FEMALE EDUCATION AND CHILD MORTALITY: THE CASE OF TAJIKISTAN

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ABSTRACT

In developing countries, the living standards of the population can be judged analysing the rates of child mortality in these countries. Child mortality in Central Asia, particularly, Tajikistan, will be worthy to scrutinize as the rate was too high from the past (UNICEF Data, 2020). Aim: The purpose of this paper is to investigate the determinants of this high rate in Tajikistan. Methods: Demographic and Health Survey data from Tajikistan in 2017 are used for Probit/MLE regression analyses of the four groups of the main determinants of child mortality: mother, family income, household and child. Findings: Variables of female education (v133), wealth index (v190a), existence of refrigerator (v122), distance from home to hospital (v467d), doctor present during birth (m3a) and age of the mother at the first birth (v212) are found to have significant effect in the determination of child survival. Female education has a significant at 5% coefficient with the value of 2% increase in the child survival chances respective to 1 more year of education. The suggestion is made for governments to draw close attention to the education of women in Central Asia.

Keywords: *Child mortality; Female education; Health care; Living standards.*

INTRODUCTION

Health, especially children's health, plays a crucial role in economic growth and one can evaluate the living standards of the population in a country glancing at the mortality rate among children. Child mortality has been one of the biggest concerns of humanity from the past. Before Modern Revolution, every fourth child died in infancy. In Europe, for example, parents lost on average 3-4 of their children (Roser, *et.al.* 2019). The world has seen remarkable reductions of about 60% in under-five child mortality in the past three decades – from 93 death per 1,000 live birth to 38

(World Health Organization (2020); Roser, *et.al.* 2019 – see appendix Figure 1 & 2). Yet, on any average day, around 15,000 children under-five are dying throughout the world (Roser, *et.al.* 2019). Many countries are suffering from the occurrence of mortality, especially, in early childhood. Central Asia, particularly, Tajikistan is not an exception, where 34 children out of 1,000 live-born are not reaching their fifth birthday (UNICEF Data, 2020). Yet, this rate is much lower in comparison with indexes from past (The World Bank, 2020 – see appendix Figure 3). To be more precise, in 1990, more than 10% of all children aged under-five could not survive and this rate continued to grow until 1994, where it peaked at 113.6 per 1,000 live births. Since then, the rate of child mortality has been declining considerably to 10.2% in 1997, 7.7% in 2001 and 5.2% in 2006. From 2006, this dramatic decline has slowed down, but continued to diminish gradually. As per the data from the World Bank (2020), child mortality rate was nearly 34 per 1,000 live births. To compare this rate with Central Asian countries, Tajikistan is the 3rd worse among Afghanistan (60.3), Turkmenistan (42), Kyrgyzstan (18.3), Uzbekistan (17.4) and Kazakhstan (10.5 child death per 1,000 live births) (The World Bank, 2020 – see Figure 4).

Since Tajikistan has higher number of early childhood deaths in Central Asia, and the culture similar to Uzbekistan, we are inclined to examine the main determinants of this high rate of child mortality in the case of Tajikistan. For this purpose, we are going to employ the Demographic and Health Survey of 2017 conducted in this country. As maternal education is considered to play a crucial role in children's survival, we will be mainly focusing on this variable. We are expecting the confirmation of female education to have a significant positive impact on child survival in Tajikistan. Yet, we are including other factors that have influence on child mortality. This study attempts (1) to identify the list of child mortality determinants; (2) to find the level of the impact of female education on child mortality and (3) formulate recommendation for the government to combat against the mortality in early childhood.

The work continues with the review of literature on child mortality and its causes. The following section describes the methodology and econometric analyses undertaken in the work. Section 5 presents the results of the study, while the conclusions of the study and suggestion of the author are given in the last section.

Literature review

Most of the research on child mortality was conducted starting from the last quarter of the previous century. The interests of researchers on this topic can be divided into two groups: the research mainly directed to study the characteristics of household; or investigating the case from government aspects.

One of the papers that targeted to examine the role of parents on child survival was carried out in 1982 by Wolfe and Behrman, who undertook a research on the main determinants of child mortality in one of the developing countries – Nicaragua. Probit model was utilized to analyse the cross-sectional multipurpose survey for 1977-1978. As per the results, mother's education (literate/illiterate) was determined as the most crucial factor influencing child mortality. However, the determinants differed considerably across regions of Nicaragua. To be more precise, father's education was found to be noteworthy only in urban areas whereas income has substantial effect on child survival only in rural areas. Findings also reveal an inverse relationship between the number of children and child survival within a family.

