

YANGON UNIVERSITY OF ECONOMICS

DEPARTMENT OF STATISTICS

**COMPARATIVE ANALYSIS OF ESTIMATED ABRIDGED LIFE
TABLES IN MYANMAR**

BY

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M.P.S

Roll No.5

NOVEMBER, 2019

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ABSTRACT

Mortality is one of the basic population parameters and also important in any given population for socio-economic planning. The mortality decline was mainly due to the improvements in medical services and Government's health plans. Life expectancy is a major key factor of current mortality condition and current health situation. In this study, an effort has been made to estimate comparative analysis of abridged life table in Myanmar for 2016. This study is mainly based on the data from Vital Statistics collected by Central Statistical Organization (CSO) in Myanmar. The comparative analysis of abridged life tables for the whole country can be measured by three indirect methods such as Reed-Merrell method, Greville's method and Keyfitz-Frauenthal method in this study. Moreover, life expectancies in some Asian Countries and Myanmar are compared with three indirect methods. In these three methods, the Greville's method is the most suitable for construction of abridged life tables in Myanmar because the estimation of this method are approximately close to the United Nations estimates than the other two methods. Among the neighbouring countries, China has the highest LEB (75 years for males and 79 years for females) and Myanmar has the lowest LEB (64 years for males and 70 years for females). Because it might be due to the fact that China is the most socially and economically more developed than Myanmar. Thus, socio-economic development could have a great impact on mortality decline. Hence, the mortality estimates reflect the state of country health, socio-economic status.

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LIST OF ABBREVIATIONS

ALT	Abridged Life Table
LEB	Life Expectancy at Birth
LT	Life Table
UN	United Nations
WHO	World Health Organization
MDGs	Millennium Development Goals
SDGs	Sustainable Development Goals

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

Every human being is interested to know how many years they will have to live in the world. The life table or the mortality table is a mathematical model that portrays mortality conditions at a particular time among a population. It is a convenient method for measuring the mortality experience of any population group and provides concise measures of the longevity of that population.

Life tables called 'mortality tables' in many countries provide the most complete statistical description of mortality. The measurement of mortality and the discovery of its relation to other demographic, economic and social phenomena are among the most important aspects of population study. The life table is constructed to show what would be the number of survivors from birth to successive ages. It is one of the decisive factors influencing the number of inhabitants. It is an important indicator of health conditions as well as of the overall social and economic well-being of a population. Estimates of Mortality supply requisite data for national health planning and population projections. Moreover, it is directly affected by the level of development and the standard of living.

These life tables may be tabulated as 'complete (or unabridged) life table' and 'abridged life table' according to the length of the age interval. A complete life table contains data for every single year of age from birth to the last applicable age. An abridged life table contains data at intervals of 5 or 10 years of age for most of the age range. Demographers usually prepare the simple abridged life table rather than the more elaborate complete life table. The abridged life tables are sufficiently detailed for most purposes and more convenient to use.

A life table is employed by a variety of specialists in a variety of ways. It is used by public health workers, demographers and many others in studies of longevity, fertility, migration and population growth. Also it is used in making projections of population size and characteristics and in studies of widowhood, orphanhood, length of married life, length of working life and length of disability free life.

In Myanmar and other countries, also for the above reasons, it is needed to construct a life table for the whole country. The construction of life tables by using conventional methods require the information on population and deaths classified by

age and sex. It is expected that these results can be used as a comparison of the mortality conditions of Myanmar with other countries. Continued decline in mortality in Myanmar has been observed, for the past few decades. It is associated with health services and other environmental and sanitation factors. The expectation of life at birth is suitable not only as a representative index of the life table of a population, but also as a summary indicator of health improvement. It refers to the occurrence of deaths depends on the quality of life and access to the health care services. Furthermore, it is important in determining the level of development in a country. Therefore, the recent life tables are estimated indirect demographic techniques in this thesis.

1.2 Objectives of the Study

The main objectives of this study are

- (i) To construct the estimated life tables in Myanmar.
- (ii) To compare the life expectancy at birth in Myanmar and some Asian Countries.

1.3 Method of Study

The life tables are constructed by three methods: the Reed-Merrell method, Greville's method and the Keyfitz-Frauenthal method. And then, each of the indirect method is applied to estimate life expectancy in Myanmar. Moreover, the estimated life expectancy at birth in Myanmar and some Asian Countries are compared.

1.4 Scope and Limitations of the Study

This study is based on secondary data. The secondary data are obtained from various issues of Statistical Year Book in Myanmar (2018), 2014 Thematic Censuses Report in Myanmar. And then, some Asian countries data are obtained from World Population Prospects 2019.

1.5 Organization of the Study

This thesis is divided into five chapters. The first chapter includes rationale of the study, objectives of the study, method of study, scope and limitations of the study and organization of the study. The second chapter describes literature review. The third chapter presents indirect methods of constructing abridged life tables. The fourth

chapter describes construction of the estimated life expectancy in Myanmar and some Asian countries. The last chapter consists of conclusion for this study.

CHAPTER II

LITERATURE REVIEW

A life table is a terse way of showing the probabilities of a member of a particular population living to or dying at a precise age. It is another effective way of expressing the death rates experienced by a population during a given period of time. The death rates were discussed and referred by many researchers as observe rates, but one of the problems of using these rates as levels of death rates is that the effect of age distribution of an actual population is reflected or requires the adoption of normal populations for acceptable comparison of levels of mortality in different populations. To overcome these problems, life table is used. Life table best expresses the pattern of human mortality. It presents a detailed sketch of a population that systematically gets depleted through death at each age.

In the year 1960, Keyfitz defines life table as the scheme for expressing the form of mortality in terms of probabilities. He further states that it is also a model of a population covering the simplest case which is discussing: a cohort or group of people born at the same moment close to migration and followed through successive ages until they die. The life table has given its shape to the natural world like other successful models; researchers are incapable of thinking about population change and mortality for any other starting point. Sometimes, life table is referred to as the mortality table which is one form of combining the mortality rates of a population at different ages into a single statistical model. The construction of life table tells about the general mortality trends existing among male and female populations or mortality status of people.

2.1 Review of Births and Deaths Registration

Accurate and timely data for mortality by age, sex and cause of death both nationally and sub-nationally are essential for the design, implementation, monitoring and assessment of health programmes and policies. Various research studies have been conducted in Myanmar and other countries of the globe on different aspects of mortality. With reference to the objectives of the present study, relevant literature as per availability to the researcher have been reviewed and reported.

In countries with well-developed statistical systems, the necessary information for such descriptive epidemiology is derive from civil registration, medically certified

cause of death, population counts from regular censuses or population registers. Both national governments and international communities have given high priority to policies that will upgrade civil registration system so that all countries will enjoy the benefit of a solid empirical base for health sector planning. However, experience has shown that such improvements need investment not only in administrative systems but also in public awareness.

The study by Ndong I, et al., (1994) was designed to evaluate the accuracy of vital registers as sources of data for infant mortality rates in Cameroon. It says there were only 4% registered cases for infant deaths. According to McCaw Binns AM et al., (1996) registration of infant deaths in Jamaica reported 13% of still births and 25% of infant deaths.

Annual summary of vital statistics by Guyer B et al, (1995) found that in United States of America, the preliminary infant mortality rate was 7.5 per thousand live births and it was the lowest ever recorded. The decline occurred for neonatal as well as for post neonatal mortality rates.

Guyer B, et al., (1996) in Annual summary vital statistics 1996 found that in United States of America, life expectancy at birth reached 76.1 years for all gender and race group combined. Age adjusted mortality rates declined in 1996 for disease of the heart, malignant neoplasm, cerebrovascular diseases, Accidents, suicide, homicide chronic liver diseases and cirrhosis etc.

T.M. Akande and O.O Sekoni, (2005) in their study conducted in Nigeria showed that though awareness of birth registration was high in the study population, the awareness of death registration was however very low. Of the 209 households that recorded deaths in the last 10 years, only 14 (11.8%) households reported registered deaths.

In the Setting Priorities using Information on Cost- Effectiveness analysis project (SPICE, 2005-06) conducted at Thailand for improving vital statistics and cause of death data they found, incompleteness of death registration to be 5% and ill defined cause of registered deaths from Verbal autopsy.

European region had highest number of countries (39 out of 52 countries) who reported complete cause of death data. Whereas African region had the lowest, it has only one country reporting the complete cause of death data (WHO, 2010).

Ruzicka and Lopez (1990) have listed five criteria used by the World Health Organization to assess fitness of country level cause of death data for inclusion in its

complications. These are basically plausibility checks. All cause and cause specific mortality rates for the population could be obtained by high quality national vital registration systems with death registration completeness of at least 70%.

The study by Mather CD and et al.,(2009), that examined data on deaths for 136 disease and injury; causes were estimated from available death registration data (111 countries), sample death registration data (India and China) and for the remaining countries from census and survey information. They found that, heart disease and cerebrovascular diseases are the leading causes of death, followed by lower respiratory infections, chronic obstructive pulmonary disease and diarrhea diseases. HIV, AIDS and TB are the sixth and seventh most common causes of death. It says globally around 6 in 10 deaths are from non-communicable diseases, 3 from communicable diseases, and 1 from injuries. Injury mortality is highest in South –East Asia, Latin America and Eastern Mediterranean region. Philip W. Setel and et al., (2005) had mentioned in their publication that registration or recording of death by age, sex and cause and calculating mortality levels were basic needs for evidence based health policy, monitoring and evaluation. But only few countries have complete death recording with correct cause of death data.

A study, “The Completeness of Death Registration in Thailand”, promote Prasartkul and Patama Vapattanawong (2006) asserted the quality of mortality data from the Registration system of Thailand. The study took the advantage of Kanchanaburi Project by comparing the deaths found in annual censuses to those recorded in Civil Registration system in order to measure the level of under registration. They pointed out the gap between the multiple steps of death registration.

Hill K (2007) found that, the total number of countries whose death registration regarded as complete increased by only seven countries for 1970 to 1990s. Joachim Cohen and et al.,(2007) studied the death records of nine European countries of which data of five countries were found to be fulfilling all criteria for finding the place of death and at the end they concluded that death certificate provided information on place of death and possibly associated factors.

India had seen an uprising trend in the level of death registration since last 25 years. It varies from state to state. Seal KC, Talwar PP (1998) in their study suggested some steps for improving the vital registration system which include the enforcement of compulsory vital recording, simplified registration rules and procedures,

involvement of notifies, reconciliation between SRS vital statistics and provision of minimum essential staff.

2.2 Historical Background of Life Table

Emilius Macer was the person who first published the table of mortality or life table to the Roman Juris-consulate, the table dates about the year 225 A.D. Macer's table. A more correct schedule was developed by Ulpian a few decades later. The table was named Ulpian's table and was considered more correct than that of Macer because it reflect the actual expectancies. John Garaunt in 1662 tabulated the number of deaths based in the study "bill of mortality" in 1658 on the city of London. This was basic life table which became the origin of the concept of life table. However, the life table was defective because it was based on mortality experience alone.

In 1693, the first mortality table is usually credited to Edmund Halley who constructed a life table base on the data from Breslau city in Poland. The table thought to be the first and as well as best of its kind. Halley's table based on the data concerning birth and death during the year 1687 to 1691 which contained the most of the column of modern life table with new application extended to insurance, pension and annuities. The table became the accepted standard of its time and it could not be corrected because it was based on the assumption that the population had remained stationary which was not possible entirely.

In 17th and 18th century, several attempt where made for constructing a life table on the basis of limited or incomplete data. In 1746 Antoine de Parcieux also contributes in the development and calculation of expectations. Milne in 1815 was the first to prepare and published a scientifically correct life table classified by age based on both population and death data.

In the 1840s, the Registrar General William Farr established an official English life table, and similar work was carried out in a number of other European countries in the later nineteenth century. In the United States, the first official complete life tables have been prepared since 1900-1902 in connection with the decennial censuses of population. These tables are based on the registered deaths in the expanding Death Registration Area.

With the spread of data collection and analysis since the Second World War, life tables have been produced for most countries, nevertheless the accuracy of many

from the Third World is questionable. On the basis of the more reliable life tables, several series of Life Tables have been developed. These are particularly useful in the estimation of mortality and other processes for population for which reliable data are unavailable.

2.3 Concepts of Life Table

Life tables are a basic demographic tool for analyzing mortality and survival. They are a tabular numerical representation of death and survivorship rates at each age of life. Two types of life table can be distinguished according to the reference year of the table, namely, the current or period life table and the generation or cohort life table. The most common type of life table is the current or period life table. The life tables are based on death rates during a specific period, and such tables are called period, current or cross-sectional life tables. Period life tables are based on the age-specific death rates of the population during a specific period of time. Life expectancy is a summary measure of those age-specific death rates, but it is a hypothetical life expectancy assuming people experience the age-specific death rates of that period over their lifetime. In contrast, cohort or generation life tables are based on the age-specific death rates of people over their lifetime. The generation life table can be constructed only after all or almost all the members of the birth cohort have died. Data over a long period of years are needed to complete a single table and it is impossible, wholly on the basis of actual data, to construct generation tables for cohorts born in this century. So, this type of life table is not practically used. It is useful for projections of mortality, for studies of mortality trends and for the measurement of fertility.

Obviously, these two types of life tables present different pictures of mortality conditions. The current life table presents a picture of mortality as of one moment of time, one year, three years or even ten years perhaps. The cohort life table presents a historical record of cohort that has actually occurred. In practice, the cohort life table is less useful for studies of current demographic problems than a current life table. At present, cohort life tables are used only for certain types of highly specialized demographic research.

Life tables are generally constructed for the various segments of a population which have differing patterns of mortality. Thus, since there are significant

differences in mortality between males and females, separate life tables for each are usually constructed. In countries where there are two or more important racial groups, separate life tables are often constructed by race as well as by sex. Sometimes, also, separate life tables are constructed for other sub-groups of a nation such as the Urban and Rural populations.

These life tables may be tabulated as 'complete (or unabridged) life table' and 'abridged life table' according to the length of the age interval in which the data are presented. A complete life table contains data for every single year of age from birth to the last applicable age. The construction of a complete life table has three distinct phases. First, the quality of basic data should be examined carefully for inconsistencies, biases and other sources of errors. The necessary adjustments should be made in the light of all information on hand. The second phase involves the computations and the graduation of the mortality rates, the third phase, and the computation of the remaining life table columns.

An abridged life table, on the other hand, contains data by intervals of 5 or 10 years of age. For many practical demographic purposes, abridged life tables are useful as fully as complete ones. Values for 5 or 10 year intervals are sufficiently accurate for most purposes and the abridged life table is less burdensome to prepare. Moreover, an abridged life table is more convenient to use. An 'abridged life table' covers the complete range of age. The size of the error in each of the specific functions seems to be so small as not to preclude the use of the abridged life table for many demographic purposes.

