Factors Influencing Higher Child Birth and Population Growth in Bangladesh

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ABSTRACT

Nowadays, developing countries have a higher birth rate than developed countries, which considerably contributes to population growth. With respect to this issue, this study aims to determine the factors influencing higher birth within families. A secondary data has been taken from the Bangladesh Demographic and Health Survey (BDHS), which is one of the biggest public health survey in Bangladesh. The survey was conducted in the year 2011. In this study, the dependent variable of interest was the total children ever born within a family. A number of demographic variables and potential factors were considered as independent variables. The Chi-square test, ordinal logistic regression, correspondence analysis and a number of charts were considered for analytical purposes. The Chi-square test of association was used to identify independent variables having correlation with the dependent variable. Ordinal logistic regression was implemented to find the strength and direction of association. It was found that the inability to read and write, less frequency of watching television, decision making to use contraceptives, unemployment status of women and husbands lower education level were significant factors associated with an increase in childbirth. Moreover, correspondence analysis was used to detect category-wise association. It was seen that women who are unable to read and write usually do not use anything to delay or to avoid getting pregnant. In addition, women who had their first child in their early twenties usually have three or more children within their lifetime spans. From multiple bar charts, it was revealed that working women and educated men both prefer fewer children. Thus, it was concluded that proper education and knowledge regarding family planning can solve the higher population growth problem.

1 INTRODUCTION

The population growth rate is being treated as one of the major common problems in developing countries like Bangladesh. Every year, many children born for various causes or factors related to their place of residence, religion, age, age at first birth, wealth index, literacy rate, work status, husbands educational level, etc. Childbirth at younger ages creates a greater risk of maternal and child mortality [Menken *et al.,* 2003]. If it keeps on accelerating at this alarming rate, it is obvious that this would seriously affect the economic and social development of the country.

Women in rural areas desire more children than women in urban areas [Asaduzza- man and Khan, 2009]. As a result, the family size is growing faster in rural areas compared to urban areas. Religion is another cause of the increasing number of children. Most of the people of Bangladesh are pious but few of them are extremely conservative minded. They think that children are the gift of God. Generally, the mean number of children born is higher among the Muslim women as compared to non-Muslim women in each age cohort [Kabir *et al.,* 2001]. Women who married early have a large probability of having more children than women who married at a late age [Asaduzzaman and Khan, 2009]. Thus the number of children born depends on the factor age at first marriage.

A major difference in the childbearing preference among women depends on their husband's level of education. [Kamal, 2012]. However, according to a new study from the National Center for Health Statistics, Centers for Disease Control and Prevention, a women's educational level is the best predictor of how many children she will have [Mathews and Ventura, 1997]. Married women who have completed secondary education want to stop bearing more children compared with illiterate married women. [Kamal, 2012].

Nowadays, both educated and uneducated women are likely to be employed. A study on the relationship between women's occupation and fertility patterns by the United Nations Development Program (UNDP) showed that women who work in the modern sector tend to have lower fertility than women who work in the traditional agricultural sector as well as women who do not work [Fukuda-Parr *et al.,* 2003]. Rajaretnam (1996) investigated the proximate determinants of fertility decline in Athoor Block of Tamil Nadu state of India, 1959-85. By decomposing the fertility measures he found that the increase in contraceptive use and the

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decrease in the proportions of women married (mainly due to increase in age at marriage) are the two proximate factors contributed to the decline of fertility in Athoor Block [Rajaretnam, 1996]. However, some studies already have done to identify factors related with fertility. Most of the studies have used the number of children alive as a dependent variable instead of the total number of children ever born.

The present study was carried out to investigate the influence of potential factors on higher number of children born within families. Statistical models and charts were used to identify the causes that were likely to be responsible for the childbirth.

Among various types of regression models, ordinal logistic regression was considered as this approach is best to model ordinal dependent variable. To identify the correlation among categories of different variables, correspondence analysis was used. The present work was thus undertaken to evaluate the factors directly or indirectly related to the total number of children ever born.

2. MATERIALS AND METHODS

Source of the Data

Bangladesh Demographic and Health Survey (BDHS) 2011 data were selected for this study. This Survey (BDHS 2011) was conducted by the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. A Bangladeshi research firm, Mitra and Associates implemented this survey.