The factors resulting in child mortality in Jordan was scrutinized by Tekçe and Shorter in 1984. Based on a household survey of the last two decades up to 1984, they investigated the main determinants of child mortality and explored the level of mother's education, the quality of the house, the occupation of the head in the family and income level of the household as the main causes contributing to the mortality among children of Jordan. Employing MCA (Multiple Classification Analysis) model, they were able to see gross and net influence of the factors on the dependent variable. Amid these variables, the most powerful impact comes from mother's education whilst head's occupation, together with household income is found to have mild effect on child mortality.

The profound impact of mother's education was also discovered by a couple of researchers. Studying child mortality based on a sample data from 1980 Brazilian census and applying Trussell's variant of the Brass method, Wood and Lovell (1990) noticed mother's education as the most important determinant, ahead of running water in the household, father's education, membership in the social security system and region. They also proved that rich children live 10 years more than children of the poor.

At the same time similar research was conducted by Gupta (1990) in the case of Punjab, India, where mother's education was confirmed as the main determinant of child mortality. Additionally, the author deeply explained the role of woman's autonomy, which is found to have significant negative impact on the death in childhood, followed by death cluster, claiming "…child mortality is highly clustered within families". As the reason for such cluster are believed to be the low abilities of incompetent parents giving their children poorer care, particularly, lacking of realizing children's needs on time and thus, ending up with child loss.

Using National Family Health Survey of 1992 Gokhale *et.al.* (2002) studied the same country and came across the strong positive association of female illiteracy with

child mortality. They divided females into three groups considering their illiteracy levels (best/medium/worst) and found out that child mortality rates per 1,000 live-birth was equal to 24, 64 and 91 respectively.

India was also investigated by Makepeace and Pal (2008) for the period of 1992-1993 and 1998-1999. They delved deeply into the role of siblings on child survival employing the household-level data from urban and rural West Bengal. The results indicate the negative association of child mortality with prior/posterior spacing between children in a family since they compete for limited parental resources.

Another common example of the research mainly directed to study the characteristics of household is given by Biradar *et.al*. (2019). They study Nigerian 2013 Demographic and Health Survey with Bi-variate and Cox regression for a cross-section of 119,386 children under 5. They conclude that many maternal characteristics, such as occupation sphere, literacy level, age and wealth play important role in determining child's health. In line with this, they claim strong negative correlation between birth intervals, especially of less than two years, and child survival.

Moreover, Klugman *et.al.* (2019) observed the impact of the Women, Peace and Security (WPS) Index on maternal and infant mortalities. With the help of fully adjusted Poisson regression model, the authors were able to come up with the following inference: 0.01 increase on the WPS Index results in 2.3% diminution in the amount of infant death and 2% decline in maternal death.

However, Kembo and Ginneken (2009) analysing the Demographic and Health survey of 2005-2006, discovered that the negative impact of maternal schooling on infant mortality, which was explored from the survey of 1994-1999, disappeared after a decade. With the help of multivariate Proportional Hazards Regression Models, they identified that birth order, birth intervals, maternal age and type of birth are dominant, whilst maternal schooling is marginal determinant of infant mortality. Moreover, quality of sewage system has stronger influence on child mortality rather than infant. The researchers insist upon practicing birth spacing methods since they noticed strong negative effect of multiple births on infant survival.

On the other hand, some authors point out the qualities of the society, where the child is born, to have more significant impact. One of the studies conducted in this field is by Lachaud (2004), who study Demographic and Health Survey of the Comoros for 1996. He studies the data with probit/log linear regression model in order to identify the factors of child mortality, survival and juvenile issues. Importance of advancement of geographical location, quality of household assets and

community characteristics, such as morbidity levels, access to vaccination or childbirth assistance, are claimed to be significant drivers of child mortality.

