DETERMINANTS OF VOLUNTARY CHILDLESSNESS AMONG WOMEN IN MYANMAR

Win Naing Oo[1]

Abstract

This study aims at investigating social, economic and demographic determinants of voluntary childlessness in Myanmar. The data used in this study were secondary data obtained from the Myanmar Demographic and Health Survey (MDHS, 2015-16). The weighted samples of currently married women were 7759 but only 283 voluntary childless women among them were included in this study. Firstly, descriptive statistics was used to point out social, economic and demographic characteristics for currently married women and voluntary childless women in Myanmar. Yangon Region and Rakhine State were showed as the highest percentage of voluntary childlessness. Then, the Pearson Chi-square test was applied to examine the association between social, economic and demographic characteristics and voluntary childlessness. Educational attainment of women and their husbands, woman's employment status, occupation of women and their husbands, wealth quintile, woman's age, husband's age, age at first marriage, marital duration and place of residence were independent variables. There were significantly related to voluntary childlessness. In addition, binary response model such as complementary log-log model was applied to investigate social, economic and demographic determinants of voluntary childlessness. Based on the findings, woman's educational attainment, husband's educational attainment, woman's employment status, woman's occupation such as skilled manual and unskilled manual, fourth and highest wealth quintiles, age at first marriage and place of residence were more likely and significant determinants to be voluntary childlessness. Woman's age, husbands at age groups except (35-39), marital duration for 5-9 years were significant determinants and less likely to be voluntary childlessness.

Keywords: Voluntary Childlessness, Pearson Chi-square, Complementary log-log model

Introduction

Childlessness is one of the main challenges of modern society. Childlessness has caused many psychological, physical, emotional and social problems such as broken family, depression and marital conflicts. Childlessness and infertility problem cause for decline in fertility rate and that are forgotten issues in reproductive health programs in many countries. The fertility of women in developing countries is higher on average than in developed countries, yet many women in developing countries remain childless (Baudin et al., 2017). Level of childlessness (both voluntary and involuntary) in the population influenced on the fertility levels of any population and it plays an important role in determining the levels and differentials of fertility (Jones, G.W. 2007). Childlessness is factors that result in low birth rates and population decline, which are associated with diminishing labor force and rising proportions in older ages.

Over the past decade, voluntary childlessness has emerged as subject of study by demographers, family sociologists, and psychologists. Although the increasing number of studies that have been done, nationally representative studies of voluntary childlessness are rare (Mosher and Bachrach,1982).There is a survey of conducting on demographic and health characteristics of 12885 ever-married women in Myanmar and what is called Myanmar Demographic and Health Survey (MDHS, 2015-16). Especially, information on voluntary childlessness such as currently married women, birth order, contraceptive use, marital duration, age at first marriage can be obtained from this survey. There have been studies in detail on childlessness in Myanmar, especially from the psychological and epidemiological perceptive. There is no specific study concerning the voluntary childlessness in Myanmar. Therefore, this study intends to analyze the Socio-economic and demographic factors affected on voluntary childlessness among currently married in Myanmar based on data obtained from MDHS (2015-16).

[1] Department of Applied Statistics, Yangon University of Economics

Literature Review

Rogers (1986) studied to review the empirical research literature on voluntary childlessness and to develop a model of the childless decision. These include lifestyle and demographic characteristics such as place of residence, education level, occupation, income, age at marriage and length of marriage. Social factors include social norms, sanctions, and the Women's Movement. Krishnan (1993) determined the influence of religious affiliation, religious homogamy, religiosity, and religious marriage on voluntary and temporary childlessness and to compare childlessness patterns among Canadian-born and foreign-born women. Multivariate analysis found that age, marriage age, education, and husband's income were statistically significantly related to voluntary childlessness. Chancey (2006) studied on voluntary childlessness since the waning of the baby boom provide cross-sectional estimates for a single time period. It was found that voluntary childlessness stayed relatively constant through the seventies and eighties, but showed a large increase from the mid-nineties to 2002. This study showed that voluntary childlessness increased in recent years because baby-boomers postponed childbearing until they no longer desired it, and younger women born in the seventies are now deciding to remain childless earlier. Tanturri (2006) pointed out determinants on childlessness in Italy by using logistic regression model. A weighted multinomial logit model is used to contrast "voluntary childless men (or women)" with other categories: the "un-voluntary childless" and fathers (or mothers). Results were found that voluntary childlessness is a common behavior among men and women, but its determinants partly differ, with particular regard to socio-economic status. The result indicated that voluntary childlessness among men associated with poor education, poor health and the unemployed. Conversely, women would have more chance to be voluntary childless when women possess a university degree and a managerial position. Soe (2008) investigated in a suburban Buddhist community in Yangon, Myanmar to find out cultural beliefs and gender norms which affects the life of childless women in contemporary Myanmar society. It was found that childless women in Myanmar society suffer from gender norms, cultural beliefs, economic problems and social problems throughout the life. It was also found that some women did not know modern fertility technologies and cannot access to these. All women were suffering from expectations from their society and families. Poston and Cruz (2010) analyzed childlessness among White, Black and Hispanic women in the U.S. The data from the 2006-08 National Survey of Family Growth to examine the degree of voluntary, involuntary, and temporary childlessness among the women were used. It was found that an important predictor of whether a woman was childless (in any of the three categories) versus having children was her level of education. The higher her level of education, the more likely she was to be in one of the childless categories, as opposed to being chided. Also, never married women are much more likely than currently married women to be childless (in any of the three categories) than to have children. Waren & Pals (2013) argued that childlessness among women has been well researched, but much of that data does not apply to men. It was found that traditional sex role belief decreases the probability of being voluntarily childless in both men and women. Avison and Furnham (2015) found the association between personality and childbearing motivation, with a focus on voluntary childlessness.

