

## **THE EFFECT OF WOMEN'S DECISION-MAKING POWER ON INFANT MORTALITY IN MYANMAR**

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### **Abstract**

Women's autonomy and empowerment has generally been recognized as one of most important factors of development. A lack of autonomy and empowerment may lead to negative outcomes on child health and mortality. This study tried to investigate the effect of women's empowerment on infant mortality in Myanmar. Sample of 4815 ever married women whose age are 15 to 49 years were drawn from 2015/16 Myanmar Demographic and Health Survey. Furthermore, the binary logistic model had been specified and estimated to investigate the effect of women's empowerment on infant mortality. Results showed that women who were more empowered were significantly less likely to experience infant mortality. This highlights the importance of women's empowerment in efforts to reduce infant mortality.

**Keywords:** Demographic health survey, infant mortality, women's empowerment

### **Introduction**

Infant mortality rate (IMR) is a widely used indicator of health status of all population as well as the level of development of a country (Reidpath and Allotey, 2003). It is defined as the number of deaths in children under the age of one year per 1000 live birth. High IMR is strongly related to low general living condition, low social well-being, low quality of environment, and low level of economic development that affect the health of the entire population. The reason behind the use of IMR as a measure of health status of the population is that the causes of infant mortality are strongly related to general living condition, social well-being, quality of the environment and the level of economic development, that affect the health of entire population. Further, the IMR as a measure of health status can be calculated easily and more accurately with less data.

The IMR, which has declined significantly over time, still remains high in many developing countries and varies widely across countries (WHO, 2013; Schell, et. al. 2007). High IMR, which indicates poor health of the population, has important implications at both micro and macro levels. Poor health results in a lower quality of human resources and lower productivity. Efforts are being made and strategies are being developed across all developing countries to reduce IMR to an acceptable level. Accordingly UN Millennium Development Goal 4 (MDG4) set the target to reduce the under-five mortality rate by two-thirds by 2015 from 1990 level (WHO, 2013). Meanwhile, the United Nation's Sustainable Development Goal 3 (SDG3) set the target to reduce the under-five mortality rate to at least as low as 25 per 1,000 live births.

In Myanmar, around 56,000 children under five die each year and 43,000 of them are younger than one month. Despite improvements, the country's under-five and infant mortality rates are the highest among ASEAN member countries, and many of these deaths are preventable. Under-five mortality rates are higher in the central plains, in rural areas, among families without formal education and among children from the poorest families. The principal causes of neonatal mortality (under 28 days of age) were prematurity birth asphyxia and sepsis,

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including pneumonia. The main direct causes of deaths among children under-five continue to be diarrhea, acute respiratory infections and malaria, exacerbated by underlying malnutrition, which contributes to around 50 percent of these deaths. Children born into the poorest households are almost twice as likely to die before age five as their wealthiest counterparts. However, poverty is not the only divider. Children are also at greater risk of dying before age five if they are born in rural areas or to a mother lacked basic education. In addition, the main causes of child deaths are lack of prenatal medical care and medical assistance during the delivery, delivering in poor health facilities, malnutrition, and preventable diseases like pneumonia, diarrhea and malaria. Access of pregnant women to antenatal care and those women with skilled health personnel in attendance are critical interventions for combating preventable maternal and neonatal mortality.

Myanmar has experienced a decrease in IMR from 73 deaths per 1,000 live births in 1990 to 68 deaths per 1,000 live births in 2007. According to the 2014 Myanmar Population and Housing Census (MPHC), infant mortality was 62 deaths per 1,000 live births. It is still high compared to other countries in the region. Despite declines in early-age mortality (infant and child mortality) over several decades, mortality rates remain high in Myanmar in comparison with its neighboring South-East Asian countries, developing countries, and globally.

Meanwhile, ever since the 1994 International Conference on Population and Development in Cairo, women's autonomy and empowerment has been recognized as one of the most important factors of development and thus, it is identified as one of the development goals of national governments and international agencies. Many researchers have argued that women's empowerment is closely linked to positive outcomes for families and societies. Numerous studies have documented the role and importance of women for the health and overall well-being of their children and family members.

