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# An exploratory examination of Afghan women Socio Economic Status (SES) and child health indicator

**By**

**Zakia Maroof**

**A Thesis submitted to the Graduate Faculty of Georgia State University in Partial Fulfillment of the Requirements for the Degree**

**MASTER OF PUBLIC HEALTH**

**ATLANTA, GA 30303**

**Approval Page**

**An exploratory examination of Afghan women Socio Economic Status (SES) and child health indicator**

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## TABLE OF CONTENTS

CHAPTER I ..... 8

INTRODUCTION ..... 8

Background ..... 8

Purpose of the study ..... 9

Research questions ..... 10

CHAPTER II ..... 11

REVIEW OF THE LITERATURE ..... 11

CHAPTER III ..... 19

METHODS AND PROCEDURES ..... 19

Source of data: ..... 19

Sampling Frame: ..... 19

Independent Variables: ..... 20

Dependent Variables: ..... 24

Statistical analysis: ..... 27

CHAPTER IV ..... 30

RESULTS ..... 30

1. Literacy among women: ..... 30
2. Listening to Radio: ..... 34
3. Watching TV: ..... 37
4. Age of women at marriage: ..... 41
5. Number of Children: ..... 46

Summary of findings ..... 49

CHAPTER V ..... 51

DISCUSSION AND CONCLUSION ..... 51

**Tables**:

Table 1, Descriptive statistics of independent Variables of the study .....23

Table 2, Descriptive statistics of dependent variables of the study .....26

Table 3, Descriptive statistics of confounding factors of the study sample .....29

*Table 4, Descriptive statistics of Women Literacy and dependent variables* .....31

*Table 5, Descriptive statistics of women with or without literacy and use of bed net* .....31

*Table 6, Statistical test for association of Women Literacy and dependent variables* .....33

*Table 7, Statistical test for association of literacy among women and use of bed net* .....34

*Table 8, Descriptive statistics of Women listening to Radio and dependent variables* .....35

*Table 9, Statistical test for association of Listening to Radio at least once a week and dependent variables* .....37

*Table 10, Descriptive Statistics of Women watching TV and dependent variables* .....38

*Table 11, Statistical test for association of watching TV and dependent variables* .....41

*Table 12, Descriptive statistics of Age of mother at Marriage and dependent variables* .....42

*Table 13, Statistical test for association of age of mother (18 or lower) at marriage and dependent variables* .....44

*Table 14, Statistical test for association of age of mother (16 and lower) at marriage and dependent variables* .....45

*Table 15, Descriptive statistics of number of children mothers have and dependent variables* .....46

*Table 16, Statistical test for association of "number of children a mother has" and dependent variables* 49

*Table 17, Summery of findings* .....50

# CHAPTER I

# INTRODUCTION

***Background***

The world faces a global challenge due to the obvious and large inequalities in health within and between countries.[1] The root of much of these inequalities can be attributed to social factors. There is evidence that the social determinants of health, such as the living circumstances, income, education, access to health care, employment rank and working conditions shape people health status.[2] Reports attribute that the causes of poor health and inequalities between and within countries to these factors. [3] Among them, income and education are defined as the most influential and powerful determinants of health.

The importance of addressing social determinants of health is recognized and reflected in the focus of public health of developed countries. Likewise, the relationship between socioeconomic status (SES) of people and their health outcome has been examined extensively.[4] Studies confirm that a vast number of adverse health outcomes such as -- mortality, self rated health, chronic conditions, disability and so on are attributable to socioeconomic status, usually measured in terms of education and income.[5]

Social determinants of health are relevant to men and women alike, and as mentioned earlier known to have health effects. However, burgeoning differences are recorded in developing countries. For example in Afghanistan men and women literacy ratio, to take one measure, is 0.5, with only 18 percent of females and 36 percent of males able to read[6]. Another particularly telling example of inequalities between men and women in Afghanistan is the employment-to-population ratio that shows a large gender difference: 80 percent of Males and 43 percent of females with an overall 62 percent.[7]

Afghanistan is the second poorest country in the world with severely damaged political, social and economical structures[8]. In addition to all these problems, education was disrupted, and in many cases it was ended for girls and women during civil war before 2001[9].

Relatively few studies in developing countries have explored the exclusive relationship between socioeconomic status of women and health outcome of their children, the outcome most sensitive to the effects of absolute material deprivation. However, existing studies show that socioeconomic status of the general population is related to health outcome.

In Afghanistan particularly, very few studies have been conducted to review and underline the relationship between women's socio economic status and their children health outcome. Relevant studies in other developing countries provide the impetus for studying the impact of women's socio economic status on child health indicators in the Afghanistan context. Low rates of literacy and employment among women in Afghanistan is a critical indicator of the situation that could significantly contribute to increasing maternal and child mortality rates in country.

The rationale for this study is driven by the alarmingly high rate of maternal and child mortality in Afghanistan, ranked as having the third highest under-five mortality rate in the world , following Sierra Leone and Angola[10]. The poor health of Afghan people is the combined result of a high rate of child and maternal deaths. Infant mortality rate is129 per 1000 live births, child mortality rate is 191 per 1000 live births, and maternal mortality ratio is1600 per 100,000 live births.[11] Afghan women, the main care takers of their children, are a socially excluded minority within the country. This marginalization may substantially affect the health outcome of their children.

***Purpose of the study***

The purpose of this study is to explore the relationship between Afghan rural women

socioeconomic status (SES) and health outcome, in particular child health indicators based on an analysis of data from the Afghan Health Survey (AHS). An understanding of this association provides insight into the health outcome of the society as a whole. Four among socio economic status factors of women have been identified and related information was obtained from the study to analyze their association with the child health and nutrition indicators. This study is approved by the Georgia State University Institutional Review Board.

***Research questions***

This study is built upon the following questions:

- Is there an association between literacy of mothers, their exposure to media, age at marriage and number of children they give birth and child health indicators?
- If there is an association, which variable (Number of children, age of mother during marriage, mother education and exposure to media) is more predictive of the outcome?

# CHAPTER II

## REVIEW OF THE LITERATURE

The link between health and socioeconomic status is demonstrated through a large volume of studies. Socioeconomic status of mothers and caretakers is shown to be a strong predictor of health outcome in children. Every year more than 10 million children under the age of five die globally[12]. More than two-fifths of all deaths among children under the age of five are attributable to diarrhea and respiratory infection, aggravated by under-nutrition[13]. Poor children in low- and middle-income countries with socioeconomic inequalities suffer disproportionately from these diseases. Parental socioeconomic status such as education and economic status are known to be predictors of the risk of illness and death in children [14].

It is known that overall wealth of a nation is a key indicator of population health, and within a nation the socioeconomic position determine the health status of advantage or disadvantage groups or individuals[15].

Income- based inequality, unequal distribution of wealth, political power; cultural assets, social assets, human capital, and education are the key factors which affect the health status of the society. This inequality is important when it is measured among individuals as well as among regions and parts of a country [16].

There are other evidences that in high income countries such as the United States and in those countries where children have access to universal health insurance there is strong association between the socioeconomic status of parents and the health of children. The studies reveal that children born to parents from low socioeconomic status have worse health at birth. This gap will become widen as the children grow[17].

A study in Greece found that socioeconomic status of parents is the important factor in immunization of children, rather than parental beliefs and attitudes toward immunization. Belonging to a minority group, having other siblings, distance from immunization centers and parental education were the important factors that explained the reasons for unimmunized children[18].

In Afghanistan, it is well known that households with higher wealth status compared to the poorest households; households with members who have some education compared to those without any education; and households living near to the health facilities compared to those living far from health facilities are seeking care more frequently and in a timely manner. The poor household, those less educated and those farther from facilities delay care seeking resulting in serious cases and relatively worse health outcomes[19].

Education of parents is another important factor in determining the health outcome of children.