Analysing over 60 low-income countries based on Demographic and Health Survey, Wang (2003) could identify the determinants of child mortality, both at the national level and for urban/rural areas separately. As per the findings, at the national level, child mortality can be extensively decreased through vaccination in infancy (the only significant factor in rural areas), availability of electricity (the only significant factor in urban areas), income and public health spending. Furthermore, the author inferred that "…as child mortality declines, the gap in mortality between the poor and the better-off widens". Mortality rate in rural is much higher than urban, besides, the reduction pace is also slower there.

In 2007, Schell *et.al.* conducted a research analysing National-level data from 152 low-, middle-, and high-income countries and identified three core determinants of infant mortality, namely, GNI/capita, maternal illiteracy and income equality (only for middle-income countries) – which predicted 92% variation in national infant mortality rate. Poverty rate and public spending on heath were found to have marginal effects. In low-income countries, the most important factor was maternal illiteracy while in high-income countries none of the above was significant.

The impact of country heath spending on infant and child mortality was examined by Farag *et.al.* (2013) in the case of 133 low- and middle-income countries. Findings reveal a strong impact of health spending on mortality rates. They also claim that depending on the quality of good governance, government health spending also affects reduction of infant/child mortality rates considerably.

Erdoğan *et.al.* (2013) detected a high negative correlation between real per capita GDP and infant mortality indexes. Selecting 25 high-income OECD countries for the period of 1970-2007 and applying two-way fixed effects model, they proved that infant mortality rate diminishes in response to the positive economic growth.

Finally, one of the extensive studies of government level determiners of child mortality is discussed by Olper *et.al.* (2018). They study emerging and developing countries from 1960 to 2010 under Synthetic Control Method in order to analyse correlation between child mortality and trade openness. Due to heterogeneity, this relationship is found to be insignificant for many of countries. However, in the countries for which this relationship is found significant, the reduction of more than 20% in the child mortality is claimed to be due to trade liberalisation. They conclude that trade is more effective to reduce child mortality in the countries where (1) democracy is more prevalent than autocracy; (2) income levels are higher; and (3) the trade openness brings reduction in taxation of the farmers.

All in all, having much work on developing countries, the literature lacks papers on transition states of the former Soviet Union. This lack is especially noticeable in terms of Central Asian countries, which have their distinct culture specific to only this region. As a result, a paper discussing the effects of female education on child mortality rates taking into account the specifications of Central Asian culture is needed. This paper is to conduct such analysis.

4. Methodology

To conduct the current research on the effect of female education on child mortality, we have chosen Tajikistan, which is the country in Central Asia. The reason for selecting this country is that (1) the culture of Tajikistan, which is much more similar to Uzbekistan, can represent the culture of Central Asia and (2) DHS has more recent data (2017) for Tajikistan than for other Central Asian countries.

The empirical model to be analysed in this research is given as:

$$CHM = \alpha + \beta \times M + \gamma \times FI + \delta \times H + \varphi \times CH + \varepsilon.$$

The variables included in the model are categorized into 4 groups with the purpose of clarity. M stands for MOTHER category of variables which are characteristics of the mother found important in child survival. FI is FAMILY INCOME category which includes income related factors. H represents HOUSEHOLD category where all household related features are included. Finally, CH stands for CHILD characteristics which are individual variables about the child under discussion. CHM is a binomial variable, being YES or NO, whose proxy is whether the child is alive at the time of the survey. The Greek letters stand for parameters of intercept and slope, except for ε, which implies error terms.

The dataset provides all necessary information to investigate the impact of maternal education on child survival. In total, we are going to use 19 variables from this dataset. The list of all variables is demonstrated in the table below:

Characteristics related to …			
Mother	**Family Income**	**Household**	**Child**
FE	HW	DHF	CHW
FAB	HR	H	
MBI	HC	DW	
FAM		E	
BI		T	
WA		HS	
DA			
AVP			

Table 1: Variables by corresponding groups

The following table illustrates the names of variables, their codes in the dataset, the descriptions and expected influence on the dependent variable:

