Ministry of Education

Department of Higher Education

Yangon University of Economics

Yangon University of Economics

Research Journal

Vol. 5, No. 2 March, 2018

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Yangon University of Economics Research Journal

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Yangon University of Economics Research Journal

Vol. 5, No. 2

Published by Yangon University of Economics

Rector : Professor Dr. Khin Naing Oo
Pro-Rector: Professor Dr. Tun Aung

Printed by,

Gonthiri Priniting House

About the Journal

2018

The Research Journal of Yangon University of Economics has come out by the guidelines of the Minister for the Ministry of Education in Myanmar. The journal aims at the advancement of research in all areas of Economics. It also has the aim of providing a scholastic platform to professionals, researchers, and academicians associated with the field of Economics. It is expected that the journal can provide implications for teaching and learning public policy, business policy and individual decision making.

The articles in this journal are contributed by researchers from all academic departments of our university. We fully appreciate the contributions of the researchers. We also admire their great efforts to contribute in this journal though gradually increasing numbers of the students enrolled in Yangon University of Economics make them occupied with teaching.

Yangon University of Economics has always been trying to promote the quality of education. This research journal is a proof of such endeavour.

Editorial

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FEMALE MARITAL PATTERNS IN MYANMAR

Khin Nu Win[12]

ABSTRACT

The fertility of East and South-East Asian countries, have declined in the second half of the twentieth century. The transition from high to low level of fertility in Myanmar has started around 1970_s. A major factor in the onset of Asian fertility transition is dramatic changes in marriage pattern. It is an essential in determining the size, composition and growth of the population through family formationconcerningthefemale reproductive rates. These rates are closely related to early and late marriages, female educational attainment, female labour force participation rate, place of residence, etc. Therefore, the singulatemean age at first marriage for female(SMAM), age-specific fertility rate(ASFR) andtotal fertility rate(TFR) are calculated in this paper. Moreover, the intrinsic rate of growth, the mean length of generation, gross reproduction rate(GRR) and net reproduction rate(NRR) are also estimated on the base of stable population model. According to the results, the SMAM can be seen around 22 to 25 years for all the states and the regions. The TFR ranges from nearly 2 to 4 persons per woman. The GRR and NRR are found to be fluctuating around 1 or 2 female live births per woman and the mean length of generation for female is nearly 28, 29 or 30 years for the whole country.

Keywords: Singulate age at first marriage for female, Intrinsic rate of growth, Mean length of generation

1. Introduction

During the past three decades, there have been rapid changes in South-East Asian not only in the socio-economic and political situation, but also in the demographic situation. In almost all countries and regions in South-East Asia, population growth has declined to moderate or low levels of rapid decline in fertility. In recent years, marriage behavior and family life are changing in Asia. The changes of marriage have played a considerable role in the recent fertility declines in most of the Asian countries. It is one of the most important factors relating to population composition and the changes of population growth. Among the components of population changes, marital status has attracted considerable attention of researchers as well as policy makers in recent years.

In Myanmar, the marriage pattern has been changing. The proportion of never married has increased in the younger age group than other age groups. The Singulate Mean Age at First Marriage and mean length of generation are important determinants of marital fertility. Future reproduction or reproductive intentions are related to the existing family size.

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For several different purposes, demographers are interested in changing patterns of marital status and fertility; they analyze some demographic processes by using the stable population model. A stable model of population can be utilized to study the importance of various factors like biological,social, cultural, economic and psychological factors and their effects on the demographic process. Therefore, the stable population model is used to demonstrate the current female marital patterns of Myanmar in this paper.

1.2 Objectives of the Study

The objectives of the study are:

(i) to determine the marital patterns of females in Myanmar,

(ii) to investigate the estimates of fertility in the states and regions of Myanmar

1.3 Scope and Limitations of the Study

The study area is focused in terms of the States and Regions of Myanmar. The necessary data and information for this study have been collected from the 2014 Myanmar Population and Housing Census. The required information such as the number of women and the number of children ever born during the last twelve months is obtained from this census and the data on the total number of person- years lived for the cohort during the specified age interval are taken from Thematic Report on Mortality published by Department of Population, Ministry of Labour, Immigration and Population in 2016.

2. Methods

In this paper, the changing patterns of marriage are calculated by using (i) Singulate Mean Age at Marriage and (ii) Mean Length of Generation. Moreover, the estimated intrinsic rate of growth, gross reproduction rate (GRR), and net reproduction rate (NRR) are calculated based on stable population model. Furthermore, age-specific fertility rate (ASFR) and total fertility rate (TFR) of Union, Urban and Rural areas are calculated for 2014.