Descriptive analysis was carried out to identify the social, economic and demographic characteristics that have an influence on the voluntary childlessness and spatial variation of childlessness in Myanmar. Pearson's Chi-square test was used to describe the association of socio-economic and demographic characteristics with voluntary childlessness. Regression model utilizing the binary response variables, such as complementary log-log regression models was used to explore the influencing factors of voluntary childlessness among Currently Married Women (CMW) in this study.

Data and Methods

Data

The secondary data from Myanmar Demographic and Health Survey (2015-16) was used to study the childless women in Myanmar. Although data on 12885 ever married women were available from the MDHS (2015-16), this study limited to 7870 currently married women of them. To obtain nationally representative estimates, sampling weight was applied and the final weighted samples include 7759 CMW aged (15-49).

Description of Variables

To account for the influence of voluntary childless of women, the description of eleven independent variables is used in this analysis. The description and classification of a dependent variable and independent variables (social, economic and demographic factors) are presented in Appendix Tables (1).

Statistical Methods

In this section, statistical methods that were used in this study were shown in following sections.

Chi-Squared Association Test

The data can be displayed in a contingency table where each row represents a category for one variable and each column represents a category for the other variable. Pearson's chi-square statistic is used to test if there is a significant relationship between two nominal (categorical) variables. This statistic is very helpful for identifying the extent to which two categorical variables are associated (Beh & Lombardo, 2014).This test requires large sample sizes to be accurate. An often-quoted rule of thumb regarding sample size is that none of the expected cell values should be less than five. The null hypothesis for this test is that there is no relationship between two variables. The alternative hypothesis is that there is a relationship between the two variables. Pearson's chi-square test statistic follows an asymptotic chi-square distribution with (R–1) (C–1) degrees of freedom when the row and column variables are independent. It is calculated as

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

O_{ij} = observed frequencies

E_{ij} = expected frequencies = $\frac{\sum_{k=1}^{c} O_{ij} \sum_{k=1}^{r} O_{kj}}{N}$

$\sum_{k=1}^{c} O_{ij}$ = Sum of the observed frequencies for ith column

$\sum_{k=1}^{r} O_{kj}$ = sum of the observed frequencies for kth row

N = total number of observations

The critical value for the chi-square statistic is determined by the level of significance (typically .05) and the degrees of freedom. If the observed chi-square test statistic is greater than the critical value, the null hypothesis can be rejected.

Complementary Log-Log (Clog-Log) Regression Model

Clog log regression is typically used when the dependent variable is binary response and the independent variables are either continuous or categorical. There are situations, however, where the response variable is qualitative.

After estimating the Clog log regression model parameters using the maximum likelihood estimator, there is a need to assess the significance of the variables with regards to predicting the response variable. There are a number of statistical methods that can be used to carry out the assessment which include Omnibus test, Hosmer-Lemeshow goodness of fit test, likelihood ratio test, Wald test. These test statistics are distributed as chi-square with degrees of freedom equal to the number of predictors.

Complementary Log-log Model and Transformation

Complementary log-log model says $\log\{-\log[1-\pi(x)]\} = X'_{p\times n}\beta_{p\times 1}$. The expression on the left-hand side is called the complementary log-log transformation.

Like the logit and the probit transformation, the complementary log-log transformation takes a response restricted to the (0, 1) interval and converts it into something in $(-\infty,+\infty)$ interval. The log of 1-π (x) is always a negative number. This is changed to a positive number before taking the log a second time. The model can be write down like,

$\pi(x) = 1-\exp\left[-\exp\left(X'_{p\times n}\beta_{p\times 1}\right)\right]$.

$\log\{-\log\{1-\pi(x)\} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k$

$-\log\{1-\pi(x)\} = \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)$ (3.1)

Omnibus Tests

Omnibus tests are a kind of statistical test. It is needed to test whether the explained variance in a set of data is significantly greater than the unexplained variance, overall. In addition, Omnibus test as a general name refers to an overall or a global test. Other names include F-test or Chi-Squared test. Omnibus test as a statistical test is implemented on an overall hypothesis that regarding coefficients $\beta_1 = \beta_2 = \ldots = \beta_k = 0$ vs. at least one is not equal to zero in multiple linear regression or in logistic regression. Usually, it tests more than two parameters of the same type and its role is to find general significance of at least one of the parameters involved.

The Likelihood Ratio Test

Likelihood Ratio (LR) uses maximum likelihood estimation to compute the coefficients for the LR equation. The method of maximum likelihood estimation chooses values for parameter estimators (regression coefficients) which make the observed data ―maximally likely. Standard errors are obtained as a by-product of the maximization process. The statistic is given by:

$-2\log\left[\frac{L_0}{L_1}\right] = -2\left[\log(L_0) - \log(L_1) = -2(l_0 - l_1)\right.$ (3.2)

where, l_0 is the maximum value for the likelihood function of a simple model and, l_1 is the maximum value for the likelihood function of a full model. (Hosmer and Lemeshow, 2013).

