **Research variables**

As in table 1 explained; the children under 5-years age mortality defined as a depend variable. Children who have died before age of five birthday categorized into 3 groups; (neonatal= the probability of death before reaching 28 days of age; infant= the probability of death before reaching 1 year of age and children under 5-year= the probability of death before reaching 5 years of age). If the children have died in the neonatal period coded 1 otherwise 0, the children who have died in the infant period coded 1 otherwise 0. And the children who have died between infant period and before 5-year age coded 1 otherwise equal 0. The explanatory variables extracted from 2015afdhs dataset as follow; the household characteristics such as gender, age and education level of household head, household wealth index, household residency area and the number children under 5 years' age. Continuously, father and mother age, education and occupation; types of households drinking water and toilet facilities;

maternal health care status and habits such as smoking cigarettes, taking alcohol, drugs and tobacco; child gender and birth order in the family stated as explanatory variables.

**Source:** authors

**Table 1 : variable explanation**

Variables	Description
<b>Mortality</b>	
Neonatal	the probability of death before reaching 28 days of age
Infant	the probability of death before reaching 1 year of age
Children under 5-year	the probability of death before reaching 5 years of age
<b>Household Characteristics</b>	
Household head gender	Male and Female category
Household head age	Age category of household
Household head education	The level of school attendant
No. of children under 5 age	Children under five year ages of household
Household wealth index	Poorest, poor, middle, richer and richest categories
Household residence	The residence type of household (Rural or Urban)
<b>Mother characteristics</b>	
Age	Current age of mother
Education	The level of school attendant
Occupation	Occupation of mother
Ethnicity	Ethnicity of mother ( Pashtun, Tajik, Uzbek, Hazara and others)
<b>Father characteristics</b>	
Age	The age category of father ( under, medium or high age)
Education	Education level of father ( no school , primary, secondary or high)
Occupation	Father occupation ( professional or not professional)
<b>Household sanitation condition</b>	
Drinking water	Protected or not protected
Toilet sanitation	Facilitated or not facilitated
<b>Maternal health care status</b>	
Age at first born	Age of mother at first birth
Health insurance	Types of health insurance
<b>Maternal habits</b>	
Smoke cigarette	Does mother smoke cigarette? Yes or No
Drink alcohol	Does mother take alcohol? Yes or No
Take drugs	Does mother currently take drugs? Yes or No
Smokes pipe full of tobacco	Does mother currently use tobacco? Yes or No
<b>Child status</b>	
Sex	Gender of child
Birth order	Birth order of child in household

### Research equation

In this study the logistic regression was applied to reveal the effect of household's socioeconomic status on children under 5-year mortality in afghanistan.

Children under 5-year death as a depend variable categorized into three groups such as; neonatal mortality; infant mortality and under 5-year mortality. All the three depend variables scaled to dummy variable and three logistic model has been applied to conduct the effect of household socioeconomic characteristics on three types of child mortality.

Neonatal mortality=  $\beta + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \epsilon$ .....  
 Model 1

Infant mortality =  $\beta + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \epsilon$ .....  
 Model 2

Children under 5 =  $\beta + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \epsilon$ .....  
 Model 3

$\beta$ = intercept

$\beta_1$ - $\beta_5$ = slopes

$\epsilon$ = error term

$x_1$ = Household Characteristics such as household head age, gender, education, water and sanitation.

$x_2$ = household wealth index such as poorest, poor, middle, rich and richest.

$x_3$ = mother’s ethnicities such as Pashtun, Tajik, Hazara and Uzbek.

$x_4$ = paternal and maternal status such age, education and occupation

$x_5$ = child information such as birth order and gender.

**Result**

According to table 2; household drinking water divided into clean water and not clean water. 59623 households out of 125572 households drink clean water and the rest of them not drink clean water. In other words, 47.48 percent of households have access to clean water the remained 52.52 percent of them have not access to clean water and consuming the unimproved water. furthermore, accessibility of households to toilet and sanitation also categorized into protected and unprotected toilet facilities. As table 2 shows, 26.64 percent of households using protected toilet and huge percentage of them (73.36) percent have not access to protected toilet and they are suffering from weak sanitation.

Table 2: the household Drinking water and toilet sanitation status

	Drinking water			Toilet		
	Clean	Not Clean	total	Protected	Not Protected	total
Frequency	59,623	65,949	125,572	33,470	92,152	125,622
Percentage	47.48	52.52	100	26.64	73.36	100

Resource: 2015Afdhs.

Table 3 shows; the children’s father and mother education status. The education level of husband and wife divided into four categories. 62.09 percent of partner (husband) never attended to school and uneducated, 12.99 percent of them

attended to school until primary education, 19.15 percent attended to school until secondary, only 5.77 percent of husbands went to higher education. Continuously; 90.02 percent of partner (wife) ever not attended to school, 5.37 attended until primary, 3.63 percent attended until secondary and the rest of them (0.98) percent got chance to go universities. The ratio of school attendance between husband and wife is huge difference the 90 percent of wives and the 62 percent of husbands are uneducated and ever not attended to school.