The most interesting and useful method has been devised to construct abridged life tables. The basic procedure involves determining the mortality rates for the specified age groups for the particular population for which the table is being calculated. Determining the mortality rates involves two steps, such as correcting the population data, and correcting the reported mortality statistics for the same population by age of death.

2.4 Life Table Functions

The conventional life table consists of seven columns, six of which represent are called the 'life table functions'. A brief description of each column is as follows;

Column 1: Exact Age (x)

The first column of the life table specifies the age at which the latter columns of the table refer. The letter x is used to represent exact age. Some of the life table functions refer to the exact age x and some refer to the age interval between exact age x and exact age x+1.

Column 2: Probability of Dying between Age x and Age x+n (${}_nq_x$)

The second column of the life table (${}_nq_x$) is the proportion of the persons in the cohort alive at the beginning of an indicated age interval (x) who will die before reaching the end of that age interval (x+n). In other words, the ${}_nq_x$ values represent the probability that a person at his x^{th} birthday will die before reaching his (x+n)th birthday.

Column 3: Survivors at Exact Age x (l_x)

The third column of the life table (l_x) represents the number of people who have survived from birth to exact age x. The initial cohort, the radix, is 100,000. The number of survivors at any age (l_x) is equal to the product of l_{x-n} and the value of the mortality rate for the preceding age interval (q_{x-n}), subtracted from the number who survive to the beginning of the preceding age interval (l_{x-n}). In formula:

$$l_x = l_{x-n} - (q_{x-n} \times l_{x-n})$$

Column 4: Number of Deaths between Age x and Age x+n (${}_nd_x$)

The fourth column represents the number of deaths between age x and age x+n. Symbolized ${}_nd_x$, it is equal to the number surviving to exact age x (l_x) multiplied by the probability of dying between age x and age x+n.

$${}_nd_x = l_x \times {}_nq_x$$

The number of cohort deaths (${}_nd_x$) is also equal to the difference between the number surviving at age x and the number surviving at age x+n, i.e:

$${}_nd_x = l_x - l_{x+n}$$

Column 5: Years lived between Age x and Age x+n (L_x)

The fifth column of the life table (L_x) represents the number of person-years lived by the cohort during an age interval.

$$L_x = (l_x + l_{x+n}) \div 2$$

Column 6: Total years lived after exact age x (T_x)

The sixth column of the life table gives the number of person-years lived after exact age x.

$$T_x = \sum L_i$$

Where L_i = entry i in the L_x column and

$\sum L_i$ = the sum of the L_x column starting with entry x and adding entries x+1, x+2, etc., until the last entry has been added.

Column 7: Expectation of life, or Average number of years lived after exact age x (e_x)

The last column in the life table is one of the most commonly used. Expectation of life, or average number of years lived after exact age x (e_x) can be calculated by the following formula.

$$e_x = \frac{T_x}{l_x}$$

2.5 Significant Historical Contributions to the Construction of Abridged Life Tables

The history of life table construction reflects increasing refinement of the method. For instance, although the tables were based solely on recorded deaths, Milne's table of 1815 took into account population figures as well. In 1839 the English Life Tables were constructed using only registered births and deaths since, due to the influence of William Farr, census figures were found to be unreliable. Other significant contributions and refinements followed, in particular those of Moore, Day, Wickens, Pell, King, Derksen, Greville, Reed-Merrell, Wiesler, Keyfitz, and Sirken.

2.6 Usefulness of Life Table

The life table has a number of very important uses, foremost of which is its use in the analysis of mortality conditions in given areas or population groups. It is used as a tool for demographic analysis, which is influenced by mortality. It is used in studies of longevity, fertility, migration and population growth as well as in studies of widowhood, orphanhood, length of married life, length of working life and length of disability-free life. Moreover, a life table is used in making projections of the future

population needed to determine the number of schools or hospitals required, depending on estimates of how long people survive.

The statistics from the vital registration system are known to be deficient in many countries. In such cases, it is sometimes possible for the actuaries or demographers to construct life tables which are usable approximations to the true pattern of death rates existing in that nation and which are more nearly accurate than are the death statistics as officially reported.

The various functions of the life tables of different population groups can be compared easily and meaningfully for the purposes of determining relative mortality. The e_x column of the life table is particularly useful. In comparing the mortality of two countries, the death rates and even the standardized death rates have weakness. Since the life expectancy figures in the life table are derived from a model that excludes migration and holds fertility constant, the values of e_x function are often used to compare the mortality of different countries or the same country at several points in time.

The value of LEB, life expectancy at birth, is used most frequently. Although the most accurate comparison of mortality in two countries involves a detailed analysis of all the q_x values or all the e_x values, the life expectancy at birth is a good summary measure. It has some hazards because the value of LEB is disproportionately affected by the infant mortality rate but infant mortality rates are usually highly correlated with death rates at other ages. Further, the value of LEB has an immediately appealing interpretation: LEB measure how long members of a cohort can expect to live on average if mortality conditions remain the same in the future.

In summary, the various functions of the life tables of different populations groups can be compared easily and meaningfully for the purposes of determining relative mortality. Perhaps the most familiar of such comparisons is that of the life expectancy at birth. Life table functions are often utilized also for making comparisons among various nations and over time periods; in such cases life table functions can serve as substitutes for standardized death rates. Finally, the study and analysis of these functions, is helpful to the solution of many public health and medical problems.

2.7 Importance of Life Table

Life tables have been constructed by Graunt, Reed and Merrell, Keyfitz, Greville and other demographers for estimating population trends regarding death rates, average expectation of life, migration rates, etc.

The importance of life table can be seen in the following:

- (i) Life table is used to project future population on the basis of the present death rate.
- (ii) It helps in determining the average expectation of life based on age specific death rates.
- (iii) The method of constructing a life table can be followed to estimate the cause of specific death rates, male and female death rates, etc.
- (iv) The survival rates in a life table can be used to calculate the net migration rate on the basis of age distribution at 5 or 10 year interval.
- (v) Life tables can be used to compare population trends at national and international levels.
- (vi) By constructing a life table based on the age at marriage, marriage patterns and changes in them can be estimated.
- (vii) Instead of a single life table, multiple decrement life tables relating to cause specific death rate, male and female death rates, etc. can be constructed for analyzing socio-economic data in a country.
- (viii) Life tables are particularly used for formulating family planning programmes relating to infant mortality, maternal deaths, health programmes, etc. They can also be used for evaluating family planning programmes.
- (ix) Life tables are used by life insurance companies in order to estimate the average life expectancy of persons, separately for males and females. They help in determining the amount of premium to be paid by a person falling in a specific age group.

Besides, if an insured person dies before the policy matures, the life table provides economic support to the insurance company without facing financial loss and it is able to give the insured amount to the legal heirs of the deceased.

CHAPTER III

INDIRECT METHODS OF CONSTRUCTING ABRIDGED LIFE TABLES

The current life table furnishes information not obtainable from other sources. It provides the public health worker, demographers and other research workers with tools for making international comparisons as well as for comparing contemporary groups within a country or for assessing trends within a given population. The estimate of life table has the advantage over other mortality indices of being independent of age and sex distributions.

Life table estimates have the disadvantage of any statistics based on the population census and vital records. Individuals or entire households may be missed by the census taker or overlooked by the informant. Some of the people are forgotten their young children, survival infancy and migrated young population. Misstatements of age are clearly discernible in bar graphs of the age distribution particularly the overstatement of the ages of young children (followed by an understatement in the middle years), of persons approaching retirement age, and of the very old; in addition, a heaping is found for ages in multiples of five and at even ages. Hence, the certificates of birth and death registrations should be cross-checked.

Completeness of birth registration varies from country to country and must occasionally be checked. Death registration can be improved by the requirement that it be filed before a burial permit is issued. These defects in mortality data and population census have a marked effect on the complete life table.

There are three disadvantages of complete life tables such as; (i) the necessary data for intervals of one year of age is frequently not available; (ii) computations are tedious and time-consuming when computer services are not available; (iii) a table consisting of 85 or 95 age group does not present a concise picture of the mortality experience of a population. These objections can be obviated by constructing an abridged life table rather than the complete life table.

Construction of life tables is based upon the information of population census and vital statistics reports. However, in Myanmar, as in many developing countries, information on the censuses and vital statistics are sometimes incomplete to be used directly for construction of a life table. Therefore, it is necessary to construct life table by indirect methods.

3.1 Sources of Mortality Data in Myanmar

There are three main sources of mortality data in Myanmar. They are (i) Censuses, (ii) Vital Registration and, (iii) Survey.

3.1.1 Censuses

The history of census taking in Myanmar dates back to 500BC during the era of King Thadodipa Mahadamayaza of the Tagaung Dynasty. The first population census of Myanmar under the British administration was carried out in 1872 and thereafter every ten years starting from 1881. The last pre-war census was carried out in 1941. The 1872 and 1881 censuses covered only lower Myanmar, as a part of the census of India. From the year 1891, nation-wide censuses were conducted regularly up to 1941. The first post-World War II census planned to be carried out in three stages. The first stage covered 252 towns in 1953 and the second stage covered 3159 village tracts in 1954. The third stage designed to cover the rest of the country, but it could not be carried out due to unsettled conditions in the country. Two nation-wide censuses after independence were taken at first in 1973 and the second in 1983. The first nation-wide census in 1973 was conducted on a de-jury basis. The census covered about 85.1 percent of the total area and 97.1 percent of the total population (Union of Burma 1976). According to the 1983 census, there were 2190 wards or 288 towns representing the total urban area and 13756 village tracts in the whole country. All urban areas and 12814 village tracts were completely covered. Out of the remaining village tracts, 112 were partially covered and 830 were omitted for security reasons. As a result, the coverage of 1983 census was 96.6 percent of the estimated total population (Union of Burma 1986 b; Part I).

The first country-wide census in the post-war era was taken in 1973. It was taken as a mass movement with the following purposes in mind:

- (i) For the preparation of the electoral rolls,
- (ii) For assessing the size of manpower and its demographic characteristics and also,
- (iii) For gathering some socioeconomic information.

The 1973 census covered 85 percent of the total area and 97.1 percent of the total population. The second post-war decennial census was taken in April 1983 with the following objectives;

- (i) To obtain reliable population statistics needed for implementing economic, social planning and administrative services of the country.
- (ii) To make basic scientific analyses and research on the current state of the population such as size composition, distribution, growth and changes, etc.
- (iii) To provide Government institutions with important social, economic and demographic information required to fulfill their respective functions and demographic information required to fulfill their respective functions and
- (iv) To provide a basic frame for social, economic and other sample surveys.

For the 1983 census, the respective committees were formed at the central, State and Division, township, wards and village tract level to conduct the census operation as a national undertaking.

The 2014 Myanmar Population and Housing Census were conducted from 29th March to 10th April 2014. This is more than 30 years after the last census in 1983. Censuses are the main source of demographic and socio-economic information in developing countries. Such information is critical to determine levels and changes in the size, distribution, socio-economic characteristics of the population and households over time. In a country like Myanmar, reliable, accurate and timely data is vital for effective development planning, evidence-based decision-making, the peace process and transition to democracy, investment decisions and research. It is therefore important that the data used to assess such changes is accurate and updated regularly.

For this reason, the Government of Myanmar conducted the 2014 Population and Housing Census as a necessary pre-requisite for assessing the socio-economic needs of its population. The Government attaches great importance in determining the size, distribution and characteristics of the population in pursuit of its programs for the political and economic reform processes, national development, peace and transition to democracy and cohesion of the country. The successful planning, enumeration and now publishing of provisional results is testimony to the Government's commitment to the political and economic reform process, national cohesion and inclusive development. The provisional results and the subsequent data will effectively inform the planning and decision making processes in our quest for national development. The 2014 Myanmar Census was conducted under the legal framework of the Population and Housing Census Law No. 19 of 2013. The law empowers the Ministry of Immigration and Population to collect, process, analyzes, publish and disseminate information through the census program.

3.1.2 Vital Registration

A vital statistics system is defined as the total process of collecting information by civil registration, vital events, and relevant entities concerned within the boundaries of a country. Vital statistics is important for the socio-economic situation of a population, communities and the need for development in a country. The vital events of interest are: live births, adoptions, legitimating, recognitions, deaths, marriages, divorces and separations. A system for registering births and deaths is organized by units of government. Vital registration system has always been an important source of demographic data for the measurement of population change.

The civil registration system continues to be the primary source of vital statistics in most countries. A fully functioning civil registration system can indicate patterns in mortality, life expectancy, fertility and other important issues. Vital statistics generated from civil registration significantly contribute to the formulation of effective and efficient evidence-based policy across multiple sectors. Reliable information on births, fertility and deaths enable the calculation and production of timely and accurate population estimates and other demographic and health statistics.

Myanmar has a long history of registering vital events experienced by its population. Myanmar's registration and vital statistics system was initially implemented in 1886, through the first Myanmar census during the regime of King Mindonmin. Myanmar's collection of vital registration data in the post-colonial era was required under the Village Act of 1952. In 1964, the management of registration and vital statistics was transferred to the Central Statistical Organization: the implementation of the system. A comprehensive census was conducted in 1983. With the absence of census data for the 30 years following the 1983 census, the Statistical Year Book published by the Central Statistical Organization was the only source of information on vital statistics in the country. In 2014 another comprehensive census was conducted by the government: preliminary data was released in early 2015.

The purpose of a vital registration system is to make available useful statistics for planning, executing and evaluating of public health programs and to provide basic statistics for demographic research.

3.1.3 Survey

As mentioned above, it is better to count deaths prospectively so that the mortality rates calculated represent recent events. However, sometimes the system to count deaths does not exist during an earlier time period in which you want to measure mortality. In such cases, mortality can be measured using surveys. Just as with nutritional status or other health outcomes, mortality information can be collected from the randomly selected households. The people living in these households report the number of deaths which have occurred in that household during a specific time period. During data analysis, the information on deaths for all the households included in the survey sample is put together. In order to calculate a mortality rate from data obtained by a survey, only deaths which occurred in a defined period in the past, call the recall period should be included. To improve the accuracy of mortality estimates in cross-sectional surveys, the beginning of the recall period should be a memorable date known to everyone in the population.