Empowered women, particularly those who are more autonomous, have increased bargaining power, relative to their husbands. It has often been argued that child health and investments in children are determined by intra-household resource allocation decisions, which are related to gender inequalities in the household. Thus, women's autonomy and empowerment can contribute to decline in fertility and child mortality rates.

Women empowerment seems to be related to the fertility and child mortality in developing countries. Duflo (2012) highlights three dimensions of women empowerment: (i) education, (ii) participation in decision making process, and (iii) involvement in economic activities. An educated woman is expected to be more enlightened and be more conscious and therefore can make better decisions for her as well as for the family (Hossain and Hoque, 2015). She may be better informed about how the health care system functions and can get better access to it. Further, she can easily interact and communicate with health service providers to get required care for her as well as for her newborn (Bloom et al., 2001). That is, an educated woman is expected to utilize all available resources and information effectively which reduce the risk of child morbidity and mortality.

In many developing countries, where a man is normally the head of a household who makes most of the household decisions, and the wife experiences no equity in this process (Holland & Hogg, 2001). For instance, men often control the financial matters no matter who earns the cash and make decisions regarding major household purchases. This translates into financial vulnerability and lack of autonomy of a woman and more dependent on her spouse. In such cases, a woman who needs health care services has to rely on husband's judgment and

willingness to spend on such cares (Hossain and Hoque, 2015). It can be hypothesized that the higher the participation in the household decisions making process by women the higher is the likelihood of receiving health care, which may increase the survival of the child in a developing country. Several factors have been associated with this decline in infant mortality. For this reason, the aim of this study is to investigate the effect of women's empowerment on infant mortality in Myanmar.

### Data and Methods

This study used data from 2015-2016 Myanmar Demographic and Health Survey (MDHS). It was implemented by the Ministry of Health and Sports of the Republic of the Union of Myanmar. This is a nationally representative survey of Myanmar households with a stratified random sample of 13,238 households. In this study, the unit of analysis was women who had last childbirth in period 2011-2016. With this limitation, there were 4,815 women aged 15-49 years old. The sample covered those who lived in both urban and rural areas and also included women who had different level of education and occupation. The questions used in the survey questionnaire included all of the important characteristics such as infant and child mortality or number of children death under five year, mother's age, education level, employment or working status, knowledge about contraceptive methods, place of residence, cooking fuel source, source of sanitization, source of water, delivery place, tetanus toxoid injection, etc.

In order to meet the objective, Descriptive statistics method was used to present the general characteristics of women under study such as gender of child, birth order, birth spacing, birth size, place of residence, wealth of household, source of cooking fuel, source of sanitation, source of water, delivery place, and tetanus toxoid injection, contraceptive use, going to health center, major household purchase alone, visiting families alone, employment, education levels, and age at first birth. In addition, logistic regression model was developed to investigate the most important predictors of infant mortality. The key explanatory variable that was investigated in this study was women's empowerment. Women's empowerment was measured on the individual level. Infant mortality for the last child of a woman was the primary outcome of the analysis. The response options were yes (code = 1) and no (code = 0).

In this analysis, the average marginal effects were calculated to test the significance of logistic regression coefficients. Before the analysis, various variables were regrouped. For example, birth spacing was recorded into two; less than equal 24 months old and more than 24 months old, birth order variable also divided by three groups namely first order, two-three order, and above third order, access to sanitation, access to water and delivery place were also grouped accordingly.

The model used in this study can be formulated as Equation 1, where  $\pi(x)$  is probability to use a skilled birth attendant during delivery,  $\beta_0$  is a constant to be estimated,  $\beta_p$  are parameters to be estimated, and  $x_p$  represents independent variables. Definitions of variables which were used in this model and priori expectations were shown in appendix-1.

$$\ln\left(\frac{\pi(x)}{1-\pi(x)}\right) = \beta_0 + \beta_1x_1 + \dots + \beta_px_p \quad (\text{Equation 1})$$

## Results and Discussion

The demographic information of the respondents was analyzed in terms of gender, birth order, birth spacing, birth size, place of residence, wealth of the household, cooking fuel source, source of sanitation, source of water, delivery place, tetanus toxoid injection, contraceptive use, going to health center, major household purchase alone, visiting families alone, employment, education level and age at first birth.