2.1 Singulate Mean Age at First Marriage

An indirect method of estimating the SMAM is applied for the observation of age at marriage. This method uses the average number of years lived by an assumed cohort of women before their first marriage on the basic of (i) the percentage of women never-married by age, and (ii) that no first marriages occur after age 50 or before age 15.

Procedure for the Estimation of Singulate Mean Age at Marriage

Step 1: Calculation of proportions single for a given sex

The proportion single for the age group from 1 (15-19) to 8 (50-54) is denoted by U(i),

Where:

U (i) = .

Step 2: Calculation of person years lived in the single state

$$RS_1 = 5 \sum$$
$$RS_2 = RS_1 + 15.0.$$

The quantity 15.0 is the number of person-years lived in the single state from birth to age 15 by the hypothetical cohort of size under consideration.

Step 3: Estimation of proportion who ever marry

The proportion remaining single at age 50, RN is estimated as

RN =

The proportion ever marrying by age 50, RM is estimated as

RM = 1.0 – RN.

Step 4: Calculation of number of person-years lived by the proportion not marrying

Since RN is estimated to be proportion who not married by age 50, the total time spent in the single state by this proportion is RS3 = 50.0 RN.

Step 5: Calculation of singulate mean age at marriage

The value of SMAM is the average number of years spent in the single state by those who marry before age 50. It is calculated as

SMAM = ———.

2.2 The Concepts of Stable and Stationary Population Model

The theoretical model of stable population has widely been used by demographers to represent and understand the structures, growth and evolution of human populations. By definition, stable population has age-specific fertility and mortality rates that remain constant over time. It can be proved mathematically that population with unchanging fertility and mortality patterns grow at a constant rate and acquire a characteristic age structure that does not change over time. The age composition of the stable population is determined by two factors: the prevailing life table and the growth rate in the annual number of births. The age composition will be constant and can be expressed in terms of the birth rate, growth rate, and life table survival function.

The stationary population model is sometimes used to study population processes. Stationary population model is a special case of stable population model with a zero growth rate (equal number of births and deaths). Such a population will have a constant age structure and certain simplified relationships among the demographic parameters.

2.3 Lotka's Intrinsic Rate of Growth

The concept of a stable population was first introduced into demography by Alfred J.Lotka. Hehas investigated the time required for a population with a given age structure and age-specific fertility and mortality to approach its ultimately stable form. He also proved that a closed population with constant age-specific fertility and mortality schedules would eventually have a constant rate of natural increase and it is called the intrinsic rate of a natural increase or intrinsic rate of growth.

Lotka computed the intrinsic rate of growth by solving the equation,

$$\int \qquad = 1$$

Where:

p(x) = the probability of surviving from birth to age x, the L_x of the life table divided by l_0

r = the intrinsic rate of growth per head per annum

f(x)= the number of female live births per annum to each woman of age x

Since f(x)= 0, outside the childbearing period

$$\int \qquad = 1$$

$$1 = \int$$

$$\frac{}{} = \int$$

substitute $g(x) = \frac{}{}$

$$\frac{}{} = \int$$

$$\frac{}{M_x}$$

$$\text{Log}\left(\frac{}{} \right. \quad \log M_x\,(-r)$$

$$\text{Log}_e\,(NRR)^{-1} = K_x\,(-r)$$

$$\text{Log}_e\,(NRR)^{-1} = K_1(-r) + K_2\frac{}{} + K_3\frac{}{} + \ldots$$

If the higher moments K_3, K_4 , … are ignored,

Let $K_1 = \alpha$, $K_2 = \beta$

$$-\text{Log}_e \text{NRR} = -\alpha r + \frac{}{}$$

$$0 = \beta \quad -2\alpha r + 2\,\text{Log}_e \text{NRR}$$

$$\beta \quad - 2\alpha r + 2\,\text{Log}_e \text{NRR} = 0$$

It is same as $ax^2 + bx + c = 0$

$$a = \beta,\ b = -2\alpha,\ c = 2\text{Log}_e \text{NRR}$$

$$x = \frac{\sqrt{\quad}}{}$$

Then, $$r = \frac{\sqrt{\quad}}{}$$

$$r = \frac{\sqrt{\quad}}{}$$

Where: R_o = NRR, R_1 and R_2 are the 1st and 2nd moments of the curve representing the age schedule of net reproductive rate. The general equation for 1st, 2nd and nth moments is given by