The list of variables by groups			
1.	**Characteristics related to Mother**		
Abr.	*Var. Code in Dataset*	*Description*	*Expected effect on CHM*
FE	v133	Education in single years. We suppose that mother's education is very important in child survival. A mother with more education takes care of her child properly rather than a mother with low or no educational background. We expect the impact coming from this variable on child mortality to be negative.	N
FAB	v212	Age of respondent at 1st birth. The mother who gave birth after her 20th is believed to be more able to up-bring her children in comparison with very young mother who has not become an adult yet. The lower the age, the higher the probability of child mortality.	N
MBI	v221	Marriage to first birth interval (months). This variable is used to calculate the next variable – Mother's age at marriage, which we could not find in the dataset. We divide the number of months (intervals) by 12 and subtract the result from mother's age at first birth.	
FAM		Mother's age at marriage. Women got married much earlier than usual are thought to have health problems in the future. The variable is expected to have negative impact on child mortality.	N
BI	b11	Preceding birth interval (month). The optimal birth interval between siblings is considered to be around 3-5 years. Shorter interval affects both the new-born child and his older siblings negatively.	N
WA	v743b	Person who usually decides on large household purchases. This variable from the dataset is used as a proxy for woman's autonomy. The woman with more freedom in terms of making decisions for her children and herself is believed to be less likely to lose them.	N
DA	m3a	Assistance: Doctor. The availability of a doctor during pregnancy, especially, in the course of parturition is very important in child survival and his health in the future.	N
AVP	m14	Number of antenatal visits during pregnancy. Giving birth to a healthy child strongly depends on the health of	N

		both woman and her child. Woman with more antenatal visits to doctor during pregnancy is more likely to give birth to healthy child in comparison with woman not visiting the doctor at all.	
2.	**Characteristics related to Family Income**		
Abr.	*Var. Code in Dataset*	*Description*	*Expected effect on CHM*
HW	v190a	Wealth index for urban/rural. Wealth of a family if one of the essential factors contributing child survival. Families with higher income/wealth are able to satisfy all needs of their children in financial terms. A simple example can be the vitamins and medicines which are highly needed for a child. The higher the income, the lower the death rate among children.	N
HR	v122	Household has refrigerator. Another asset that can represent the income level of a family is refrigerator, which enables us to keep food products safe and fresh. The relationship is supposed to be negative.	N
HC	v125	Household has car/truck. The availability of personal car is very important in the wellbeing of a family. A family with a car is believed to have adequate income and this asset is very needed in a daily life. It is supposed to have negative relationship with child mortality.	N
3.	**Characteristics related to Household**		
Abr.	*Var. Code in Dataset*	*Description*	*Expected effect on CHM*
DHF	v467d	Getting medical help for self: distance to health facility. This variable represents the accessibility to health facilities like hospitals, polyclinics and others. The lower the access to health facilities, the higher the risk of mortality.	P
H	v745a	Owns a house alone or jointly. A family that owns a house is more likely to create the needed environment for their children in comparison with a family that rents a house, changes the place of living every certain period or a family that does not possess a house at all.	N
DW	v113	Source of drinking water. As the drinking water is vital for humanity, the availability of this source directly affects the health of children and their mothers.	N
E	v119	Household has electricity. The availability of electricity in the household implies the usage of machinery to ease the workload on family members, such as machinery of heating, refrigerating and so on. This in turn decreases child mortality rates by giving mother more time to take	N

		care of the child	
T	v153	Household has telephone (land-line). This variable is another indicator of infrastructure, giving the family opportunity to get access to public services, like first aid or the police. As a result, probability of child mortality declines.	N
HS	v136	Number of household members (listed). This variable is also believed to be significant since the higher the quantity, the lower the quality. Children in such families tend to compete with each other for limited maternal/parental resources.	P
4.	**Characteristics related to Child**		
Abr.	*Var. Code in Dataset*	*Description*	*Expected effect on CHM*
CHW	m19	Birth weight. One of the first indicators of a new-born child is his weight. The lower the weight than normal, the lower the probability of survival.	P

Table 2: List of variables

The econometric tool to be used in this paper is Maximum Likelihood Estimator. This is because Child Mortality rate is presented by a variable which takes only values “yes” or “no”. Probit model based on MLE is preferred by many authors in literature (Makepeace and Pal, 2008; Lachaud, 2004). It ensures the predicted values of the dependent variable to stay in the range between 0 and 1. STATA-14 econometric tools package will be employed in order to manipulate the dataset and conduct Probit analysis.

Descriptive Statistics

Because of the data cleaning, the Tajikistan DHS of 2017 which surveyed more than 25,000 Tajik women is diminished into a sample of 3,725 observations. The dataset under study contains of 20 variables, 9 of which are quantitative, 6 binary and 5 categorical.