Table (1) displays the sample characteristics. The proportion of male babies born stood at (52.5%) compared to female babies (47.5%). Birth order 2-3 was (40.5) which was slightly larger than the remaining categories. Majority (54.5%) of the children born had birth spacing of more than two years and (86.6%) of women received the tetanus toxoid injection during pregnancy compares with only (13.4%) who reportedly did not receive the injection. (65.9%) of women further reported that they gave birth at home, (27.6%) gave birth at government hospital compared to only (6.2%) who gave birth in private hospital. More than half (55.3%) of women used open wells were main source of water and only (12%) of women used piped water. Most of the women (40.6%) used pit toilet and (37.6%) of the women used flush toilet. For cooking fuel source, firewood was the main source of cooking fuel especially in the rural areas where it was easily accessible. The findings further revealed that respondent's participation in different household decision varies from (18.3%) in major household purchase to (40.5%) in seeking child healthcare. Similarly, respondents had say in the use of contraception was (52.7%) and mostly (95.9%) of the respondents were employed. Nearly one-half (44.3%) had primary education, (17.9%) of the respondents had no education, (31.0%) had secondary education and only (6.8%) had higher education respectively.

**Table 1 Demographic, Environmental and Socio-economic Characteristics**

<b>Variables</b>	<b>Percentage</b>
<b>Gender of the child</b>	
Male	52.5
Female	47.5
<b>Birth order</b>	
First order	32.2
2-3 order	40.5
Above third order	27.3
<b>Birth spacing</b>	
Less than 24 months	45.5
More than 24 months	54.5
<b>Birth size</b>	
Small	5.2
Average	71.5
Large	23.3
<b>Type of residence</b>	
Urban	21.0
Rural	79.0
<b>Wealth of the household</b>	
Poor	53.2
Middle	34.6
Rich	12.2

<b>Variables</b>	<b>Percentage</b>
<b>Cooking fuel source</b>	
Electricity	14.1
LPG/Gas	0.4
Coal	14.9
Wood	66.2
Grass	1.7
Others	2.7
<b>Source of sanitations</b>	
Flush toilet	37.6
Pit toilet	40.6
No facility	18.7
Others	3.1
<b>Source of water</b>	
Piped	12.0
Public tap	4.5
Open well	55.3
Spring	5.2
River	9.5
Others	13.5
<b>Delivery place</b>	
Home	65.9
Government hospital	27.6
Private hospital	6.2
Non-government organization	0.3
<b>Tetanus Toxoid Injection</b>	
Immunized	86.6
Not immunized	13.4
<b>Use of contraceptive</b>	
Yes	52.7
No	47.3
<b>Going to health center</b>	
Alone	40.5
With husband	57.2
With other person	2.3
<b>Major HH purchase alone</b>	
Yes	18.3
No	82.7
<b>Visiting families alone</b>	
Yes	35.7
No	64.3
<b>Employment</b>	
Yes	95.9
No	4.1
<b>Education</b>	
No education	17.9
Primary	44.3
Secondary	31.0
Higher	6.8

Variables	Percentage
<b>Age at first birth</b>	
< 15 age at first birth	2.7
≥ 15 age at first birth	97.3

Data Source: MDHS Data (2015-16)

Table (2) shows the total number of live births, total number of infant deaths and infant mortality rates by residence. Based on the survey data, it can be seen that infant mortality rate of Union was 47 deaths per 1000 live births. The infant mortality rate of rural was much higher than that of the urban area. Regarding the State and Region, it was found that Chin State had the highest rate of infant mortality (84 deaths per 1000 live births) and this was followed by Shan State (70) which was second largest among the States and Regions, then Taninthayi Region (48), Mandalay Region (47), Ayeyarwaddy Region (43), Kayin State (42), Naypyitaw (38), Bago Region (37), Kachin State and Sagaing Region (35), Yangon Region (33), Rakhine State (31), Magway Region (30), Mon State (29), and Kayah State (27) respectively.