Akaike Information Criterion (AIC)

AIC is one of the model selection criteria, (Clayton et al., 1986). AIC is defined as:

$AIC = -2\ln(L) + 2p$ (3.3)

where L: maximized value of the likelihood function for the estimated model.

p: number of parameters in the model.

When comparing competing models fitted by maximum likelihood to the same data, the smaller the AIC, the better the fit, (Lawal, 2003).

Bayesian Information Criterion (BIC)

The Bayesian information criterion(BIC), proposed by Schwarz and hence also referred to as the Schwarz information criterion and Schwarz Bayesian information criterion, is another model selection criterion based on information theory but set within a Bayesian context (Clayton et al., 1986). The BIC is computed as follows:

$$\text{BIC} = -2 \log L(\hat{\theta}) + k \log n \qquad (3.4)$$

The best model is the one that provides the minimum BIC.

Wald Test

The Wald statistic can be used to assess the contribution of individual predictors or the significance of individual coefficients in a given model. The formula for computing the Wald statistic is

$$\text{W} = \frac{\hat{\beta}_i}{SE\ (\hat{\beta}_i)} \qquad (3.5)$$

Where $\hat{\beta}_i$ is the estimate of the coefficient of the independent variable X_i and SE ($\hat{\beta}_i$) is the standard error of $\hat{\beta}_i$. The Wald statistic is chi-square distributed with 1 degree of freedom. The null hypothesis is rejected if the p-value of the test is less than α significant level and it implies that the variable is important in the model.

Odds and Odds Ratio

The odds of success are the probability of success (p) divided by the probability of failure (1-p). In proportional odds model, the outcome variable is ordered with multiple levels, and the odds of being at or below a particular category($\text{Y} \leq m$). The odds of being at or below a category in Ordinary likelihood Ratio (OLR) equals the probability of being at or below a category divided by the probability of being above that category:

$$Odds\ (\text{Y} \leq m) = \frac{\Pr(\text{Y} \leq m)}{\Pr(\text{Y} > m)}. \qquad (3.6)$$

Since the probability of being at or below a category and the probability of being above that category is complementary, $\Pr(\text{Y} \leq m) + \Pr(\text{Y} > m) = 1$. This equation (3.28) can be rewritten as:

$$Odds\ (\text{Y} \leq m) = \frac{\Pr(\text{Y} \leq m)}{1 - \Pr(\text{Y} \leq m)}. \qquad (3.7)$$

It can be remarked that the odds of being at or below a category *m* in OLR equals the probability of being at or below a category divided by its complementary probability, 1 minus the probability of being at or below that category. The probability of being at or below a category $\Pr(\text{Y} \leq m)$ is the cumulative probability since it equals the sum of the probabilities of all categories at or below that category:

$$\Pr(\text{Y} \leq m) = \Pr(\text{Y} = 1) + \Pr(\text{Y} = 2) + \cdots + \Pr(\text{Y} = m) \qquad (3.8)$$

when $m = 1,2, \ldots, \text{M}$.

The odds of being at or below a category in OLR are also called the cumulative odds. The cumulative odds in OLR are basically comparisons between two complementary probabilities (Xu and Long, 2005). The odds ratio in OLR is the change in the odds (i.e., the odds of being above a particular category versus being at or below that category) for a one-unit increase from any value of *x* to the value of (*x* +1), and it is an exponentiated logit coefficient, exp (β). In contrast, the odds of being at or below a particular category is the inverse of the odds of being above that category. It is the exponentiated logit coefficient with a negative sign before that (i.e., exp(-β)).

Findings

Descriptive Statistics

There are a total of 7759 currently married women. The fact that there are 283 (3.6%) voluntary childless women but 7476 (96.4%) women are not voluntary childless women is , Appendix Table (2). The percentage of the currently married women who have completed primary educational level is 47.1%, followed by 29.5% for secondary educational level, 15.4% without any educational attainment and 8.0% in higher educational level**.** Similarly, the percentage of husbands who have attained primary educational level 41.3%, followed by 37.6% in secondary educational level, 14.8% without any educational attainment and 6.3% in higher educational level. There are 36.4% are unemployed women and 63.6% of CMW are employed women. Regarding women's occupation, the percentage of CMW who are not working is 29.3%, followed by 25.6% unskilled manual, 17.5% sales, 9.6% agricultural-self-employed, 5.9% skilled manual, 5.7% agricultural employee. The percentages of currently married women for the rest types of occupation are less than 5%. According to husband's occupation, it shows that minority of husbands (38%) are unskilled manual, followed by 19.5% skilled manual and 18.1% agricultural-self-employed. The percentages of husbands for the rest types of occupation are less than 10%. In relation to wealth quintile, 19.2%, 20.9%, 20.4%, 20.0% and 19.5% are the lowest, second, middle, fourth, and highest wealth quintiles, respectively. The percentages of currently married women with age groups 15-19, 20-24, 25-29, 30-34, 35-39 and 40 and above are 2.9%, 10.7%, 16.2%, 19.4%, 19.1% and 31.7%, respectively. Then, the percentage of husbands with age groups under 25, 25-29, 30-34, 35-39, 40-44 and 45 and above are 8.7%, 14.0%,17.7%, 18.5%, 16.9% and 24.2% respectively. The percentages of women aged at first marriage are 46.9% at 15-19 years, 34.8% at 20-24 years, 12.2% at 25-29 years and 6.1% at 30 years and above. The percentage of women who got married under 5 years is 19.2% and it is the largest percentage. The percentage of those women by marital duration 5-9 years, 10-14 years, 15-19 years, 20 years and above are 18.5%, 17.9%, 17.3% and 27.1%. Regarding the place of residence, the percentage of currently married women who lived in rural area is 73.9% and that of women who live in urban is 26.1%. The descriptive statistics of social, economic and demographic characteristics and voluntary childlessness are shown in the following Appendix Table (2).