**Table 3: father and maternal education Status**

<b>Husband education level</b>	<b>Freq.</b>	<b>Percent</b>	<b>Cum.</b>
No education	77,886	62.09	62.09
Primary	16,289	12.99	75.08
Secondary	24,023	19.15	94.23
Higher education	7,238	5.77	100
Total	125,436	100	
<b>wife education level</b>			
No education	113,171	90.02	90.02
Primary	6,753	5.37	95.39
Secondary	4,565	3.63	99.02
Higher education	1,226	0.98	100
Total	125,715	100	

Resource: 2015Afdhs.

Poor societies hardly restricted against women freedom and extremely leading by men. As in table 4 the household head characteristics tabulated, 98.84 percent of household's head are male and the only 1.16 percent of them are female. 12.57 percent of household's head are under 30 years' age, 59.81 percent are between 31-50 years' age, 24.55 percent are between 51-70 years' age and 3.06 percent of household head are above the 71 years' age. Furthermore, 90.02 percent of household's head are uneducated and do not attended to school the rest of 10 percent households head are at least attended to school, the only 0.98 percent out of 10 percent school attended went to higher education. 24.29 percent of households lives in urban area and the remained 75.71 percent of them lives in rural area.

**Table 4: Household Head characteristics**

<b>household Head Sex</b>	<b>Freq.</b>	<b>Percent</b>	<b>Cum.</b>
Male	124,258	98.84	98.84
Female	1,457	1.16	100
Total	125,715	100	
<b>Household Head Age</b>			
<30	15,807	12.57	12.57
Between 31-50	75,186	59.81	72.38
Between 51-70	30,868	24.55	96.94
> 71	3,853	3.06	100
total	125714	100	
<b>Household Head Education</b>			
Uneducated	113,171	90.02	90.02

Primary	6,753	5.37	95.39
Secondary	4,565	3.63	99.02
Higher	1,226	0.98	100
Total	125,715	100	
<b>Households residence Area</b>			
Urban	30,532	24.29	24.29
Rural	95,183	75.71	100
Total	125,715	100	

Resource: 2015Afdhs.

According to marginal effect result of research as illustrated in table 6 there is no significant evidence about effects of household characteristics on neonatal mortality except household clean drinking water, good sanitation and rural residence. If the current condition of households drinking water improved one unite the death of children in neonatal period will decrease 1.62 percent with 95 % confidence interval. when the current toilet sanitation increase one unite the probability of death in neonatal will decrease about 1.92% by 95% CI. Continuously, the probability of children death at the age bellow of 28 days in rural area less than urban residents, if the current situation of rural residents increase one unite the probability of neonatal mortality will decrease around 1.42% with 95% CI. In infant mortality all the explanatory variables except toilet sanitation have not statistically effect on children death in the age of infant period, as in the table 6 has shown if the current condition of toilet sanitation increased one unit the probability of death in infant period will decrease 4% with 95% CI. Furthermore, in the model of children less than 5 age mortality the number of children living in same household significantly effecting the death of child in the age of less than 5 years. If the number of children increase from current condition, the probability of dyeing in the age of before 5 years will increase around 1 % with 95 % CI too. clean drinking water and protected toilet sanitation significantly effecting the lives of children in the age of 5-year.

Household wealth index strongly effecting the lives of children in every period of age. The children who had born in rich household more likely to alive than who had born in poor or poorest household. If the current condition of richer household improved one unit, the probability of dying in the age of neonatal period will decrease 3.74 % with 95% CI, the condition poorest household strongly effecting the lives of children in the age of infant period, as illustrated in table 6; the current condition of poorest households increase one unit the probability of dying the in the age of infant period will decrease 4.21% with 95% CI. if the current condition of poorest households decreases one unit the probability of dying in the age of between infant and under 5-year will increase 1.64% with 95% CI.

Ethnicity of mother significantly effecting the lives of children in neonatal period and children under 5-year age. As in table 6 explained, the ethnicity of mothers in neonatal and children under 5-year mortality strongly effecting and in infant



mortality only the Pashtun ethnicity effecting the lives of children other ethnicity dose not influencing the lives of children in infant period.