$$R_1 = \int$$

$$R_2 = \int$$

$$R_n = \int$$

$$\alpha = E(x) = \int$$

$$\alpha = \int$$

$$\alpha = \frac{}{}$$

$$\alpha = \int$$

$$\beta = V(x) = E(x^2) - [\,E(x)\,]^2$$

$$\beta = \int \qquad (\qquad)$$

$$= \int \qquad dx - \qquad)$$

$$= \qquad\qquad (\quad)$$

$$\int$$

$$\beta = \frac{(\quad)}{\sqrt{(\quad)}\ [\quad(\quad)]}$$

$$r = \frac{}{(\quad)}$$

2.4 Mean Length of Generation

The mean length of generation is defined as the mean age of mothers at the birth of their daughters. Since the stable population is growing at the annual rate r, compounded continuously and NRR is rate of growth in one generation by length, T years.

$$NRR = \frac{}{}$$

$$T = \frac{}{}$$

$$T = \text{Log}_e\ NRR$$

Where:

T represents the mean length of generation

r represents the intrinsic rate of growth

NRR represent the net reproduction rate

2.4.1 Intrinsic Birth Rate

The intrinsic birth rate or true birth rate is the birth rate that would eventually be reached in closed population, which is subject to constant age-specific fertility and mortality rates for a sufficiently long period of time. It is the birth rate of a stable population.

The intrinsic birth rate per annum is

$$b = \frac{}{\int}$$

Where:

p(x) is the probability of surviving from birth to age x

r is the intrinsic rate of natural growth per year.

2.4.2 Intrinsic Death Rate

The intrinsic death rate is equal to the difference between the intrinsic birth rate and the intrinsic rate of growth.

$$d = b-r$$

Where:

d = intrinsic death rate

b = intrinsic birth rate

r = intrinsic rate of growth

2.5 Age Specific Fertility Rate (ASFR)

Age Specific Fertility Rate is the number of live births to female of specified age per 1000 mid-year female population of that particular age in a specified period.

$$_5 f_x = \text{ASFR} = \frac{_5 B_x}{_5 F_x} \times 1000$$

Where :

$_5B_x$ = number of live births to females aged between x and x+5 in an area during a year

$_5F_x$ = mid-year female population of aged x to x+5 in the same area during that year

2.6 Total Fertility Rate (TFR)

Total Fertility Rate (TFR) is defined as "the average number of children a woman would have assuming that current age-specific birth rates remain constant throughout her childbearing years". It is the average number of children a woman would have if she survives all her childbearing (or reproductive) years. Childbearing years are considered age 15 to 49.

$$\text{TFR} =$$

2.7 Gross Reproduction Rate (GRR)

This measure is very similar to the (TFR) except that it considers only female rather than all births. It is calculated in the same way as the TFR but uses female age-specific fertility rates. GRR is the number of girl babies that would be produced by a woman who survives the entire reproductive period and if she experiences the ASFRs prevailing at the time under study.

$$\text{GRR} = 5 \sum_5 {}_x$$

$$\text{GRR} = \underline{\qquad \Sigma \qquad}$$

Where:

${}_5f^*_x$ = the ASFR for female births only.

$${}_5f^*_x = \frac{{}_5FB_x}{{}_5f_x}$$

2.8 Net Reproduction Rate (NRR)

The NRR is the average number of daughters that would be born to a woman taking into account the prevailing levels of fertility, female mortality and the sex ratio at birth. When the NRR is one, each woman is exactly replacing herself with one surviving daughter and this implies that fertility is at replacement level.

$$\text{NRR} = 5 \sum \frac{{}_5L_x}{l_0} \quad \text{x}$$

$$\text{NRR} = 5 \sum \frac{{}_5L_x \times f_x}{l_0 \times 2.05}$$ (Sex Ratio at birth is assumed as 1.05)

3. Results and Findings

3.1 Proportion of Never-Married Women

The following Table shows the changes in the proportion of never-married women by age group between 1973 and 2014 in Myanmar.

Table (1) Proportion of Never-Married Women (%)

Age Group	Year				
	1973	1983	1991	1997	2014
15-19	78.0	83.2	89.3	93.4	86.8
20-24	35.5	42.1	56.0	65.3	54.4
25-29	16.7	21.6	32.4	40.6	32.0
30-34	9.3	12.9	19.6	24.7	20.8
35-39	7.0	8.9	13.8	17.0	16.3
40-44	6.2	6.7	10.4	14.7	14.0
45-49	5.9	5.9	9.1	12.2	12.9

Source: 1973 Census, 1983 Census, 1991 PCFS, 1997 FRHS, 2014 Census

According to the results, the proportion of never-married women between the period of 1973 and 1997 gives a rise in the age pattern of proportion. This table clearly shows that the

proportion of single has increased from 78.0 percent in 1973 to 93.4 percent in 1997. But it has declined to 86.8 percent in 2014. The proportion of single for females aged 45-49 has risen from 1973 to 2014, 5.9 percent in 1973 and 1983, 9.1 percent in 1991 and 12.2 percent in 1997 and 12.9 percent in 2014. Generally, the proportion of never-married women has increased during the periods of study.

