

MORTALITY STATISTICS OF BURMA

by

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DECLARATION

Except where otherwise indicated, this thesis is my own work.

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January, 1984.

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ABSTRACT

In this thesis an attempt is made to study the mortality statistics of Burma. It is mainly based on the fourteen years (1965-1978) published vital registration data collected by the Central Statistical Organisation and the Directorate of Health. Death registration is deficient in many ways and the official death rates are found to be lower than the perceived rates. Leading causes of death are pneumonia, tuberculosis, diseases of the heart, enteritis and diarrhoea diseases, cancer, accidents, perinatal mortality and bronchitis. Burmese mortality pattern follows the pre-industrial mortality pattern with high mortality at extreme ages. There are indications of declining mortality during 1950-1978 and that mortality reduction has stabilized since 1971 and further improvement is not likely for a considerable period.

Successful implementation of death registration in Burma lies in strengthening the trained staff coupled with more co-ordination and co-operation between concerned departments. More exposure of the objectives of death registration to the general mass as national movement under the guidance of Burma Socialist Program Party is a promising aid for future death registration of Burma.

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CHAPTER 1

INTRODUCTION

The objectives of the study is to examine vital registration data. The particular aims are (a) to review the vital registration system, (b) to analyse the mortality statistics, (c) to appraise the mortality situation, and (d) to predict the future perspectives.

1.1 The Study Area and People

Burma is situated in Southeast Asia between latitudes 10°N and 28°N and longitude 92°E and 101°E . It is bordered by Bangladesh and India on the northwest, China to the northeast, Laos and Thailand to the southeast, and the Bay of Bengal on the south and west. The total area of the country is 261,228 square miles. The mountain ranges on the west, north and east serve as natural barriers. There are three seasons - monsoon, cold and dry. The annual rainfall ranges from 25 to 45 inches in central Burma; about 100 inches in the hills of the east (Shan, Kayah, etc.) and around 200 inches in the coastal regions of Arakan and Tennesserim, and the mountain regions to the extreme north.

Burma is a planned socialist state. The Socialist Republic of the Union of Burma as declared in the constitution adopted by the country-wide referendum in 1973, is a republic comprising seven states bearing the names of the indigenous racial groups and seven divisions having geographical names, thus making fourteen major administrative units in all. The fourteen states and divisions are further divided into 314 townships, which are again subdivided into 283 towns and 13,670 village tracts (Union of Burma, 1973, p.8). The administrative levels are arranged with the highest being the union level, followed by state and division level, township level and finally the village level.

The people of Burma can be basically divided into three broad

groups. Tibeto-Burman, Mon-Khmers, and Thai-Chinese. According to the 1973 census Burma had a population of 28.9 million. Rangoon division, being the most urban, is the most densely populated region with a density of 811 persons per square mile, followed by Irrawaddy division and Mon state with 306 and 277 persons per square mile respectively. Out of fourteen state and divisions, Kayah state is the smallest. Kachin state is the most sparsely populated state with a density of only 21 persons per square mile. Male to female sex ratio is highest in Rangoon division and lowest in the Chin hills.

The population is made up of 68 per cent Burmese, 9 per cent Shans, 7 per cent Karens, 4 per cent Arakans with the remaining percentage distributed among other ethnic groups and foreigners. Burmese is the national language. Almost 89 per cent of the population are Buddhists. Among other religious groups Christians form nearly 5 per cent and Muslims form a mere 4 per cent of the population (Union of Burma, 1973, p.20). According to the 1973 census the female literacy rate was 29.6 per cent while the male literacy rate recorded was 36.0 per cent. Per capita income was calculated as 488 kyats (constant prices) (Union of Burma, 1982, p.28). Average family size was estimated as 5.9 persons (Central Statistical Organisation, 1975, p.384).

Burma is an agricultural exporting country with plentiful arable land and a climate suitable for perennial agriculture (Andrus, 1947, p.44). Principal agricultural exports include rice and rice products, pulses, jute, rubber, cotton and maize. The export of agricultural products contributes nearly 57 per cent of the total export revenue. Recently the export of forest products is of growing importance, mainly teak and hardwood (Central Statistical Organisation, 1975, p.175). Burma has not suffered serious natural catastrophies nor major shortages of foodstuff recently. Rice is the staple food of the people.