The BDHS-2011 data were collected under two stages stratified random sampling. In the first stages, each division was subdivided into urban and rural areas. The urban areas of each division were further subdivided into city corporations and non-city corporations. In the first stage, 600 Enumeration Areas (EA) were selected with probability proportional to the EA size and with independent selection in each sampling stratum. In the second stage of the selection, a fixed number of 30 households per cluster was selected with an equal probability systematic selection from the newly created household list. With this design, 16010 residential households were selected and were expected to result in completing interviews with about 18,000 ever married women. Detailed information about the survey can be found in the 2011 BDHS report [NIPORT *et al.*, 2011].

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Ethics approval

Our study is entirely based on an analysis of increasing growth rate obtained from BDHS 2011, which is freely available online with all identifier information removed. The BDHS 2011 was reviewed and approved by the ICF Macro Institutional Review Board and the National Research Ethics Committee of the Bangladesh Medical Research Council. This survey was conducted by the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare and implemented by Mitra and Associates, Bangladesh. The technical assistance for the survey was provided by ICF International of Calverton, Maryland, USA, as a part of its international Demographic and Health Survey program (MEASURE DHS). The U.S. Agency for International Development (USAID) provided financial support to complete the survey.

Variables under Study

In the 2011 BDHS, married women were asked to provide retrospective information about the number of total children ever born. To encourage complete reporting, each woman was first asked about the number of sons and daughters living with her, the number living elsewhere and the number died. They were also asked about their socioeconomic status, educational background, contraceptive usage and intention, their working status and required information about their husbands, etc. [NIPORT *et al.*, 2011].

Various socioeconomic factors have played a crucial role in influencing fertility of Bangladesh. For our study, we considered demographic characteristics, respondent's place of residence, religion, age of respondents, respondents age at first birth, wealth index, literacy, respondents current working status, husbands education level.

Respondents frequency of watching television, awareness about family planning in television in the last few months, the husbands desire of having children, decision maker on using contraceptives, usage of anything ever for delaying or avoiding getting pregnant and fertility preference were considered as potential explanatory variables causing higher birth of children.
Total children ever born within families were categorized as having one child, two children and three or more children.

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Methodology

At first bivariate analysis (chi-square test) was used to discover the specific causes those were related to increasing population growth. Our null hypotheses were "there is no association between total number of children ever born and the specific factors". After identifying the factors which were found significant in the bivariate analysis, an ordinal logistic regression model was used to model the total number of children ever born in a family.

Using Ordinal logistic regression model revealed better fit than multinomial logistic regression model since the dependent variable was classified according to their order of magnitude. The Ordinal logistic regression model has been developed for analyzing ordinal response variables [Anderson, 1984]. Moreover, when there is a need to take several factors into consideration, ordinal logistic regression for ordinal data is the natural alternative [Agresti, 1989].

Ordinal logistic regression:

Logistic regression is a well-known technique for identifying correlates and predicting ordered response variable. Ordinal logistic regression or ordinal regression is used to predict an ordinal dependent variable given one or more independent variables. It will enable us to determine which of our independent variables have a statistically significant effect on the dependent variable of interest [Bursac *et al*. 2008].

$$ln \left(\frac{Prob\ (event)}{1 - prob(event)} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k \qquad (1)$$

The quantity to the left of the equal sign is called a logit. It is the log of the odds that an event occurs. The odds that an event occurs is the ratio of the number of people who experience the event to the number of people who do not. This is what one gets when divides the probability that the event occurs by the probability that the event does not occur since both probabilities have the same denominator and it cancels, leaving the number of events divided by the number of non-events. The coefficients in the logistic regression model tell us how much the logit changes based on the values of the predictor variables.

Correspondence Analysis

Correspondence analysis (CA) is a multivariate statistical technique proposed [Novak, 2004] by Hirschfeld [Hirschfeld, 1935] and later developed by Jean-Paul Benzcri [Benz´ecri, 1977]. It is

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conceptually similar to principal component analysis but applies to categorical rather than continuous data. In a similar manner to principal component analysis, it provides a means of displaying or summarizing a set of data in two-dimensional graphical form. Correspondence analysis is a statistical technique that provides a graphical representation of cross tabulations (which are also known as cross tabs, or contingency tables). This arises whenever it is possible to place events into two or more different sets of categories [Yelland, 2010].