Bivariate Analysis

Pearson's Chi-square test was used to find the association of demographic and socioeconomic characteristics, and voluntary childless. The relationship between social, economic and demographic characteristics and voluntary childlessness is analyzed using the Chi-square test and the results are shown in the following Appendix Table (3). It has been found that all socio-economic and demographic variables are statistically significant at the 1% level. It can be said that there is association between voluntary childlessness and all socio-economic and demographic variables.

Analysis of Complementary Log-Log Regression Model

The overall model fitting information for the complementary log-log regression model is given in Appendix Table (4). Omnibus test of model coefficient shows that the inclusion of eleven independent variables yields a Chi-square value of 1009.10, with 38 degrees of freedom, P-value = 0.000. Therefore, the overall model is statistically significant, which means that adding the eleven explanatory variables to the model have significantly increased ability to predict whether the factors influenced on childlessness situation. The result of Cox and Snell R-square, 0.4194 indicates a reasonable fit of the model to the data. This shows that 41.94% of the variation in childless women or not can be explained by socio-economic and demographic characteristics. Since -2 log likelihood statistic is 711.1132, it can be said that the existence of a relationship

between the independent variables and the dependent variable is supported. The results of the AIC and BIC are 1500.226 and 1772.088, respectively.

The independent variables such as educational attainment of women and their husbands, woman's employment status, woman's occupation (skilled manual and unskilled manual), the fourth and the highest wealth quintiles, woman's age, husband's age group (25-29, 30-34, 35-39), age at first marriage, marital duration (5-9) years and place of residence are statistically significant characteristics on childlessness.

The coefficient of woman's educational attainment is positively related to childlessness. The odds ratio of primary educational attainment suggests that women who have attained primary educational level are 1.79 times more likely to be childlessness as compared to no educated women and it is statistically significant at 10% level. A 95% confidence interval suggests that magnitude of the effect can be increased from 0.91 times to 3.54 times. The odds ratios for secondary and higher educational attainments are 2.18 times and 2.28 times more likely to be childlessness compared to no educated women. The coefficients for secondary and higher educational attainment are statistically significant at 5 % level. The 95 % confidence intervals suggest that magnitude of the effect can be increased from 1.09 times to 4.35 times in secondary educational level and from 1.00 times to 5.14 times in higher educational level.

The coefficient of husband's educational attainment is positively related to childlessness. The odds ratio of primary educational attainment suggests that husbands who have attained primary educational level are 1.92 times more likely to be childlessness as compared to no educated husbands and it is statistically significant at 10% level. A 95 % confidence intervals suggest that magnitude of the effect can be increased from 0.93 times to 3.96 times. The odds ratios of secondary and higher educational attainments are 2.45 times and 2.95 times more likely to be childlessness compared to no educated husbands. The coefficients for secondary and higher educational attainment are statistically significant at 5% level. The 95 % confidence intervals suggest that magnitude of the effect can be increased from 1.19 times to 5.06 times in secondary educational level and from 1.24 times to 6.98 times in higher educational level.

The coefficient of woman's employment status has positive relation with childlessness and statistically significant at 5% level. The odds ratio of employed women is 1.50 times more likely to be childlessness as compared to unemployed women. A 95% confidence interval suggests that magnitude of the effect can be increased from 0.99 times to 2.27 times.

Regarding woman's occupation, the odds suggest that women who work in skilled manual are 1.65 times more likely to be chance for childlessness as compared to not working women and it is statistically significant at 10% level. A 95 % confidence interval for skilled manual suggests that magnitude of the effect can be increased from 0.95 times to 2.88 times. Women who are unskilled manual are 1.70 times more likely to have the chance for childlessness as compared to not working women and it is statistically significant at 5% level. A 95 % confidence interval for unskilled manual suggests that magnitude of the effect can be increased from 1.02 times to 2.84 times.

In wealth quintile, the coefficients of the fourth and highest quintiles are positively related to childlessness and statistically significant at 5% level and 10 % level. The odds ratio suggests that the fourth quintile women are 51% and the highest quintile women are 42% more likely to be chance for childlessness as compared to the lowest women. The 95 % confidence intervals for fourth and highest quintiles suggest that magnitude of the effect can be increased from 1.00 times to 2.28 times and from 0.97 times to 2.07 times.

Woman's age is statistically significant at 1% level and it is negatively related to childlessness. The odds ratio suggests that women age (20-24) is 76% less likely to be childlessness as compared to women age (15-19). A 95% confidence interval is recommended to reduce the efficiency level from 63% to 85%. The odds ratio suggests that women age (25-29) is 96% less likely to be childlessness compared with women age (15-19). A 95% confidence interval is

recommended to reduce the efficiency level from 92% to 98%. The odds ratio suggests that women age (30-34) are 99.4% less likely to be childlessness compared with women age (15-19). A 95% confidence interval is recommended to reduce the efficiency level from 98.11% to 99.81%. The odds ratio suggests that women age (35-39) is 99.47% less likely to be childlessness compared with women age (15-19). A 95% confidence interval is recommended to reduce the efficiency level from 97.82% to 99.87%. The odds ratio suggests that women's age 40 and above is 99.93% less likely to be childlessness compared with women age (15-19). A 95% confidence interval is recommended to reduce the efficiency level from 99.33% to 99.99%.