3.2 Proportion of Ever-Married Women

The following table shows the changes in proportion of ever married women by age between 1973 and 2014 in Myanmar.

From the above table, the proportion of ever married women in the age group 15-19 has declined from 20.7 percent in1973 to 12.4 percent in 2014.The largest proportion of ever married women are found to be age group 35-39 years. Among these age groups, it is found that the age groups like 30-34 years, 35-39 years, 40-44 years and 45-49 years are higher than other age groups.

Table (2) Proportion of Ever-Married Women (%)

Age Group	Year				
	1973	1983	1991	1997	2014
15-19	20.7	15.9	10.7	6.5	12.4
20-24	60.9	55.0	44.0	33.4	43.6
25-29	78.7	74.1	67.6	56.9	65.1
30-34	84.5	81.3	80.4	71.2	74.8
35-39	85.1	83.1	86.2	78.0	77.7
40-44	81.9	81.5	84.0	76.1	77.3
45-49	77.4	78.4	90.9	74.9	74.9

Source: 1973 Census, 1983 Census, 1991 PCFS, 1997 FRHS, 2014 Census

3.3 Changes in Marital Status for Female

Changes in age at marriage and proportion marrying have important influence on fertility trends. The patterns of marriage are very important because of their significant role in determining the size, composition and growth of the population through family formation and fertility. Generally, marital status is classified by four categories namely (1) Single, (2) Married, (3) Widowed and (4) Divorced. The following table describes the changes in marital status for female.

In 1973, the percent of single female was 37.4%. It has increased to 40% in 1983, 42.7% in 1991 and 55.1% in 1997. But, it has decreased to 29.5% in 2014. The married women have steadily declined from 1973 to 1997. It has declined from 50.7% in 1973 to 49.1% in 1983, 45.8% in1991, 36.4% in 1997. But, it has increased to 57.8% in 2014.Widowed women are one-fifth of married women and divorced women are very few. It might be due to Myanmar culture and other socio-economic factors.

Table (3) Changes in Marital Status for Female (%)

Year	Single	Married	Widowed	Divorced	Total
1973	37.4	50.7	10.0	1.8	100.0
1983	40.0	49.1	9.2	1.7	100.0
1991	42.7	45.8	9.6	2.0	100.0
1997	55.1	36.4	7.4	1.1	100.0
2014	29.5	57.8	10.4	2.0	100.0

Source: 1973 Census, 1983 Census, 1991 PCFS, 1997 FRHS, 2014 Census

3.4 Changes in Singulate Mean Age at First Marriage

The following Table shows the changes in Singulate Mean Age at First Marriage (SMAM) for female from the period 1973 to 2014 in Myanmar.

Table (4) Changes in Singulate Mean Age at First Marriage for Female, 1973-2014 (Years)

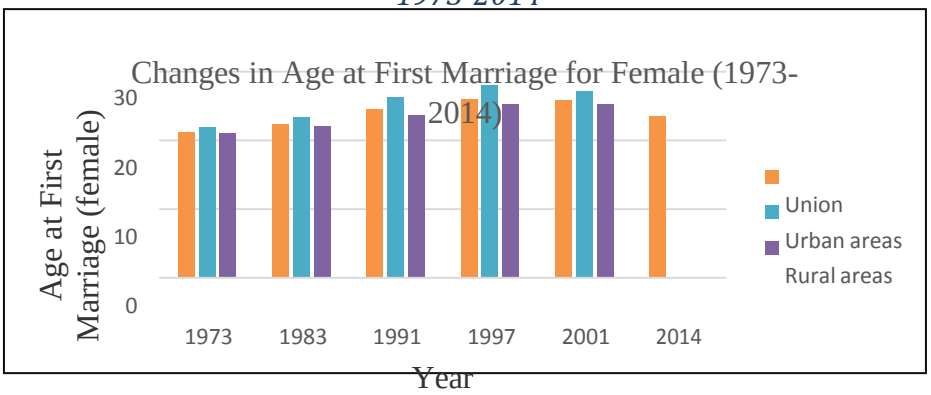
Regions	**1973**	**1983**	**1991**	**1997**	**2001**	**2014**
Union	21.2	22.4	24.5	26.0	25.8	23.6
Urban areas	21.9	23.3	26.3	28.0	27.2	-
Rural areas	21.0	22.1	23.7	25.3	25.3	-