A study conducted in China, discovered the fact that education level of women who adopted children had a significant positive effect on the health outcomes of the adoptees. In this study the level of income, number of siblings, environmental health and other socioeconomic factors were controlled and it was found that still the level of education of mothers had a nurturing effect[20].

Socioeconomic status is a strong predictor of outcomes in child nutrition. In addition, family income affects overall financial resources which can affect the ability to access care and medications. One study revealed that mothers' education affects positively access to health facilities in the community. This study concluded that mothers with higher education or mothers with lower education in communities with a high level of education have more access to health facilities. This study also discovered that higher immunization coverage among children of

mothers with higher education reduced mortality due to communicable diseases such as measles. The study controlled for other socioeconomic factors, such as economic level of households[21].

A study in Bolivia revealed that in an environment with sufficient resources and maternal education has positive effects a child's nutritional status through promoting health care utilization from modern health care centers and reproductive health behaviors[22].

The Afghanistan Health Survey 2006, studied the association of several child health indicators with the mothers socioeconomic status. For example, it was revealed that immunization among children of mothers who have some education is higher comparing to mothers with no education. Mothers who are living 2-3 hours far from health facilities have more children immunized comparing to those living 3-4 or more than 4 hours far from health facilities[23].

Beside other risks, children from lower socioeconomic status parents suffer from exposure to environmental hazards. Exposure to hazardous environment will affect seriously the health of children and cause chronic conditions among them. One of the results of this poor health outcome is lower income when the children grow, and this will cause that there are many more parents with lower income and the cycle will repeat again and again[24].

Another study in Turkey conducted to see the risk factors for diarrhea among infants. 204 infants were followed for one year by home visiting teams to follow any episode of diarrhea, anthropometric measurement and morbidity surveillance. The result shows that there are significant association between episodes of diarrhea and persistent diarrhea among infants and several socioeconomic factors of their parents. Infants of uneducated mothers had more episodes of diarrhea and persistent diarrhea. The study shows also that living in a slum, self employed father, having no kitchen, having no hygienic toilets, starting breastfeeding after first hour of life

and low birth weight all were factors that had significant association with the number of episodes of diarrhea and persistent diarrhea. The study used logistic regression to control the factors and found that each factor has its effect independent of the other factors[25].

In Afghanistan it is known that households living in remote areas far from health facilities and poor settings seek less care than their counterparts living near to health facilities or with higher income. [26] Most mothers reported the cost of transportation and cost of treatment as the reason for not seeking modern health care.

A study in Nigeria looked for the implication of women's work on the nutrition status of their children (wasting and stunting). The study includes 5,331 children aged 0-59 months using data from the 1990 Nigerian Demographic and Health Survey. The findings of the study say that there are significant association between the nutrition status of children and socioeconomic factors of the household, including mothers work. There were less stunting children among those mothers who were working out of their houses. Also the result revealed that having recent diarrhea episodes, shorter breastfeeding period, being higher parity, mothers' education, being in house with pit toilet increased stunting. Children born in wealthy households are less likely to become stunted than children born in poor households[27].

It is known by many studies that the maternal age has association with the health outcome of children, but this association is mainly affected by the environmental factors such as neighborhood influences. A study in Chicago, USA reviewed 229,613 births of mothers aged 20-45 and found out that the age of mothers has significant association with the birth weight. This association is correlated with the effect of neighborhood. Mothers living in poor neighborhoods

with lower age have more children with low birth weight compare to the mothers living in the better off neighborhoods[28].

A cross-sectional analysis of 19,302 births to 13,396 mothers was conducted in India to study association between child marriage (marriage before age 18) and morbidity and mortality of infants and children less than 5 years old. The study found that there were association between child marriage and diarrhea, malnutrition (stunted, and wasted), low birth weight and mortality among children. Further analysis and adjustment showed that the association between child marriage and malnutrition (stunted and underweight) among their children were significant[29].

It is known that early initiation of breastfeeding can save lives of infants.

To explore the association of neonatal deaths with initiation of breastfeeding, a study was conducted in Nepal. 22,838 breast-fed newborns surviving to 48 hours were included in the study. Home visits were conducted during the first 28 days of life of all those newborns. A multivariable regression model was used to analyze the association. The result indicated that partially breastfed newborns were at higher risk of death than exclusively breastfeed newborns. The risk of death was increasing if delay in initiation of breastfeeding increased. Mortality was higher among those started breastfeeding after 24 hours of life, comparing to those started within 24 hours. The study concluded that if initiation of breastfeeding within first hour of life become universal in the area, mortality rate will decrease 19.1% from the current rate 30.

A study in California, USA measured the effects of socioeconomic factors on breastfeeding. The study used logistic regression to analyze the association of different socioeconomic factors on

the initiation of breastfeeding as well as breastfeeding during postpartum period. A random sample of 10,519 women was selected for the study. The results indicates that women with higher household income, women with higher education level or their husband had higher education, , and women who had or whose partners had professional or executive occupations were more likely than their counterparts to breastfeed. After controlling for many potential confounders, maternal and paternal education remained positively associated with breastfeeding, while association of income and occupation were no longer significant. The study concluded that specific health education or higher level of general education has a positive effect on breastfeeding during postpartum period[31].

Another well known cause of mortality and morbidity among children in developing countries is malaria. In Afghanistan, the disease is endemic in the East, North-East, North and South regions of the country.

A study was carried out between October 2001 and September 2003 in 25 villages in Kilombero Valley, southern Tanzania. The study used Bayesian geostatistical models to assess the effect of different bed net density measures on child mortality adjusting for possible confounders. In the multivariate model addressing potential confounding, the only measure significantly associated with child mortality was the bed net density at household level. The study concluded that for reducing malaria transmission for both users and non-users of bed net, it is important to increase the number and use of long-lasting nets among households in the area32.

Further studies found that ownership and use of bed net among women is associated with their socioeconomic factors. A study in Kinshasa, Democratic Republic of Congo has been conducted and found this association. An interview was conducted with 351 women. 115 (33%) reported

having a bed net and 86 (25%) reported that slept under the bed net last night. 48% of those who did not have bed net reported cost as the reason for not having a bed net. Among those used bed net, those women with secondary school or higher education had used bed net 3.4 times more comparing to those without secondary or higher education[33].

Likewise, a cross-sectional study conducted in Gabon to find the association of socioeconomic status with use of insecticide-treated bed nets (ITNs) in 2007. The study included 397 mothers or guardians of young children. The respondents were classified according to their socioeconomic status and the condition of bed net use was evaluated through home visiting. The study found that socioeconomic condition were negatively associated with use of bed net, Living in a stone house (OR 0.26, 95% CI 0.14–0.48), running water in the house (OR 0.44, 95% CI 0.21–0.92), shower/flush toilet in the house (OR 0.39/0.34, 95% CI 0.21–0.75/0.16–0.73), ownership of a freezer (OR 0.50, 95% CI 0.26–0.96) and belonging to the highest group in the economic score (OR 0.32, 95% CI 0.15–0.67). In contrast, similar factors were positively associated with a good maintenance condition of the bed nets: higher monthly income (OR 5.64, 95% CI 2.41–13.19) and belonging to the highest group in the economic score (OR 2.55, 95% CI 1.19 – 5.45). The study concluded that coverage of untreated bed nets were high among poor families and the condition of those bed nets were worse. This study recommended urgent attention for educational programs as well as need-tailored marketing strategies for ITNs[34].

In Afghanistan, insecticide treated bed nets (ITNs) are distributed free of charge to pregnant women living in endemic areas of the country during the antenatal visits and immunization weeks. The impact or effect of this strategy has not been evaluated yet.

However, studies in other countries have confirmed the positive impacts. To find out the effect of free-distribution of long lasting insecticide treated bed nets during antenatal visits a study is conducted in Kinshasa, Democratic Republic of Congo. The study followed a cohort of pregnant women, who received bed nets during the first antenatal visit free of charge. 328 women were selected randomly and interview was conducted during delivery and 100 women were interviewed six months after delivery. The study found that 79% of women reported having slept under a bed net with their less than 5 years old child during the time of delivery. Six months after delivery 80% of women reported slept under bed net. This was compared with a baseline study that found only 25% of women used bed net. The study concluded that free distribution of LLINs during the antenatal period increases use of bed net among pregnant women and their newborn babies[35].