There is no absolutely “correct” length for a recall period for surveys measuring mortality rates. The recall period should be based on the objectives of the survey and the following factors:

- (i) **Accuracy:** the recall period should be short enough to allow accurate recall of information about the death. For most purposes, a recall period greater than one year probably will result in less accuracy.
- (ii) **Statistical precision:** the recall period should be sufficiently long to provide enough person-time units to obtain the desired precision around the estimates of the mortality rate. For sample sizes used in many surveys, such as 1,000 households, a recall period substantially less than 90 days produces relatively poor precision.
- (iii) **Recent changes in mortality rates:** if mortality rates are changing rapidly, you may not be interested in the average rate over the last year, but rather the average rate over the prior few months. The population should also have a relatively constant mortality rate during the recall period. This may have to be assumed if no information is available.
- (iv) **Seasonality in mortality:** if you are trying to measure the impacts on mortality of factors not determined by season, the recall period should be chosen to cover several seasons so these effects can be mitigated.

- (v) **Logistic considerations:** longer recall periods reduce the number of households which need to be included in the survey sample and therefore the time needed to complete the survey.

3.2 Required Data for Construction of Life Table

The fundamental necessary data for the construction of a general population life table are:

- (i) The number of deaths experienced by the population during the period, the deaths being classified by age
- (ii) An enumeration of the population for the mid-date of the period covered by the deaths, the population being similarly classified by age
- (iii) Births for the period

Population statistics are customarily gathered at census enumeration and presented in reports which give details of the population with respect to age, sex, race, residence, etc. Births and deaths statistics are collected from the vital statistics reports. But, in some countries, in the absence of birth and death data, life tables have been constructed on the basis of the age distributions of the population at censuses.

3.3 Construction and Assumption of Abridged Life Tables

The abridged life tables were constructed by Reed-Merrell method, Greville's method and Keyfitz-Frauenthal method. To construct the various current life tables for Myanmar, the following data are required:

- (i) Number of deaths in specific years, by age group and sex, for Myanmar;
- (ii) Number of births in specific years, by sex, for Myanmar;
- (iii) Population counts from the census, by age group and sex, for Myanmar;

A typical life table illustrates some of these data plus derived information, including death rates, mortality rates, and life expectancies (see Life table elements).

The life table elements are:

- (i) ${}_n m_x$ = observed death rate for the age interval from x to $x+n$
- (ii) ${}_n P_x$ = observed population count for the age interval from x to $x+n$
- (iii) ${}_n q_x$ = proportion of the cohort alive at age x who died during the age interval from x to $x+n$ (mortality rate)
- (iv) l_x = number alive at age x (out of an initial cohort of $l_0 = 100,000$)
- (v) ${}_n d_x$ = number in the cohort who died during the age interval from x to $x+n$

- (vi) ${}_nL_x$ = number of person-years lived by the cohort during the age interval from x to x+n
- (vii) T_x = number of person-years lived by the cohort at age x and all subsequent ages
- (viii) e_x = life expectancy at age x (average number of years of life remaining)

A life table is based on the following assumptions:

- (i) A hypothetical cohort of life table usually comprises of 1,000 or 10,000 or 1,00,000births.
- (ii) The deaths are equally distributed throughout the year.
- (iii) The cohort of people diminishes gradually by death only.
- (iv) The cohort is closed to the in-migration and out-migration.
- (v) The death rate is related to a pre-determined age specific death rate.
- (vi) The cohort of persons dies at a fixed age which does not change.
- (vii) There is no change in death rates overtime.
- (viii) The cohort of life tables are generally constructed separately for males and females.

3.4 Age Specific Death Rate

Age specific death rates (${}_n m_x$) were computed by using the formula:

$${}_n m_x = \frac{{}_n d_x}{{}_n p_x}$$

where, ${}_n d_x$ = estimated number of deaths of persons who died between age x and age x+n

${}_n p_x$ = number of persons alive between age x and age x+n.

These rates were separately showed by Myanmar's Union; Urban and Rural areas in 2016 see Appendix Table (1).

3.5 Specific Short-Cut Methods

The most fundamental step in life table construction is to convert the observed age-specific death rates into their corresponding mortality rates, or probabilities of dying. In a complete life table, the basic formula for this transformation is

$${}_n q_x = \frac{2m_x}{2+m_x}$$

where, m_x is the observed death rate at a given age and q_x is the corresponding probability of dying. As stated earlier, this formula is based on the assumption that deaths between exact ages x and $x + 1$ are rectangular distributed by age and time interval. One of the key features of the various shortcut methods described below is the procedure for making this basic transformation from m_x to q_x when the data are grouped. Another difference in the methods is in the way the stationary population is derived. The three shortcut methods are: the Reed-Merrell method, the Greville's method and the Keyfitz-Frauenthal method.

3.5.1 The Reed-Merrell Method

The Reed-Merrell method was the most frequently used shortcut procedures for calculating an abridged life table. In this method the mortality rates are read off from a set of standard conversion tables showing the mortality rates associated with various observed central death rates. The standard tables for ${}_3m_x$, ${}_5m_x$ and ${}_{10}m_x$ were prepared on the assumption that the following exponential equation holds:

$${}_nq_x = 1 - \exp[-n \cdot {}_nm_x - a \cdot n^3 \cdot {}_nm_x^2]$$

where, n is size of the age interval, ${}_nm_x$ is the central death rate, a is a constant, and e is the base of the system of natural logarithms. Reed and Merrell found that a value of $a = 0.008$ would produce acceptable results. The conversion of ${}_nm_x$'s to ${}_nq_x$'s by use of the Reed-Merrell tables is usually applied to 5-year or 10-year data, but special age groups are employed at both ends of the life table. At the younger ages the most frequently used groupings are (i) ages under 1, 1, and 2 to 4 or (ii) ages under 1 and 1 to 4.

The conversion tables are used to derive ${}_5q_x$ from ${}_5m_x$ for all 5-year age groups from 5 to 9 on. At the higher ages, the mortality rate for the open-end group (e.g., 85 years old and over) is evidently equal to one because the life table ends at the age where there are no more survivors.

Once the mortality rates have been calculated, the construction of the abridged life table continues with the computation of each entry in the survivor column, l_x , and the death column, ${}_nd_x$, along standard lines, using the formulas

$$l_{x+n} = (1 - {}_nq_x) l_x$$

$${}_nd_x = l_x - l_{x+n}$$

All three shortcut methods described in this section follow the same procedure in deriving l_x and ${}_n d_x$. In the calculation of the next life table function, ${}_n L_x$, each of the three methods to be discussed follows a different procedure. In the Reed-Merrell method, T_x values are directly determined from the l_x 's for ages 10 and over, or 5 and over, by use of the following equations:

$$T_x = -.20833l_{x-5} + 2.5l_x + .20833l_{x+5} + 5 \sum_{\alpha=1}^{\infty} l_{x+5\alpha}$$

if the age intervals in the table are 5-year intervals, and

$$T_x = 4.16667l_x + .8333l_{x+10} + 10 \sum_{\alpha=1}^{\infty} l_{x+10\alpha}$$

For the ages under 10, Reed and Merrell note that L_x may be determined directly from the following linear equations:

$$L_x = \frac{n}{2}(l_x + l_{x+n})$$

The conversion tables are employed to obtain ${}_n q_x$ at all ages and use is made of the tables for m_0 , ${}_4 m_1$, and ${}_5 m_x$. The steps are as follows:

- (i) Read off ${}_n q_x$ values corresponding to ${}_n m_x$ values from the appropriate conversion table.
- (ii) Derive the l_x and ${}_n d_x$ columns by the following steps:
 - Multiply q_0 by the radix l_0 (100,000) to obtain d_0 .
 - Subtract d_0 from l_0 to get l_1 .
 - Continue multiplying the successive values of l_x by the corresponding ${}_n q_x$ values to get ${}_n d_x$ and subtracting the successive values of ${}_n d_x$ from l_x to get l_{x+n} .
- (iii) Sum the values of l_x from the end of life to age x .

$$l_x = \sum_{\alpha=0}^{\infty} l_{x+5\alpha}$$

- (iv) Substitute these sums and the indicated L_x values to get T_x .
- (v) Compute the value of e_x as the ratio of T_x to l_x .

3.5.2 The Greville's Method

A method suggested by T. N. E. Greville (1943) converts the observed central death rates to the needed mortality rates by the use of the formula

$${}_nq_x = \frac{{}_nm_x}{\frac{1}{n} + {}_nm_x \left[\frac{1}{2} + \frac{n}{12} ({}_nm_x - \log_e c) \right]}$$

where, c comes from an assumption that the ${}_nm_x$ values follow an exponential curve. $\log_e c$ could be assumed to be about 0.095. The derivation of ${}_5q_{55}$ by this method requires several columns in a manual calculation, but it may be programmed for direct calculation by computer on the basis of the ${}_5m_x$'s and the two constants, n and $\log_e c$. In Greville's method, the central death rates in the life table and in the observed population are assumed to be the same, and the desired value of ${}_nL_x$ is calculated by the use of

$${}_nL_x = \frac{{}_nd_x}{{}_nm_x}$$

For the last age interval, that is, the interval with the indefinite upper age limit, the usual approximation for L_x is

$${}_{\infty}L_x = \frac{l_x}{{}_{\infty}m_x}$$

3.5.3 The Keyfitz-Frauenthal Method

Keyfitz and Frauenthal (1975) suggested the following procedure for converting the annual central age-specific death rate to the life table ${}_nq_x$:

$${}_nq_x = 1 - \exp \left[-n \times \left({}_nm_x + \frac{({}_nP_{x-n} - {}_nP_{x+n})({}_nm_{x+n} - {}_nm_{x-n})}{48 {}_nP_x} \right) \right]$$

where, P is the observed population in the age interval. The desired value of ${}_nL_x$ is calculated as

$${}_nL_x = \frac{n(l_x - l_{x+n})}{\ln l_x - \ln l_{x+n}} \left[1 + \frac{n}{24} ({}_nm_{x+n} - {}_nm_{x-n}) \right]$$

The Keyfitz-Frauenthal method shows the calculation of an abridged life table. The steps are as follows:

- (i) Set down n, the width of each age interval.
- (ii) Calculate differences between alternate populations and between alternate death rates, and multiply them together, to obtain the numerator.
- (iii) Calculate the denominator.
- (iv) Obtain value of exponential term.
- (v) Calculate ${}_nq_x$ and ${}_nL_x$.
- (vi) Calculate T_x and e_x in usual manner. Save ${}_{\infty}L_x$ by $l_x \div {}_{\infty}m_x$.

3.6 Comparison of Abridged Life Table with Three Methods

There are a wide variety of analytical methods to identify the set of abridged life tables best fit to the actual population under observation. The most appropriate mortality level of abridged life table is determined on the basis of sex-age structure of the population enumerated in a census or a survey.

Even if actual life tables are available, a comparison of abridged life tables with three methods may be undertaken for some specific objectives in analytical studies of mortality as is done in practice in the present analysis. Since the life expectancy at birth is known from the actual life table, the value of LEB may be taken as a key function for the interpolation purpose in this case. For example, if the given value of LEB is located between mortality levels (n) and (n+1) of abridged life tables, the exact level of mortality corresponding to the given value of LEB can be obtained. For the present analytical study, an attempt has been made to compare the age pattern of mortality rates with three methods of abridged life tables for Myanmar and some Asian countries.

CHAPTER IV
CONSTRUCTION OF THE ESTIMATED LIFE EXPECTANCIES IN
MYANMAR AND SOME ASIAN COUNTRIES

The measurement of mortality is involved in many types of demographic studies, life table techniques can be used as a special tool for measuring mortality in a wide variety of population studies. Life tables prepared from these data portray the mortality experience of the population observed during the period. In this chapter, the constructions of life tables are calculated by using specific short-cut methods. The results are compared with other studies of the past mortality trends. Moreover, these results are compared with Myanmar and some Asian countries.

4.1 The Reed-Merrell Method

The relationship between the probability q_x and the mortality rate, m_x , Lowell J. Reed and Margaret Merrell studied extensively some thirty-three tables in J. W. Glover's 1910 series of United States Life Tables. Their findings were published in 1939 showing that ${}_nq_x$ describes satisfactorily the entire range of observations in Glover's tables. Many formulas are also given to determine the L_x column from the number of survivors l_x in the life table.

Life table is a key summary tool for assessing and comparing mortality conditions prevailing in population. The application of the life table functions was used to generate the period life table for the period under study, which made it possible to examine the mortality condition of the target population. Life expectancy in 2016 of Union, Urban and Rural areas of males and females in Myanmar are presented in Table (4.1) measured by Reed-Merrell Method.

Table (4.1)
Life Expectancy of Union, Urban and Rural Areas in Myanmar by Reed-Merrell
Method

(2016)

Age (Years)	Union		Urban		Rural	
	Males	Females	Males	Females	Males	Females
<1	60.2	69.3	53.0	65.4	60.6	68.8
1-4	62.2	71.2	53.9	66.2	63.0	71.1
5-9	59.7	68.5	50.7	63.0	60.8	68.5
10-14	55.2	63.9	45.9	58.3	56.2	63.9
15-19	50.6	59.1	41.2	49.9	51.7	59.1
20-24	45.9	54.4	36.4	48.6	47.0	54.4
25-29	41.5	49.6	31.8	43.8	42.6	49.7
30-34	37.3	44.9	35.0	39.1	38.3	45.0
35-39	33.4	40.4	31.3	34.5	34.4	40.4
40-44	29.7	35.8	27.9	29.8	30.6	35.8
45-49	26.3	31.3	24.7	25.3	26.9	31.4
50-54	22.8	26.9	21.6	26.8	23.3	26.9
55-59	19.4	22.7	18.4	22.7	19.6	22.7
60-64	16.0	18.6	15.5	18.6	16.2	18.6
65-69	12.9	14.9	12.5	14.9	12.9	14.7
70-74	9.9	11.4	9.7	11.5	9.9	11.3
75-79	7.2	8.1	7.2	8.1	7.2	8.1
80-84	4.9	5.2	4.8	5.0	4.8	5.1
85+	2.5	3.1	2.5	3.2	2.5	3.0

Source: Statistical Yearbook (2018)

The calculation of abridged life table for males and females in Union of Myanmar are given in Appendix Table (3) and Appendix Table (4). In Union of Myanmar, the disparity between male and female ages from (<1 years) to (25-29 years) have nearly 9 years and also from (30-34 years) to (40-44 years) have nearly 7 years. The disparity between male and female ages from (45-49 years) to (50-54 years) have nearly 5 years and, from (55-59 years) to (65-69 years) have nearly 3 years and then, again from (70-74 years) to (85⁺ years) have 1 year. According to the results, the proportions of female life expectancy are higher than male life expectancy and the life expectancy at birth for males and females in Union of Myanmar are found to be 60.2 years and 69.3 years by Reed-Merrell Method.