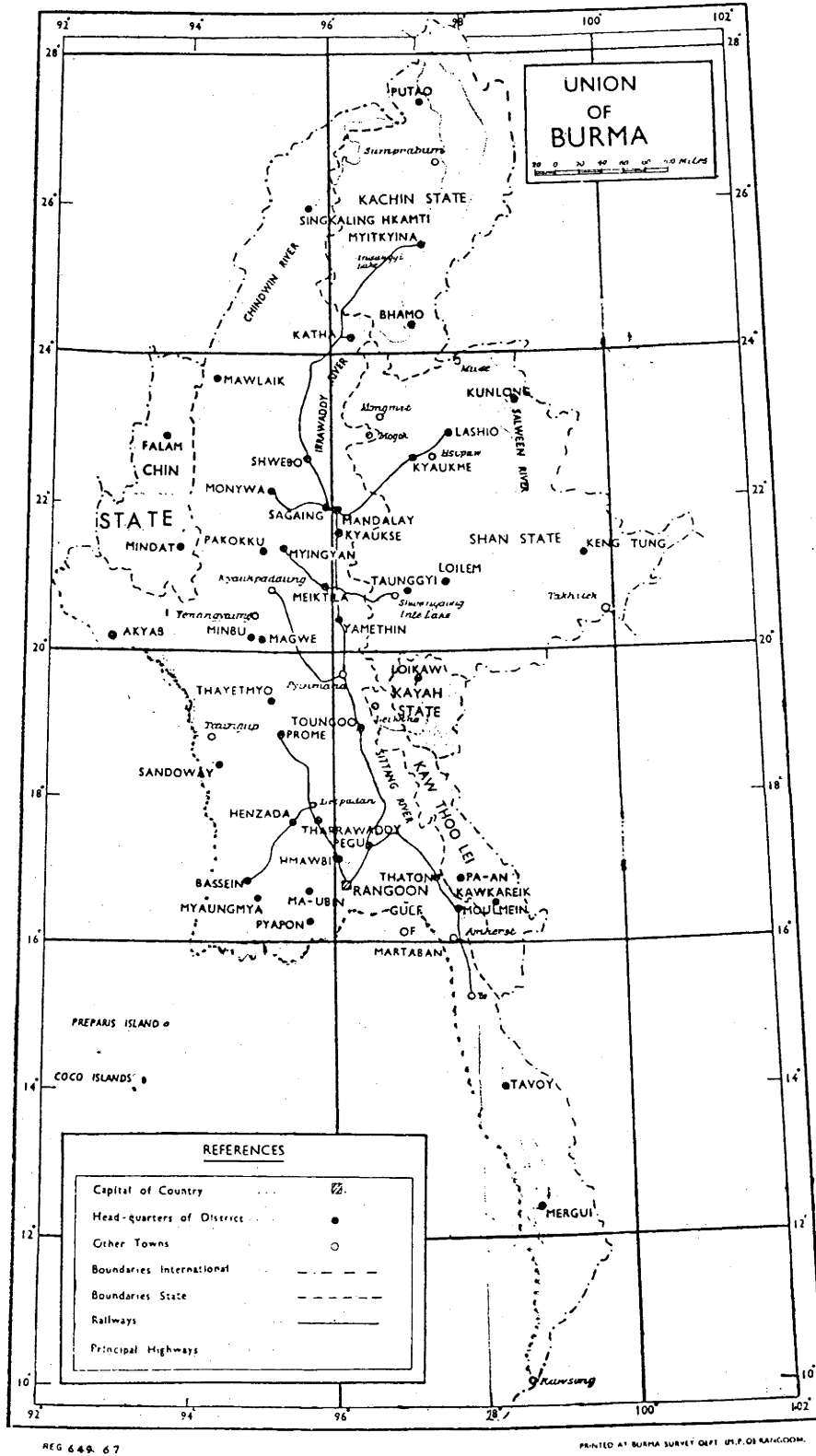
Between the states and divisions a wide dispersion of natural resources and socio-economic services exist. This is the intention of the Union of Burma Government to reduce these mal-distributions by preferential expenditure programs. Large discrepancies in wealth, income, health and welfare persist between regions. As a result of these persisting differences, we might expect similar differentials in mortality between regions.

1.2 Status of Vital Registration in Burma

Vital registration in the pre-war period was first introduced to lower Burma under British rule and gradually extended to other parts of the country. It was introduced into the towns of Lower Burma in 1906 and spread into the villages of Upper Burma in 1907. Births and deaths statistics were collected under the authority of the Department of Public Health. In urban areas municipal health officers and ward headmen recorded the vital events. In rural areas, recording was done by the village headman. Village headman later reported the vital events to the Department of Public Health through township or district headquarters. The topics on which data were collected in birth registration form included date of birth, sex of child, names of parents and occupation of the father. Death registration forms included name, age and sex of the deceased, place of death and the cause of death classified into a small group of diseases. The registration of births and deaths is compulsory by law throughout the country. Vital events were recorded under the provisions of bylaws made under (1) the Municipal Act 1898, (2) the Burma Towns Act 1907, (3) the Burma Village Act 1907, and (4) the City of Rangoon Municipal Act 1922.

The vital registration system broke down completely during the war. It was revived soon after the war and covered 78 municipalities. Immediate post-war registration more or less followed the same organisational structure and registration procedures were as in the pre-war period.

FIGURE 1.1 MAP OF UNION OF BURMA



Reproduced from "Handbook of Burma" (1968), Rangoon, Burma.

In 1953 an Inter-Departmental Committee on Vital and Health Statistics was set up for the improvement of registration in the country. In 1956 a Vital and Health Statistics Branch was set up at the Directorate of Health Services as a World Health Organisation assisted project. In 1961 the Vital Statistics Branch and the Health Statistics Branch were set up independently under the Directorate of Health Services.

In 1962 the new vital registration system was first introduced in Rangoon and 16 other towns with a standardized law and procedures. Vital statistics were collected under the Central Statistical Authority Act of 1952. Vital registration was jointly operated by the Health Department and the Central Statistics and Economics Department (now Central Statistical Organisation). Births and deaths were registered by the health authorities. Vital events were systematically registered under the strict supervision of the medical registrar. Causes of death had to be verified by the township medical officer. Death had to be initially certified by a legal medical practitioner or, in the absence of such a person, by the ward people's council member.

In 1964 the Vital Statistics Branch under the Department of Health was reorganised and put into the Central Statistics and Economics Department (C.S.E.D). The role of the Vital Statistics Branch was to record, compile and analyse vital statistical events. It also published annual vital reports jointly with the Health Department.

The new vital registration system is more of a centralised system. Towns covered by the registration had to send reports monthly to the Central Office (C.S.E.D). The registration of deaths exists in urban Burma only. Out of 283 towns, registration is carried out in 243 towns. In population terms it implies that 80 per cent of the total urban population is covered by registration. In 1973 the urban population of Burma was 24 per cent of the total Burmese population.