In Afghanistan Health Survey 2006 several socioeconomic variables such as number of children a woman has given birth to, ability of women to read, exposure to media (listening to radio and watching TV), and age of mothers at marriage have been studied; however, association between these variables and child health indicators have not been analyzed. There are anecdotal information that these factors are strong predictors of children health and nutrition outcomes; therefore, in this study the association between each of these variables with the key child health indicators will be examined.

# CHAPTER III

# METHODS AND PROCEDURES

In this section we will explain the source of data, sampling frame, independent variables, dependent variables, confounding factors and the statistical analysis used.

***Source of data:***

In this study we used the data from the Afghanistan Health Survey 2006. This survey was conducted by the Ministry of Public Health of Afghanistan with technical support from Bloomberg School of Public Health, Johns Hopkins University, and Indian Institute of Health Management Research. The 2006 Afghanistan Health Survey (AHS) is a population based survey designed to provide information on maternal and child health, child survival, family planning, health care utilization, and related expenditures in rural Afghanistan. The survey was conducted using structured questionnaires through interviewing the households. The questionnaire had 836 questions about the households comprised of structure of the family, socio-economic factors, health utilization, and health outcomes. With the help of experts from Johns Hopkins University in Afghanistan, we selected the questions which were relevant to our study.

***Sampling Frame:***

The AHS is a multistage cluster survey that covers most rural parts of Afghanistan. Six major cities and provinces and districts that could not be covered due to insecurity were excluded from the survey prior to the selection of sample villages.

Afghanistan is comprised of 34 administrative units (provinces). Each of these provinces is divided into districts. Districts are divided into enumeration units, which are villages and sub-

villages in rural areas and urban blocks in urban areas. The sampling was done for the village level, using Central Statistic Office (CSO) data.

For this study, 8278 households were randomly selected in which 8281 women aged 10-49 years were interviewed by survey teams using a structured questionnaire. The information was also collected for all children aged 5 years or less from all these households. The sample includes 7843 (13.8%) children under the age of 5 years old.

***Independent Variables:***

The independent variables are a set of socioeconomic status variables about women 10-49 years old who have either children aged 0-59 months, or are the caretakers for these children. The variables are divided into the following categories:

1. **Literacy**: Although women's education deteriorated considerably during the Taliban regime, because girls were prohibited from going to school, there were still women and girls with basic literacy. We calculated the literacy rate among the women using the following variables:

**Ability to read**: All eligible women were asked if they could read a text in the local language. The survey found out that 390 (4.7%) women answered yes.

To verify the ability to read, a card with a sentence was shown to the women who said "yes can read" and they were asked to read it loudly. The result showed that a significant number of women who said "yes" to the previous question, had the ability to read the whole or parts of the sentence.

2. **Exposure to mass media**: As the mass media is a source of information, especially about the health care, so women who have access to mass media would have higher

socioeconomic status. In this study the women were asked if they watch TV or listen to Radio.

However, to use this information for our analysis, we recoded this variable in the dataset and divided into only two categories: 1) Exposure to media at least once a week including those exposed everyday; 2) Exposure to media less than once a week including those exposed not at all,. The other response options were treated as missing data.

.

3. **Age of women at Marriage**: Anecdotal information explain that in Afghanistan the age at marriage is very low in women and this may have a negative impact on the health outcomes of their children. To study the association between the age of mothers at marriage and the health of their children, we selected this variable as independent variable. The mothers were asked what was their age at marriage. For our study purpose we recoded the variable and divided the women into two categories of married at 18 years or less and above 18 years.

1. **Number of children**: It is believed that as the the number of children a woman gives birth to increases, the woman cannot take care of them and especially the youngest children will suffer from lack of proper attention. To examine association between number of children and their health outcomes in a family, we studied association of this variable after categorizing into two categories, having 4 or fewer children and more than 4 children.

Table 1, describes the descriptive statistics of independent variables of the study in the sample.

Table 1, Descriptive statistics of independent Variables of the study

| DEPENDENT VARIABLES | n | (%) |
|---|---|---|
| **Ability of reading a letter** | | |
| Yes | 390 | (4.7) |
| No | 7891 | (95.2) |
| **Listening the Radio** | | |
| Almost every day | 2915 | (35.2) |
| At least once a week | 962 | (11.6) |
| Less than once a week | 365 | (4.4) |
| Not at all | 4023 | (48.5) |
| No Response | 16 | (0.2) |
| **Watching the TV** | | |
| Almost every day | 1178 | (14.2) |
| At least once a week | 369 | (4.5) |
| Less than once a week | 139 | (1.7) |
| Not at all | 6546 | (79) |
| No Response | 49 | (0.6) |
| **Age Category** | | |
| Less than 18 yrs | 5394 | (65.1) |
| Above 18 yrs | 1703 | (20.6) |
| No Response | 1184 | (14.3) |
| **Number of children** | | |
| 1-4 children | 3479 | (42.0) |
| More than 4 children | 4275 | (51.6) |
| No response | 527 | (6.4) |
| **TOTAL** | **8281** | **(100.0)** |

***Dependent Variables:***

The dependent variables are key health indicators for children 0-59 months old. The dependent variables are as follow:

1. **Immunization**: The immunization program in Afghanistan consists of routine immunization and supplementary immunization programs (national and sub-national immunization campaigns). The routine immunization program consists of vaccination for BCG (immediately after birth), three doses of DPT and OPV vaccines from fourth week after birth in six weeks intervals, and measles vaccine at the age of nine month. In this study we only examined the BCG vaccine.

   **BCG immunization**: BCG is administered for children at birth to immunize them against Tuberculosis. To find the coverage of this vaccine, the mothers were asked about the status of BCG vaccination of their 0-59 months children and this was verified by seeing the BCG vaccine scar on the left shoulder of the child. We used this indicator to avoid recall bias, the coverage of other vaccines were calculated based on mothers' recall as well as verification of immunization card, which was lost in most of the cases. Also BCG vaccine shows exposure of mothers and children to the health system soon after birth, which is critical time in the childhood period.

2. **Breastfeeding**: This variable is measured for children less than 2 years old. According to UNICEF and WHO strategy[36], optimal feeding of infants and young children focus on four issues: a) initiation of breastfeeding within one hour after birth, b) exclusive breastfeeding for six months, c) introduction of complementary feeding at the age of six months and d) continuation of breastfeeding for two years or more. From the data

collected in the AHS we were able to calculate only the first indicator (initiation of breastfeeding within first hour of life) precisely. As there was no appropriate data to calculate the other indicators, in this study we used a variable that indicated whether breastfeeding of a newborn started within the first hour after birth or later.

3. **Use of bed net**: Malaria is one of the main causes of morbidity among children in Afghanistan. It is well known that sleeping under an insecticide treated bed net will prevent children from having malaria in endemic areas. The bed nets are distributed by the Ministry of Public Health and other channels such as WHO to the people. Also, there are anecdotes that most families do not use the bed nets, even if they are available. Here we wanted to see if a child had slept the last night under a bed net or not.

Table 2, demonstrates descriptive statistics of dependent variables of the study in the sample.