Variable	Obs	Mean	Std. Dev.	Min	Max
v133	3,725	10.25987	3.281398	0	19
v136	3,725	8.035436	3.439336	1	23
v201	3,725	2.597584	1.307437	1	12
v212	3,725	21.70121	3.25007	11	39
v218	3,725	2.504698	1.232086	0	9
v221	3,725	18.7404	18.03117	0	323
m14	3,725	5.510872	7.229118	0	98
m19	3,725	3269.647	589.3297	800	6000
b11	2,893	38.8842	27.09334	8	218

Table 3: Summary statistics of quantitative variables

In terms of the health conditions of child birth, the weight of the newborn (m19) goes as low as 800 grams and 8 months of birth interval (b11). Both of these indicators highlight bad health condition of the newborn.

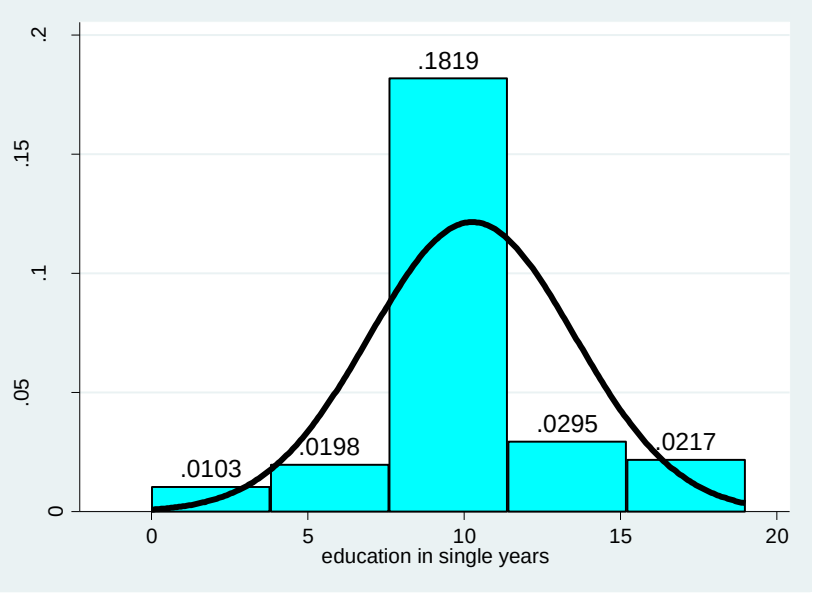

Figure 1: Density distribution of years of education of mothers

Figure 1 shows the histogram of density of mothers' education. Looking at the figure, it is clear that the distribution is approximately normal with high density centered around 9-11 years.

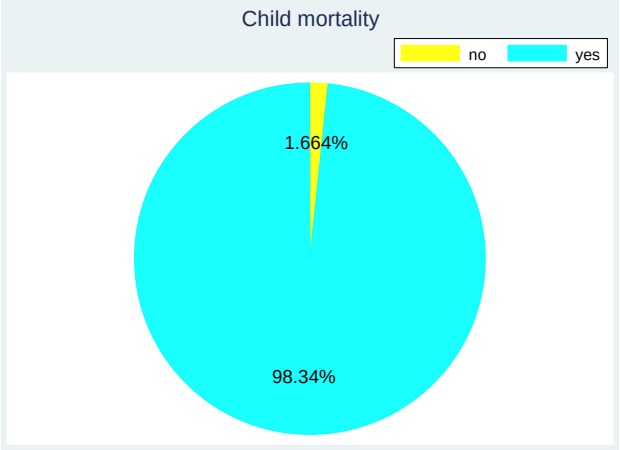

Figure 2: Child mortality rate among the respondents

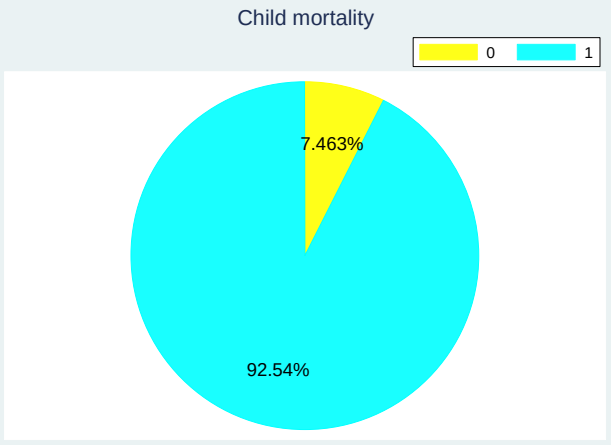

Figure 3: Child mortality rate among the respondents

Figure 2 shows the pie chart of the shares of answers to the question of whether the child born in the past 5 years is still alive. In the dataset in this study, the cases of lost child life constitute 1.66%. Despite seeming small, 16.6 deaths among 1,000 births is still a bad statistic.