In husband's age, an odd ratio suggests that husbands aged (25-29) is 32% less likely to be childlessness as compared to husbands aged (under 25). It is negatively related to childlessness and statistically significant at 5% level. A 95% confidence interval is recommended to reduce the efficiency level from 7.8% to 49.55%. The odds ratio suggests that husbands aged (30-34) is 38% less likely to be childlessness compared with husbands aged (under 25). It is negatively related to childlessness and statistically significant at 5% level. A 95% confidence interval is recommended to reduce the efficiency level from 5.19% to 59.67%. The odds ratio suggests that husbands aged (35-39) is 69% less likely to be childlessness compared with husbands aged (under 25). It is negatively related to childlessness and statistically significant at 1% level. A 95% confidence interval is recommended to reduce the efficiency level from 32.29% to 85.59%.

Age at first marriage is statistically significant at 1% level and it is positively related to childlessness. The odds ratio suggests that women who got marriage at age groups (20-24, 25-29 and 30 and above) are 4.02, 17.35 and 45.53 times more likely to be childlessness compared to women who got marriage at age 15-19 respectively. A 95% confidence interval suggests that magnitude of the effect can be increased from 2.62 times to 6.20 times for age 20-24. A 95% confidence interval suggests that magnitude of the effect can be increased from 8.40 times to 35.82 times for age 25-29. A 95% confidence interval suggests that magnitude of the effect can be increased from 13.22 times to 156.84 times for age 30 and above.

The coefficient of 5-9 years' marital duration is statistically significant at 1% level and it is negatively related to childlessness. The odds ratio suggests that women who have 5-9 years' marital duration are 68% less likely to be childlessness compared to women who have under five years' marital duration. A 95% confidence interval suggests that magnitude of the effect can be anywhere from a 40.34% decrease to a 83.21% decrease.

The coefficient of urban place of residence is statistically significant at 1% level and it has positively related to childlessness. The odds ratio suggests that woman who live in urban areas are 1.53 times more likely to be childlessness compared with women who live in rural areas. A 95 % confidence interval proposes that magnitude of the effect can be increased from 1.11 times to 2.09 times.

Discussions

This study indicates prevalence of voluntary childlessness among currently married women in Myanmar. In this study, the higher educational attainment is significant effect on voluntary childlessness. Most of childless women tend to progress their life careers as first priority whereas they also believe in being higher the educational level which can support the better job opportunities to be got in their life. Many women who pursue an advanced education delay or postpone marriage and childbearing until their education is complete. If the occupation of the husband and/or wife becomes more important and satisfying than the prospects of having children, they may continue postponement of childbearing. Besides, their income is usually spent in promoting of their skills than in rearing their children. Although some educated women with job tend to be better in growing up their children, particularly their education and health, they cannot spend a lot of time on their children. These women can be found in working status such as skilled manual occupation. In this study, rich women who have fourth and highest wealth quintiles can be found as voluntary childless women. The older women have less chance to be

voluntary childlessness compared with the younger women because the latter may focus on their education, jobs and they cannot look after their children well. However, they may be willing to have child at the time they are ready for that. Therefore, this type of childlessness is known as temporarily childlessness. It is obvious that a woman who marries late has fewer fertile years of marriage. The older women at first marriage may take less responsibility on rearing their children and also, other effects of these women's physical and mental health are crucial to take into account for having children. Another factor of childlessness among women in this study is marital duration of couples. It can be noted that many couples mainly emphasize on standing their life without any help from other people and trying hard to promote their skills and wages to be having children above five years of marital duration. Urban communities may be more favorable to voluntary childlessness than rural areas because there are availability of better medical care, a higher standard of living and more chance to get contraceptive methods easily compared to rural areas. Moreover, women do not tend to have any children due to insufficient time and income to be spent on rearing their children and extra person who cares their children. As contrast, some of the reasons such as woman's age less than 25 year and marital duration less than 5 years towards to be voluntary childlessness may cover only for short term. It may lead to be temporarily childlessness among these women.

Recommendations and Suggestions

Childlessness and infertility are forgotten issues in reproductive health programs in Myanmar. The limitation of this study was the difficulty in reaching voluntarily childless women and voluntary childlessness which is only viewed from a women’s perspective. It is also recommended that survey based on childlessness should be conducted to provide much more information and an assessment should be made on how the decision of childlessness is reflected in the relationship between spouses. One of the important factors for postponement childbearing and voluntary childlessness is to keep maintains achieving higher education. It is also important that young couple become aware of the relationship between age and fecundity and biological risks of postponing motherhood due to causing higher involuntary sterility as the result of the longer postponements. Understanding the factors and attitudes of childless people and couples in our society might encourage society to prepare for this growing population of childlessness which has many advantages and disadvantages for society as a whole. It is also recommended more research should be needed to study with other important measurable variables or factors in considering the rise in childlessness.