Table 2, Descriptive statistics of dependent variables of the study

| DEPENDENT VARIABLES | n | (%) |
|---|---|---|
| **BCG Vaccination among children** | | |
| Yes | 4678 | (73.9) |
| No | 1377 | (21.8) |
| Don't Know | 234 | (3.7) |
| No Response / Blank | 39 | (0.6) |
| **Total** | 6328 | (100) |
| **Breastfeeding initiation time** | | |
| Immediately/ within first hour after birth | 1005 | (38.7) |
| After the first hour | 1261 | (48.5) |
| Don't Know | 319 | (12.3) |
| No Response | 14 | (0.5) |
| **Total** | 2599 | (100) |
| **Child slept under a bed net last night** | | |
| Yes | 1129 | (15.0) |
| No | 6121 | (81.3) |
| Don't Know | 4 | (0.1) |
| No Response | 271 | (3.6) |
| **Total** | **7525** | **(100)** |

***Statistical analysis:***

The original raw data from Afghanistan Health Survey has been saved in STATA version 9.0 software. However; for this analysis we transferred the data into SPSS.16.0 software and used SPSS for our statistical analysis. The original data was stored in different files for women, immunization, household data and household listing. For our analysis we merged the data from the relevant data files into one dataset in SPSS.16.0. To verify that no errors occurred during the data transfer and merging exercise, we cross checked the variables of interest with the original data in the Johns Hopkins University office with the experts and found that the data was the same and accurate.

After recoding the variables we used Chi square tests and Odds ratio analyses to find the association between independent and dependent variables.

**Confounding Variables**: The Afghanistan Health Survey indicated that two major factors had a significant association with all health indicators, the economic level of households and distance from the nearest health facility. Therefore, we controlled for these variables to see if the association was due to the independent variables of interest or due to these confounding factors. Logistic Regression was used to control for the confounders.

**Economic situation of households**: For measuring the economic status of household we used the asset-based measure of wealth, as it was used by JHU during previous analyses. Thirteen assets were included in the survey and each household was asked if they owned any of them. One of the assets (kerosene lamp) was owned by almost all households, so it was removed from the list during analysis and we did so as well. The total score for the rest of the assets was calculated for each household and it was decided to categorize the households into two

categories, poor and non-poor. The Afghanistan Health Survey had divided the households into five quintiles, in which the bottom fifth quintile was the poorest category of the households. However, in our analysis we categorized the households into two categories of poor and non-poor, in which the poor households are those lying in the bottom fifth quintile according to the JHU analysis. This variable was controlled in the study to exclude the role of economic status of households from the independent variables of interest in this study. The following table shows the number and percentage of poor and non-poor categories of household in this population.

**Distance from HF**: Another factor which was found in the Afghanistan Health Survey (AHS) as a major influential factor in health indicators was the distance that a household had from the nearest health facility without considering the transportation means used. In the AHS this variable was categorized into six categories: < 1 hour, 1-2 hours, 2-3 hours, 3-4 hours, 4-6 hours and > 6 hours. However, for our analysis, we recoded the variable and divided them into two categories of <= 4 hours and > 4 hours. According to Afghanistan condition a distance of 4 hour from the health facilities has been considered accessible to the households and beyond this distance can be "hard to access". We controlled for this variable in our analysis to find if the association between the independent and dependent variables we are interested is not due to distance from health facilities.

Table 3, shows the descriptive statistics of the confounding factors of the study sample.

Table 3, Descriptive statistics of confounding factors of the study sample

| CONFOUNDING FACTORS | n | (%) |
|---|---|---|
| **Poor and non-poor households** | | |
| Poor | 1768 | (21.5) |
| Non-Poor | 6199 | (75.2) |
| No response/ system missing | 273 | (3.3) |
| Total | 8240 | (100) |
| **Distance to HF 4 hours or more** | | |
| =<4 Hours | 7551 | (94.4) |
| >4 Hours | 447 | (5.6) |
| Total | 7998 | (100) |

# CHAPTER IV

# RESULTS

This chapter explains the results obtained from the tests of association between the above mentioned independent variables (socio-economic status of women) and dependent variables (health indicators of their children). First, we examined the association between each independent variable with the all dependent variables and then controlled for the main confounding factors, if the association was significant. The results are presented in the tables and graphs below.

1. ***Literacy among women:***

Among the sample we found 301(5.1%) of women said "yes" to the question if they could read or not, while 7606 (94.9%) responded "no". Then the vaccination status of their children was checked – evidenced by BCG scar – and it was found that 4546 (77.0%) of children had been vaccinated for BCH, while 1361 (23.0%) were not vaccinated.

To find out the initiation of breastfeeding within first hour after birth or after one hour of birth, the women were questioned about their starting time of breastfeeding for their youngest child. 976 (44.2%) of women responded they started breastfeeding during one hour after birth, while 1230 (55.8%) of them responded that they started breastfeeding after the first hour.

In response to the question of their children (less than five years old) slept under a bed net last night, 1099 (15.6%) women responded "yes", while 5961 (84.4%) responded "no". Descriptive statistics of this analysis is shown in Table 10.

*Table 4, Descriptive statistics of Women Literacy and dependent variables*

| | | Women Literacy (Can read or not) | | Total |
|---|---|---|---|---|
| | | Yes<br>n (%) | No<br>n (%) | n (%) |
| **BCG vaccine** | **Yes** | 232 (3.9) | 4314 (73.0) | 4546 (77.0) |
| | **No** | 69 (1.2) | 1292 (21.9) | 1361 (23.0) |
| **Breastfeeding Initiation** | **Within first hour** | 52 (2.4) | 924 (41.9) | 976 (44.2) |
| | **After first hour** | 56 (2.5) | 1174 (53.2) | 1230 (55.8) |
| **Bed net use** | **Yes** | 52 (0.7) | 1047 (14.8) | 1099 (15. 6) |
| | **No** | 299 (4.2) | 5662 (80.2) | 5961 (84.4) |

As Malaria is not endemic in all over Afghanistan and there are some known provinces as endemic areas for Malaria, so we analyzed the data separately in the endemic and non-endemic areas. Descriptive statistics of this analysis is shown bellow in Table 11.

*Table 5, Descriptive statistics of women with or without literacy and use of bed net*

| Endemic/ non-endemic Provinces to Malaria | | | Women Literacy | |
|---|---|---|---|---|
| | | | Yes<br>n (%) | No<br>n (%) |
| **No endemic** | Bed net use | Yes | 30 (0.6) | 742 (14.1) |
| | | No | 230 (4.4) | 4249 (80.9) |
| | **Total** | | **260 (5.0)** | **4991 (95.0)** |
| **Yes endemic** | Bed net use | Yes | 22 (1.4) | 300 (18.6) |
| | | No | 63 (3.9) | 1230 (76.2) |
| | **Total** | | **85 (5.3)** | **1530 (94.7)** |

**Association between women literacy and dependent variables**: To find out if there is significant association between literacy of women in the sample with the dependent variables the independent variable was analyzed with each of the dependent variable separately in 2 x 2 tables using Chi-Square test and risk analysis (Odd ratio) tests, using SPSS.16 for this application. The result of these statistical tests has been shown in table 12, bellow.

- *Women literacy and BCG vaccination*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.961 > 0.05). Risk analysis test indicates that Odds of BCG vaccine among children is 1.007 with 95% confidence interval (0.764-1.327) if their mothers can read. We can conclude that in this sample literacy (ability to read) of mothers / caretakers does not have significant association with the level of BCG vaccination of their children.

- *Women literacy and initiation of breastfeeding*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.402 > 0.05). Risk analysis test indicates that Odds of initiation of breastfeeding within first hour after birth among mothers who can read is 1.180 with 95% confidence interval (0.801-1.738). Therefore, from this statistical analysis we can conclude that in this sample literacy (ability to read) of mothers / caretakers does not have significant association with the time of initiation of breastfeeding.

- *Women literacy and use of bed net for protecting children from Malaria*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.690 > 0.05). Risk analysis test indicates that Odds of use of bed net among children is 0.940 with 95% confidence interval (0.695-1.272) if their mothers can read. Therefore,

from this statistical analysis we can conclude that in this sample literacy (ability to read) of mothers / caretakers does not have significant association with the level of use of bed net to protect their children from Malaria.