	v133	v190a	v122	v467d	m3a	v212	v743b	m14	v745a
v133	1.0000								
v190a	0.1330	1.0000							
v122	0.0592	0.1544	1.0000						
v467d	0.0839	0.1803	0.0767	1.0000					
m3a	0.1115	-0.0046	0.0117	0.0972	1.0000				
v212	0.1247	-0.1097	-0.0090	-0.0421	0.0432	1.0000			
v743b	-0.1165	0.0441	-0.0169	-0.0526	-0.0228	-0.1535	1.0000		
m14	0.0891	0.0875	0.0749	0.0799	0.0797	0.0048	-0.0538	1.0000	
v745a	0.0324	-0.0718	-0.0625	-0.0156	-0.0292	0.0526	-0.0680	-0.0747	1.0000
v136	-0.1324	-0.0381	-0.0102	-0.0687	-0.0511	-0.0957	0.2597	-0.0644	-0.0920

	v136
v136	1.0000

Table 4: Correlation matrix of all variables.

Another interesting aspect to study is the strength of the women's opinions/decisions in the family. To provide brief knowledge, the information on the ownership of the house in which the household resides is depicted in Figure 3. The bar chart displays that the biggest part of the respondents have no ownership rights in the housing, all rights being kept by the husband. A very small part of the respondents are the owners of their housing facility. This indicates that the influence of Tajik women in their family is weak.

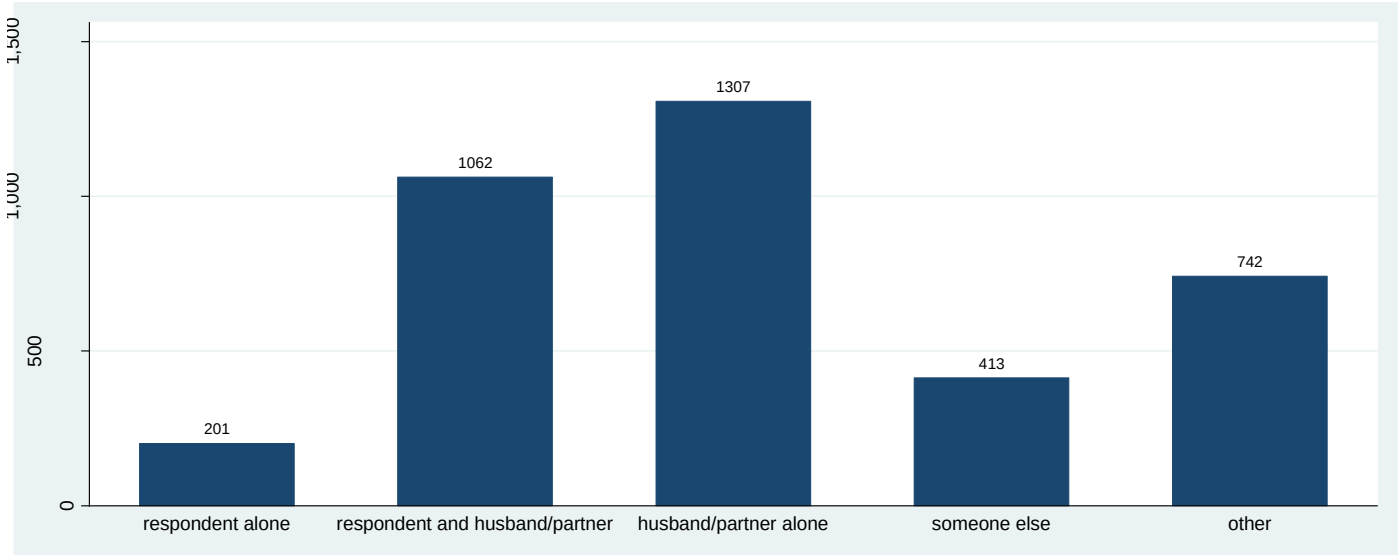

Figure 4: The ownership of the house

Empirical results.