The calculation of abridged life table for males and females in Urban of Myanmar are given in Appendix Table (5) and Appendix Table (6). In Urban of Myanmar, the disparity between male and female ages from (<1 years) to (10-14 years) have nearly 13 years and (15-19 years) have only 8 years and then from (20-24 years) to (25-29 years) have nearly 12 years respectively. According to the results, the disparity from (<1 years) to (10-14 years) have very high between male and female because women life expectancies are higher than male life expectancies. But the disparity between male and female ages of (15-19 years) is significantly lower than (20-24 years). And then, the disparity between male and female ages from (30-34 years) to (35-39 years) have nearly 4 years and, from (40-44 years) to (45-49 years) have 2 years and then from (50-54 years) to (55-59 years) have nearly 5 years. Finally, the disparity between male and female ages from (60-64 years) to (65-69 years) have nearly 3 years and, from (70-74 years) to (80⁺ years) have 1 year respectively. According to the results, the proportions of female life expectancy are higher than male life expectancy and the life expectancy at birth for males and females in Urban of Myanmar are found to be 53 years and 65.4 years by Reed-Merrell Method.

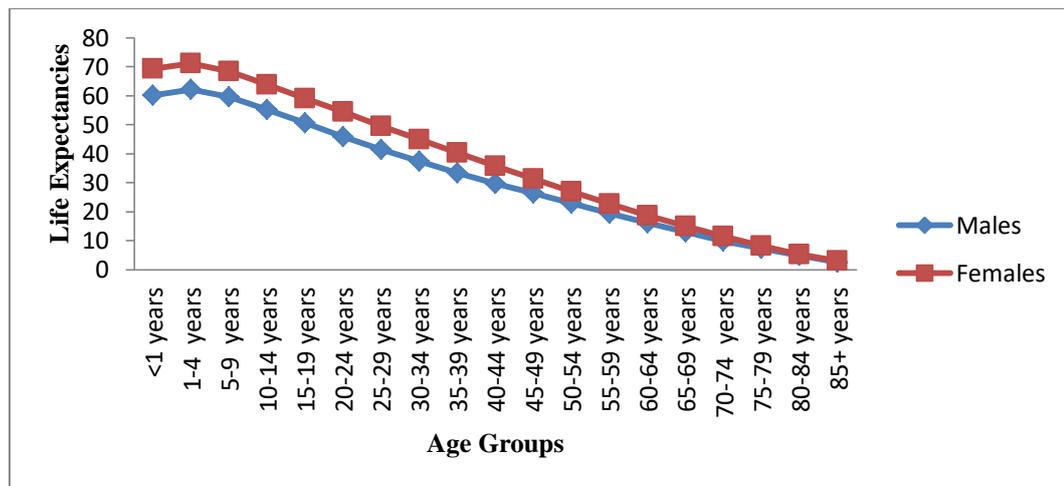
The calculation of abridged life table for males and females in Rural of Myanmar are given in Appendix Table (7) and Appendix Table (8). In Rural of Myanmar, the disparity between male and female ages from (<1 years) to (30-34 years) have nearly 8 years and from (35-39 years) to (45-49 years) have nearly 6 years and then from (50-54 years) to (55-59 years) have nearly 4 years. Finally, the disparity between male and female ages from (60-64 years) to (70-74 years) have nearly 2 years and from (75-79 years) to (85⁺ years) have 1 year respectively.

According to the results, the proportions of female life expectancy are also higher than male life expectancy and the life expectancy at birth for males and females in Rural of Myanmar are found to be 60.6 years and 68.8 years respectively. The following Figure (4.1), Figure (4.2) and Figure (4.3) are presented by Reed-Merrell Method.

Figure (4.1)

Life Expectancy in Union of Myanmar by Reed-Merrell Method

(2016)

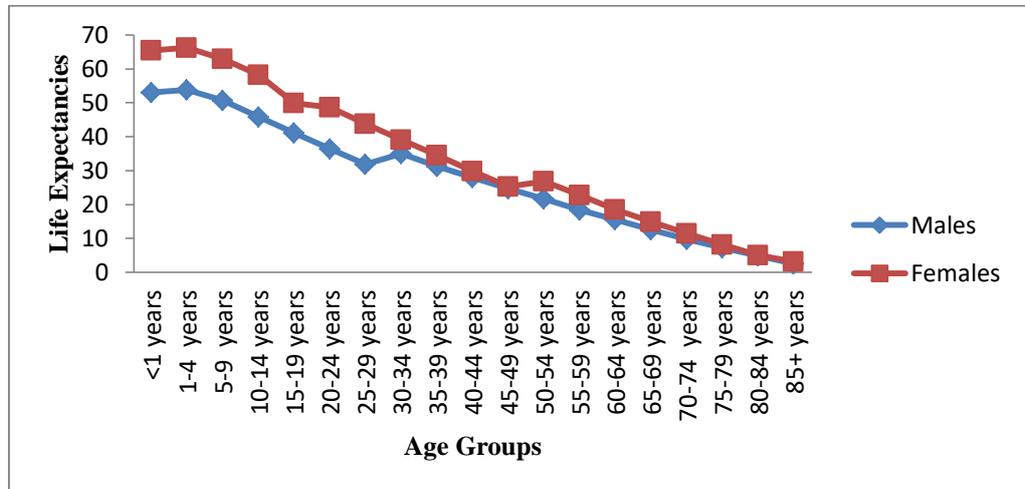


Source: Table (4.1)

In Figure (4.1), it can be said that all male life expectancy are lower than all female life expectancy. Because it can be assumed that men are less likely to seek medical help early, and, if diagnosed with a disease, they are more likely to be non-adherent to treatment.

Figure (4.2)

**Life Expectancy in Urban of Myanmar by Reed-Merrell Method
(2016)**



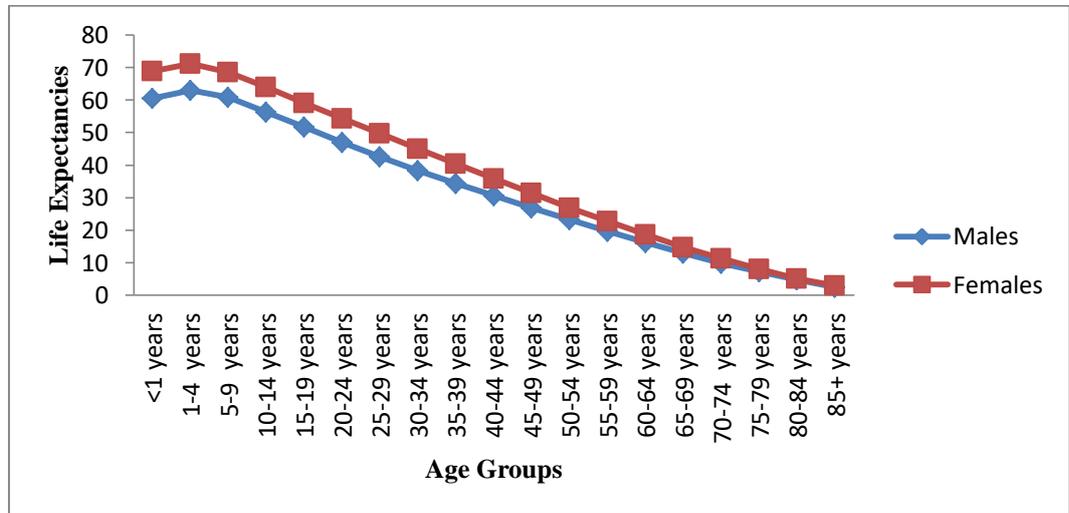
Source: Table (4.1)

In Figure (4.2), it can be said that male life expectancy from (<1 years) to (25-29 years) are gradually fall down in urban but life expectancy in (30-34 years) are higher than (35-39 years) because (30-34 years) males are the working age people in urban areas and they can take care their health and standard of living. And then, the other life expectancies are again gradually fall down. Female life expectancy from (<1 years) to (45-49 years) are gradually fall down but life expectancy in (50-54years) are little higher than (55-59 years) and then the other life expectancies are again gradually fall down.

Figure (4.3)

Life Expectancy in Rural of Myanmar by Reed-Merrell Method

(2016)



Source: Table (4.1)

In Figure (4.3), it can be said that both male and female, life expectancies from (<1 years) to (85+ years) are gradually fall down in rural areas. According to the results, life expectancy of (1-4 years) in Figure (4.1), Figure (4.2) and Figure (4.3) are higher than (5-9 years) in both sexes because it might be due to Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) of Myanmar start with broader economic, social and environmental determinants of health, but also looks into specific gaps and challenges in health sector.

4.2 The Greville's Method

T.N.E. Greville used a mathematical approach to derive a relation between q_x and m_x . He started with the equation

$$m_x = - \frac{d}{dx_i} \times \log L_x$$

After integrating both sides of the equation, thus yielding L_x , and applying the Euler-Maclaurin summation formula, Greville was able to express T_x in terms of a series of exponential functions of m_i . He then used quite skilful mathematical manipulations and arrived at the formula ${}_nq_x$. Greville also suggested a number of formulas to compute the life table population L_x . Table (4.2) shows life expectancy in 2016 of Union, Urban and Rural areas of males and females in Myanmar which measured by Greville's Method.

Table (4.2)
Life Expectancy of Union, Urban and Rural Areas in Myanmar by Greville's
Method

(2016)

Age (Years)	Union		Urban		Rural	
	Males	Females	Males	Females	Males	Females
<1	60.4	69.9	60.0	71.3	60.9	69.4
1-4	62.5	71.8	61.2	72.3	63.3	71.6
5-9	60.1	69.1	58.0	69.2	61.1	69.0
10-14	55.4	64.4	53.3	64.4	56.5	64.4
15-19	50.8	59.7	48.6	59.6	51.9	59.7
20-24	46.2	54.9	43.9	54.8	47.3	54.9
25-29	41.7	50.3	39.4	50.1	42.9	50.3
30-34	37.5	45.5	35.2	45.4	38.6	45.6
35-39	33.7	40.9	31.5	40.8	34.6	40.9
40-44	30.1	36.4	28.2	36.3	30.9	36.4
45-49	26.5	31.9	24.9	31.8	27.3	31.9
50-54	23.1	27.6	21.9	27.5	23.6	27.5
55-59	19.6	23.4	18.8	23.3	19.9	23.2
60-64	16.4	19.4	15.7	19.3	16.5	19.3
65-69	13.2	15.6	12.7	15.7	13.2	15.4
70-74	10.4	12.2	10.1	12.3	10.3	12.0
75-79	7.7	9.1	7.5	9.1	7.7	8.9
80-84	5.6	6.4	5.5	6.2	5.5	6.3
85+	4.2	4.8	4.1	4.9	4.1	4.7

Source: Statistical Yearbook (2018)

The calculation of abridged life table for males and females in Union of Myanmar are given in Appendix Table (9) and Appendix Table (10). In Union of Myanmar, the disparity between male and female ages from (<1 years) to (35-39 years) have nearly 9 years and also from (40-44 years) to (50-54 years) have nearly 6 years. Finally, the disparities between male and female ages from (55-59 years) to (65-69 years) have nearly 3 years and, from (70-74 years) to (85⁺ years) have 1 year. According to the results, the proportion of female life expectancy are higher than male life expectancy and the life expectancy at birth for males and females in Union of Myanmar are found to be 60.4 years and 69.9 years respectively.

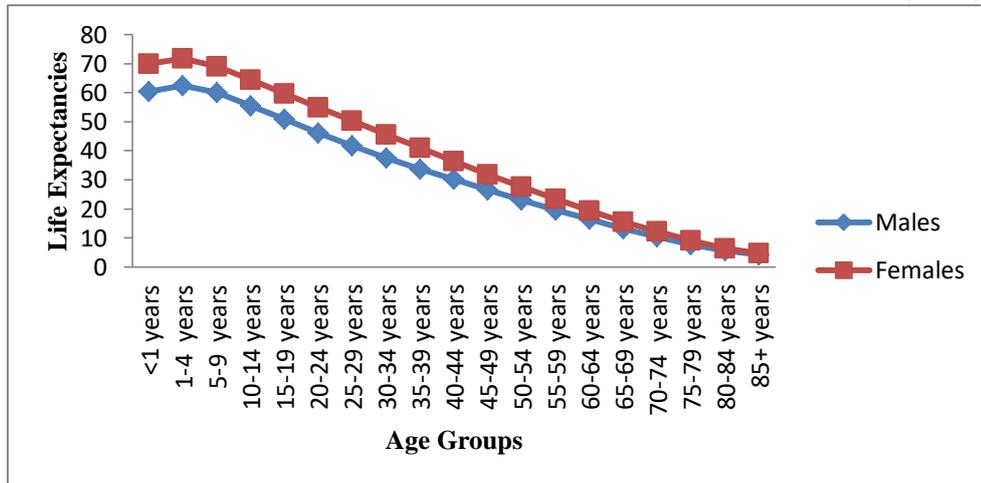
The calculation of abridged life table for males and females in Urban of Myanmar are given in Appendix Table (11) and Appendix Table (12). In Urban of Myanmar, the disparity between male and female ages from (<1 years) to (25-29 years) have 11 years and also from (30-34 years) to (35-39 years) have nearly 10 years. The disparities between male and female ages from (40-44 years) to (45-49 years) have nearly 8 years and, from (50-54 years) to (55-59 years) have nearly 6 years. Finally, the disparities between male and female ages from (60-64 years) to (65-69 years) have nearly 3 years and, from (70-74 years) to (85⁺ years) have 1 year. According to the results, the proportion of female life expectancy are higher than male life expectancy and the life expectancy at birth for males and females in Urban of Myanmar are found to be 60 years and 71.3 years respectively.

The calculation of abridged life table for males and females in Rural of Myanmar are given in Appendix Table (13) and Appendix Table (14). In Rural of Myanmar, the disparity between male and female ages from (<1 years) to (1-4 years) have nearly 9 years and also from (5-9 years) to (30-34 years) have nearly 8 years. And then, the disparity between male and female ages from (35-39 years) to (50-54 years) have nearly 6 years and, from (55-59 years) to (60-64 years) have nearly 4 years respectively. Finally, the disparity between male and female ages from (65-69 years) to (70-74 years) have 2 years and from (75-79 years) to (85⁺ years) have 1 year respectively. According to the results, the proportions of female life expectancy are also higher than male life expectancy and the life expectancy at birth for males and females in Rural of Myanmar are found to be 60.9 years and 69.4 years respectively. The following Figure (4.4), Figure (4.5) and Figure (4.6) are presented by Greville's method.