3. RESULTS AND DISCUSSION

Table 1 showed demographic characteristics of respondents. It was seen that 65.6% women were from rural areas and more than 80% were Muslim. The majority of respondents were from age group 21 to 30. More than half of the respondents (58.7%) had their first baby at ages between 16 to 20. Nearly 50% of respondents were being middle and poor socioeconomic classes. The literacy rate was high as 52.3% respondents were able to read the whole sentence. Despite the higher literacy status, very few numbers of respondents (13.4%) were job oriented. In terms of husbands educational level, a few of them were highly educated.

Table 2 indicated the distribution of response variable "Total children ever born". Among the total number of sample which was 16010, nearly 50% respondents had three or more children. Only 23% women had single child and 28% had two children.

Chi-square test of association was performed to identify any association between total children ever born and potential factors. The majority of factors were associated significantly with the total children ever born as shown in table 3.

Table 3 clearly showed, independent variables, literacy, frequency of watching television, heard family planning on television in the last few months, decision maker on contraceptives, respondents working status, anything ever tried, fertility preference, and respondents age at first birth were associated significantly with total number of children ever born within families. Finally, an ordinal logistic regression model was used to regress the dependent variable (categorized as discussed before) using independent variables which were found significant in chi-square test of association. The findings were presented in table 4.

Interpretation of parameters in ordinal logistic regression is not straight forward. Generally, it can

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be said that compared to reference category, categories within factors having positive coefficients are more likely to influence higher number of child birth within families. Such as, respondents who were unable to read and write (illiterate women) were more likely to have a higher number of children compared to literate ones. The factor of hearing about family planning in the last few months was quite insignificant. However, it showed that respondent with less frequency in watching television had higher chances of producing childbirth compared to one who watches television at least once in a week. That might be, people who did not usually watch television were not aware of family planning or the consequences of having a larger family.

Another significant factor was decision makers for using contraceptives. Contraceptives are important in lowering family size regardless the person who is making the decision of using contraceptives. Conversely, women who were not working were more likely to have more children compared to working women. That was probably because; working women might find difficulties to maintain higher number of children besides their job responsibilities, which resulted in the preference of having fewer children.

The husband's education level is identified as contributing factors as expected from [Ka- mal, 2012]. It was found that husbands with no or lower education level provided more priority for higher number of children compared to higher educated partners. Husbands desire for children was not significant in the model.

Test of association between present children and child died was taken under consideration. This might be, the death of children might have influence on parents to take more children due to insecurity. As both variables were of categorical type, chi-square test of association was considered. The test result showed positive association among them.

Figure 1 showed a bi-plot to identify category-wise association between literacy of re-respondents and ever used process to delay or to avoid getting pregnant. It was clear that respondents who cannot read at all usually do not use anything to delay or to avoid getting pregnant. On the other hand, literate people might know traditional or standard procedure to delay or to avoid of getting pregnant.

The association between categories of two factors, total children ever born and respondents age

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at first birth were represented in figure 2. From the plot, it was understandable that women who had first child in their early twenties usually have three or more children, which was also indicated in [Asaduzzaman and Khan, 2009]. This might be, marriage in very early age gives opportunity for a longer fertile period and due to illiteracy, women remain unaware of family planning which results in higher childbirth within the family.

The multiple bar chart (figure 3) showed an overview of the respondents working status and their fertility preference. Fukuda-Parr *et al.* [2003] show the significant contribution of women's employment status that leads similar conclusion in this study. The chart revealed that working women preferred fewer children (35%) whether unemployed women desired of having higher number of children within families (37%). That indicates employment status of women plays an important role in making decisions on total number of children.

Figure 4 presented an overview of husband's education level and their desire for children. The graph visibly indicated that higher educated husbands favored a lower number of children. Conversely, no education and lower education level showed just the opposite.

2 Limitations of the study

As our study had been performed based on BDHS 2011 Data, there might be some differences with the most recent scenario. Moreover the data set of BDHS survey does not distinguish between slum areas and the residential areas. So, these data are not rep- representative for the slum population of urban areas. While the data are designed to be nationally representative, it is possible that there is some sort of bias in the sampling. However, it cannot be proved it to be a potential source of bias since there is no identifier of slum areas in the data. Despite these limitations, we believe that our findings may be helpful to illuminate the association of total number of children with other explanatory variables under study.