Source: 1973 Census, 1983 Census, 1991 PCFS, 2001 FRHS, 2014 Census

Table (4) and Figure (1) show changes in singulate mean age at first marriage. It is one of the main factors of fertility changes. According to the results, the average age of women at first marriage has risen from 21.2 years in 1973 to 26.0 years in 1997. But it has declined from 25.8 years in 2001 to 23.6 years in 2014. For urban areas, the change in age at first marriage for female is 21.9 years in 1973 to 27.2 years in 2001. For rural areas, the change in age at first marriage for female is 21 years in 1973 to 25.3 years in 2001. Therefore, it can be

observed that singulate mean age at first marriage for female is found to be urban areas and is also higher than in rural areas.

Figure (1) Changes in Singulate Mean Age at First Marriage for Female (SMAM), 1973-2014



Source: Table (4)

Table (5) describes the Singulate Mean Age at First Marriage (SMAM) of female as observed in 2014 Population Census for each state and region.

Table (5) Singulate Mean Age at First Marriage (SMAM) for Female by States & Regions

States and Regions	SMAM(years)	States and Regions	SMAM(years)
Union	23.6	Magway	24.0
Kachin	23.8	Mandalay	24.4
Kayah	23.8	Mon	23.6
Kayin	22.8	Rakhine	22.4
Chin	22.7	Yangon	25.2
Sagaing	24.1	Shan	22.6
Tanintharyi	23.6	Ayeyawady	22.2
Bago	22.8	Nay Pyi Taw	23.0

Source: The 2014 Population and Housing Census

According to the results, the ranges of SMAM for female are from 22 to 25 years. There is no significant difference in each state and region. The highest Singulate Mean Age at First Marriage (SMAM) for female is found in Yangon Region and the lowest Singulate Mean Age at First Marriage (SMAM) for female is found in the Ayeyawady Region. It might be due to the differences in education, occupations, cultures, knowledge on fertility and other factors, etc.

3.5 Age Specific Fertility Rate (ASFR) of Union, Urban and Rural for 2014

The following Table presents the ASFRs of urban, rural and union for 2014.

Table (6) ASFRs of Union, Urban and Rural for 2014

Age Group	ASFRs		
	Union	Urban	Rural
15-19	0.0218	0.0152	0.0246
20-24	0.0946	0.0682	0.1070
25-29	0.1185	0.0959	0.1286
30-34	0.1059	0.0910	0.1125
35-39	0.0745	0.0593	0.0812
40-44	0.0346	0.0232	0.0399
45-49	0.0081	0.0050	0.0096
TFR	2.29	1.789	2.517

Source: 2014 Population and Housing Census

According to the results, there is a substantial difference in fertility between urban and rural areas. Comparing to urban and rural areas, rural women have more additional children than these of urban women (3 versus 2). Generally, $ASFR_s$ in rural areas were more than those of urban areas for each reproductive age group. The ASFRs of middle age group 25-29 years and 30-34 years are higher than the other reproductive age groups. Table (7) and Figure (2) show ASFRs from various sources for different years.

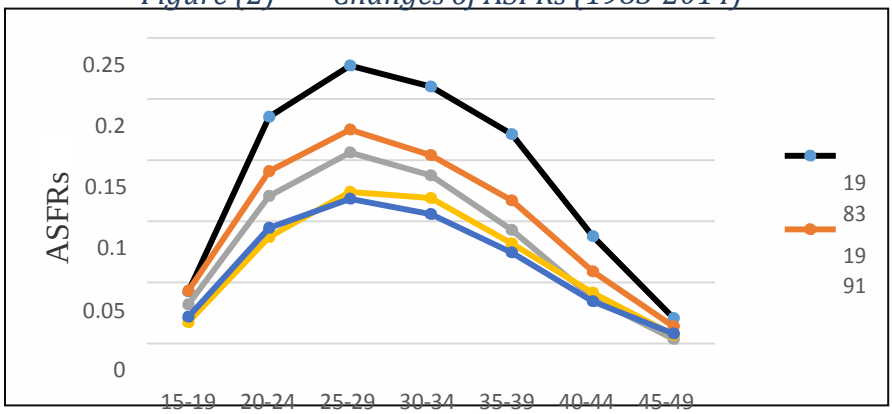
Table (7) Changes in ASFRs (1983-2014)