Figure (4.4)

Life Expectancy in Union of Myanmar by Greville's Method

(2016)



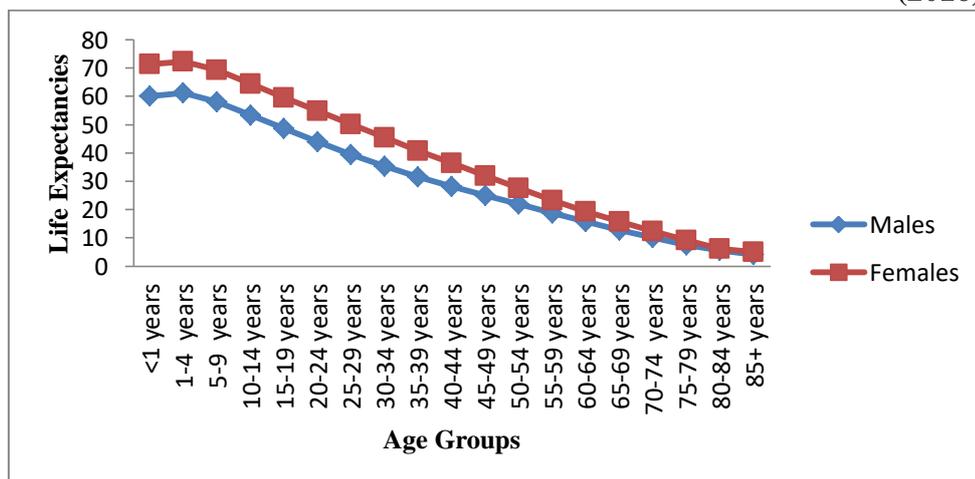
Source: Table (4.2)

In Figure (4.4), it can be said that all male life expectancy are lower than all female life expectancy. Because it can be assumed that men are less likely to seek medical help early, and, if diagnosed with a disease, they are more likely to be non-adherent to treatment.

Figure (4.5)

Life Expectancy in Urban of Myanmar by Greville's Method

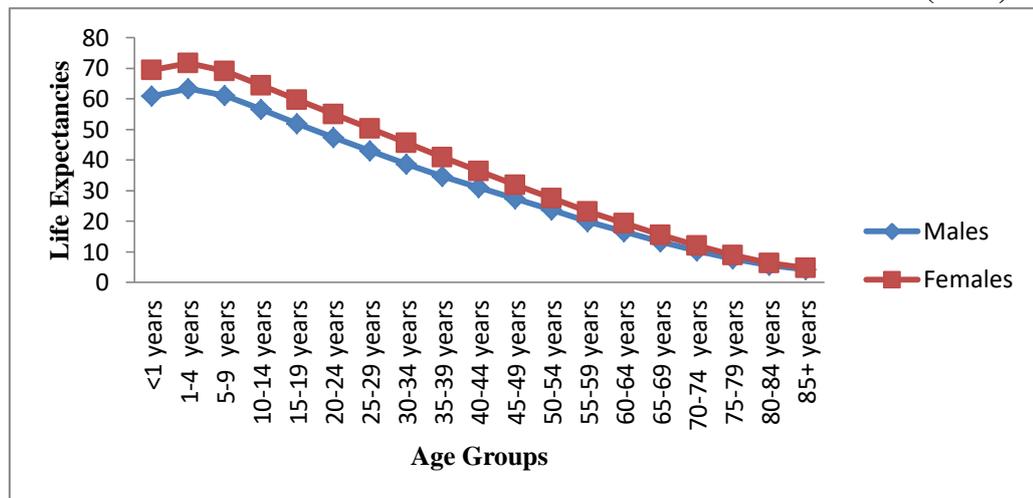
(2016)



Source: Table (4.2)

In Figure (4.5), it can be said that both male and female, life expectancies from (<1 years) to (85+ years) are gradually fall down in urban areas.

Figure (4.6)
Life Expectancy in Rural of Myanmar by Greville's Method
(2016)



Source: Table (4.2)

In Figure (4.6), it can be said that both male and female life expectancies in (1-4 years) are little higher than (5-9 years) and then the other life expectancies are gradually fall down. According to the results, Figure (4.4), Figure (4.5) and Figure (4.6) are not different. And then, life expectancy of (1-4 years) in Figure (4.4), Figure (4.5) and Figure (4.6) are higher than (5-9 years) in both sexes because it may be due to Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) of Myanmar start with broader economic, social and environment determinants of health, but also looks into specific gaps and challenges in health sector.

4.3 The Keyfitz-Frauenthal Method

This is an iterative procedure using the basic relationship between the probability q_x and the age-specific mortality rate m_x . A life table is constructed and the age-specific mortality rate is compared with those observed, and an adjustment made for the next iteration. The iterative process continues until the life table age specific rates agree with the corresponding observed rates. Table (4.3) presents life expectancy in 2016 of Union, Urban and Rural areas of males and females in Myanmar which measured by the Keyfitz-Frauenthal Method.

Table (4.3)
**Life Expectancy of Union, Urban and Rural Areas in Myanmar by Keyfitz-
Frauenthal Method**

(2016)

Age (Years)	Union		Urban		Rural	
	Males	Females	Males	Females	Males	Females
<1	57.7	69.8	59.9	71.3	60.8	69.4
1-4	59.6	71.7	61.1	72.2	63.2	71.5
5-9	57.1	69.1	57.9	69.2	61.1	69.1
10-14	52.5	64.4	53.2	64.4	56.4	64.4
15-19	47.9	59.7	48.5	59.6	51.8	59.7
20-24	43.2	54.9	43.8	54.8	47.3	54.9
25-29	38.7	50.2	39.4	50.1	42.8	50.2
30-34	34.4	45.5	35.1	45.4	38.5	45.5
35-39	30.5	40.9	31.4	40.8	34.6	40.9
40-44	26.8	36.4	28.1	36.3	30.8	36.4
45-49	23.1	31.9	24.9	31.8	27.2	31.9
50-54	19.5	27.6	21.8	27.5	23.6	27.5
55-59	15.7	23.4	18.7	23.3	19.9	23.2
60-64	12.1	19.3	15.7	19.4	16.5	19.2
65-69	13.2	15.6	12.7	15.7	13.2	15.4
70-74	10.3	12.3	10.1	12.3	10.3	12.1
75-79	7.7	9.1	7.6	9.1	7.7	8.9
80-84	5.6	6.4	5.6	6.3	5.6	6.3
85+	4.1	4.8	4.1	4.9	4.1	4.7

Source: Statistical Yearbook (2018)

The calculation of abridged life table for males and females in Union of Myanmar are given in Appendix Table (15) and Appendix Table (16). In Union of Myanmar, the disparity between male and female ages from (<1 years) to (30-34 years) have nearly 12 years and also from (35-39 years) to (40-44 years) have nearly 10 years. The disparities between male and female ages from (45-49 years) to (60-64 years) have nearly 8 years and, from (65-69 years) to (75-79 years) have 2 years. Finally, the disparity between male and female ages from (80-84 years) to (85⁺ years) have 1 year. According to the results, the proportion of female life expectancy is higher than male life expectancy and the life expectancy at birth for males and females in Union of Myanmar are found to be 57.7 years and 69.8 years respectively.

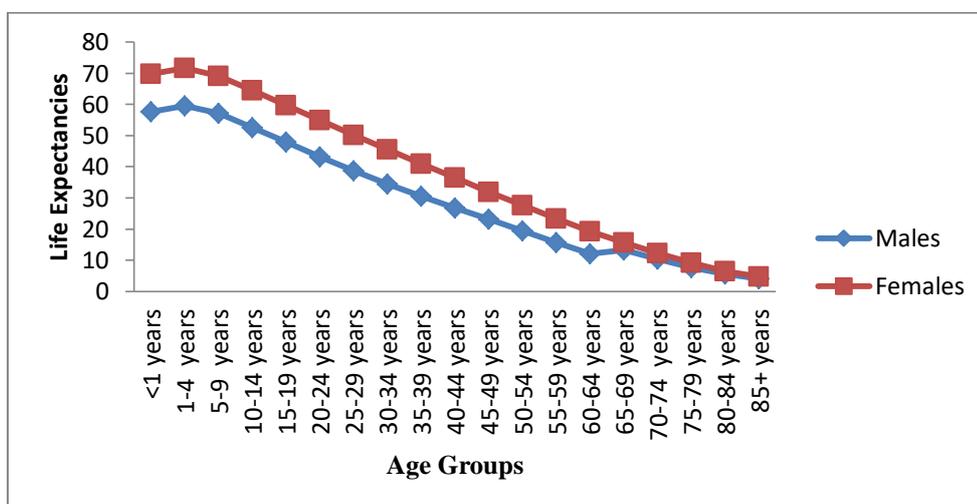
The calculation of abridged life table for males and females in Urban of Myanmar are given in Appendix Table (17) and Appendix Table (18). In Urban of Myanmar, the disparity between male and female ages from (<1 years) to (25-29 years) have nearly 12 years and also from (30-34 years) to (35-39 years) have nearly 10 years. And then, the disparity between male and female ages from (40-44 years) to (45-49 years) have nearly 8 years and also from (50-54 years) to (60-64 years) have nearly 6 years. Finally, the disparity between male and female ages from (65-69 years) to (75-79 years) have 2 years and also from (80-84 years) to (85⁺ years) have 1 year respectively. According to the results, the proportion of female life expectancy is higher than male life expectancy and the life expectancy at birth for males and females in Urban of Myanmar are found to be 59.9 years and 71.3 years respectively.

The calculation of abridged life table for males and females in Rural of Myanmar are given in Appendix Table (19) and Appendix Table(20). In Rural of Myanmar, the disparity between male and female ages from (<1 years) to (1-4 years) have nearly 9 years and also from (5-9 years) to (30-34 years) have nearly 8 years. And then, the disparity between male and female ages from (35-39 years) to (40-44 years) have nearly 6 years and, from (45-49 years) to (55-59 years) have nearly 4 years respectively. Finally, the disparity between male and female ages from (60-64 years) to (70-74 years) have 2 years and also from (75-79 years) to (85⁺ years) have 1 year respectively. According to the results, the proportion of female life expectancy is also higher than male life expectancy and the life expectancy at birth for males and females in Rural of Myanmar are found to be 60.8 years and 69.4 years respectively. The following Figure (4.7), Figure (4.8) and Figure (4.9) are presented by Keyfitz-Frauenthal method.

Figure (4.7)

Life Expectancy in Union of Myanmar by Keyfitz-Frauenthal Method

(2016)



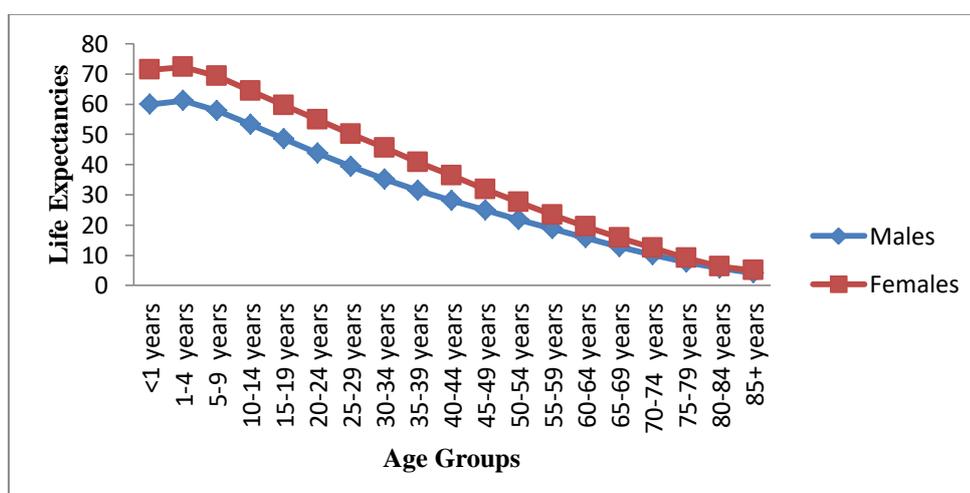
Source: Table (4.3)

In Figure (4.7), it can be said that male life expectancy are lower than female life expectancy. Because it can be assumed that men are less likely to seek medical help early, and, if diagnosed with a disease, they are more likely to be non-adherent to treatment. Male life expectancy from (<1 years) to (60-64 years) are gradually fall down but life expectancies in (65-69 years) are little higher than (70-74 years). And then, the other life expectancies are again gradually fall down.

Figure (4.8)

Life Expectancy in Urban of Myanmar by Keyfitz-Frauenthal Method

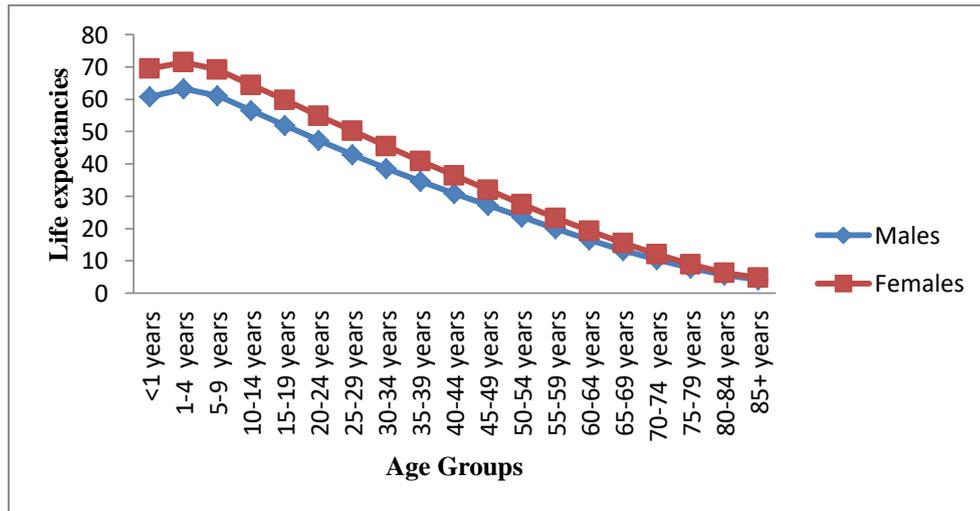
(2016)



Source: Table (4.3)

In Figure (4.8), it can be said that all male life expectancy are lower than all female life expectancy. Because it can be assumed that men are less likely to seek medical help early, and, if diagnosed with a disease, they are more likely to be non-adherent to treatment.

Figure (4.9)
Life Expectancy in Rural of Myanmar by Keyfitz-Frauenthal Method
(2016)



Source: Table (4.3)

In Figure (4.9), it can be said that both male and female, life expectancy of (1-4 years) are little higher than (5-9 years). And then, the other life expectancies are again gradually fall down. According to the results, life expectancy of (1-4 years) in Figure (4.7), Figure (4.8) and Figure (4.9) are higher than (5-9 years) in both sexes because it may be due to Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) of Myanmar start with broader economic, social and environment determinants of health, but also looks into specific gaps and challenges in health sector.