If there is no relationship between child mortality and female education in simple OLS, there is no point adding further controls or improving the specifications. Table 6 presents the preliminary regression. The results are in line with the theory, presenting positive significant coefficient for female education (v133).

Source	SS	df	MS	Number of obs	=	3,725
				F(1, 3723)	=	7.52
Model	.518871729	1	.518871729	Prob > F	=	0.0061
Residual	256.733746	3,723	.068958836	R-squared	=	0.0020
				Adj R-squared	=	0.0017
Total	257.252617	3,724	.06907965	Root MSE	=	.2626

y2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
v133	.0035972	.0013114	2.74	0.006	.0010261	.0061683
_cons	.8884622	.0141259	62.90	0.000	.860767	.9161574

Table 5: Preliminary regression of OLS with child mortality and female education only

The problem with the correlation is to be checked next. In order to do this, an OLS regression with all independent variables is run and VIF test is conducted on its result. Table 6 presents the results of the OLS regression, while Table 7 presents the VIF scores.

According to the OLS regression, a range of variables appear to be significant, while the others are not. The most surprising results is that doctor's existence at birth affects the baby's chances to survive negatively.

Source	SS	df	MS	Number of obs	=	3,725
				F(12, 3712)	=	5.56
Model	4.5401354	12	.378344617	Prob > F	=	0.0000
Residual	252.712482	3,712	.068079871	R-squared	=	0.0176
				Adj R-squared	=	0.0145
Total	257.252617	3,724	.06907965	Root MSE	=	.26092

y2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
v133	.0027336	.0013672	2.00	0.046	.000053	.0054143
v190a	.0104296	.0031931	3.27	0.001	.0041692	.0166901
v122	.0117817	.0037902	3.11	0.002	.0043507	.0192126
v467d	.0414873	.0111914	3.71	0.000	.0195455	.0634292
m3a	-.0332442	.0127934	-2.60	0.009	-.058327	-.0081614
v212	.0028999	.0014887	1.95	0.051	-.0000188	.0058186
v743b	.0046454	.002855	1.63	0.104	-.0009521	.0102428
v221	-.000086	.0002623	-0.33	0.743	-.0006004	.0004283
m14	.0003189	.0006018	0.53	0.596	-.000861	.0014987
v745a	-.0049039	.0036862	-1.33	0.183	-.0121312	.0023234
v136	.0005612	.0013074	0.43	0.668	-.002002	.0031244
m19	7.09e-06	7.31e-06	0.97	0.332	-7.24e-06	.0000214
_cons	.7041569	.0507342	13.88	0.000	.6046872	.8036266

Table 6: Preliminary OLS with all independent variables

As the variables with high correlation are taken out, the VIF scores show no multicollinearity.

Variable	VIF	1/VIF
v212	1.28	0.780944
v221	1.22	0.816985
v743b	1.11	0.902679
v136	1.11	0.904216
v133	1.10	0.908237
v190a	1.10	0.908432
v467d	1.06	0.944857
v122	1.04	0.965918
m14	1.04	0.965970
m3a	1.03	0.967436
v745a	1.03	0.972569
m19	1.01	0.985912
Mean VIF	1.09	

Table 7: Variance Inflation Factors

The binary feature of the dependent variable is introduced into the regression and the results are obtained. This is conducted using Probit regression. The results are provided in Table 8 below. The results are not different from those which are obtained from OLS, except the categorical variable of the person who makes decisions for the family (v743b).

y2	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
v133	.0193165	.0095111	2.03	0.042	.0006752	.0379579
v190a	.0665681	.0232104	2.87	0.004	.0210766	.1120596
v122	.1347133	.0479947	2.81	0.005	.0406455	.2287811
v467d	.2509402	.0742049	3.38	0.001	.1055012	.3963792
m3a	-.2695134	.0999682	-2.70	0.007	-.4654474	-.0735793
v212	.0224951	.0113819	1.98	0.048	.000187	.0448031
v743b	.0340497	.0205055	1.66	0.097	-.0061403	.0742398
v221	-.0008383	.0020054	-0.42	0.676	-.0047687	.0030921
m14	.0027874	.0057563	0.48	0.628	-.0084948	.0140696
v745a	-.0359259	.0257766	-1.39	0.163	-.0864472	.0145954
v136	.0012435	.0105211	0.12	0.906	-.0193775	.0218646
m19	.0000486	.0000588	0.83	0.408	-.0000666	.0001638
_cons	-.0095029	.3798278	-0.03	0.980	-.7539518	.734946