Acknoledgements

I am extremely grateful to everyone who has made even a single step along the way with me. First of all, I owe my gratitude to Dr. Tin Tin Htwe, Rector of Yangon University of Economics. I am extremely grateful to Professor Dr. Cho Cho Thein, Pro-rector of Yangon University of Economics. I also sincere thank Pro-rector who render her help during the period of my thesis work. I would also like to extend my gratitude to Professor Dr. Aye Thida, Head of Department of Statistics, for instructing the key courses which enhanced my academic understanding of the subject. I would like to express my indebtedness to Professor Dr. Hlaing Hlaing Moe, Head of Department of Applied Statistics, Yangon University of Economics, for her valuable suggestions, helpful advices and recommendations to improve my thesis. I would like to express my heartfelt appreciation to my wife, Daw Thida Win, Associate Professor, Department of Statistics, Yangon University of Economics for her support and encouragement throughout this paper.

References

Avison, M., & Furnham, A. (2015). Personality and voluntary childlessness. Journal of Population Research, 32, 45-67.

Baudin, T., De La Croix, D., & Gobbi, P. E. (2015). Fertility and childlessness in the United States. American Economic Review, 105(6), 1852-82

Chancey, L. (2006). Voluntary childlessness in the United State: recent trends by cohort and period. Louisiana State University and Agricultural and Mechanical College.

Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). Applied logistic regression. John Wiley & Sons.

Jones, G. W. (2007). Delayed marriage and very low fertility in Pacific Asia. Population and development review, 33(3), 453-478.

Krishnan, V. (1993). Religious Homogamy and Voluntary Childlessness in Canada. Sociological Perspectives, 36, 83-93.

Ministry of Health and Sports and ICF . (2017). Myanmar Demographic and Health Survey: 2015-16.

Ministry of Health and Sports and ICF . (2017). Myanmar Demographic and Health Survey: 2015-16. Nay Pyi Taw, Myanmar and Rockville, MD, USA: Ministry of Health and Sports, and ICF

Mosher, W. D., & Bachrach, C. A. (1982). Childlessness in the United States: Estimates from the National Survey of Family Growth". Journal of Family Issues,3, 517-543.

Poston, J., & Cruz, C.E (2010).Voluntary, Involuntary and Temporary Childlessness in the United States,Department of Sociology,Texas A& M University,College Station, Texas 77843

Jones, G. W.(2007). Delayed marriage and very low fertility in Pacific Asia. Population and development review, 33(3), 453-478.

Roger, L. (1986). Voluntary childlessness:A review of the literature and a model of the childlessness Decision. Montana State University,Bozeman, Montana.

Soe, M. M. (2008). Sufferings from Expectations: Lives of Married Childless Women in a Semi-Urban Myanmar Community. Mahidol University.

Tanturri, M., & Mencarini, L. (2006). "Childless or childfree? Paths to voluntary childlessness in Italy". Population and development review, (34).

Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). Applied logistic regression. John Wiley & Sons.

Waren, J. E., & Pals, H. (2013). Comparing characteristics of voluntary childless men and women. Journal of Population Research, 30(2), 151-170.

Lawal, B., & Lawal, H. B. (2003). Categorical data analysis with SAS and SPSS applications. Psychology Press.

Appendix Table (1) Description of Variables

Variables	Definition	Coding
Childlessness	Childlessness is defined as currently married woman with no living children and uses any contraceptive method.	0 = Not childless woman (Reference) 1 = Childless woman
Woman's educational attainment	Highest level of education for woman	1 = No education (Reference) 2 = Primary 3 = Secondary 4 = Higher
Husband's educational attainment	Highest level of education for husband	1 = No education (Reference) 2 = Primary 3 = Secondary 4 = Higher
Woman's employment status	Woman who were employed in the 7 days before the survey	1 = Unemployed (Reference) 2 = Employed
Woman's occupation	Occupation refers to types of job.	1 = Not working (Reference) 2= Professional/technical/managerial 3 = Clerical/Sales/Services/Domestic service 4 = Agriculture 5 = Skilled manual 6 = Unskilled manual
Husband's occupation	Occupation refers to types of job.	1= Professional/technical/managerial (Reference) 2 = Clerical/Sales/Services/Domestic service 3 = Agriculture 4 = Skilled manual 5 = Unskilled manual
Wealth quintile	Households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, plus housing characteristics such as source of drinking water, toilet facilities, and flooring materials. These scores are derived using principal component analysis.	1 = Lowest(Reference) 2 = Second 3 = Middle 4 = Fourth 5 = Highest
Woman's age (Years)	Completed years of woman's age	1 = 15-19(Reference) 2 = 20-24 3 = 25-29 4 = 30-34 5 = 35-39 6 = 40-49
Husband's age (Years)	Completed years of husband's age	1 = Under 25(Reference) 2 = 25-29 3 = 30-34 4 = 35-39 5 = 40-44 6 = 45 and above
Age at first marriage (Years)	Age of woman who has firstly got married	1 = 15-19 (Reference) 2 = 20-24 3 = 25-29 4 = 30 and above

Appendix Table (1) (Continued)

Variables	Definition	Coding
Marital duration (Years)	Age by duration of marriage	1 = Under 5(Reference) 2 = 5-9 3 = 10-14 4 = 15-19 5 = 20 and above
Place of Residence	Place where respondent stays permanently	1 = Rural (Reference) 2 = Urban
Woman's age (Years)	Completed years of woman's age	1 = 15-19(Reference) 2 = 20-24 3 = 25-29 4 = 30-34 5 = 35-39 6 = 40-49