Actual copies of registration slips are collected by the central office. The information collected on the birth registration form includes place and date of occurrence, sex, name of parents, citizenship of parents, religion, occupation, mother's age and type of birth (i.e. twin or triplets). Information collected on the death registration form includes place and date of death, name, sex, occupation, age, citizenship, name of parents, marital status and the cause of death. Still birth is recorded separately in the new registration system, whereas the pre-war registration system did not record still birth separately. Over 80 per cent of the total Burmese population had been covered by the pre-war vital registration (Sundrum, 1957, p.7), hence post-war registration coverage is well behind the pre-war situation.

Pre-war registration omitted the question on age of the mother in the case of birth registration. This made it impossible to calculate age specific fertility rates. Deaths were classified in selected groups of diseases which limits the scope of the analysis of the cause of death statistics. The new system classifies causes of death in accordance with the International Classification of Diseases issued by the World Health Organization.

1.3 Topics Covered in Vital Statistics Report

Mortality statistics are covered under five broad headings in the vital statistics report. These are general, perinatal, foetal, infant, neonatal, and maternal mortality. The following are the tables provided under each separate heading.

General Mortality

1. Deaths by age group, sex and towns.
2. Deaths and percentages by age group and marital status of deceased.
3. Age specific death rate for towns.
4. Persons certifying causes of deaths and their percentages.
5. Deaths and proportional mortality rate by place of occurrence and sex for the City of Rangoon.
6. Deaths and proportional mortality rate by residence and sex for the City of Rangoon.
7. Causes of death (B-list) by age group and sex by towns.
8. Causes of death (B-list) by age group and sex in the City of Rangoon.
9. Deaths and death rate from leading causes by towns.

Perinatal Mortality

1. Perinatal mortality and ratio by towns.
2. Perinatal deaths and perinatal ratios.

Foetal Mortality

1. Late foetal deaths and late foetal death ratio by sex and age group of mother in the City of Rangoon and other towns.
2. Late foetal deaths by sex and birth order in towns.

Infant Mortality

1. Infant deaths and infant mortality rate by age group and sex in towns.
2. Infant deaths and infant mortality rate by place of occurrence and sex in the City of Rangoon.
3. Infant deaths by cause (B-list), sex and age group in towns.

Neonatal Mortality

1. Neonatal deaths and neonatal mortality rates.

Maternal Mortality

1. Maternal deaths and maternal mortality rate.
2. Maternal deaths by cause and age group in towns.
3. Maternal deaths by cause and age group in the City of Rangoon.

1.4 Irregular Reporting of Registration Towns

Under the Burmese vital registration system, reporting is irregular. Division towns with established administrative facilities and easier transport access have better reporting than State towns. State towns are mostly situated in hill and mountainous regions or coastal areas. Air and sea serve as the major means of transportation which are very unreliable. The problem of irregular reporting may be regarded as an organisational weakness. Apart from big cities (e.g. Rangoon, Mandalay) most hospitals are generally understaffed. It is likely that death reporting is neglected because of other priority work. Especially in small towns, township medical officers are over-burdened with many responsibilities.

No serious action is taken against irregular reporting or non-reporting of deaths in the registration towns. The Central Statistical Office usually sends reminders but the response is poor. Therefore, the death registration of Burma faces the problem of irregular and poor reporting from designated towns. Regular visits of inspection teams to poor reporting towns did result in some improvement in the number of reporting towns. However, financial constraints as well as limited vital statistics staff pose a problem for wider inspection of registration towns. The unreliable and inefficient postal service also adds to the problem. Though there exist no records for such omissions, another factor also needs to be taken into account regarding poor reporting. Paper is rather expensive in Burma. Used office papers as well as old newsprint for repacking purposes can fetch a reasonable price. Losses of vital returns and death reports are possibly linked with such factors.

1.5 Coverage of Registration Towns

The 1978 Vital Statistics Report shows that out of 283 towns in Burma 243 towns have been covered by the vital registration system. With the introduction of the new vital registration system in 1962 the number of registration towns had grown through the years. The peak expansion period was reached in 1974 covering 275 towns.

Table 1.1

Number of Reporting Towns, 1962-1978

Year	1962	1965	1970	1974	1978
Registration Towns	15	126	240	275	243
Reporting Towns	15	119	139	178	159
Per Cent Reporting	100.0	94.4	57.9	64.7	65.4

Source: 1962-1978 Vital Statistics Reports, Central Statistical Organisation, and the Directorate of Health, Rangoon, Burma.

Table 1.1 shows the number of reporting towns from 1962-1978. Over 90 per cent of towns reported when the total number of registration towns was less than 200. Reporting dropped considerably with the increase in the number of towns. The reporting also varied from year to year. Some of the established registration towns were lost in 1978 recording 32 fewer towns than the last four-year total. In short, we may note that Burmese death registration is not maintaining the established norms but rather is losing ground through time. Another consideration is that the present statistical facility is not sufficient to facilitate expansion or coverage of over 200 registration towns.

1.6 Definition of Town in Burma

In Burma deaths are recorded compulsorily by law by the death registration system in towns designated as urban areas. Though towns are designated as urban, many of the towns either lack the basic characteristics of a town or else cannot be literally termed as urban. In this study some explanation might be necessary for a clear understanding of the word 'town' in the Burmese context. Emphasis is given to administrative criteria in classifying towns in Burma. Classification as a town does not require any essential characteristic and does not adhere to any international standard definitions.