4.4 Comparison of Life Expectancy at Birth (LEB)

Life Expectancy (LE) is one of the most commonly used measures in the basic life table functions. When the mortality of the countries is compared at several points of time, the values of the LE can be used. Although detailed analyses of all the q_x values or all the LE values involve the most accurate comparison of mortality in countries, the life expectancy at birth (LEB) is a good summary measure. It measures how long members of a cohort can expect to live on the average if mortality

conditions remain the same in the future as they were during the year of birth. The value of LEB is disproportionately affected by the infant mortality rate, but all these rates are usually highly correlated with death rates at other ages.

4.4.1 Comparison of LEB by Using Different Methods

Life expectancy at birth in Union, Urban and Rural of Myanmar which compared with three different methods are presented below.

(i) Comparison of LEB by Using Different Methods for Union of Myanmar

Life expectancy at birth in Union of Myanmar by using different methods for 2016 is shown in Table (4.4).

Table (4.4)

Life expectancy at Birth in Union of Myanmar by Different Methods, 2016

No	Methods	LEB	
		Males	Females
1	Reed-Merrell Method	60.2	69.3
2	Greville's Method	60.4	70.0
3	Keyfitz-Frauenthal Method	57.7	69.8

Source: Tables (4.1), (4.2), (4.3)

In above table, Keyfitz-Frauenthal method gives the lowest LEB among the estimates. This method is sensitive to age reporting errors and it does not provide estimate of the child mortality level in Union of Myanmar. These estimates of LEB are very low compared with the United Nations estimates of 63.7 years for males and 69.8 years for females in 2016 (World Population Prospects 2019).

The Reed-Merrell method and the Greville's method produce similar estimates of LEB. The LEB of Reed-Merrell method gives 60.2 years for males and 69.3 years for females. These estimates are a little lower than the United Nations estimates (World Population Prospects 2019).

The LEB of Greville's method gives 60.4 years for males and 70 years for females. The estimates of LEB by using this method are very close to the United Nations estimates (World Population Prospects 2019). By comparing all these

findings, the Greville's method seems to be the most suitable for construction of life tables in Union of Myanmar.

(ii) Comparison of LEB by Using Different Methods for Urban of Myanmar

Life expectancy at birth in Urban of Myanmar by using different methods for 2016 is shown in Table (4.5).

Table (4.5)

Life expectancy at Birth in Urban of Myanmar by Different Methods, 2016

No	Methods	LEB	
		Males	Females
1	Reed-Merrell Method	53.0	65.4
2	Greville's Method	60.0	71.3
3	Keyfitz-Frauenthal Method	59.9	71.3

Source: Tables (4.1), (4.2), (4.3)

In above table, Reed-Merrell method gives the lowest LEB among the estimates. This method is sensitive to age reporting errors and it does not provide estimate of the child mortality level in Urban of Myanmar. These estimates of LEB are very low compared with the United Nations estimates of 59.2 years for males and 69.9 years for females in 2016 (World Population Prospects 2019). Moreover, the difference in life expectancy at birth for males and females is about 12 years. Usually there is not much difference between males and females so it is unrealistic.

Greville's method and Keyfitz-Frauenthal method produce similar estimates of LEB. The LEB of Greville's method gives 60 years for males and 71.3 years for females. The estimates of LEB by using this method are very close to the United Nations estimates (World Population Prospects 2019).

The LEB of Keyfitz-Frauenthal method gives 59.9 years for males and 71.3 years for females. The estimates of LEB by using this method are very close to the United Nations estimates (World Population Prospects 2019). By comparing all these findings, both Greville's and Keyfitz-Frauenthal method seem to be the most suitable for construction of life tables in Urban of Myanmar.

(iii) Comparison of LEB by Using Different Methods for Rural of Myanmar

Life expectancy at birth in Rural of Myanmar by using different methods for 2016 is shown in Table (4.6).

Table (4.6)

Life expectancy at Birth in Rural of Myanmar by Different Methods, 2016

No	Methods	LEB	
		Males	Females
1	Reed-Merrell Method	60.6	68.8
2	Greville's Method	63.3	71.6
3	Keyfitz-Frauenthal Method	60.8	69.4

Source: Tables (4.1), (4.2), (4.3)

In above table, Reed-Merrell method and Keyfitz-Frauenthal method produce similar estimates of LEB. Both of these two methods are little lower than the United Nations estimates of 63.7 years for males and 70.1 years for females (World Population Prospects 2019).

Greville's method gives the estimates of LEB as 63.3 years for males and 71.6 years for females. The estimates of LEB by using this method are very close to the United Nations estimates (World Population Prospects 2019). By comparing all these findings, Greville's method seems to be the most suitable for construction of life tables in Rural of Myanmar.

According to the results, Greville's method is the most suitable for construction of life tables in Myanmar because the estimations of this method are approximately close to the United Nations estimates than the other two methods.

4.4.2 Comparison of Life Expectancy at Birth with Some Asian Countries and Myanmar

Life expectancies at birth are compared to study of mortality in some selected countries in Asia. There are eight countries in South Asia, eleven countries in South-East Asia and two countries in East Asia that are shown in Table (4.7).

Table (4.7)
Life Expectancy at Birth in Some Asian Countries, 2005-2020

Countries	Males			Females		
	2005-2010	2010-2015	2015-2020	2005-2010	2010-2015	2015-2020
<u>South Asia</u>						
Afghanistan	58.34	60.93	62.85	61.02	63.79	65.81
Bangladesh	67.83	69.43	70.48	69.99	72.38	74.11
Bhutan	66.79	69.19	70.96	67.29	69.61	71.62
Maldives	73.73	75.52	77.07	76.15	78.45	80.36
Nepal	65.16	67.27	68.83	67.82	70.03	71.72
India	64.68	66.68	68.11	66.43	68.95	70.53
Pakistan	63.62	65.13	66.11	65.45	66.99	68.00
Sri Lanka	71.49	72.45	73.32	78.51	79.31	80.05
<u>South-East Asia</u>						
Brunei Darussalam	73.43	73.84	74.54	75.51	76.22	76.88
Cambodia	62.73	65.5	67.17	67.35	69.55	71.5
Indonesia	66.42	67.91	69.29	70.28	72.21	73.63
Lao People's Democratic Republic	61.16	63.67	65.68	64.82	67.28	69.24
Malaysia	72.01	72.99	74.01	76.27	77.19	78.1
Myanmar	59.08	61.29	63.67	65.81	68.02	69.75
Philippines	65.77	66.23	67.08	73.38	74.61	75.31
Singapore	78.72	80.06	81.25	83.66	84.52	85.52
Thailand	69.82	71.59	73.12	76.59	78.87	80.62
Timor-Leste	64.72	65.92	67.18	67.63	69.51	71.26
Viet Nam	70.44	70.83	71.16	78.67	79.06	79.4
<u>East Asia</u>						
Republic of Korea	76.01	77.87	79.63	82.69	84.43	85.7
China	71.89	73.07	74.47	75.67	77.45	78.97

Source: World Population Prospects 2019

The above Table (4.7) presents the life expectancy at birth in some Asian countries from 2005-2010 to 2015-2020. During the study period, the LEB is ranged from nearly 60 years to 70 years in South Asia countries. Both sexes of LEB in Afghanistan are lower than other countries because it might be caused by war and violence. From the period 2005-2010 to 2015-2020, males LEB in Maldives is the highest than other countries because it might be due to implement successful initiatives to improve health, end hunger, improve nutrition, food security and apply sustainable agricultural practices (Marissa Field; The Borgen Project). During the period from 2005-2010 to 2010-2015, females LEB in Sri Lanka is higher than other countries because their economy is growing and people's standard of living are improving (Josh Fritzjunker and Kim Thelwell; The Borgen Project).

During the period from 2005-2010 to 2015-2020, both sexes of LEB in Singapore is higher than other South-East Asia countries because health care providers have taken a bigger role in managing chronic diseases such as diabetes, heart diseases and high blood pressure (Dr Ngauyen Minh Ha; Healthy Ageing). Both sexes of LEB in Myanmar and Lao People's Democratic Republic are lower than other countries because it can be assumed that inadequate nutritional health support to grow into healthy and capable adults from Government.

When the life expectancy at birth is compared with the neighbouring countries, Myanmar is still lower than Bangladesh, India, Pakistan, Lao, Thailand and China. Among these neighbouring countries, China has the highest LEB and Myanmar has the lowest LEB. Because it might be due to the fact that China is the most socially and economically developed country. Thus, social and economic development could have a great impact on LEB increase.

CHAPTER V

CONCLUSION

Recent developments of analytical tools, especially of life tables, have made it possible to derive estimates of mortality levels by age patterns of mortality on the basis of limited data. In some countries, census report data can be used to derive analytical estimates of mortality by age. Under such circumstances, the age-specific mortality rates and life table functions have been estimated through some indirect approaches on the basis of incomplete data. The future trends of population growth and structure can be changed by mortality levels. The health policies affect the mortality levels. Estimates of mortality supply requisite data for the national health planning and population projections and can be evaluated through the construction of abridged life tables. For the past few decades, continued decline in mortality has been observed in Myanmar. According to United Nations World Population Prospects 2019, the average life expectancy at birth was 71 years around the world. And then the male life expectancy was 70 years and the female life expectancy was 72 years. Women are alive longer than men in all regions around the world. The mortality decline was mainly due to the improvements in medical services and Government's health plans.

This study examined the comparative analysis of estimated abridged life tables in Myanmar. Indirect methods are used to construct the abridged life tables. These tables have been constructed by three indirect methods: Reed-Merrell method, Greville's method and Keyfitz-Frauenthal method. In these indirect methods, the Greville's method gives the highest LEB (60 years for males and 70 years for females) and the Keyfitz-Frauenthal method gives the lowest LEB (58 years for males and 69 years for females) for the Union of Myanmar. In Urban, the Greville's method gives the highest LEB (60 years for males and 71 years for females) and the Reed-Merrell method gives the lowest LEB (53 years for males and 65 years for females). But in Rural areas, the Greville's method gives the highest LEB (63 years for males and 72 years for females) and the Reed-Merrell method gives the lowest LEB (61 years for males and 69 years for females). In these methods, the Greville's method is the most suitable for construction of abridged life tables in Myanmar because the estimation of this method are approximately close to the United Nations estimates than the other two methods. According to the results, female life expectancy exceeds

male life expectancy in Myanmar because men are less likely to seek medical help early, and, if diagnosed with a disease, they are more likely to be non-adherent to treatment. In addition, men are more likely to take life-threatening risks and to die in car accidents, brawls or gun fights.

During the period from 2005-2010 to 2015-2020, the LEB is ranged from nearly 60 years to 70 years in some Asian countries. Both sexes of LEB in Afghanistan are lower than other countries because it might be caused by war and violence. From the period 2005-2010 to 2015-2020, males LEB in Maldives is the highest than other countries because it might be due to implement successful initiatives to improve health, end hunger, improve nutrition, food security and apply sustainable agricultural practices. During the period from 2005-2010 to 2010-2015, females LEB in Sri Lanka is higher than other countries because their economy is growing and people's standard of living are improving.

During the period from 2005-2010 to 2015-2020, both sexes of LEB in Singapore is higher than other South-East Asia countries because health care providers have taken a bigger role in managing chronic diseases. Both sexes of LEB in Myanmar and Lao People's Democratic Republic are lower than other countries because it can be assumed that inadequate nutritional health support to grow into healthy and capable adults from Government.

Myanmar and its neighbouring countries have achieved a decline in mortality throughout the 2005s to 2020s. Among the neighbouring countries, China has the highest LEB (75 years for males and 79 years for females) and Myanmar has the lowest LEB (64 years for males and 70 years for females). Because it might be due to the fact that China is the most socially and economically more developed than Myanmar. Thus, socio-economic development could have a great impact on mortality decline. Hence, the mortality estimates reflect the state of country health, socio-economic status.

Since all sectors of national development programmes become increasingly use in demographic data, it is important in vital statistics data which are the main components of population dynamics should be given special attention. In Myanmar, as in many developing countries, the quality of vital statistics is incomplete and covers only a limited number of towns that a lot of problems have to be faced in using them to construct an abridged life table for the whole country. In such situation, indirect methods may be best to provide a possible construction of an abridged life

table. These abridged life tables should be given priority in future mortality studies. Some results suggest the expansion of health services and infrastructure to reach borderer, especially these living in hard-to-reach and remote areas. The Government should be attempted to improve health services and conditions for people in the whole country.

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APPENDIX

Table (1)
Age Specific Death Rates for Myanmar and its Urban and Rural Areas in 2016

Age (Years)	Union		Urban		Rural	
	Male	Female	Male	Female	Male	Female
<1	0.0505	0.041	0.0353	0.0276	0.0555	0.0454
1-4	0.0063	0.0047	0.0036	0.0033	0.0071	0.0052
5-9	0.0015	0.0011	0.001	0.0007	0.0016	0.0012
10-14	0.0014	0.0008	0.0011	0.0006	0.0015	0.0009
15-19	0.0014	0.0008	0.0014	0.0007	0.0015	0.0008
20-24	0.0025	0.0011	0.0024	0.001	0.0026	0.0012
25-29	0.004	0.0014	0.0044	0.0013	0.0037	0.0014
30-34	0.0064	0.0018	0.0076	0.0019	0.0056	0.0017
35-39	0.0089	0.0024	0.0112	0.0025	0.0077	0.0023
40-44	0.0107	0.0031	0.0137	0.0033	0.0091	0.003
45-49	0.0126	0.0044	0.0163	0.0045	0.0107	0.0042
50-54	0.0144	0.006	0.0185	0.0065	0.0124	0.0056
55-59	0.0192	0.0093	0.0232	0.0096	0.0176	0.0091
60-64	0.0245	0.0143	0.0286	0.0154	0.0231	0.0135
65-69	0.0368	0.0234	0.0407	0.0229	0.0356	0.0237
70-74	0.0536	0.035	0.057	0.0329	0.053	0.0363
75-79	0.0851	0.0601	0.0899	0.0566	0.0851	0.0626
80-84	0.1443	0.1209	0.1468	0.1339	0.1473	0.1255
85+	0.2388	0.209	0.2431	0.2001	0.2422	0.2127

Source: Statistical Yearbook (2018)

Table (2)
Total Population by Five-year Age Groups for Myanmar and its Urban and Rural Areas in 2016