*Table 6, Statistical test for association of Women Literacy and dependent variables*

| **Dependent Variables** | **P-Value** | **Odd Ratio** | **95% Confidence interval** |
|---|---|---|---|
| BCG | 0.961 | 1.007 | (0.764-1.327) |
| Initiation of Breastfeeding | 0.402 | 1.180 | (0.801-1.738) |
| Use of Bed Net | 0.690 | 0.940 | (0.695-1.272) |

- *Association between women literacy and use of bed net in endemic and non-endemic areas*: Association between the two variables were tested separately in Malaria-endemic and non-endemic areas of the country. Here we found that Chi-Square test indicates no association between the two variables neither in endemic area, nor in non-endemic area (P-Value > 0.05). Risk analysis indicates that the odds of use of bed net among mothers who can read is 1.432 (0.867-2.364) in endemic area and is 0.747 (0.506-1.101) in non-endemic area. As a result, we can conclude that in this sample literacy (ability to read) of mothers/ care takers does not have significant association with use of bed net for protecting children from malaria neither in endemic nor in non-endemic areas. Table 7, shows the statistical tests result for this analysis.

*Table 7, Statistical test for association of literacy among women and use of bed net*

| Dependent Variables | P-Value | Odd Ratio | 95% Confidence interval |
|---|---|---|---|
| Use of Bed Net in Malaria Endemic area | 0.16 | 1.432 | (0.678-2.364) |
| Use of bed net in non-endemic area | 0.14 | 0.747 | (0.506-1.101) |

2. ***Listening to Radio:***

In the sample we found 2747(46.6%) women reported that they were listening to radio at least once in a week, while 3149 (53.4%) responded they were listening to radio less than once in a week or not at all. In the sample 4536 (76.9%) children of these women had been vaccinated for BCH, while 1360 (23.1%) had not been vaccinated.

972 (44.1%) of women responded they started breastfeeding during one hour after birth, while 1231 (55.9%) of them responded they started breastfeeding after the first hour.

In response to the question if their children (less than five years old) slept under a bed net last night, 1096 (15.6%) women responded "yes", while 5951 (84.4%) responded "no". Descriptive statistics of this analysis is shown in Table 8.

*Table 8, Descriptive statistics of Women listening to Radio and dependent variables*

| | | Listening to Radio | | Total |
|---|---|---|---|---|
| | | At least once a week | Less than once a week | |
| **BCG Vaccine** | **Yes** | 2143 (36.3) | 2393 (40.6) | 4536 (76.9) |
| | **No** | 604 (10.2) | 756 (12. 8) | 1360 (23.1) |
| **Breastfeeding Initiation** | **Within first hour** | 471 (21.4) | 501 (22.7) | 972 (44.1) |
| | **After first hour** | 519 (23.6) | 712 (32.3) | 1231 (55.9) |
| **Bed net use** | **Yes** | 480 (6.8) | 616 (8.7) | 1096 (15.6) |
| | **No** | 2782 (39.5) | 3169 (45.0) | 5951 (84.4) |

**Association between listening to radio and dependent variables**: To find out if there is significant association between exposure of women to radio with the dependent variables in the sample, the independent variable was analyzed with each of the dependent variable separately in 2 x 2 tables using Chi-Square test and risk analysis (Odd ratio) tests, using SPSS.16. The result of these statistical tests has been shown in table 9, bellow.

- *Listening to radio and BCG vaccination*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.066 > 0.05). Risk analysis test indicates that Odds of BCG vaccine among children is 1.121 with 95% confidence interval (0.992-1.266) if their mothers listen to radio at least once a week. So, we can conclude that in this sample exposure to radio (listening to radio at least once per week) of mothers / caretakers does not have significant association with the level of BCG vaccination of their children.

- *Listening to radio and initiation of breastfeeding*: Chi-Square test shows that the two variables have significant association with each other (P-value 0.003 < 0.05). Risk analysis test indicates that Odds of initiation of breastfeeding within first hour after birth among mothers who listen to radio at least once in a week is 1.180 with 95% confidence interval (0.801-1.738) comparing to those not listening to radio or listening less than once in a week. Therefore, from this statistical analysis we can conclude that in this sample, exposure of mothers/ care takers to radio has significant association with the initiation time of breastfeeding.

- *Controlling for the confounders*: To test if the above-mentioned association is due to exposure to radio or it is due to the fact that those mothers who listen more to radio could be from wealthier households or who live near to the health facilities, we test the association using logistic regression test. The result indicates that although economy of households (being poor or not poor) and distance to the health facility (more than 4 hours or less than 4 hours) have significant association with the time of initiation of breastfeeding, listening to radio independently has significant association with the dependent variable too (P-value 0.016 < 0.05 and Odd Ratio 1.250 (1.043-1.499).

- *Listening to radio and use of bed net for protecting children from Malaria*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.072 > 0.05). Risk analysis test indicates that Odds of use of bed net for children is 0.888 with 95% confidence interval (0.780-1.011) if their mothers listen to radio at least once in a week. Therefore, from this statistical analysis we can conclude that in this sample exposure to radio (Listening at least once per week) of mothers / caretakers does

not have significant association with the level of use of bed net to protect their children from Malaria.

*Table 9, Statistical test for association of Listening to Radio at least once a week and dependent variables*

| **Dependent Variables** | **P-Value** | **Odd Ratio** | **95% Confidence interval** |
|---|---|---|---|
| BCG vaccination | 0.066 | 1.121 | (0.992-1.266) |
| Initiation of Breastfeeding within first hour | 0.003 | 1.290 | (1.089-1.527) |
| Use of Bed Net | 0.072 | 0.888 | (0.780-1.011) |
| **Logistic Regression Test (Initiation of breastfeeding within first hour and listening to radio at least once a week)** | | | |
| Distance to HF(more than 4 hours/4hrs or less) | 0.276 | 0.820 | (0.574-1.172) |
| HH economy (Poor/Non-poor) | 0.955 | 0.994 | (0.801-1.233) |
| Listening to radio (at least once a week/ less than once a week) | **0.016** | 1.250 | (1.043-1.499) |

### *3. Watching TV:*

Among 1215(20.7%) women who reported that they were watching TV at least once in a week, 321 (5.5%) of their children had been vaccinated for BCG. Among 4656 (79.3%) of mothers

who responded that they watch TV less than once in a week or they do not watch at all, 1033 (17.6%) of their children were vaccinated. 894 (15.2%) of children of mothers who were exposed to TV and 3623 (61.7%) of those were not exposed to TV were not vaccinated for BCG.

968 (44.1%) women responded they started breastfeeding during one hour after birth, while 1227 (55.8%) of them responded that they started breastfeeding after the first hour.

In response to the question of their children (less than five years old) slept under a bed net last night, 1092 (15.5%) women responded "yes", while 5924 (84.5%) responded "no". Descriptive statistics of this analysis is shown in Table 10.

*Table 10, Descriptive Statistics of Women watching TV and dependent variables*

| | | **Watching TV** | | **Total n (%)** |
|---|---|---|---|---|
| | | **At least once a week n (%)** | **Less than once a week n (%)** | |
| **BCG vaccine** | Yes | 321 (5.5) | 1033 (17.6) | 1354 (23.1) |
| | No | 894 (15.2) | 3623 (61.7) | 4517 (76.9) |
| **Breastfeeding Initiation** | Within first hour | 196 (8.9) | 772 (35.2) | 968 (44.1) |
| | After first hour | 212 (9.6) | 1015 (46.2) | 1227 (55.8) |
| **Bed net use** | Yes | 205 (2.9) | 887 (12.6) | 1092 (15.5) |
| | No | 1203 (17.1) | 4721 (67.2) | 5924 (84.4) |

**Association between watching TV and dependent variables**: To find out if there is significant association between exposure of women to TV with the dependent variables in the sample, the independent variable was analyzed with each of the dependent variable separately in 2 x 2 tables

using Chi-Square test and risk analysis (Odd ratio) tests. The result of these statistical tests has been shown in table 11, bellow.