**Table 6 :Marginal effect result of Neonatal, Infant and Children under 5 years age mortality in Afghanistan**

variables	Neonatal mortality		Infant Mortality		children < 5 age mortality	
	dy/dx	p	dy/dx	p	dy/dx	p
<b>Household Characteristics</b>						
Female head	0.1247	0.1420	-0.0757	0.3330	-0.0405	0.4770
head age	-0.0895	0.3410	0.0206	0.8530	0.0458	0.6710
children live under 5 age	-0.0156	0.2880	0.0053	0.7230	0.0119	0.2850
children had death	-0.0215	0.3350	0.0281	0.2180	-0.0130	0.4180
total children living	-0.0082	0.1190	-0.0006	0.8550	0.0105	0.0000
Clean Drinking water	-0.0162	0.0010	-0.0184	0.1050	-0.0224	0.0110
Protected toilet sanitation	-0.0192	0.0090	-0.0402	0.0040	-0.0221	0.0350
rural residence	-0.0142	0.0000	0.0077	0.6440	0.0071	0.5890
<b>Household wealth index</b>						
poorest	-0.0190	0.4430	0.0421	0.0040	0.0164	0.0000
poor	-0.0038	0.8770	-0.0211	0.3940	0.0242	0.2350
middle	-0.0115	0.6260	-0.0056	0.8180	0.0175	0.3740
richer	-0.0374	0.0080	0.0248	0.2780	-0.0080	0.6510
<b>Mothers ethnicity</b>						
Pashtun	0.1475	0.0000	-0.0702	0.0000	-0.0653	0.0000
Tajik	0.0806	0.0000	-0.0172	0.3510	-0.0505	0.0000
Hazara	0.1008	0.0000	0.0013	0.9520	-0.0775	0.0000
Uzbek	0.0708	0.0050	-0.0038	0.8670	-0.0512	0.0000
<b>Mothers status</b>						
Age under 20 years	0.0154	0.0000	-0.0037	0.0140	-0.0009	0.4260
mutual health insurance	0.1636	0.5640	0.1774	0.3160	0.1170	0.4850
occupation	-0.0094	0.0030	0.0092	0.0010	-0.0007	0.7300
smoke cigarettes	0.0582	0.0500	0.0588	0.2990	-0.0011	0.9780
<b>Child status</b>						
birth order	0.0161	0.0000	-0.0008	0.7280	-0.0135	0.0000
gender male	0.0263	0.0090	-0.0203	0.0470	-0.0056	0.4790
observation	N=9,645		N=9,639		N=9,642	

Resource: 2015Afdhs.

the evidence shows, age of mother at first birth effecting the lives of newborn children. If the age of mother changed from 20 years at birth to less than 20, the probability of dying at neonatal period will increase 1.54% with 95% confidence interval. occupation of mother indirectly effecting the child death at neonatal period, whose mother has occupation and has income the death of children at neonatal period will decrease around 0.94% with 95 % CI. smoking cigarettes directly effecting the death of children at neonatal period, if the current condition of mothers who are smoking cigarettes change by one unit the probability of children death at neonatal period will increase 5.82% with 95% CI. age of mother and occupation of mother as influenced the lives of children in the age of neonatal period, both variables effecting the lives of children at the age of infant period too. when the children grew up from

one month and started the age of infant period the age of mother under 20 years indirectly effecting the lives of children in the infant period. As in table 6 revealed, if the age of mother at birth changed from current situation the probability of child dying at infant period will decrease 0.37 % with 95% CI. furthermore, the mother occupation in infant period significantly improving the lives of children at infant period, there is no evidence to prove the effect of mother age and occupation on children under 5-year age mortality.

Child birth order in the household and sex of child significantly effecting the lives of children in neonatal period. If the birth order of child is the last in the household, the probability dying more likely higher than who is the first. If the current condition of child birth order changes the probability of child dying in the age of neonatal period will increase 1.61% with 95% CI. when the child rescued in the age of neonatal and infant period, the birth order in the age of under 5-year has indirect effect on child mortality. As in table 6 illustrated, if the bird order of child in the household increase the probability of dying in the age of under 5-year will decrease 1.35% with 95% confidence interval. if the gender of child were male the probability of dying at neonatal period is 2.63% higher the female child but in the infant period if the gender of child were male the mortality rate of infant will decrease 0.90% with 95% CI.

## **Conclusion**

Nearly more than half of households have not access to safe drinking water and protected sanitation. Above 90% of households are headed by uneducated people and more than 98% of household's head are male. Extremely poverty hardly effecting the lives of households in the rural region and have not access to basic qualified public health facilities and education. The above mentioned situation strongly effecting the death of children under 5-year in all three models (neonatal, infant and under 5-year) of this study. Neonatal age period significantly influencing by household's hygiene and sanitation condition more than infant period. Observing to sanitation statistically reducing the death of child in all stage of under 5-year and drinking improved and safe water effecting the lives of children in the age of neonatal and under 5-year period, there is no evidence safe water effecting the infant age period. Continuously, wealth index of households, ethnicity of mother, age of mother, occupation of mother and mother habits such as smoking cigarettes, taking alcohol and drugs, the birth order of child in the household and gender of child significantly have impacts on children mortality of Afghanistan. Male child more likely dying in the age of neonatal age and female child in the age of infant age.

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