Age	1983	1991	1997	2001	2014
15-19	0.0425	0.0430	0.0319	0.0174	0.0218
20-24	0.1855	0.1410	0.1206	0.0872	0.0946
25-29	0.2274	0.1750	0.1563	0.1240	0.1185
30-34	0.2102	0.1540	0.1375	0.1189	0.1059
35-39	0.1712	0.1170	0.0929	0.0818	0.0745
40-44	0.0878	0.0590	0.0372	0.0415	0.0346
45-49	0.0208	0.0140	0.0037	0.0070	0.0081

Source: PCFS (1992), FRHS (2002), 2014 Census

As a result, the fertility of the youngest age group 15-19 and the highest age group 45-49 has decreased and other age groups 25-29 and 30-34 has increased especially concentrated at ages between 25 and 29. The contributions of fertility by women under 20 and above 40 yearsare very low. The fertility of women age 25-29 years is higher than the other age groups.

Figure (2) Changes of ASFRs (1983-2014)



Source: Table (7)

3.6 Intrinsic Birth and Death Rates by States and Regions

The intrinsic rate of growth is the most direct indication of actual growth of a given population during a given year. If births exceed deaths, the growth rate is positive. If deaths exceed births, the growth rate is negative. The true or intrinsic birth and death rates are the birth rate and death rate that would eventually be reached in a population subject to fixed fertility and mortality schedule. The following table shows intrinsic birth and death rates of each state and region.

As a result, the lowest intrinsic birth rate for female can be seen in Yangon Region and the highest in Chin State. The same pattern of intrinsic birth rate for male can be seen in those two regions. The lowest intrinsic death rate for female can be seen in Bago Region and the highest in Chin State. The same pattern of intrinsic death rate for male can be seenin those two regions. Generally, intrinsic birth rate of male is more than female for almost all the states and regions. Similarly, intrinsic death rate of male is more than female for the whole country except Sagaing Region.

3.7 Regional Differentials in Fertility and Female Marital Pattern

Intrinsic Rate of Growth, Total Fertility Rate (TFR), Gross Reproductive Rate (GRR), Net Reproduction Rate (NRR) and Mean Length of Generation for each state and region in Myanmar are calculated in Table (9).

According to the findings of State and Region wise, intrinsic rate of growth for Yangon Region is the lowest and Chin State is the highest. The intrinsic rate of growth for the whole

country in Myanmar is about 0.0009 percent. Moreover, the intrinsic rate of growth is found to be positive in rural areas and negative in urban areas. It can be assumed that the number of births is higher than that of deaths in the rural areas and the number of births is lower than that of deaths in the urban areas.

Table (8) Intrinsic Birth and Death Rates by States and Regions

States & Regions	Intrinsic Birth Rate		Intrinsic Death Rate	
	Female	Male	Female	Male
Union	32.3	32.6	31.4	31.7
Urban areas	24.8	25.3	31.1	31.6
Rural areas	35.7	35.8	32	32.1
Kachin	40.4	41.3	32.2	33.1
kayah	47.8	48.6	34.4	35.2
Kayin	49.3	49.7	35.1	35.1
Chin	62.7	63.1	41.9	42.3
Sagaing	38.1	32.9	36.7	31.5
Tanintharyi	42.4	42.2	33.2	33
Bago	30.7	31.1	30.1	30.5
Magway	28.9	29.7	32.3	33.1
Mandalay	27.1	27.5	31.3	31.7
Mon	34.5	35.3	30.9	31.7
Rakhine	31.5	31.4	31.4	31.3
Yangon	23.7	24	31.4	31.7
Shan	38.3	38.3	32	32
Ayeyawady	36.6	36.7	32.7	32.8
Nay Pyi Taw	30.1	30	31.1	31

Source: The 2014 Population and Housing Census

Based on the findings, the Total Fertility Rate (TFR) ranges from 1.7 to 4.4. The lowest TFR can be observed in Yangon Region followed by Mandalay Region and the highest TFR can be observed in Chin State. It's about 2 times of Yangon and Mandalay Regions.

According to the results, GRR for Myanmar in 2014 was estimated at 1.12 female live births per woman; it is nearly 0.88 for urban and 1.23 for rural areas. These values are comparatively lower in urban than in rural areas. The chances of dying from pregnancy related causes are still high in some regions; it ranges from a minimum of 0.84 in Yangon Region to a maximum of 2.14 in Chin State. Similarly, the same pattern of fertility can be seen in NRR.

GRR and NRR fluctuated around 1 or 2 female live births per woman. Comparing the mean length of generation for female population, there are nearly 28, 29 or 30 years for the whole country in Myanmar. The mean length of generation has risen in Myanmar. It might be due to many reasons; knowledge and use of fertility control may have spread among women especially the younger generation and other factors, etc.