Source: MDHS (2017)

Appendix Table (2) Descriptive Statistics of Voluntary Childlessness among Currently Married Women

Voluntary Childlessness	No. of Currently Married Women	Percent
Yes	283	3.6
No	7476	96.4
Woman's educational attainment		
No education	1193	15.4
Primary	3656	47.1
Secondary	2286	29.5
Higher	624	8.0
Husband's educational attainment		
No education	1149	14.8
Primary	3205	41.3
Secondary	2915	37.6
Higher	490	6.3
Employment Status		
Unemployed	2821	36.4
Employed	4938	63.6
Woman's Occupation		
Not working	2270	29.3
Professional/technical/managerial	351	4.5
Clerical	81	1.1
Sales	1356	17.5
Agricultural - self employed	748	9.6
Agricultural - employee	447	5.7
Domestic service	14	0.2
Services	46	0.6
Skilled manual	460	5.9
Unskilled manual	1986	25.6
Husband's Occupation		
Professional/technical/managerial	573	7.4
Clerical	88	1.1
Sales	546	7.0
Agricultural - self employed	1403	18.1
Agricultural - employee	577	7.4
Domestic service	22	0.3
Services	89	1.2
Skilled manual	1509	19.5
Unskilled manual	2952	38.0

Appendix Table (2) (Continued)

Voluntary Childlessness	No. of Currently Married Women	Percent
Wealth Quintile		
Lowest	1486	19.2
Second	1622	20.9
Middle	1586	20.4
Fourth	1556	20.0
Highest	1509	19.5
Woman's age		
15-19	228	2.9
20-24	834	10.7
25-29	1258	16.2
30-34	1505	19.4
35-39	1482	19.1
40-49	2452	31.7
Husband's age		
Under 25	673	8.7
25-29	1089	14.0
30-34	1375	17.7
35-39	1437	18.5
40-44	1313	16.9
45 and above	1872	24.2
Woman's age at first marriage		
15-19	3636	46.9
20 -24	2699	34.8
25-29	943	12.2
30 and above	481	6.1
Marital duration (Years)		
Under 5	1491	19.2
5-9	1436	18.5
10-14	1390	17.9
15-19	1340	17.3
20 and above	2102	27.1
Place of residence		
Rural	5737	73.9
Urban	2022	26.1
Total	**7759**	**100.00**

Source: MDHS (2017)

Appendix Table (3) Distribution and Association between Characteristics and Voluntary Childlessness

Variables	Childlessness (%)	Not Childlessness (%)	Chi-Square	P-value
Woman's Education				
No education	10(3.5)	1183(15.8)	109.916***	0.000
primary	85(30.1)	3571(47.8)		
secondary	151(53.3)	2135(28.5)		
higher	37(13.1)	587(7.9)		
Husband's Education				
No education	9(3.1)	1140(15.2)	87.163***	0.000
primary	76(26.9)	3129(41.9)		
secondary	170(60.1)	2745(36.7)		
higher	28(9.9)	462(6.2)		
Employment Status				
Unemployed	82(29.0)	2739(36.6)	6.903***	0.000
Employed	201(71.0)	4737(63.4)		

Appendix Table (3) (Continued)

Variables	Childlessness (%)	Not Childlessness (%)	Chi-Square	P-value
Woman's Occupation				
Not working	55(19.4)	2215(29.6)	39.186***	0.000
Professional/technical/managerial	18(6.4)	334(4.5)		
Clerical, sales, domestic service and services	61(21.5)	1436(19.2)		
Agriculture	37(13.1)	1158(15.5)		
Skilled Manual	37(13.1)	422(5.6)		
Unskilled Manual	75(26.5)	1911(25.6)		
Husband's Occupation				
Professional/technical/managerial	28(9.9)	545(7.3)	19.281***	0.001
Clerical, sales, domestic service and services	29(10.3)	716(9.6)		
Agriculture	64(22.3)	1916(25.6)		
Skilled Manual	78(27.7)	1431(19.1)		
Unskilled Manual	84(29.8)	2868(38.4)		
Wealth Quintile				
Lowest	61(21.8)	1425(19.1)	24.565***	0.000
Second	37(13.0)	1585(21.2)		
Middle	41(14.4)	1545(20.7)		
Fourth	71(25.0)	1484(19.9)		
Highest	73(25.8)	1437(19.1)		
Woman's age (Years)				
15-19	70(24.7)	158(2.1)	959.938***	0.000
20-24	129(45.6)	705(9.4)		
25-29	53(18.7)	1205(16.1)		
30-34	15(5.3)	1490(19.9)		
35-39	13(4.6)	1469(19.7)		
40-49	3(1.1)	2449(32.8)		
Husband's age (Years)				
Under 25	148(52.1)	525(7.0)	822.204***	0.000
25-29	80(28.2)	1009(13.5)		
30-34	34(12.0)	1340(17.9)		
35-39	9(3.2)	1429(19.1)		
40-44	8(2.8)	1305(17.5)		
45 and above	4(1.7)	1868(25.0)		
Woman's age at first marriage (Years)				
15-19	101(35.7)	3535(47.3)	17.368***	0.001
20-24	123(43.5)	2576(34.4)		
25-29	44(15.5)	899(12.1)		
30 and above	15(5.3)	466(6.2)		
Marital duration (Years)				
Under 5	256(90.5)	1235(16.5)	963.008***	0.000
5-9	14(4.9)	1422(19.0)		
10-14	10(3.5)	1380(18.5)		
15-19	1(0.4)	1339(17.9)		
20 and above	2(0.7)	2100(28.1)		
Place of residence				
Rural	179(63.3)	5558(74.3)	17.416***	0.000
Urban	104(33.7)	1918(25.7)		