**Table 2 Infant Mortality Rates by Residence**

Residence	Total Number of Live Births	Total Number of Infant Deaths	Infant Mortality Rates
<b>State and Region</b>			
Kachin	340	12	35
Kayah	369	10	27
Kayin	336	14	42
Chin	439	37	84
Sagaing	334	12	35
Taninthayi	310	15	48
Bago	270	10	37
Magway	261	8	30
Mandalay	255	12	47
Mon	239	7	29
Rakhine	346	11	31
Yangon	240	8	33
Shan	326	23	70
Ayeyarwaddy	300	13	43
Naypyitaw	232	9	38
Rural	3617	170	47
Urban	980	31	32
Union	4597	201	47

Data Source: MDHS Data (2015-16)

Table (3) displays the summary results and marginal effects of Logistic regression are shown in Table (3). In this analysis, the infant mortality is as a dependent variable (if infant mortality occurs =1, if not = 0) and mother's age, number of children, age at first birth, types of residence, household wealth, source of water, sanitation facilities, source of cooking fuels, birth order and size, gender of child, birth spacing, health service, and women empowerment variables are independent variables. The aspects of women empowerment which are considered in this study include; education, contraceptive use, women's participation in household decisions, women's freedom of movement, and employment.

The results of logistic regression model showed that age of mother, age at first birth, sources of water, sanitation facilities, births spacing, size at birth, birth in last three years, breast feeding, sex of child, empowerment variables such as education, women's participation in household decisions, women's freedom of movement, and employment were significant predictors which have impact on infant mortality.

Starting from the age of women, age of women had negative effect which shows lower probability for infant mortality. This means that an increase in the mother's ages by one year will reduce the probability of infant mortality by 9.8% holding all other factors constant. Mothers with less than three children had a lower probability of infant mortality by 2.11% as compared to those mothers who had more than two children. This can be attributed to education levels. Moreover, women who age at first birth were 15 years and above had a lower probability of infant mortality by 6.8% as compared to their counterpart.

Regarding the place of residence, compared between urban and rural, the women who lived in urban area had a 4.94% lower probability of infant mortality than those who lived in rural areas. For the wealth status, women who were rich had a lower probability of infant mortality by 5.49%, women who were of middle wealth status had a lower probability of infant mortality by 1.88% than those who were poorest. This can be attributed to education; educated mothers are more likely to be categorized as middle class; this implies that with the increase in wealth and health knowledge, the risks associated with infant mortality is lowered.

Besides, source of water was expected to improve the status of health of the child and thus reduce mortality levels. Thus, piped, public tap, open well, spring and river water sources can lower the probability of infant mortality by 28.37%, 24.57%, 26.44%, 25.47%, and 25.20 % respectively relative to those other sources of water.

It was found that, increase in preceding birth spacing reduces the chances of infant mortality. Mother who birth spacing was more than two years was likely to reduce the infant mortality by 7.43 % compared to mother who birth spacing was less than equal to two years. Short birth interval may reduce mothers' recovery time leading to adverse perinatal outcomes. This study found that significant association between short birth interval and greater risk for adverse perinatal outcomes, such as preterm birth, low birth weight, and small size for gestational age.

Regarding the child factors, birth in last three years and breastfeeding also significantly affected infant mortality. Children who were of average and large size at birth had 10.55% and 15.07% lower probability of facing deaths as compared to infants who were of small sizes at birth. Mother who gave birth in last three years had less likely to reduce the infant mortality by 6.89% compared to its counterpart and mother who were breastfeeding had less likely to reduce the infant mortality by 6.02% compared to those were not breastfeeding.

Regarding the child sex, the result pointed out that the female babies had less likely to decrease the infant mortality by 3.48% compared to its counterparts. Thus, boys and girls have different probabilities of death due to biological factors, and these differences vary between infancy and early childhood. Boys were more likely to die before reaching their first birthday.

The result showed a child born in the government hospital has a higher chance of die less than one year than a child born in the private hospital. Mothers who use private hospital had lower probability of infant mortality by 2.82 % compared to government and other delivery.