- *Watching TV and BCG vaccination*: Chi-Square test shows that the two variables have significant association with each other (P-value 0.002 < 0.05). Risk analysis test indicates that Odds of BCG vaccine among children is 1.259 with 95% confidence interval (1.089-1.456) times higher if their mothers watch TV at least once a week. So, we can conclude that in this sample exposure to TV (watching TV at least once per week) of mothers / caretakers have significant association with the level of BCG vaccination of their children.

- *Controlling for the confounders*: To test if the above-mentioned association is due to exposure to TV or it is due to the fact that those mothers who watch TV frequently could be from wealthier households or live near to the health facilities, we test the association using logistic regression test. The result indicates that although economy of households (being poor or not poor) and distance to the health facility (more than 4 hours or less than 4 hours) have significant association with the time of initiation of breastfeeding, watching TV independently has significant association with the dependent variable (P-value 0.016 < 0.05 and Odd Ratio 1.250 (1.043-1.499).

- *Watching TV and initiation of breastfeeding*: Chi-Square test shows that the two variables have significant association with each other (P-value 0.076 > 0.05). Risk analysis test indicates that Odds of initiation of breastfeeding within first hour after birth among mothers who watch TV at least once in a week is 1.216 with 95% confidence interval (0.980-1.508) comparing to those not watching TV or watching less than once in

a week. Therefore, from this statistical analysis we can conclude that in this sample, exposure of mothers/ care takers to TV does not have significant association with the initiation time of breastfeeding.

- *Watching TV and use of bed net for protecting children from Malaria*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.245 > 0.05). Risk analysis test indicates that Odds of use of bed net among children is 1.216 with 95% confidence interval (0.769-1.069) if their mothers watch TV at least once in a week. Therefore, from this statistical analysis we can conclude that in this sample exposure to TV (watching at least once per week) of mothers / caretakers does not have significant association with the level of use of bed net to protect their children from Malaria

*Table 11, Statistical test for association of watching TV and dependent variables*

| Variables | P-Value | Odd Ratio | 95% Confidence interval |
|---|---|---|---|
| BCG | 0.002 | 1.259 | (1.089-1.456) |
| Initiation of Breastfeeding | 0.076 | 1.216 | (0.980-1.508) |
| Use of Bed Net | 0.245 | 0.907 | (0.769-1.069) |
| **Logistic Regression Test (BCG vaccine)** | | | |
| Distance to HF(4hrs/more) | 0.008 | 1.522 | (1.114-2.078) |
| HH economy (Poor/Non-poor) | 0.002 | 0.777 | (0.662-0.914) |
| Watching TV | 0.009 | 1.229 | (1.054-1.434) |

***4. Age of women at marriage:***

Among 1256 (24.9%) women who reported that they got married when they were 18 years old or older, 981 (19.5%) of their children had been vaccinated for BCG. Among 3781 (75.1%) of mothers who responded that they got married when they were less than 18 years old, 2876 (57.1%) of their children were vaccinated and 905 (18.0%) of their children did not received BCG vaccine.

858 (45.0%) women responded they started breastfeeding during one hour after birth, while 1047 (55.0%) of them responded that they started breastfeeding after the first hour.

In response to the question of their children (less than five years old) slept under a bed net last night, 979 (16.2%) women responded "yes", while 5057 (83.8%) responded "no". Descriptive statistics of this analysis is shown in Table 12.

*Table 12, Descriptive statistics of Age of mother at Marriage and dependent variables*

| | | **Age at Marriage** | | **Total** |
|---|---|---|---|---|
| | | **More than 18 yrs** | **Less than 18 yrs** | |
| | | **N (%)** | **N (%)** | **N (%)** |
| **BCG vaccine** | **Yes** | 981 (19.5) | 2876 (57.1) | 3857 (76.6) |
| | **No** | 275 (5.4) | 905 (18.0) | 1180 (23.4) |
| **Initiation of Breastfeeding** | **Within first hour** | 218 (11.4) | 640 (33.6) | 858 (45.0) |
| | **After first hour** | 256 (13.4) | 791 (41.5) | 1047 (55.0) |
| **Bed Net Use** | **Yes** | 254 (4.2) | 725 (12.0) | 979 (16.2) |
| | **No** | 1239 (20.5) | 3818 (63.2) | 5057 (83.8) |

**Association between age of mothers at marriage and dependent variables**: To find out if there is significant association between age of mothers at marriage with the dependent variables in the sample, the independent variable was analyzed with each of the dependent variable separately in 2 x 2 tables using Chi-Square test and risk analysis (Odd ratio) tests. The result of these statistical tests has been shown in table 13, bellow.

- *Age at marriage and BCG vaccination*: Chi-Square test shows that the two variables do not have significant association with each other (P-value 0.139 > 0.05). Risk analysis test

indicates that Odds of BCG vaccine among children is 1.123 with 95% confidence interval (0.963-1.308) times if their mothers married at age 18 or above. So, we can conclude that in this sample age of mothers at marriage (married at 18 or older ages) of mothers / caretakers did not have significant association with the level of BCG vaccination of their children.

- *Age at marriage and initiation of breastfeeding*: Chi-Square test shows that the two variables do not have significant association with each other (P-value 0.631 > 0.05). Risk analysis test indicates that Odds of initiation of breastfeeding within first hour after birth among mothers who married at age 18 or above is 1.052 with 95% confidence interval (0.854-1.297) comparing to those married at age of less than 18 years. Therefore, from this statistical analysis we can conclude that in this sample, age of mothers/ care takers at marriage does not have significant association with the initiation time of breastfeeding.

- *Age at marriage and use of bed net for protecting children from Malaria*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.338 > 0.05). Risk analysis test indicates that Odds of use of bed net among children is 1.080 with 95% confidence interval (0.923-1.263) times if their mothers married at age 18 or above. Therefore, from this statistical analysis we can conclude that in this sample age of mothers / caretakers at marriage does not have significant association with the level of use of bed net to protect their children from Malaria

*Table 13, Statistical test for association of age of mother (18 or lower) at marriage and dependent variables*

| Dependent Variables | P-Value | Odd Ratio | Confidence interval |
|---|---|---|---|
| **BCG** | **0.139** | **1.123** | **(0.963-1.308)** |
| **Initiation of Breastfeeding** | **0.631** | **1.052** | **(0.854-1.297)** |
| **Use of Bed Net** | **0.338** | **1.080** | **(0.923-1.263)** |

As the legal age for marriage for girls is 16 years according to Afghanistan civil law[37], if we use 16 years as the cutoff point and see the association the result would be different. Here, we can see that BCG vaccination has significant association with the age of mothers at marriage (P-Value 0.001<0.05) and the risk analysis shows that odds of BCG vaccine among children is 1.261 (1.104-1.440) times higher if mothers got married above 16 years. After controlling for the confounders through logistic regression test, we can see that each of the variables (household economy, distance to health facility and age of mothers at marriage) has significant association with BCG vaccination of children independent from each other. Table 14, show the statistical test for this analysis.

*Table 14, Statistical test for association of age of mother (16 and lower) at marriage and dependent variables*

| **Dependent Variables** | **P-Value** | **Odd Ratio** | **Confidence interval** |
|---|---|---|---|
| BCG | 0.001 | 1.261 | (1.104-1.440) |
| Initiation of Breastfeeding | 0.566 | 1.06 | (0.87-1.28) |
| Use of Bed Net | 0.283 | 0.925 | (0.802-1.067) |
| **Logistic Regression Test (BCG vaccine)** | | | |
| Distance to HF(more than 4 hours /4hrs or less) | 0.012 | 0.634 | (0.444-0.904) |
| HH economy (Non-poor/ Poor) | 0.001 | 1.341 | (1.123-1.601) |
| Age at marriage (16 or above and less than 16 yrs) | 0.000 | 1.331 | (1.157-1.531) |

### 5. *Number of Children:*

Among 2477 (44.5%) women who reported having 1-4 children, 1874 (33.7%) of their children had been vaccinated for BCG. Among 3081 (55.4%) of mothers who responded that they got more than 4 children, 2401 (43.2%) of their children were vaccinated and 680 (12.2%) of their children did not received BCG vaccine.