Table (9) Regional Differential in Fertility and Female Marital Pattern

State	Intrinsic Rate	Total	Gross	Net	Mean Length
Union	0.0009	2.30	1.12	1.03	29.28
Urban areas	-0.0063	1.80	0.88	0.83	30.17
Rural areas	0.0037	2.50	1.23	1.12	29.95
Kachin	0.0082	2.80	1.38	1.28	29.79
Kayah	0.0134	3.30	1.63	1.50	30.24
Kayin	0.0142	3.40	1.68	1.53	30.15
Chin	0.0208	4.40	2.14	1.87	30.20
Sagaing	0.0014	2.30	1.13	1.04	30.35
Tanintharyi	0.0092	3.00	1.46	1.32	30.40
Bago	-0.0006	2.20	1.07	0.98	28.58
Magway	-0.0034	2.10	1.01	0.90	29.98
Mandalay	-0.0042	1.90	0.95	0.88	30.27
Mon	0.0036	2.40	1.19	1.11	30.16
Rakhine	0.00006	2.20	1.10	1.00	28.31
Yangon	-0.0077	1.70	0.84	0.79	30.65
Shan	0.0063	2.70	1.31	1.20	29.27
Ayeyawady	0.0039	2.60	1.26	1.12	29.88
Nay Pyi Taw	-0.0010	2.20	1.05	0.97	30.15

Source: 2014 Population and Housing Census

3.8 Impact of Socio-economic Factors on Fertility Changes (1973-2014)

Fertility is one of the most important determinants of population growth rate. It has important effect on social and economic development. The main factors that most directly affect fertility are Female Singulate Mean Age at Marriage (SMAM), Female Adult Literacy Rate

(FALR), FemaleLabour Force Participation Rate (FLFPR). Crude Birth Rate (CBR) and Total Fertility Rate (TFR) have changed based on the three factors already mentioned.

Table (10) Impact of Socio-economic Factors on Fertility Changes (1973-2014)

Year	SMAM	FALR	FLFPR	CBR	TFR
1973	21.2	66.9	30.93	32.5	5.65
1983	22.4	76.6	34.40	28.3	4.73
1991	24.5	83.6	48.61	24.3	3.52
1997	26.4	90.0	47.18	22.4	3.48
2001	25.8	-	47.32	25.7	2.96
2014	23.6	86.9	50.50	18.0	2.30

Source: FRHS (1998), CSO (1992), CSO (1997), HDR (2005), Census (2014)

On the basis of the above Table, it is noted that the change in age at first marriage for female has increased from 1973 to 1997. And then, it has decreased from 2001 to 2014. The FALR has increased from 1973 to 1997 and slightly decreased in 2014. FLFPR has also increased during the study period. The CBR has decreased; it has fallen from 32.5 in 1973 to 18 in 2014 except 2001. The TFR has steadily declined from 5.65 in 1973 to 2.3 in 2014 which means that it has halved in 41 years. It can be concluded that female marital pattern can play an important role in major fertility declines. Moreover, it is very closely related to FALR and FLFPR. It can be said that increasing SMAM, FALR, FLFPR have occurred owing to the decreasing CBR and TFR.

4. Discussion

In Asia today, the rate of fertility decline has been varied, so that fertility levels are widely diversed. More recently, fertility has declined dramatically almost everywhere. A change in the size and composition of population is related to changes of fertility. It is one of the most essential factors of population growth. In any study of fertility, changes in marriage pattern are important for the effects of reproduction.

In recent period, the delayed marriage and low fertility tend to be closely linked in Asia. Myanmar shows the most extreme marriage delays in the region while fertility is still slightly abovethe replacement level. Both delayed marriage and sharp fertility decline have occurred in South-East and East Asia when women's education level has been rising and their labour force participation generally increasing. In most developing countries, especially in Asia,

there has been a transition from traditional to modern patterns of marriage. The changing pattern of marriage may be caused by education, employment status, place of residence,etc.

Educational attainment has a positive relationship with the age at marriage and fertility is conversely related to educational attainment. Women with university education are the most likely to remain unmarried. It may be that more educated women have less reason to marry because they are able to be financially independent or it may be that it is more difficult for them to find a suitable partner. The educational level of society increase, the proportion of never married can also be expected to increase. Moreover, the effect of population structure is depending upon on education. The lower levels of education are associated with larger proportion of married and greater fertility, but also with a later age of marriage and consequently with delayed childbearing and lower fertility.