Age (Years)	Union		Urban		Rural	
	Male	Female	Male	Female	Male	Female
<1	2457	2405	603	587	1854	1818
1-4	2499	2439	614	597	1885	1842
5-9	2461	2404	592	572	1868	1833
10-14	2637	2540	659	618	1978	1922
15-19	2438	2429	757	728	1681	1701
20-24	2183	2308	767	791	1416	1518
25-29	2027	2217	679	732	1349	1485
30-34	1948	2113	614	661	1334	1453
35-39	1792	1954	549	604	1242	1349
40-44	1621	1818	483	562	1138	1256
45-49	1457	1676	437	533	1020	1142
50-54	1273	1494	369	471	904	1023
55-59	1039	1253	297	396	742	857
60-64	789	982	223	307	566	675
65-69	544	708	155	224	388	484
70-74	323	459	95	145	228	314
75-79	212	319	60	97	152	222
80-84	136	218	39	67	97	151
85+	51	95	15	31	37	64

Source: 2014 Censuses Report

Table (3)**Calculation of Abridged Life Table for Myanmar's Union Males in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0505	0.04927	100000	4927	97537	6015002	60.2
1-4	0.0063	0.0249	95073	2367	375557	5917465	62.2
5-9	0.0015	0.007472	92706	693	461797	5541908	59.7
10-14	0.0014	0.006976	92013	642	458460	5080111	55.2
15-19	0.0014	0.006976	91371	637	455262	4621651	50.6
20-24	0.0025	0.01243	90734	1128	450849	4166389	45.9
25-29	0.004	0.01982	89606	1776	443589	3715540	41.5
30-34	0.0064	0.03153	87830	2769	432226	3271951	37.3
35-39	0.0089	0.0436	85061	3708	416032	2839725	33.4
40-44	0.0107	0.0522	81352	4247	396143	2423693	29.7
45-49	0.0126	0.06121	77105	4720	373728	2027550	26.3
50-54	0.0144	0.06966	72386	5042	349323	1653822	22.8
55-59	0.0192	0.09187	67343	6187	321250	1304499	19.4
60-64	0.0245	0.1158	61157	7082	288078	983250	16.0
65-69	0.0368	0.1692	54075	9149	247500	695172	12.9
70-74	0.0536	0.2373	44925	10661	197974	447673	9.9
75-79	0.0851	0.3513	34264	12037	141230	249699	7.2
80-84	0.1443	0.524	22227	11647	82019	108470	4.9
85+	0.2388	0.7138	10580	10580	26451	26451	2.5

Source: Author's Own Computation (2019)

Table (4)**Calculation of Abridged Life Table for Myanmar's Union Females in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.041	0.04018	100000	4018	97991	6933254	69.3
1-4	0.0047	0.01863	95982	1788	380352	6835263	71.2
5-9	0.0011	0.005485	94194	516	469678	6454911	68.5
10-14	0.0008	0.003992	93677	374	467451	5985233	63.9
15-19	0.0008	0.003992	93303	372	465585	5517782	59.1
20-24	0.0011	0.005485	92931	510	463380	5052197	54.4
25-29	0.0014	0.00696	92421	645	460493	4588818	49.6
30-34	0.0018	0.00896	91776	822	456826	4128324	44.9
35-39	0.0024	0.01194	90954	1086	452055	3671498	40.4
40-44	0.0031	0.01539	89868	1383	445882	3219443	35.8
45-49	0.0044	0.02178	88485	1927	437607	2773561	31.3
50-54	0.006	0.02959	86558	2561	426386	2335954	26.9
55-59	0.0093	0.04552	83997	3824	410424	1909568	22.7
60-64	0.0143	0.06919	80173	5547	386997	1499145	18.6
65-69	0.0234	0.1109	74626	8276	352439	1112148	14.9
70-74	0.035	0.1616	66349	10722	304944	759709	11.4
75-79	0.0601	0.2622	55628	14586	241675	454765	8.1
80-84	0.1209	0.4616	41042	18945	157848	213091	5.2
85+	0.209	0.6633	22097	22097	55243	55243	3.1

Source: Author's Own Computation (2019)

Table (5)**Calculation of Abridged Life Table for Myanmar's Urban Males in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0353	0.03469	100000	3469	98266	5302989	53.0
1-4	0.0036	0.01431	96531	1381	383361	5204724	53.9
5-9	0.001	0.004988	95150	475	474562	4851363	50.7
10-14	0.0011	0.005485	94675	519	472077	4346801	45.9
15-19	0.0014	0.006976	94156	657	469137	3874724	41.2
20-24	0.0024	0.01194	93499	1116	464704	3405587	36.4
25-29	0.0044	0.2178	92383	20121	411610	2940884	31.8
30-34	0.0076	0.03734	72262	2698	354563	2529273	35.0
35-39	0.0112	0.05458	69563	3797	338325	2174711	31.3
40-44	0.0137	0.06638	65767	4366	317919	1836386	27.9
45-49	0.0163	0.07852	61401	4821	294952	1518467	24.7
50-54	0.0185	0.08866	56580	5016	270358	1223515	21.6
55-59	0.0232	0.1100	51563	5672	243637	953157	18.4
60-64	0.0286	0.1339	45891	6145	214095	709520	15.5
65-69	0.0407	0.1855	39747	7373	180301	495424	12.5
70-74	0.057	0.2504	32374	8106	141602	315124	9.7
75-79	0.0899	0.3672	24267	8911	99059	173522	7.2
80-84	0.1468	0.5302	15356	8142	56427	74463	4.8
85+	0.2431	0.7205	7214	7214	18036	18036	2.5

Source: Author's Own Computation (2019)

Table (6)**Calculation of Abridged Life Table for Myanmar' Urban Females in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0276	0.02723	100000	2723	98639	6540908	65.4
1-4	0.0033	0.01312	97277	1276	386556	6442270	66.2
5-9	0.0007	0.003494	96001	335	479165	6055714	63.0
10-14	0.0006	0.002996	95665	287	477610	5576549	58.3
15-19	0.0007	0.003494	95379	333	476060	5098939	49.9
20-24	0.001	0.004988	95045	474	474042	4622879	48.6
25-29	0.0013	0.006479	94571	613	471325	4148837	43.8
30-34	0.0019	0.009455	93959	888	467572	3677512	39.1
35-39	0.0025	0.01243	93070	1157	462459	3209940	34.5
40-44	0.0033	0.01637	91913	1505	455805	2747481	29.8
45-49	0.0045	0.2227	90409	20134	401709	2291676	25.3
50-54	0.0065	0.03202	70274	2250	345748	1889967	26.8
55-59	0.0096	0.04695	68025	3194	332138	1544219	22.7
60-64	0.0154	0.07433	64831	4819	312107	1212081	18.6
65-69	0.0229	0.10865	60012	6520	283759	899974	14.9
70-74	0.0329	0.1526	53492	8163	247051	616215	11.5
75-79	0.0566	0.2489	45329	11282	198438	369164	8.1
80-84	0.1339	0.4971	34046	16925	127921	170726	5.0
85+	0.2001	0.6467	17122	17122	42805	42805	3.2

Source: Author's Own Computation (2019)

Table (7)**Calculation of Abridged Life Table for Myanmar's Rural Males in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0555	0.05401	100000	5401	97300	6061130	60.6
1-4	0.0071	0.02803	94599	2652	373093	5963830	63.0
5-9	0.0016	0.007968	91947	733	457905	5590738	60.8
10-14	0.0015	0.007472	91215	682	454370	5132832	56.2
15-19	0.0015	0.007472	90533	676	450975	4678462	51.7
20-24	0.0026	0.01293	89857	1162	446379	4227488	47.0
25-29	0.0037	0.01834	88695	1627	439408	3781109	42.6
30-34	0.0056	0.02764	87068	2407	429325	3341701	38.3
35-39	0.0077	0.03783	84662	3203	415301	2912376	34.4
40-44	0.0091	0.04456	81459	3630	398220	2497075	30.6
45-49	0.0107	0.0522	77829	4063	378989	2098855	26.9
50-54	0.0124	0.060258	73766	4445	357720	1719866	23.3
55-59	0.0176	0.08452	69321	5859	331959	1362146	19.6
60-64	0.0231	0.1096	63462	6955	299923	1030187	16.2
65-69	0.0356	0.1641	56507	9273	259353	730264	12.9
70-74	0.053	0.2349	47234	11095	208432	470912	9.9
75-79	0.0851	0.3513	36139	12696	148955	262479	7.2
80-84	0.1473	0.5315	23443	12460	86066	113524	4.8
85+	0.2422	0.7191	10983	10983	27458	27458	2.5

Source: Author's Own Computation (2019)

Table (8)**Calculation of Abridged Life Table for Myanmar' Rural Females in 2016 by the Reed-Merrell Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0454	0.0444	100000	4440	97780	6888467	68.8
1-4	0.0052	0.02059	95560	1968	378305	6790687	71.1
5-9	0.0012	0.005982	93592	560	466562	6412382	68.5
10-14	0.0009	0.00449	93033	418	464119	5945820	63.9
15-19	0.0008	0.003992	92615	370	462150	5481701	59.1
20-24	0.0012	0.005982	92245	552	459846	5019552	54.4
25-29	0.0014	0.006976	91693	640	456867	4559706	49.7
30-34	0.0017	0.008464	91054	771	453342	4102838	45.0
35-39	0.0023	0.01144	90283	1033	448833	3649497	40.4
40-44	0.003	0.0149	89250	1330	442926	3200664	35.8
45-49	0.0042	0.0208	87920	1829	435030	2757738	31.4
50-54	0.0056	0.02764	86092	2380	424509	2322708	26.9
55-59	0.0091	0.04456	83712	3730	409235	1898199	22.7
60-64	0.0135	0.06544	79982	5234	386824	1488965	18.6
65-69	0.0237	0.1122	74748	8387	352772	1102141	14.7
70-74	0.0363	0.1671	66361	11089	304083	749369	11.3
75-79	0.0626	0.2716	55272	15012	238831	445286	8.1
80-84	0.1255	0.4744	40260	19099	153553	206455	5.1
85+	0.2127	0.67002	21161	21161	52902	52902	3.0

Source: Author's Own Computation (2019)

Table (9)**Calculation of Abridged Life Table for Myanmar's Union Males in 2016, by the Greville's Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0505	0.04927	100000	4927	97555	6040659	60.4
1-4	0.0063	0.02491	95073	2368	375838	5943104	62.5
5-9	0.0015	0.007474	92706	692	461931	5567265	60.1
10-14	0.0014	0.006977	92013	642	458584	5105334	55.4
15-19	0.0014	0.006977	91371	638	455384	4646750	50.8
20-24	0.0025	0.01243	90733	1128	451064	4191366	46.2
25-29	0.004	0.01982	89606	1776	443925	3740301	41.7
30-34	0.0064	0.03153	8829	2770	432737	3296376	37.5
35-39	0.0089	0.0436	85060	3709	416696	2863639	33.7
40-44	0.0107	0.052202	81352	4247	396888	2446944	30.1
45-49	0.0126	0.061204	77105	4719	374538	2050056	26.5
50-54	0.0144	0.06966	72386	5042	350170	1675518	23.1
55-59	0.0192	0.09187	67343	618	322227	1325348	19.6
60-64	0.0245	0.1158	6115	7083	289116	1003121	16.4
65-69	0.0368	0.1692	54073	9148	248604	714005	13.2
70-74	0.0536	0.2373	44925	10661	198892	465401	10.4
75-79	0.0851	0.3514	34264	12039	141471	266509	7.7
80-84	0.1443	0.5245	22225	11657	80784	125038	5.6
85+	0.2388	0.7156	10568	10568	44254	44254	4.2

Source: Author's Own Computation (2019)

Table (10)**Calculation of Abridged Life Table for Myanmar's Union Females in 2016, by the Greville's Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.041	0.040184	100000	4018	98009	6989992	69.9
1-4	0.0047	0.01864	95982	1789	380565	6891983	71.8
5-9	0.0011	0.005486	94193	517	469774	6511418	69.1
10-14	0.0008	0.003993	93676	374	467519	6041644	64.4
15-19	0.0008	0.003993	93302	373	465653	5574125	59.7
20-24	0.0011	0.005486	92929	510	463474	5108472	54.9
25-29	0.0014	0.006977	92419	645	460613	4644998	50.3
30-34	0.0018	0.008963	91775	823	456978	4184385	45.5
35-39	0.0024	0.01193	90952	1085	452258	3727407	40.9
40-44	0.0031	0.01539	89867	1383	446142	3275149	36.4
45-49	0.0044	0.021779	88484	1927	437966	2829006	31.9
50-54	0.006	0.02959	86557	2561	426857	2391040	27.6
55-59	0.0093	0.04552	83996	3823	411104	1964184	23.4
60-64	0.0143	0.06919	80173	5547	387927	1553080	19.4
65-69	0.0234	0.11089	74625	8276	353671	1165153	15.6
70-74	0.035	0.1616	66349	10720	306286	811483	12.2
75-79	0.0601	0.2622	55629	14588	242736	505196	9.1
80-84	0.1209	0.4619	41041	18956	156791	262460	6.4
85+	0.209	0.6647	22085	22085	105669	105669	4.8

Source: Author's Own Computation (2019)

Table (11)**Calculation of Abridged Life Table for Myanmar's Urban Males in 2016, by the Greville's Method**

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0353	0.03469	100000	3469	98283	6004996	60.0
1-4	0.0036	0.014303	96531	1381	383529	5906713	61.2
5-9	0.001	0.004989	95149	475	474656	5523184	58.0
10-14	0.0011	0.005486	94675	519	472179	5048528	53.3
15-19	0.0014	0.006977	94156	657	469265	4576348	48.6
20-24	0.0024	0.01193	93499	1116	464920	4107083	43.9
25-29	0.0044	0.02178	92383	2012	457265	3642163	39.4
30-34	0.0076	0.03734	90371	3375	444033	3184898	35.2
35-39	0.0112	0.05458	86996	4748	423941	2740864	31.5
40-44	0.0137	0.06638	82248	5459	398517	2316923	28.2
45-49	0.0163	0.078511	76789	6029	369859	1918406	24.9
50-54	0.0185	0.08866	70759	6274	339115	1548546	21.9
55-59	0.0232	0.110002	64486	7094	305759	1209431	18.8
60-64	0.0286	0.1339	57393	7688	268807	903672	15.7
65-69	0.0407	0.1855	49705	9219	226519	634865	12.7
70-74	0.057	0.25044	40486	10139	177882	408347	10.1
75-79	0.0899	0.3673	30346	11146	123984	230465	7.5
80-84	0.1468	0.53079	19200	10191	69422	106480	5.5
85+	0.2431	0.7223	9009	9009	37058	37058	4.1

Source: Author's Own Computation (2019)

Table (12)

Calculation of Abridged Life Table for Myanmar' Urban Females in 2016, by the Greville's Method