Source: MDHS (2017)

Appendix Table (4) Overall Model Evaluation for Complementary Log-Log Regression Model

Specification	Value	df	P-Value
Likelihood Ratio χ^2 (Omnibus Test)	1009.10	38	0.000
Cox & Snell R- Square (Pseudo R-Square)	0.4194		
-2Log Likehood	711.1132		
Akaaike I.C(AIC)	1500.226		
BIC	1772.088		

Source: MDHS (2017)

Appendix Table (5) Parameter Estimates of Clog-log Regression Model

Independent Variables	Coefficient	Std. Err.	Wald Statistic	P-Value	95% Confidence Interval		Odds
					Upper	Lower	
Constant	-3.05***	0.52	-5.86	0.000	0.02	0.13	0.05
Woman's educational attainment							
No education (Ref :)							
Primary	0.59*	0.35	1.69	0.091	0.91	3.54	1.79
Secondary	0.78**	0.35	2.21	0.027	1.09	4.35	2.18
Higher	0.82**	0.42	1.98	0.048	1.01	5.14	2.28
Husband's educational attainment							
No education (Ref :)							
Primary	0.65*	0.37	1.75	0.079	0.93	3.96	1.92
Secondary	0.90**	0.37	2.42	0.015	1.19	5.06	2.45
Higher	1.08**	0.44	2.46	0.014	1.24	6.98	2.95
Woman's employment status							
Unemployed (Ref :)							
Employed	0.41*	0.21	1.95	0.051	0.99	2.27	1.50
Woman's occupation							
Not working (Ref :)							
Professional/technical/managerial	0.20	0.37	0.55	0.584	0.59	2.52	1.22
Clerical, sales, domestic service and services	0.32	0.26	1.21	0.226	0.82	2.31	1.38
Agriculture	0.17	0.31	0.55	0.582	0.64	2.19	1.19
Skilled Manual	0.50*	0.28	1.76	0.078	0.95	2.88	1.65
Unskilled Manual	0.53**	0.26	2.04	0.041	1.02	2.84	1.70
Husband's Occupation							
Professional/technical/managerial (Ref :)							
Clerical, sales, domestic service and services	-0.04	0.28	-0.15	0.880	0.55	1.66	0.96
Agriculture	0.06	0.28	0.21	0.831	0.62	1.82	1.06
Skilled Manual	-0.19	0.25	-0.78	0.433	0.51	1.34	0.82
Unskilled Manual	-0.24	0.26	-0.93	0.354	0.48	1.30	0.79
Wealth quintile							
Lowest (Ref :)							
Second	0.20	0.27	0.74	0.461	0.72	2.05	1.22
Middle	0.38	0.25	1.54	0.124	0.90	2.38	1.46
Fourth	0.41**	0.21	1.97	0.048	1.00	2.28	1.51
Highest	0.35*	0.19	1.78	0.074	0.97	2.07	1.42

Appendix Table (5) (Continued)

Independent Variables	Coefficient	Std. Err.	Wald Statistic	P-Value	95% Confidence Interval		Odds
					Upper	Lower	
Woman's age							
15-19 (Ref :)							
20-24	-1.44***	0.23	-6.18	0.000	0.15	0.37	0.24
25-29	-3.30***	0.37	-9.02	0.000	0.02	0.08	0.04
30-34	-5.10***	0.58	-8.80	0.000	0.002	0.02	0.01
35-39	-5.24***	0.72	-7.28	0.000	0.001	0.02	0.01
40-49	-7.23***	1.14	-6.32	0.000	0.0001	0.01	0.001
Husband's age							
Under 25 (Ref :)							
25-29	-0.38**	0.15	-2.48	0.013	0.51	0.92	0.68
30-34	-0.48**	0.22	-2.20	0.028	0.40	0.95	0.62
35-39	-1.16***	0.39i	-2.95	0.003	0.14	0.68	0.31
40-44	-0.38	0.44	-0.86	0.392	0.29	1.62	0.69
45 and above	-0.73	0.56	-1.29	0.196	0.16	1.46	0.48
Woman's age at first marriage							
15-19 (Ref :)							
20-24	1.40***	0.22	6.35	0.000	2.62	6.20	4.03
25-29	2.85***	0.37	7.72	0.000	8.40	35.82	17.34
30 and above	3.82***	0.63	6.05	0.000	13.22	156.84	45.53
Marital duration							
Under 5 (Ref :)							
5-9	-1.15***	0.32	-3.56	0.000	0.17	0.60	0.32
10-14	0.06	0.51	0.11	0.910	0.39	2.88	1.06
15-19	-0.10	1.09	-0.91	0.362	0.04	3.13	0.37
20 and above	0.49	1.15	0.43	0.671	0.17	15.47	1.63
Place of residence							
Rural (Ref :)							
Urban	0.42***	0.16	2.60	0.009	1.11	2.10	1.53

Source: MDHS (2017)