Immunized for TTI were also important for the status of child health and reduce mortality rates. Furthermore, mothers who were immunized for TTI had a 3.99% lower probability of infant mortality as compared to mothers who were not immunized for TTI.

Concerning the level of education, women with higher level of education had the infant death had lower than uneducated women. The educated mothers prefer fewer children whom they are able to take proper care of thus reducing the probability of child death.

For the household decision making, the coefficients of the variables measuring the participation of household decision making process, going alone to health center and visiting families alone are 0.0215, 0.0751, and 0.0306 respectively. These results indicate that the probability of infant mortality are 2.15 % more if mothers participate in household decisions and mothers who go alone to health center and visit families alone are 7.51% and 3.06% more likely to increase the probabilities of infant mortality compared to those of reference groups. The coefficient of women employment shows -0.1269 suggesting that the probability of infant mortality are expected to be 12.69% less if mothers participate in income generating activities compared to their counterparts.

**Table 3 Marginal Effects of Infant Mortality**

Variable	Coefficients	Marginal Effects
<b>Individuals factors</b>		
Mother's age	-0.097 (-2.06)**	-0.098 (-2.061)**
< 3 number of children (ref: ≥ 3 number of children)	-0.2124 (-0.28)	-0.0211 (-0.28)
≥ 15 years (age at first birth) (ref: < 15 years (age at first birth))	-0.0683 (-1.98)**	-0.068 (-1.97)**
<b>Household factors</b>		
Urban residence (ref: Rural residence)	-0.4975 (-1.98)**	-0.0494 (-1.984)**
rich	-0.5531 (-0.85)	-0.0549 (-0.85)
middle (ref: poorest)	-0.1900 (-0.40)	-0.0188 (-0.40)
<b>Source of water</b>		
Piped	-2.8580 (-2.13)**	-0.2837 (-2.15)**
Public tap	-2.4749 (-1.73)**	-0.2457 (-1.74)**
Open well	-2.6626 (-2.05)**	-0.2644 (-2.06)**
Spring	-2.5653 (-1.84)**	-0.2547 (-1.85)**
River (ref: others)	-2.5382 (-1.89)**	-0.2520 (-1.91)**
<b>Sanitation facilities</b>		
Flush toilet	2.8717 (2.05)**	0.2851 (2.06)**
Pit toilet (ref: others)	2.8363 (2.03)**	0.2816 (2.04)**
<b>Source of cooking fuel</b>		
Electricity	-0.2207 (-0.18)	-0.0219 (-0.18)
Wood	-0.6191 (-0.60)	-0.0614 (-0.60)
Coal (ref: others)	-1.0263 (-0.92)	-0.1019 (-0.92)



Variable	Coefficients	Marginal Effects
<b>Child factors</b>		
First order	-0.4140 (-0.54)	-0.0411 (-0.54)
Two- three birth order (ref: above third order)	-0.0302 (-0.07)	-0.0030 (-0.07)
> 24 months birth spacing (ref: ≤ 24 months birth spacing)	-0.7482 (-2.18) **	-0.0743 (2.18)**
Average (birth size)	-1.0624 (-1.83)	-0.1055 (-1.84)
Large (birth size) (ref: Small (birth size))	-1.5185 (-2.32)**	-0.1507 (-2.33)**
Birth in last 3 years	0.6945 (2.24)**	- 0.0689 (2.25)**
Breastfeeding-yes (ref: Breastfeeding-no)	-0.6059 (-1.16)***	- 0.0602 (-1.64)***
Female (ref: Male)	-0.3506 (-1.16)*	-0.0348 (-1.16)*
<b>Health service factors</b>		
Private-delivery (ref: Government-delivery and others)	-0.2843 (-0.61)	-0.0282 (-0.61)
Immunized for TTI (ref: Not Immunized for TTI)	- 0.4021 (-1.25)	-0.0399 (-1.25)
<b>Empowerment factors</b>		
Primary education	-0.2020 (-2.50)**	-0.02019 (-2.56)**
Secondary education	-0.2906 (-2.57)**	-0.02892 (-2.57)**
Higher education (ref: No education)	-0.4536 (-2.134)**	-0.04531 (-2.14)**
Contraceptive-use (ref: No contraceptive-use)	- 0.4318 (-1.28)	-0.0429 (-1.28)
Going alone to health center	0.7583 (2.15)*	0.0751 (2.14)*
Going health center with husband (ref: others)	0.0998 (2.22)*	0.00996 (2.23)*
Major HH purchase alone (ref: others)	0.2168 ( 0.48)	0.0215 ( 0.48)
Visiting families alone (ref: others)	0.3082 (1.78)**	0.0306 (1.79)**
Employment	-1.2788 (-2.52)*	-0.1269(-2.55)*
Number of observations = 499: Iteration = 35: log likelihood = -166.1086: LR $\chi^2(35) = 53.89$ , Prob > $\chi^2 = 0.0216$ : Pseudo $R^2 = 0.1396$ *, **, *** significant at the 1%, 5% and 10% level respectively, Z statistics in parenthesis. Dependent variable: if infant mortality occurs =1, not occur = 0.		