Table 8: Probit regression

Female education has a significant role in deteriorating child mortality. This can be interpreted as almost 2% of better chances for a newborn to survive childhood if

the mother gets one more year of education. Similarly, around 6.5% better chances are present to a newborn if the parents' wealth index gets higher by 1 unit.

The list of 5 variables are removed from the model as they are not found statistically significant. The results of this specification are displayed in Table 10.

y2	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
v133	.0190122	.0092675	2.05	0.040	.0008482	.0371762
v190a	.070311	.0231158	3.04	0.002	.0250048	.1156171
v122	.1374594	.0479356	2.87	0.004	.0435073	.2314114
v467d	.252274	.0741418	3.40	0.001	.1069587	.3975892
m3a	-.2551952	.0992232	-2.57	0.010	-.449669	-.0607213
v212	.0198495	.0101437	1.96	0.050	-.0000319	.0397309
v743b	.0350269	.0200896	1.74	0.081	-.004348	.0744019
_cons	.1546122	.3040482	0.51	0.611	-.4413113	.7505356

Table 9: Robustness check

The regression with new specification does not present different results from the main model. Similar results may be observed in the robustness check specification with the change of a proxy. The variable of refrigerator ownership (v122) is replaced by its closely-correlated counterpart variable of access to electricity (v199). The regression with this specification is given in Table 10. These results also support the previous analysis.

y2	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
v133	.020666	.0094071	2.20	0.028	.0022284	.0391036
v190a	.0850548	.0226347	3.76	0.000	.0406917	.129418
v119	.1096655	.0458814	2.39	0.017	.0197396	.1995915
v467d	.2689268	.0736151	3.65	0.000	.1246438	.4132099
m3a	-.2717479	.0998795	-2.72	0.007	-.4675081	-.0759877
v212	.0217644	.0113864	1.91	0.056	-.0005526	.0440815
v743b	.0326169	.0204402	1.60	0.111	-.0074451	.0726789
v221	-.0008072	.0019941	-0.40	0.686	-.0047154	.0031011
m14	.0030122	.0058716	0.51	0.608	-.0084959	.0145202
v745a	-.0358405	.0256926	-1.39	0.163	-.086197	.014516
v136	.0023224	.0105789	0.22	0.826	-.018412	.0230567
m19	.0000509	.0000588	0.86	0.387	-.0000645	.0001662
_cons	-.115131	.3797166	-0.30	0.762	-.8593618	.6290998

Table 10: Robustness check with electricity access

All things considered, the 2% positive effect of female education on child survival chances significant at 5% should be accepted as robust result. The importance of wealth index and infrastructure provision, like electricity and fridge,

should not be skipped without attention. Their effects are also positive significant. Age of the mother at first birth is also a significant positive factor of child survival chances.

CONCLUSIONS

The determinants of child mortality are studied in this work using the example of Tajikistan from DHS 2017. A sample of 3,725 women is obtained on different variables, such as education in single years, number of children ever born and number of children alive. Using this dataset, Probit regression is conducted on the share of children alive over total. 19 control variables of 4 categories, MOTHER, FAMILY INCOME, HOUSEHOLD and CHILD are taken. Variables of female education (v133), wealth index (v190a), existence of refrigerator (v122), distance from home to hospital (v467d), doctor present during birth (m3a) and age of the mother at the first birth (v212) are found to have significant effect in the determination of child survival.

Female education is the main independent variable of interest. Its performance in the model meets the expectations. This variable has a significant at 5% coefficient with the value of 2% increase in the child survival chances respective to 1 more year of education.

Some significant conclusions can be drawn from the results. Firstly, female education is a significant variable in the determination of child mortality. Therefore, close attention should be drawn to the education of women in Central Asia. Secondly, wealth and infrastructure access are important for safety in early life of the child. Governments are highly encouraged to improve employment and salary conditions of people, as well as access to infrastructure.

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