914 (43.7%) women responded they started breastfeeding during one hour after birth, while 1177 (56.3%) of them responded that they started breastfeeding after the first hour.

In response to the question of their children (less than five years old) slept under a bed net last night, 1045 (15.7%) women responded "yes", while 5598 (84.3%) responded "no". Descriptive statistics of this analysis is shown in Table 15.

*Table 15, Descriptive statistics of number of children mothers have and dependent variables*

| | | **Number of Children** | | **Total n (%)** |
|---|---|---|---|---|
| | | **1-4 n (%)** | **More than 4 n (%)** | |
| **BCG vaccine** | **Yes** | 1874 (33.7) | 2401 (43.2) | 4275 (76.9) |
| | **No** | 603 (10.8) | 680 (12.2) | 1283 (23.1) |
| **Breastfeeding Initiation** | **Within first hour** | 416 (19.9) | 498 (23.8) | 914 (43.7) |
| | **After first hour** | 527 (25.2) | 650 (31.1) | 1177 (56.3) |
| **Bed net use** | **Yes** | 450 (6.8) | 595 (8.9) | 1045 (15.7) |
| | **No** | 2521 (37.9) | 3077 (46.3) | 5598 (84.3) |

**Association between number of children and dependent variables**: To find out if there is significant association between number of children mothers had with the dependent variables in the sample, the independent variable was analyzed with each of the dependent variable separately in 2 x 2 tables using Chi-Square test and risk analysis (Odd ratio) tests. The result of these statistical tests has been shown in table 16, bellow.

- *Number of Children and BCG vaccination*: Chi-Square test shows that the two variables have significant association with each other (P-value 0.046 < 0.05). Risk analysis test indicates that Odds of BCG vaccine among children is 0.88 with 95% confidence interval (0.78-0.99) times lower if their mothers 1-4 children. So, we can conclude that in this sample number of children (1-4 children) of mothers / caretakers have significant association with the level of BCG vaccination of their children.

- *Controlling for the confounders*: To test if the above-mentioned association is due to number of children or it is due to the fact that those mothers who have more than 4 children could be from wealthier households or live near to the health facilities, we test the association using logistic regression test. The result indicates that the association was due to economy of households (being poor or not poor) and distance to the health facility (more than 4 hours or less than 4 hours) and number of children independently does not have significant association with the dependent variable (P-value 0.055 > 0.05 and Odd Ratio 1.138 (0.997-1.299).

- *Number of children and initiation of breastfeeding*: Chi-Square test shows that the two variables do not have significant association with each other (P-value 0.736 > 0.05). Risk analysis test indicates that Odds of initiation of breastfeeding is 0.971 with 95%

confidence interval (0.816-1.155) times among mothers with 1-4 children. Therefore, from this statistical analysis we can conclude that in this sample, number of children mothers/ care takers have does not have significant association with the initiation time of breastfeeding.

- *Number of children and use of bed net for protecting children from Malaria*: Chi-Square test shows that the two variables did not have significant association with each other (P-value 0.239 > 0.05). Risk analysis test indicates that Odds of use of bed net among children is 1.083 with 95% confidence interval (0.948-1.238) times if their mothers have 1-4 children. Therefore, from this statistical analysis we can conclude that in this sample number of children mothers / caretakers had does not have significant association with the level of use of bed net to protect their children from Malaria

*Table 16, Statistical test for association of "number of children a mother has" and dependent variables*

| Variables | P-Value | Odd Ratio | Confidence interval |
|---|---|---|---|
| BCG | 0.046 | 0.88 | (0.78-0.99) |
| Initiation of Breastfeeding | 0.736 | 0.971 | (0.816-1.155) |
| Use of Bed Net | 0.239 | 1.083 | (0.948-1.238) |
| **Logistic Regression Test (BCG vaccine)** | | | |
| Distance to HF(4hrs/more) | 0.008 | 1.539 | (1.117-2.121) |
| HH economy (Poor/Non-poor) | 0.003 | 0.778 | (0.660-0.917) |
| Number of children (1-4/ More than 4) | 0.055 | 1.138 | (0.997-1.299) |

***Summary of findings***:

The following table shows the summery of the findings of this study, and indicates that there is no association between literacy of women and the independent variables; listening to radio at least once a week or more has a positive association with initiation of breastfeeding; watching TV once a week or more has positive association with BCG vaccination among children. Age of mothers at marriage does not have significant association with the dependent variables if we consider 18 years as the cutoff point, but it has significant association if we consider 16 years old (the legal age of marriage for girls in Afghanistan) the association is significant with BCG

vaccination. The number of children (women who have more than 4 children) had association with BCG vaccination, but after controlling for the household economy and distance to health facilities through logistic regression the association was lost. It seems that the effect was from household economy and number of children does not have significant association with BCG vaccination. Table 17 shows the summary of our findings from this analysis.

*Table 17, Summery of findings*

| Independent Variables | Dependent Variables | Association | Control for confounding factors | Association after controlling for confounding |
|---|---|---|---|---|
| **Literacy of mothers** | BCG | No | No | NA |
| | Breastfeeding initiation | No | No | NA |
| | Use of bed net for children | No | No | NA |
| **Listening to Radio** | BCG vaccine | No | No | NA |
| | Breastfeeding initiation | Yes | Yes for distance to HF and household economy | Yes |
| | Use of bed net | No | No | NA |
| **Watching TV** | BCG vaccine | Yes | Yes for distance to HF and household economy | Yes, |
| | Breastfeeding initiation | No | No | NA |
| | Use of bed net | No | No | NA |
| **Age at marriage** | BCG vaccine | No | No | No |
| | Breastfeeding initiation | No | No | NA |
| | Use of bed net | No | No | NA |
| **Number of children** | BCG vaccine | Yes | Yes for distance to HF and household economy | No, the association was due to household economy |
| | Breastfeeding initiation<br>Use of bed net | No<br>No | No<br>No | |

# CHAPTER V

# DISCUSSION AND CONCLUSION

This chapter covers limitations, discussion and interpretation of the main findings, conclusion, and key recommendations.

## a) Limitations:

First of all we used secondary data from the Afghanistan Health Survey which was conducted for a different purpose. The data was collected to find the key outcome indicators of maternal and child health in Afghanistan. The main objectives of the survey were38:

1) To provide estimates of priority health indicators for rural Afghanistan.
2) To describe care-seeking practices, provider preferences and health expenditures for illnesses and injuries in rural Afghanistan.
3) To present breakdowns of priority maternal and child health indicators and care-seeking practices by wealth status and travel time to the nearest health facility.

Therefore, our study had several limitations in analyzing the association of socioeconomic status of women with the child health indicators. For example, we initially wanted to study the age of mothers during pregnancy or delivery of their recent child, but the questionnaire did not have such information. Other example is, the information for other vaccination coverage, rather than BCG, such as DPT and OPV, which was based on either recall of mothers or showing vaccination cards. These two methods had huge difference with each others. The coverage rate that was found by AHS was also different from the data collected through surveillance system at the Ministry of Public Health. Therefore, we used only BCG vaccination in our study as it was based on cross-checking the scar on the shoulder of

children (objectively) and error due to recall problems or losing the vaccination card was almost zero in this vaccine. The other limitation was information about the nutrition status of the children. The questionnaire had questions on initiation of breastfeeding, ever breastfeed and exclusive breastfeeding. But as the question regarding exclusive breastfeeding was not giving us a concrete answer (it was based on 24 hour recall, rather than asking the mothers if they have given additional food or drink to the children from the birth till age of six months), so we used the only question about initiation of breastfeeding.

Therefore, this study is just the first step to open the way for further investigations and studies to address specifically the socioeconomic status of mothers/ caretakers and health indicators of children.