Table 1.2 presents the number of towns in census years by size of population. The 1901 Burma census showed a total of 53 towns. The following is the 1901 census definition of towns. (1) Areas under the municipalities regardless of size of population, (2) civil lines (other than municipalities), (3) army cantonment areas, (4) areas of not less than 5,000 population with permanent buildings and areas specified as important for inclusion in the census by the head of the region (U Win, 1979, p.171). The number of towns rose to 75 in the 1911 census. The increase in the number of towns was due mainly to the consideration that the inclusion of areas according to the 1901 census definition was found to be insufficient for covering enough areas for the 1911 census. The number of towns did not vary significantly during the 1921 and 1931 censuses (U Win, 1979, p.171). Information about towns in the 1941 census was lost in the Second World War.

After Independence the first stage census was taken in 1953 and the number of town rose to 252. This was due to the fact that after Independence, most of the areas in the country were reorganised and divided into various administrative regions. All administrative areas were classified as towns in the 1953 census. Towns in the 1953 census included (1) municipal towns, (2) areas classified as towns, (3) railway station towns, and (4) areas which local people called towns. Therefore, in the 1953 census there were 145 towns with less than 5,000 population (Union of Burma, 1957, p.3).

The 1973 census report showed a total of 283 towns within the country (Union of Burma, 1973, p.8). However, the 1978 vital statistics report showed a total of 288 towns (Central Statistical Organisation and the Directorate of Health, 1978, p.2). Although there is some discrepancy in the number of towns in the country the 1973 census report should be taken as most accurate. In the 1973 census the classification of towns emphasized the inclusion of administrative regions as towns rather than areas with town characteristics (U Win, 1979, p.172). In general, it can be remarked that the Burmese definition of towns is primarily administrative in nature. This fact is rather noteworthy for our analysis. Towns covered by death registration varied in size of population as well as basic socio-economic characteristics. The aim of this study is to spell out the situation of mortality statistics based on such differences.

Table 1.2

Number of Towns in Census Years by Size of Population

Population Group	<u>1901-1973</u>					
	1901	1911	1921	1931	1953	1973 [*]
100,000 and Above	2	2	2	2	3	5
50,000 - 100,000	1	1	1	1	2	16
20,000 - 50,000	5	6	5	5	23	48
10,000 - 20,000	17	17	17	17	26	60
5,000 - 10,000	18	37	39	51	53	74
Below - 5,000	10	12	21	15	145	80
Total	53	75	85	91	252	283

Source: U Win, Definition of Towns in Burma, Takatho Pade'tha Sasaung, Rangoon University, Rangoon, Burma, 1979, p.169.

* Union of Burma 1973 Population Census Report, Immigration and Manpower Department, Rangoon, Burma, 1973, p.8.

1.7 Mortality Situation

Mortality in Burma may be said to have improved during the last half century. The crude death rates from vital registration indicate signs of declining mortality. Information on the causes of morbidity and mortality is deficient in Burma. Crude death rates may serve as good measures of the mortality situation of the country in the absence of other sophisticated measures, in spite of their limitations. The quality of registration data and the extent of under-registration were neither known nor checked by any demographic measures. Therefore, the crude death rates may not be taken at face value. However, the crude rates broadly revealed a falling mortality pattern in the country.

The crude death rate in 1950 was recorded at 46.8 but fell by more than half in 1960 with 20 deaths per thousand. It was again reduced to half in 1970 and fell further to 8.6 in 1978 (Central Statistical Organisation and the Directorate of Health, 1978, p.4). The rates published by the Ministry of Planning gives much higher estimates than those based on vital registration. Crude death rate for 1978 was given as 10.1 (Union of Burma, 1979/80, p.210). The United Nations' estimated rate for 1978 was 14.3 (United Nations, 1980, p.465). Therefore, it may be reasoned that the level of mortality could be higher than the anticipated rates. However, the United Nations' estimates are for total Burma while those of vital registration rates are for urban areas only.

The infant mortality rate fell from over 300 in 1950 to almost half in 1960 and reached its lowest level in 1978 with 46 infant deaths per live births. In a similar manner the maternal mortality rate also fell from 5.3 in 1954 to 3.5 in 1964, and further to 1.5 (per thousand live births) in 1978. It was observed that the fall in maternal mortality was not drastic in the later years after 1967, but stabilized in the range of 1.5 - 1.9.

Table 1. 3 shows life expectancy at birth for urban males and females from 1921-1978. Over the last five decades the expectation of life has increased by 70 and 74 per cent. The average expectancy of life for both sexes was estimated at more than 60 years in 1978.

Table 1.3

Life Expectancy at Birth for Urban Burma, 1921-1978

Period	Life Expectancy at Birth		Percentage Increase in e_0^0 Since 1921	
	Male	Female	Male	Female
1921-31	34.9	36.8	-	-
1954	40.8	43.8	16.9	19.0
1964	45.0	47.8	28.9	29.9
1965*	47.1	50.0	34.9	35.9
1971	55.9	59.1	60.2	60.6
1974	56.3	50.2	61.3	63.6
1978	59.3	64.0	69.9	73.9

Source: Report to Pyithu Hluttaw on the financial, economic and social conditions of the Socialist Republic of the Union of Burma, 1969/70, p.139; 1974/75, p.222; 1983/84, p.229, Ministry of Planning and Finance, Rangoon, Burma.

* Statistical Year Book, 1975, p.55, Central Statistical Organisation, Rangoon, Burma.