4. CONCLUSION

Concerning the population progression, this study is designed to identify potential factors of higher population growth in Bangladesh. Predictive modeling and test of association are performed to discover association from acquired secondary data. Predictive modeling shows, inability to read and write, less frequent of watching television, decision making of using

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contraceptive, unemployment status of women, and husbands lower education level as a significant factor in accelerating family size through higher reproduction.

Correspondence analysis is done to identify category-wise association between variables. From the bi-plot, it is observed, women who are unable to read and write usually do not use anything to delay or avoid getting pregnant. It is also interesting to notice that women, who had first child in their early twenties usually have three or more children. Moreover, multiple bar charts show that working women prefer fewer children. It is also observed that higher educated husbands favor a lower number of children within a family.

Large family size contributes bigger societies which ultimately stimulate population growth. Due to higher population size, a number of problems have been rising including all means of pollution, raise of temperature, deficiency of food in developing countries, and increased rate of crime worldwide. Such problems could gradually be lessened by reducing population size. That could be initiated by identifying the root cause, for instance, larger family size. This study identifies potential causes of higher childbirth within the family. These problems can be solved by ensuring a proper education to men and women focusing particularly in rural areas, making sure the empowerment of women and providing knowledge regarding family planning and health care.

Regarding the awareness of family planning, a number of steps are needed to take under consideration. As Bangladesh is a developing country, more than 50% people live below the poverty line and most of them are not in touch with social media. This might be the reason that, medium of awareness, for example newspaper, television and radio might not have a fruitful effect in terms of educating people on family planning. In this study, it is observed 67% of respondents do not watch television and 22% watch television less than once a week.

Concerning the current situation, alternative steps might be taken by governmental and non-governmental organizations. For example, door to door training facilities on family planning might be instigated by volunteers or employees of government and non-government organizations. Such volunteers might educate the respondents regarding the consequences of having a larger family, proper age of girls to get married, procedures of taking contraceptives. It is also required to let them know how important it is when women work and make financial contribution toward

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the family.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Table 1: Demographic characteristics of respondents

Place of residence	Number of respondents	Percentage
Urban	5515	34.4
Rural	10495	65.6
Religion		
Islam	14202	88.7
Hinduism	1731	10.8
Buddhism	32	.2
Christianity	45	.3
Age of respondents		
10-20	1564	9.8
21-30	6259	39.1
31-40	4886	30.5
41-50	3301	20.6
Respondents age at first birth		
10-15	3813	23.8
16-20	9400	58.7
21-25	2271	14.2
26-30	432	2.7
31-35	80	.5
36-40	14	.1
Wealth index		
Poorest	2871	17.9
Poorer	3000	18.7
Middle	3070	19.2
Richer	3340	20.9
Richest	3729	23.3
Literacy		
Cannot read at all	5955	37.2
Able to read only parts of	1672	10.4
Able to read whole sentence	8375	52.3
No card with required language	1	.0
Blind/visually impaired	7	.0
Respondents currently working		
No	13870	86.6
Yes	2140	13.4
Husbands education level		
No education	4889	30.5
Primary	4379	27.4
Secondary	4490	28.0
Higher	2252	14.1

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Table 2: Distribution of response variable

	Number of respondents	Percentage
Total children ever born		
Having two children	4513	28.2
Having three or more	7810	48.8

Table 3: Variables associated with higher childbirth

Factors	p value
Literacy	0.000
Frequency of watching TV	0.000
Heard family planning in TV last few months	0.000
Husbands desire	0.207
Decision Maker on contraceptives	0.000
Respondents working status	0.000
Anything ever tried	0.025
Fertility preference	0.000
Respondents age at first birth	0.000

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Table 4: Parameter estimates of ordinal logistic regression model