Source: MDHS Data (2015-16)

## Conclusion

This study shows the effects of women empowerment on infant mortality in Myanmar. The probability of infant mortality is substantially lower for the children of those mothers, who are empowered, particularly through education, participation in the household decision making process. That is, women employment appears to influence the probability of infant survival.

Infant mortality is also affected by age at delivery, source of water, sanitation facilities, birth weight, birth in last three years, breastfeeding, sex of child, birth interval, and employment.

This study has shown that women who are more empowered have better outcomes on child health, especially in reducing infant mortality.

In addition, boys and girls have different probabilities of death due to biological factors, and these differences vary between infancy and early childhood. This finding shows that boys were more likely to die before reaching their first birthday. It can be suggested that risky behaviour and poor health habits among males may be the cause of such mortality disparities between the sexes. This has to be investigated further and confirmed through research studies so that appropriate policies and programmes can address the root causes of such behavioural patterns. Short birth interval may reduce mother's recovery time leading to adverse perinatal outcomes.

### Policy Recommendation

The study has shown that women who were more empowered would have better outcomes on child health, especially in reducing infant mortality. It can be strongly indicated the need for policy to promote women empowerment to improve achievement in health development, especially in reducing infant mortality.

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## Appendix

## Variable Definitions and Priori Expectations

Variables	Measure	Priori expectation
Mother's age	Mother's age at the time of child birth measured as a discrete variable with different age groups.	Very young and very old women are likely to have high infant mortality.
Residence type	Household's residence whether in rural or in urban area.	Urban residents are expected to have low mortality risks as
Wealth of the Household	The households are categorized as poor, middle or rich	Children born from poor families are expected to have
Access to water	Source of drinking water for households. Whether piped, well, rainwater, river water.	Clean drinking water is expected to improve child survival.
Access to sanitation	Availability of sanitation services in households, it is captured as no facility, flush toilet, pit toilet and ventilated improved toilet.	Clean human waste disposal availability reduces mortality risks.
Cooking fuel Source	Source of cooking fuel used by households. It is categorized as use of electricity, LPG, wood, charcoal or dung.	Clean cooking fuel is associated with low mortality risks.
Birth order	The child's birth order in the family, it is captured as first, second, third and above 3.	Mortality is expected to be high at first birth and above 3 birth order.
Birth size	Refers to the size of the baby at birth as reported by the mother. It is captured as small, very small, average, large or very large babies.	Small size and very large babies are expected to be associated with high mortality risks.
Gender	Sex of the child which is either male or female.	Girls are expected to have lower mortality risk than boys.
Birth spacing	The birth spacing between children captured as less than 24 months or more than 24months.	Birth spacing of 24 months or more is expected to decrease infant mortality.
Delivery	Place where child was born, either at the hospital or non-hospital deliveries.	Hospital delivery is expected to lower infant mortality
Tetanus Toxoid injection	Captures as whether mother received immunization or not.	Children whose mothers are immunized are expected to have lower mortality risks.
Mother's education	The level of education attained by the mother captured as no education, primary, secondary or higher education.	Higher education level is expected to be associated with low mortality levels.