Gains in life expectancy between 1965-1971 and 1974-1978 are very significant. Such a spectacular improvement in mortality within a short period may be due largely to the improvements in economic and health conditions, particularly in maternal and child health. Females seem to have benefited more from improving health conditions than males, enjoying longer life expectancy and thus further widening the mortality gap between the sexes. Many of the questions on the significant progress in mortality in the above short period remain unanswered. In the absence of other demographic measures and

because existing vital registration data are deficient, finding plausible explanations for the above phenomenon might not be possible. The most one can speculate is that the improving mortality in the urban towns was brought about by the modernisation process and health intervention.

1.8 Sources and Limitations of Data

The study will be based mainly on the 13 years vital registration data covering the period between 1965-1978. Since 1962, registration reports have been published annually, but the 1962-1964 reports are not available to the author. Also, the 1969 report covered Theinchaung Rural Experimental Station only. Theinchaung rural area was chosen as a test site in 1969 for the introduction of vital registration in rural areas. Therefore, this report needs to be excluded from the study.

1973 urban census data are used for the calculation of three years (1972-1974) average vital rates as it is the latest available census data. The 1983 census data are still being processed and are not yet published for use in the present study. The 1973 national population census data have been tested and judged to be of high quality (Tin Tin Nyunt, 1978, p.36). In contrast, the 1973 urban population data have not been put to the test. It is assumed here to be as reliable as the national population census data.

Hospital statistics, morbidity and mortality reports will be supplemented in analysing the cause of death data. These statistics are compiled from hospital records of urban towns. They are taken to be more reliable in defining morbidity and cause of death.

Ad hoc economic and social surveys are conducted on a rotational basis in regions throughout the country every year. The surveys are

conducted by the Central Statistical Organisation with the aim of assessing the economic and social conditions of various states and divisions in the country. Some of this survey data will be used to explain the socioeconomic background of the study area with respect to the prevailing mortality situations. Linking survey information to registration data will pose some difficulty.

The Limitations: Vital registration data is deficient in a number of ways. First, the coverage. The registration system exists in urban areas only. 21 per cent of the total population is covered. But for the towns (designated as urban areas) the coverage is 80 per cent (Central Statistical Organisation and the Directorate of Health, 1973, p.3). Second, the under-registration of the deaths and irregular reporting of registration towns. Under-registration may be due to two sources. The failure of concerned respondents to report deaths in their family households and the failure of registration towns staff to send registration slips to the central office in Rangoon. It is stated that such failures also occurred in the pre-war registration system (Sundrum, 1957, p.8). Death reporting is much more likely to be accurate than birth reporting (Sundrum, 1957, p.9). The event of death cannot escape unnoticed in the Burmese community and is regarded as part of community affairs. Neighbours, friends and relatives usually gather together to assist with the burial.

In the event of death in a certain family, it is the usual custom for all the family members to gather at the place of the deceased. The dead body is normally kept for an odd number of 1, 3 or 5 days in order to allow time for the family members at faraway places to arrive in time for the funeral day. It is not usual for the dead body to be buried within 24 hours or a day, unless a person dies of some contagious disease and immediate burial is instructed by the medical doctor. Most of the adult dead bodies are kept for 5 days, 7 days is rare, whereas dead

children are kept for a shorter period of 3 days. Infant dead are usually buried within a day. The customary burial procedures followed are the same as for adult dead. The immediate burial of dead infants may be responsible for the large proportion of under-reporting at young ages. Dead infant girls are reported less than infant boys as being not significantly important (Sundrum, 1957, p.8).

Inefficiency and unreliability of postal services lead to the failure of registration slips to reach the Central Statistics Office. It is also probable that lack of interest, ignorance of the value of vital statistics and less attention to registration due to heavy work loads are reasons for under-registration as well.

Errors in age reporting and defects in classification of deaths by cause compound the problem. Cause of death is recorded in accordance with the International Classification of Diseases. However, the data is not of high quality, as can be seen from the proportions in the unknown cause category, which usually serves as the quality measure, is well over 40 per cent.

It has already been noted in the earlier section (Section 1.8) that Burmese vital registration data is defective in a number of ways. There is much to be challenged in both quantitative and qualitative measures. However, despite its limitations and short-comings, data from vital registration provides the only basis for measuring the mortality situation in Burma. Therefore, bearing this in mind, the analysis and interpretations made throughout this thesis are constrained primarily by the various drawbacks and limitations of the data base.

Data on foetal deaths will not be analysed in this present study because trying to arrive at conclusive results is not possible for incompleteness of their registration, the problems of accuracy of diagnosis and of reporting the sex of the foetus.

1.9 Organization of Study

The rest of the chapters in this thesis are organized as follows:

- Chapter II : Mortality Statistics
- Chapter III : Causes of Death and Life Tables
- Chapter IV : Future Perspectives
- Chapter V : Summary and Conclusions

CHAPTER 2

ANALYSIS OF MORTALITY STATISTICS2.1 The Number of Deaths

The number of deaths depends on the size and various demographic, socio-economic characteristics of the population and physical environment, e.g. economic well-being, the quality of health facilities, availability and quality of food. Age is the most important factor in considering death because the risk of death sharply rises with age. Also, the socio-economic characteristics of a population vary with age. Therefore the age structure of the population plays an important role in mortality analysis. The 1973 Population Census of Burma shows that more than two-fifths (41.5 per cent) of the population is below 15 years of age (Union of Burma, 1973, p.48). Hence, Burma has a young population with only a small proportion at older ages where risk of death is higher.

It can be seen that the number of deaths in Urban Burma ranges from nearly fifty thousand deaths to a little over sixty thousand deaths annually (Appendix 2.1). More than 80 per cent of the deaths occur in urban division towns, with almost 50 per cent of the total deaths in Rangoon Division, followed by 14 per cent in Mandalay Division and over 11 per cent in Irrawaddy Division (Central Statistical Organisation, 1982, p.5).