	Estimates	Standard Errors	p value
Response Variable			
Total child ever born in a family			
Having one child	-13.97	0.226	0.000
having two child	-11.49	0.219	0.000
Independent variables			
Literacy			
Cannot read	0.925	0.091	0.000
Able to read parts of sentence Able to read whole sentence (ref)	0.428	0.113	0.000
Heard family planning on last few months			
No	-0.131	0.085	0.122
Yes (ref)			
Frequency of watching tv			
Not at all	0.671	0.086	0.000
Less than once a week	0.224	0.114	0.050
At least once a week (ref)			
Decision maker for using contraception			
Mainly respondents	-11.38	0.107	0.000
Mainly husband, partner	-11.62	0.138	0.000
Joint decision Other (ref)	-11.54	0.162	0.000
Respondents currently working			
No	0.495	0.097	0.000
Yes (ref)			
Husbands education level			
No education	0.741	0.122	0.000
Primary	0.524	0.108	0.000
Secondary Higher (ref)	0.273	0.101	0.007
Husbands desire for children			
Both want same	0.143	0.128	0.264
Husband wants more Husband wants fewer (ref)	0.147	0.158	0.351

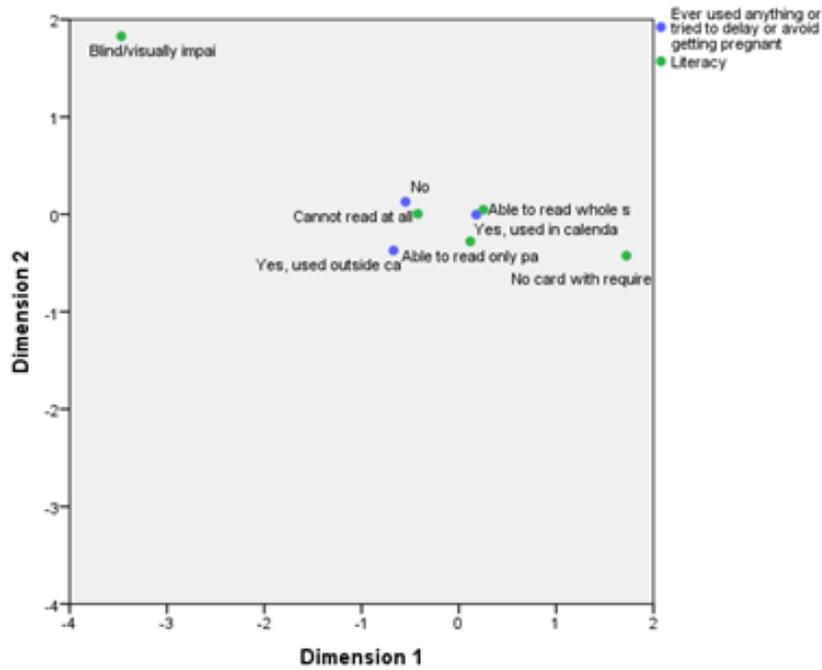*Citation: Mst Noorunnahar et al. Ijsrm.Human, 2016; Vol. 4 (4): 308-322.*

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Figure 1: This figure shows association among categories of literacy and ever used process to delay or avoid of getting pregnant.
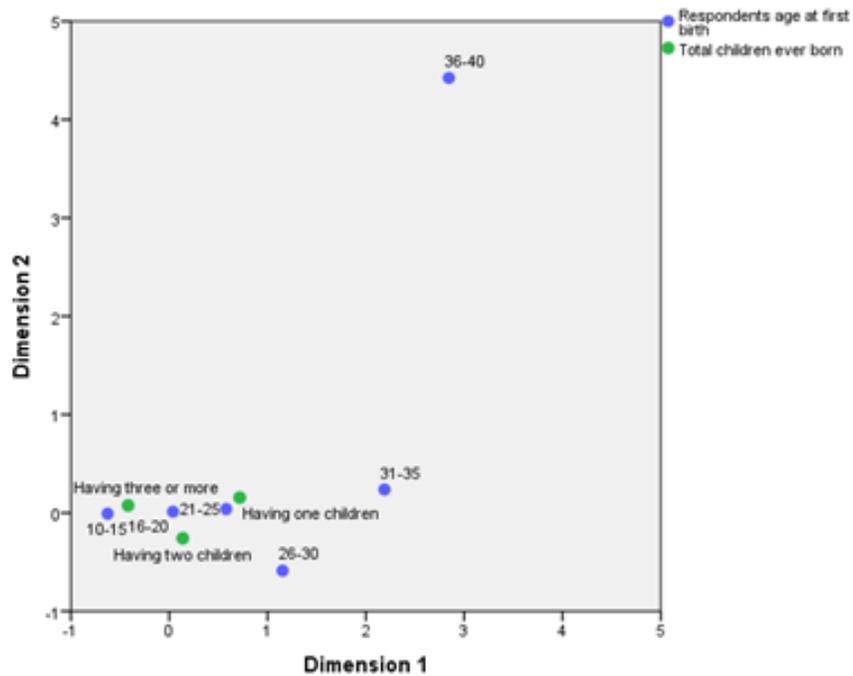