In general, the status of employment has a strongly influence on fertility. Women who are employed full-time tend to have smaller families. Employment of the mother has a positive effect on nutrition and health status of children. The lower occupational status tends to high fertility and the higher employment status tends to low fertility. The employment status is negative relationship of fertility changes and positive relationship of marital status. Moreover, never married women are more likely to be active in the labour force than ever married women.

Place of residence has an effect on age at marriage. Generally, early marriage is more common in rural areas than in urban areas. The highest proportion of women who married early occurred among women especially in villages and still lived in rural areas. Most of the women in urban areas are better educated compared to those in rural areas. Jobs in urban areas are usually outside the home and women are not allowed to bring their children to the place of work and they would not consider having more children.

5. Conclusion

As a result, the largest proportion of never-married women is in 15-19 years reproductive age groups. From 1973-2014, the proportion of never-married women has increased all reproductive age groups except 2014. The proportion of married women is particularly age group 30-34, 35-39 and 40-44 years. The largest proportion of ever married women can be seen in age group 35-39 years.

Firstly, changes in female marital status are studied by four kinds of categories. Generally, the percent of single women has increased and the percent of married women hasalso decreased. Widowed women are one-fifth of married women and divorced women are very few. It might be due to culture of Myanmar women and other related factors.

Secondly, the changes in SMAM for female are presented for each state and region. The highest SMAM for female can be seen in Yangon Region and the lowest SMAM for female can be seen in Ayeyawady Region. But,there is no significant difference in each state and region. It might be due to the mothers' educational level, occupational status, knowledge on birth spacing and other factors, etc.

Thirdly, ASFRs of union, urban and rural for 2014 Census are presented. Based on findings, rural areas of ASFRs are more than urban areas of ASFRs for each reproductive age group. Moreover, the changes of ASFRs are studied for different years. As a result, the age below 20 and above 40 years, the ASFRs are very low. Especially, concentrated ASFRs are found to be at middle age group: 25-29 years.

Finally, the intrinsic rates of growth are calculated based on intrinsic birth and death rates. From the results, the lowest intrinsic birth rate is found to be Yangon Region and the highest intrinsic birth rate is found to be Chin State.The lowest intrinsic death rate for female can be seen in BagoRegion and the highest in Chin State. Furthermore, the mean length of generation is found to be each state and region based on the intrinsic rate of growth. Based on the results, the intrinsic rate of growth has decreased in Urban areas, Bago, Magway, Mandalay, Yangon Regions and Nay Pyi Taw Council Territory. It can be assumed that the number of deaths higher than the number of births in urban and some regions.

In addition, the TFR, GRR and NRR are calculated by states and regions. The TFR ranges from nearly 2 to 4 persons produce per woman. The lowest TFR is observed in Yangon Region and the highest TFR is observed in Chin State. GRR and NRR are fluctuated around 1 or 2 female live births per woman among states and regions. According to the study, NRR is only slightly less than the GRR. Besides, the mean length of generation for female is observed that nearly 28, 29 or 30 years for the whole country.In Chin State, the TFR has increased in other states and regions. It might be due to their cultural factors. The TFR has decreased in Yangon and Mandalay Regions. It might be due to the socio economic conditions and other related factors. These factors are higher costs of rearing children, women's education and employment opportunities.

Furthermore, the socio-economic factors on fertility changes are studied. Based on findings, SMAM, FALR, FLFPR have increased whereas the CBR and TFR have decreased during the year from 1973 to 2014. The SMAM for female is about 24 years for the whole country. The SMAM for females have become more and more uncommon to find at age group 15-19. Generally, the important factors of fertility decline are female education and female labor force participation. It is assumed that higher level of education is associated with higher age at first marriage, the use of birth control methods; desire to have small family size and to achieve the better standard of life.

On the policy grounds, the decline in fertility can easilyhave profound effects on many socio- economic issues in Myanmar such as education, health care, housing plan, retirement protection, business opportunities and saving behaviors. It is hoped that the results of this paper would be useful for policy makers and future researchers.

ACKNOWLEDGEMENTS

Firstly, I would like to convey my deepest gratitude to Professor Dr. Khin Naing Oo, Rector, Yangon University of Economics and professor Dr. Tun Aung, Pro-rector, Yangon University of Economics who encouraged me to write this research paper. I am highly indebted to Professor and Head Dr. Maw MawKhin and Professor Dr. MyaThandar, Department of Statistics for their encouragement in writing this research paper. Finally, I am also very grateful to all Professors, Associate Professors and all my colleagues at the Department of Statistics for their kind co-operation. I would also like to express my sincere gratitude to all of those who supported my research paper in different ways.

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