There are some variations in the total number of deaths from year to year caused mainly by irregular reporting of registration towns. Hence, nothing conclusive can be derived from the reported number of total deaths in these towns, except that the number of male deaths exceeds female deaths throughout the period.

The number of monthly deaths by sex for Urban Burma for 1975-1979 (Appendix 2.2) are compiled from raw data of death returns as sent to the Vital Statistical Section. These five-year data on monthly death returns indicate some form of seasonality of death in Burma.

The higher number of reported deaths in December may be due to the late arrival of returns from the reporting towns, thus lumping a larger number of deaths into December. Seasonal indexes calculated on five years data (1975-1979) for males and females of Urban Burma are shown in Appendix 2.2(a) and 2.2(b). The results further strengthen the findings of existence of seasonal pattern of deaths in Burma.

2.2 The Crude Death Rates

The crude death rate is defined as the number of deaths per year per 1000 population at the mid-year. It is one of the most common measures of mortality. However, it is not a good measure as it is highly sensitive to change in population structure, especially in age structure. Hence, in the study of mortality trends within a population over long periods or mortality differentials between populations, the use of this rate is not very appropriate. However, in the absence of any other mortality studies, crude death rate may act as a good indicator of the mortality situation of a country.

In Burma crude death rates were calculated from the death statistics and estimated populations of urban reporting towns. Therefore, these rates are not for the whole country.

Table 2.1 presents the crude death rates for Urban Burma for both sexes. It is apparent that the highest crude death rate was recorded in 1950. The early years of the 1950s were post-war years of rehabilitation

Table 2.1
Crude Death Rates for Urban Burma for
Both Sexes, 1950-1978

Year	Number of Reporting Towns	Crude Death Rate ¹	Crude Death Rate ²
1950	N.A.	46.8	N.A.
1955	66	20.7	20.0
1960	61	20.0	20.0
1965	104	16.4	17.9
1970	139	10.4	10.8
1971	138	10.9	11.4
1972	126	10.9	11.3
1973	170	9.5	11.1
1974	178	10.5	11.3
1975	164	10.1	10.5
1976	145	9.8	10.6
1977	115	9.1	10.4
1978	159	8.6	10.1

Source: ¹ Vital Statistics Report, 1978, p.4, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.
² Union of Burma, 1971/72, p.162; 1982/83, p.263; Ministry of Planning and Finance, Rangoon, Burma.

with poor economic performance and a lack of general health facilities (Knappen Tippetts Abbet Engineering Report, 1952, p.20). Internal struggles for power raging in the country in that period may also explain such abnormally high death rates.

A marked improvement in crude death rates was seen over the following years, falling from over 20 deaths per thousand in 1960s to below 9 in 1978. Such a pronounced fall in death rates was brought about by improvements in socio-economic conditions, health facilities and the introduction of modern (Western) medicine. Steady economic growth was achieved between 1960-1978, with Gross Domestic Product increasing at an annual average of 4 per cent (Union of Burma, 1972/73, p.1; 1977/78, p.3). Economic development has enabled the Union of Burma Government to increase health expenditure four-fold, resulting in a substantial expansion of public health facilities (Union of Burma, 1977, p.165).

Another consideration is that crude rates may also vary with the changing population base. Projected or estimated populations were used for the calculation of crude rates in the years before 1973. These estimates were provided by the Census Department (Central Statistical Organisation, 1967, p.2). During the post-war period Burma conducted three censuses, in 1953, 1973 and 1983. The census of 1953 was not completed due to political unrest and insurgency prevalent in the country at that time. The 1973 and 1983 censuses are the only two complete censuses conducted in the post-war era. 1973 census data is published but 1983 data is still being processed at the time of writing.

Besides the various population projections based on various assumptions, there was even an instance where the annual rate per capita consumption of rice was used as a basis for calculating population estimates (Census Department mimeograph, n.d., Appendix C). Given such evidence we may conclude that the death rates derived from the various population estimates may have added to variations of rates seen in our study.

There seems to be a growing awareness among the Burmese authorities concerning the problem of under-registration. This point is evident from the crude death rates published by the Ministry of Planning and Finance which are higher than the published vital registration rates. It is very likely that the Ministry of Planning and Finance, being aware of this problem, inflated their rates (Figure 2.1).

In order to add reliability to the measure of mortality, a 3-year average crude death rate covering the period 1972-1974 was calculated. The 1972-1974 period was chosen because 1973 was the census year, therefore the 1973 census population is employed in the calculation of crude rates in this study. The 1973 population census was found to be of good quality by Daw Tin Tin Nyunt (Daw Tin Tin Nyunt, 1978, p.36).

The numbers of deaths for the years 1972-1974 were averaged and divided by the 1973 census population to arrive at crude death rates. The rates were calculated for each registration reporting town of the seven Divisions and seven States. The crude death rate of each town is shown in Appendix 1.1. The rates for urban Burma by division and state are given in Figure 2.2