Figure 2: This figure shows association among categories of total children ever born and respondent's age at first birth

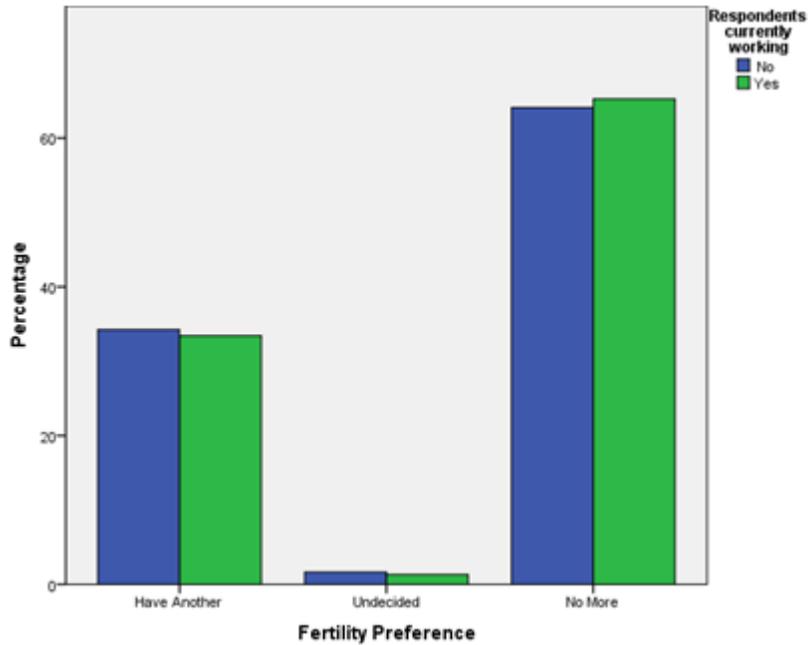*Citation: Mst Noorunnahar et al. Ijsrm.Human, 2016; Vol. 4 (4): 308-322.*

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Figure 3: This figure shows overview of respondents working status and fertility preference.
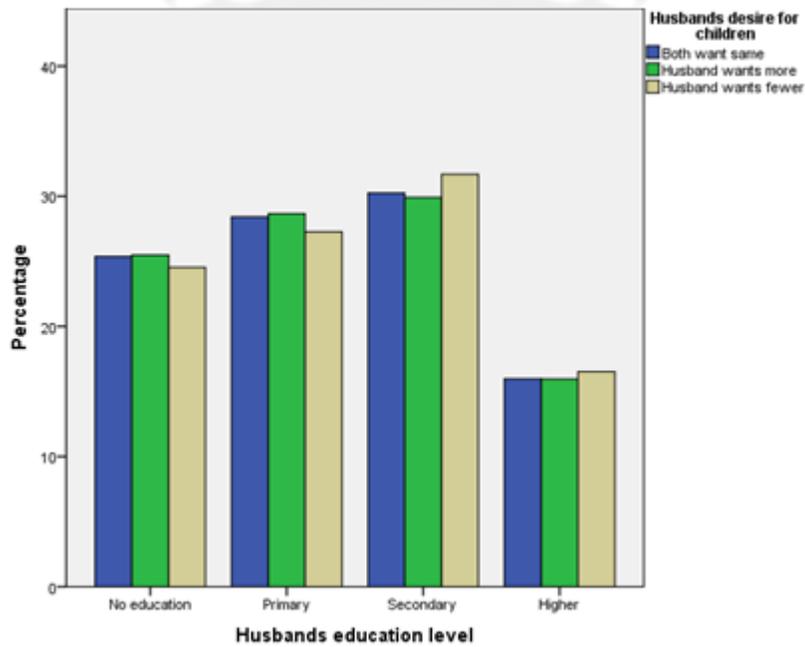

Figure 4: This figure shows overview of husband's education level and their desire for children.

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