**b) Interpretation and conclusion:**

Here we summarize and explain the study findings for each of the dependent variable.

1) **BCG vaccination**: In our study we found that women exposed to media (watching TV) at least once a week, more likely vaccinate their children for BCG. After controlling for confounding factors we found that watching TV still had significant association. We do not know how watching TV has positive role in BCG immunization, while listening to radio does not have. As the coverage of radio is more in rural area and listening to radio is easier than TV, the question requires further investigation and studies. The result of such studies will help the Ministry of Public Health to design more suitable health communication messages using mass media.

In our study we found that BCG vaccination is almost equal among children of women married at age bellow 18 or above 18 years old, and there was no significant association between the age of mothers at marriage and BCG vaccination. But further analysis showed that if we consider 16 years as the cutoff point, which is more common age for marriage among girls, we find that women married after their 16th birthday are more likely vaccinate their children for BCG and this association remain significant after controlling for household economy and distance to health facility. The following table indicates this association by logistic regression test:

This result indicates that children of mothers married before 16 years old are at higher risk of not being vaccinated. This can be due to low decision making power, lack of parenting experience, and other social factors. The MoPH and other actors can emphasize on reducing the number of child marriage and improve efforts for empowerment of women.

2) **Initiation of breastfeeding**: In our study we found that listening to radio at least once a week has positive effect on starting breastfeeding within one hour of life. This can be due to the fact that the Ministry of Public Health of Afghanistan launched a mass media campaign on child nutrition, or there are other factors involved. To find out how listening to radio affect the behavior of mothers positively and why it was not associated with the other dependent variables, require further study. However; as most women in rural area have access to radio and listening to radio does not require a lot of efforts on the women side (they can do their house work while listening to radio at the same time), so broadcasting health messages through radio can affect the

behavior of mothers positively. Other studies also found the positive effect of radio on increasing coverage of Polio vaccination during national immunization days. Our study is consistent with those findings and we recommend broadcasting public health related messaged through radio, especially those channels covering rural areas.

3) **Use of bed net**: In our study we did not find association between bed net use for protection of children from Malaria and the socioeconomic variables we studied. This can be either due to limitations of the study or due to other facts, for example; in Malaria endemic areas promotion of use of bed net has been done mainly through interpersonal communication to mothers attending the health facilities and other hand there is no messages on use of bed net through mass media, so that listening to radio or watching TV did not have any association. However, we recommend further studies in this regard before recommending any policy reform.

4) The fact that why the other independent variables did not have association with BCG vaccination, initiation of breastfeeding and use of bed net can be either due to limitation of the study or there are other reasons that require further studies.

Regarding literacy among women; there can be two more reasons: first; only ability to read a sentence, which was the question in the study, cannot indicate the level of education of mothers, as most of other studies worldwide shows that higher education of mothers is associated with many health indicators among their children. Second; even if some individual mother has basic literacy, this is not enough to improve things, while in the society as a whole the rate of illiteracy is much higher. There are evidences from other parts of the globe which indicates the same reason. A study in Latin America, for example, found that fathers' education is as important in health outcome of children as mothers' education, but this factor has not been emphasized on

public health research and studies.[39] Another study in Bolivia founds mothers' basic abilities and personality characteristics such as decision making power and autonomy has positive impact on children's health outcome, independently from other factors, like education and economic wealth[40]. In Afghanistan where low status of women in the families as well as the society is well known, any approach to bring positive change on children's health indicators should be integrated with women empowerment approaches. Another study found that efforts of mothers at individual level fail to improve health status if the community as a whole has lower level of education. This finding was significant in cases such as diarrhea among children[41]. Therefore; we can conclude that literacy has a positive effect, when it is a cultural issue and most of the people in a society are literate, otherwise, the culture of illiteracy will dominate decision making power of individual women. This important issue can be addressed through policies and programs in coordination with other sectors, especially the education sector to be addressed through programs such as *literacy for life program*.

*Age of mother at marriage* is very important and other studies found that health indicators among children of child-marriage mothers are lower. A cross sectional study in India was found the association of child marriage of mothers has significant association with child nutrition. The study included data from a national health and family survey which contains 19302 women (15-49 years old) who had given birth in the past five years and the child health indicators were studied for all children born in the past five years. The study found that maternal child marriage was associated with malnutrition indicators for children under 5 years. Children of women married as minors were significantly more likely to have stunting (OR 1.85, 95% CI 1.71 to 1.99), wasting (1.19, 1.07 to 1.30), and underweight status (1.87, 1.74 to 2.01). Associations between maternal child marriage and being stunted or underweight attenuated but remained

significant after adjusting for demographics and maternal BMI (stunted AOR 1.22, 95% CI 1.12 to 1.33; underweight 1.24, 1.14 to 1.36). The study also found that most deaths of children occurred among minor mothers are the first child and the first year of life[42].

Another study in India searched for the consequences of child marriage to the maternal health indicators. The study included 124385 women (16-49 years old) from a national health and family survey. The study found that 22.6% of women reported marriage prior to age 16 years, and 2.6% were married prior to age 13 years. Child marriage was significantly associated with women's increased risk for no contraceptive use prior to first childbirth (AOR=1.37, 95% CI=1.22, 1.54), high fertility (AOR=7.40, 95% CI=6.45, 8.50), history of rapid repeat childbirth (AOR=3.00, 95% CI=2.74, 3.29), multiple unwanted pregnancies (AOR=2.36, 95% CI=1.90, 2.94), pregnancy termination (AOR=1.22; 95% CI=1.06, 1.41) and female sterilization (AOR=5.54, 95% CI=4.86, 6.32) relative to women married at 18 years or older. Associations between child marriage and rapid repeat childbirth, multiple unwanted pregnancies, pregnancy termination and sterilization remained significant after controlling for duration of marriage[43].

In our study we did not calculated the health indicators for the first child of these mothers to find out if there is any association between child marriage and child health indicator.

In our study most of the children were not the first child and this result may indicates that by pass of time, the mothers get experiences and learn how to care their children. However; as the problem of child marriage is hot in Afghanistan, we recommend that another study should be conducted to explore this association and other health consequences of child marriage in detail.

5) Role of the two confounding factors we analyzed here in this study – household economy and distance to health facility – are studied in detail through other studies, especially in the Afghanistan Health Survey, which we used the data. It is clearly known that these two factors

have association with most of health indicators and health care seeking behavior of the families. However; in our analysis we found that the 22% poorest proportion of the households in terms of economy are at higher risk and all health indicators are lower for them. This requires further attention of the Ministry of Public Health of Afghanistan to emphasize on pro-poor health service delivery approaches.

Although in our study we controlled the associations for distance to health facilities using the cutoff point of four hours distance to health facility, which indicated significant association with most of the dependent variables. We conclude those living four hours far from health facilities are at higher risk of health outcomes. Therefore; our recommendations would be to review the distribution of health facilities among rural area and efforts should be done to bring the most basic health services such as maternal and child health services more closer to the families. Decreasing the number of Comprehensive Health Centers (CHCs) which have higher running cost and increasing the number of Basic Health Centers (BHCs) could be a cost-effective approach to bring the basic services more closer to the families.

To summarize our recommendations based on findings of this study we can conclude that:

1. Use of mass media for broadcasting health messages to rural families, especially through radio can be effective and should be emphasized.
2. Review the distribution of health facilities and efforts should be done to increase the number of Basic Health Centers (BHCs). Cost estimation of current BPHS provision shows that annual running cost of one comprehensive Health Center can afford running three BHCs in one year that can provide the most essential services to the remote areas (BPHS 2005).

3. All efforts for improving healthy behavior of families should be integrated and include women empowerment approaches to increase decision making power of women among households.
4. Efforts to educate and raise awareness of the societies as whole through mass campaigns, approaches to address all community members, and intensive programs on literacy for life should be focused to change the culture of illiteracy in rural areas of Afghanistan.

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