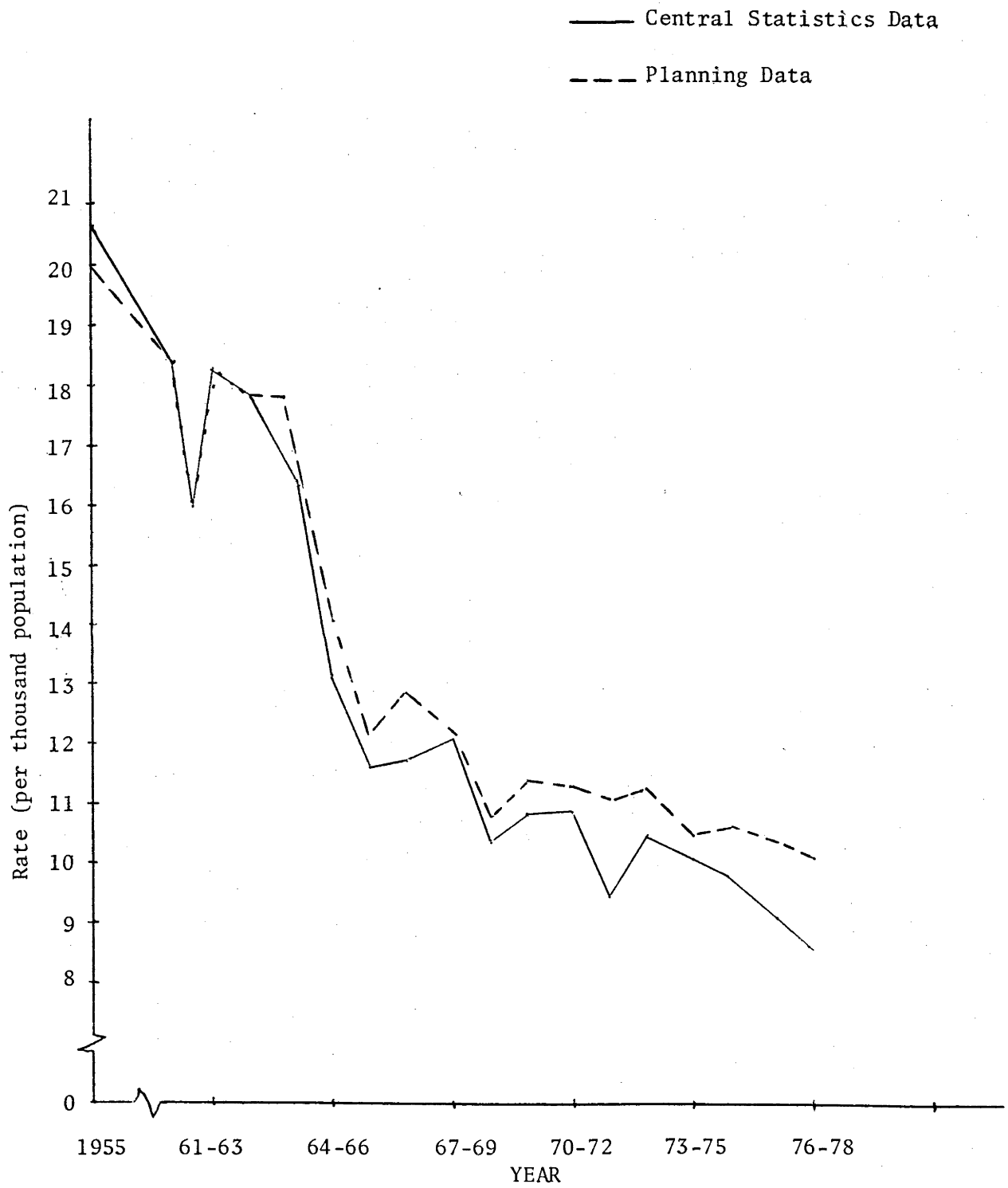


Figure 2.1
Crude Death Rates of Urban Burma, 1955-1978

Table 2.2 shows the three-year (1972-1974) crude death rates of Urban Burma by division and state. It can be observed that male crude death rates are higher than female rates in all divisions and states. The rates for Urban Burma are 10.4 for males and 8.8 for females, a slightly higher rate than the 1973 annual rate in the Vital Registration Report. Since over 70 per cent of the total urban population of Burma lives in divisions, the division crude death rate is almost the same as the national rate. Of the seven divisions the death rate is highest in both Irrawaddy and Mandalay Divisions, with Rangoon and Tennesserim slightly lower from both males and females. Among the seven states, Kachin has the highest rate followed by Mon and Shan.

The high mortality in Kachin State may be due to persistent insurgency, intermittent food shortages, poor health facilities and slower economic development. Development and public works programs in the area are greatly hampered by the constant insurgency.

In the course of this study it was also found that death rates of some towns are as low as one to three deaths per thousand. The existence of such low rates in towns in Burma is quite abnormal. The most likely explanation for such low rates is poor reporting rather than any other reasons. The health and socio-economic conditions of towns cannot possibly be better than big cities like Rangoon and Mandalay which have much higher death rates (Union of Burma, 1972-1975, p.2).

Table 2.2
Crude Death Rates by Divisions and States of Urban Burma, 1972-1974

S.N.	State/Division	(Rate per 1000)						Towns with CDR 7 and Above ³	
		All Reporting Towns ¹		Towns With CDR 5 and Above ²					
		Male	Female	Male	Female	Male	Female	Male	Female
	Union of Burma	10.4	8.8	11.1	9.6	11.6	10.1		
1.	Irrawaddy Division	10.6	9.3	11.5	10.3	11.9	11.0		
2.	Mandalay Division	10.6	9.1	11.9	11.0	13.2	11.4		
3.	Rangoon Division	10.3	9.0	10.6	9.2	10.7	9.3		
4.	Pegu Division	9.8	7.9	10.7	8.8	10.9	9.3		
5.	Sagaing Division	9.8	8.0	10.7	9.0	10.7	9.9		
6.	Magwe Division	9.7	8.0	10.1	9.2	10.5	9.0		
7.	Tenasserim Division	10.0	8.1	10.9	8.8	13.5	11.2		
	Division Average	10.3	8.8	10.9	9.5	11.3	9.9		
8.	Shan State	11.1	8.3	11.8	8.9	12.1	11.9		
9.	Arakan State	8.9	6.7	10.2	8.0	11.5	9.1		
10.	Mon State	12.3	10.7	13.9	12.2	15.7	13.1		
11.	Karen State	9.2	7.7	9.8	8.4	10.1	8.4		
12.	Kachin State	14.4	10.7	15.1	12.9	15.1	12.9		
13.	Chin State	5.4	4.3	8.8	6.1	7.8	N.R.		
14.	Kayah State	8.7	7.5	8.7	7.5	8.7	7.5		
	State Average	11.0	8.8	12.2	10.0	13.1	11.7		

Note: N.R = No Reporting.