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0276	0.02723	100000	2723	98654	7133017	71.3
1-4	0.0033	0.01312	97277	1276	386712	7034363	72.3
5-9	0.0007	0.003494	96001	335	479232	6647651	69.2
10-14	0.0006	0.002996	95666	287	477668	6168419	64.4
15-19	0.0007	0.003494	95379	333	476127	5690751	59.6
20-24	0.001	0.004989	95046	474	474136	5214624	54.8
25-29	0.0013	0.006481	94572	613	471445	4740488	50.1
30-34	0.0019	0.009459	93959	889	467744	4269042	45.4
35-39	0.0025	0.01243	93069	1157	462681	3801300	40.8
40-44	0.0033	0.01638	91913	1505	456091	3338619	36.3
45-49	0.0045	0.02227	90408	2013	447387	2882528	31.8
50-54	0.0065	0.032018	88395	2830	435421	2435141	27.5
55-59	0.0096	0.04695	85565	4018	418494	1999720	23.3
60-64	0.0154	0.07433	81547	6061	393588	1581226	19.3
65-69	0.0229	0.10865	75486	8202	358157	1187639	15.7
70-74	0.0329	0.1526	67284	10267	312080	829482	12.3
75-79	0.0566	0.2489	57017	14192	250739	517402	9.1
80-84	0.1339	0.4975	42825	21307	159129	266663	6.2
85+	0.2001	0.6479	21517	21517	107534	107534	4.9

Source: Author's Own Computation (2019)

Table (13)

Calculation of Abridged Life Table for Myanmar's Rural Males in 2016, by the Greville's Method

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0555	0.05401	100000	5401	97317	6086368	60.9
1-4	0.0071	0.02802	94599	2651	373404	5989051	63.3
5-9	0.0016	0.007971	91948	733	458049	5615647	61.1
10-14	0.0015	0.007474	91215	682	454503	5157598	56.5
15-19	0.0015	0.007474	90533	677	451106	4703095	51.9
20-24	0.0026	0.01292	89856	1161	446603	4251989	47.3
25-29	0.0037	0.01834	88695	1627	439718	3805387	42.9
30-34	0.0056	0.02764	87068	2406	429773	3365668	38.6
35-39	0.0077	0.03783	84662	3202	415885	2935895	34.6
40-44	0.0091	0.04456	81459	3629	398872	2520011	30.9
45-49	0.0107	0.05220	77829	4063	379704	2121139	27.3
50-54	0.0124	0.06026	73766	4445	358485	1741435	23.6
55-59	0.0176	0.08452	69321	5859	332904	1382949	19.9
60-64	0.0231	0.1096	63462	6952	300972	1050045	16.5
65-69	0.0356	0.1641	56509	9274	260512	749073	13.2
70-74	0.053	0.2349	47236	11098	209404	488561	10.3
75-79	0.0851	0.3513	36137	12697	149205	279158	7.7
80-84	0.1473	0.5320	23439	12471	84664	129953	5.5
85+	0.2422	0.7209	10969	10969	45289	45289	4.1

Source: Author's Own Computation (2019)

Table (14)

Calculation of Abridged Life Table for Myanmar's Rural Females in 2016, by the Greville's Method

Age (Years)	m_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0454	0.0444	100000	4440	977798	6940908	69.4
1-4	0.0052	0.020599	95559	1968	378539	6843110	71.6
5-9	0.0012	0.005983	93592	560	466667	646471	69.0
10-14	0.0009	0.004491	93032	418	464195	5997904	64.4
15-19	0.0008	0.003993	92614	369	462217	5533708	59.7
20-24	0.0012	0.005983	92244	552	459948	5071491	54.9
25-29	0.0014	0.006977	91692	639	456986	4611543	50.3
30-34	0.0017	0.008467	91052	771	453484	4154558	45.6
35-39	0.0023	0.01144	90281	1033	449024	3701074	40.9
40-44	0.003	0.01489	89249	1329	443174	3252049	36.4
45-49	0.0042	0.02079	87919	1828	435369	2808875	31.9
50-54	0.0056	0.02764	86091	2379	424947	2373505	27.5
55-59	0.0091	0.04456	83711	3730	409896	1948559	23.2
60-64	0.0135	0.06544	79981	5234	387707	1538662	19.3
65-69	0.0237	0.1122	74747	8389	354005	1150955	15.4
70-74	0.0363	0.1671	66357	11087	305423	796949	12.0
75-79	0.0626	0.2716	55269	15013	239829	491527	8.9
80-84	0.1255	0.4748	40257	19112	152288	251697	6.3
85+	0.2127	0.6714	21144	21144	99409	99409	4.7

Source: Author's Own Computation (2019)

Table (15)

Calculation of Abridged Life Table for Myanmar's Union Males in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0505	2457	0.04927	100000	4927	97537	5773370	57.7
1-4	0.0063	2499	0.0249	95073	2367	375557	5675833	59.6
5-9	0.0015	2461	0.007472	92706	693	461797	5300276	57.1
10-14	0.0014	2637	0.006976	92013	642	458306	4838479	52.5
15-19	0.0014	2438	0.006995	91371	639	455502	4380173	47.9
20-24	0.0025	2183	0.01247	90732	1131	451230	3924671	43.2
25-29	0.004	2027	0.01985	89601	1779	443803	3473441	38.7
30-34	0.0064	1948	0.03155	87822	2771	432555	3029637	34.4
35-39	0.0089	1792	0.04360	85051	3708	416312	2597082	30.5
40-44	0.0107	1621	0.05217	81343	4244	396278	2180771	26.8
45-49	0.0126	1457	0.06114	77099	4714	373858	1784492	23.1
50-54	0.0144	1273	0.06968	72385	5044	349701	1410634	19.5
55-59	0.0192	1039	0.09198	67342	6194	321651	1060933	15.7
60-64	0.0245	789	0.1163	61148	7111	28674	739282	12.1
65-69	0.0368	544	0.17022	54036	9198	247964	710608	13.2
70-74	0.0536	323	0.239	44838	10716	198160	462644	10.3
75-79	0.0851	212	0.3519	34122	12007	141035	264484	7.7
80-84	0.1443	136	0.5231	22114	11568	80613	123449	5.6
85+	0.2388	51	1.0000	10546	10546	42836	42836	4.1

Source: Author's Own Computation (2019)

Table (16)

Calculation of Abridged Life Table for Myanmar's Union Females in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.041	2405	0.04018	100000	4018	97991	6989102	69.8
1-4	0.0047	2439	0.01863	95982	1788	380352	6891111	71.7
5-9	0.0011	2404	0.005485	94194	517	469678	6510759	69.1
10-14	0.0008	2540	0.003992	93677	374	467169	6041082	64.4
15-19	0.0008	2429	0.003992	93303	372	466114	5573912	59.7
20-24	0.0011	2308	0.005495	92931	511	463071	5107798	54.9
25-29	0.0014	2217	0.006985	92420	645	460981	4644727	50.2
30-34	0.0018	2113	0.008969	91775	823	456463	4183746	45.5
35-39	0.0024	1954	0.01195	90951	1086	452491	3727283	40.9
40-44	0.0031	1818	0.01541	89865	1384	445651	3274792	36.4
45-49	0.0044	1676	0.02182	88479	1930	437952	2829141	31.9
50-54	0.006	1494	0.02969	86549	2569	426656	2391189	27.6
55-59	0.0093	1253	0.04577	83979	3843	411008	1964533	23.4
60-64	0.0143	982	0.06977	80136	5591	387669	1553525	19.3
65-69	0.0234	708	0.1118	74545	8334	352994	1165856	15.6
70-74	0.035	459	0.1633	66211	10812	305515	812862	12.3
75-79	0.0601	319	0.2645	55398	14653	242769	507347	9.1
80-84	0.1209	218	0.4523	40746	18429	157801	264578	6.4
85+	0.209	95	1.0000	22316	22316	106777	106777	4.8

Source: Author's Own Computation (2019)

Table (17)

Calculation of Abridged Life Table for Myanmar's Urban Males in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0353	603	0.03469	100000	3469	98265	5998997	59.9
1-4	0.0036	614	0.014303	96531	1381	383361	5900732	61.1
5-9	0.001	592	0.004989	95149	475	474563	5517371	57.9
10-14	0.0011	659	0.005475	94675	518	472119	5042808	53.2
15-19	0.0014	757	0.006956	94157	655	469272	4570689	48.5
20-24	0.0024	767	0.01196	93502	1118	464999	4101417	43.8
25-29	0.0044	679	0.02188	92384	2021	457342	3636418	39.4
30-34	0.0076	614	0.03743	90362	3382	443930	3179076	35.1
35-39	0.0112	549	0.054604	86980	4749	423453	2735146	31.4
40-44	0.0137	483	0.066322	82231	5454	397785	2311693	28.1
45-49	0.0163	437	0.078388	76777	6018	369003	1913908	24.9
50-54	0.0185	369	0.088599	7059	6269	338363	1544906	21.8
55-59	0.0232	297	0.109985	64489	7093	305011	1206543	18.7
60-64	0.0286	223	0.134251	57397	7706	268230	901532	15.7
65-69	0.0407	155	0.18612	49691	9249	225869	633301	12.7
70-74	0.057	95	0.2518	40442	10185	177320	407433	10.1
75-79	0.0899	60	0.3676	30258	11123	123637	230112	7.6
80-84	0.1468	39	0.5288	19135	10118	69384	106476	5.6
85+	0.2431	15	1.0000	9017	9017	37092	37092	4.1

Source: Author's Own Computation (2019)

Table (18)

Calculation of Abridged Life Table for Myanmar's Urban Females in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0276	587	0.02723	100000	2723	98001	7128636	71.3
1-4	0.0033	597	0.01312	97277	1276	386556	7030636	72.2
5-9	0.0007	572	0.003494	96001	335	49166	6644080	69.2
10-14	0.0006	618	0.002996	95666	286	477611	6164913	64.4
15-19	0.0007	728	0.003484	95379	332	476103	5687302	59.6
20-24	0.001	791	0.004987	95047	474	474107	5211199	54.8
25-29	0.0013	732	0.006495	94573	614	471414	4737093	50.1
30-34	0.0019	661	0.009479	93958	890	467679	4265679	45.4
35-39	0.0025	604	0.01245	93068	1158	462572	3798000	40.8
40-44	0.0033	562	0.01639	91909	1506	455961	3335428	36.3
45-49	0.0045	533	0.022304	90403	2016	447253	2879468	31.8
50-54	0.0065	471	0.03213	88387	2839	435257	2432215	27.5
55-59	0.0096	396	0.04723	85546	4041	418326	1996958	23.3
60-64	0.0154	307	0.07483	81506	6099	393173	1578631	19.4
65-69	0.0229	224	0.1094	75407	8247	357320	1185458	15.7
70-74	0.0329	145	0.1543	67161	10362	311346	828138	12.3
75-79	0.0566	97	0.2528	56799	14360	251535	516792	9.1
80-84	0.1339	67	0.4955	42438	21029	158264	265257	6.3
85+	0.2001	31	1.0000	21409	21409	106993	106993	4.9

Source: Author's Own Computation (2019)

Table (19)

Calculation of Abridged Life Table for Myanmar's Rural Males in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0555	1854	0.05401	100000	5401	97299	6080379	60.8
1-4	0.0071	1885	0.028026	94599	2651	373093	5983080	63.2
5-9	0.0016	1868	0.007971	91948	732	457906	5609987	61.1
10-14	0.0015	1978	0.007471	91215	681	454359	5152080	56.4
15-19	0.0015	1681	0.00751	90533	679	451068	4697722	51.8
20-24	0.0026	1416	0.01297	89853	1165	446552	4246654	47.3
25-29	0.0037	1349	0.01835	88688	1627	439635	3800101	42.8
30-34	0.0056	1334	0.02764	87061	2407	429617	3360467	38.5
35-39	0.0077	1242	0.03782	84654	3202	415517	2930850	34.6
40-44	0.0091	1138	0.04454	81452	3628	398372	2515333	30.8
45-49	0.0107	1020	0.05217	77824	4060	379142	2116961	27.2
50-54	0.0124	904	0.06033	73764	4449	358096	1737819	23.6
55-59	0.0176	742	0.084704	69315	5871	332418	1379723	19.9
60-64	0.0231	566	0.1101	63443	6987	300534	1047306	16.5
65-69	0.0356	388	0.1653	56457	9333	259856	746772	13.2
70-74	0.053	228	0.2369	47123	11162	208585	486916	10.3
75-79	0.0851	152	0.35206	35961	12661	148736	278334	7.7
80-84	0.1473	97	0.5304	23300	12359	84424	129599	5.6
85+	0.2422	37	1.0000	10941	10941	45175	45175	4.1

Source: Author's Own Computation (2019)

Table (20)

Calculation of Abridged Life Table for Myanmar's Rural Females in 2016, by the Keyfitz-Frauenthal Method

Age (Years)	m_x	P_x	q_x	l_x	d_x	L_x	T_x	e_x
<1	0.0454	1818	0.044401	100000	4440	97779	6936959	69.4
1-4	0.0052	1842	0.020599	95559	1968	378303	6839179	71.5
5-9	0.0012	1833	0.005983	93592	560	466558	6460876	69.1
10-14	0.0009	1922	0.004487	93092	417	464075	5994318	64.4
15-19	0.0008	1701	0.003999	92614	370	462173	5530244	59.7
20-24	0.0012	1518	0.005991	92244	553	459893	5068071	54.9
25-29	0.0014	1485	0.006978	91691	639	456902	4608178	50.2
30-34	0.0017	1453	0.008473	91051	771	453410	4151277	45.5
35-39	0.0023	1349	0.01145	90279	1034	448961	3697867	40.9
40-44	0.003	1256	0.01492	89246	1331	443067	3248936	36.4
45-49	0.0042	1142	0.02084	87914	1831	435211	2805869	31.9
50-54	0.0056	1023	0.02775	86083	2388	424846	2370658	27.5
55-59	0.0091	857	0.0448	83693	3749	409696	1945812	23.2
60-64	0.0135	675	0.06606	79944	5281	387544	1536115	19.2
65-69	0.0237	484	0.1133	74663	4461	353412	1148571	15.4
70-74	0.0363	314	0.1688	66202	11175	304664	795159	12.1
75-79	0.0626	222	0.2737	55028	15062	239855	490496	8.9
80-84	0.1255	151	0.4747	39965	18973	151947	250641	6.3
85+	0.2127	64	1.0000	20992	20992	98694	98694	4.7

Source: Author's Own Computation (2019)

Table (21)
Life Expectancy at Birth for Myanmar and its Urban and Rural Areas in 2016

Age (Years)	Union		Urban		Rural	
	Male	Female	Male	Female	Male	Female
LEB	63.7	69.8	59.2	69.9	63.7	70.1

Source: World Population Prospects (2019)