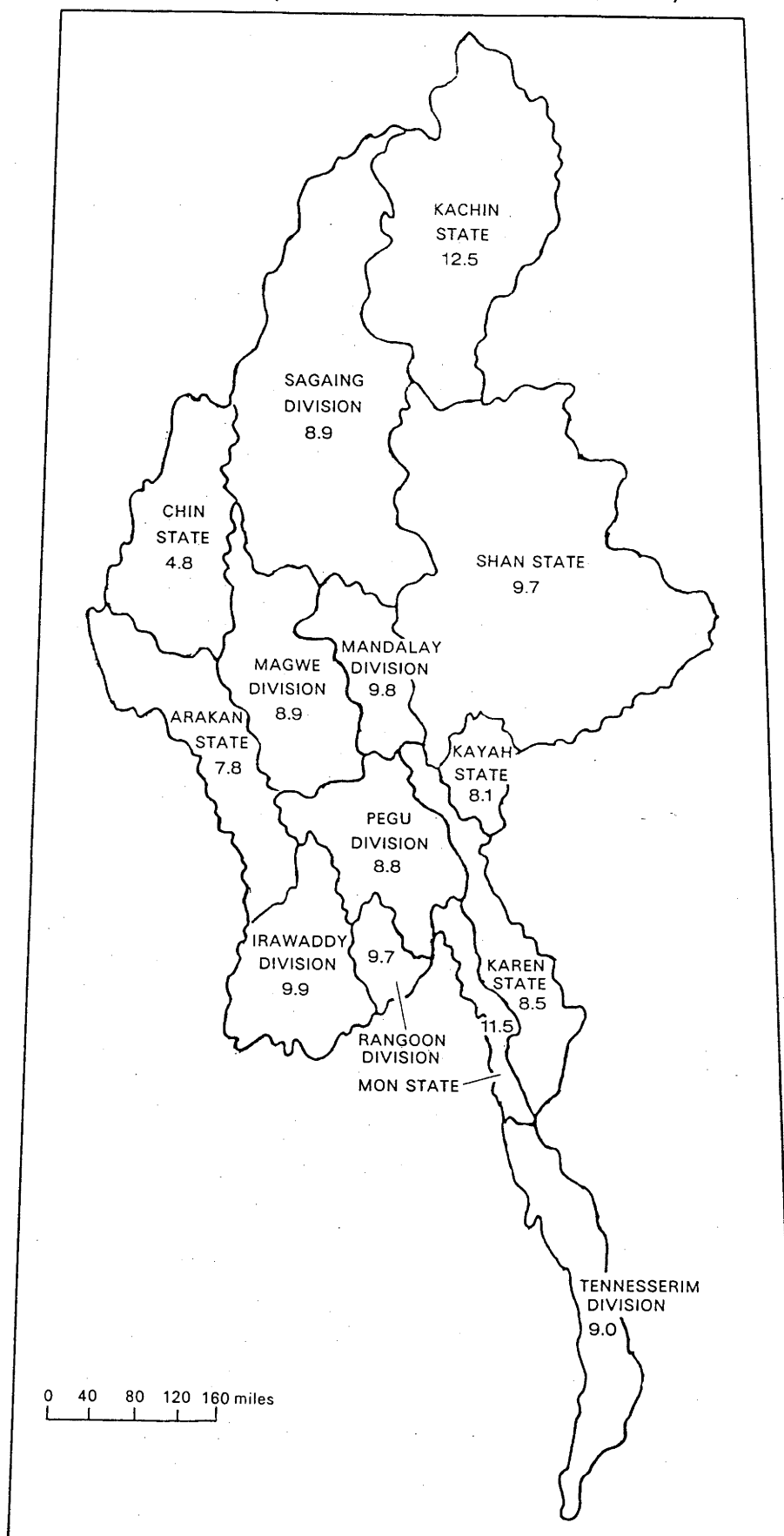
1 Excluding towns where 1973 census population is not available

2 Excluding towns with crude death rate less than 5 per thousand

3 Excluding towns with crude death rate less than 7 per thousand

Source: Calculated from 1972-1974 vital statistics reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

FIGURE 2.2 MAP OF CRUDE DEATH RATES OF URBAN BURMA
(BOTH SEXES) BY DIVISIONS AND STATES
1972-1974
(RATE PER THOUSAND POPULATION)



- (1) The Map is reproduced from "Map of Burma" published by the Land Record Department, Rangoon, Burma.
- (2) Death rates are calculated from 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

In Burma, due to severe under-reporting in some registration towns, the derived rates may be much lower than the actual or expected rate. In the absence of any national mortality study in Burma trying to estimate the actual or expected death rate is impossible. For a clear understanding of the mortality situation in the country, the abnormally low death rates of towns are deleted from the 3-year (1972-1974) average data. This procedure is based on the assumption that for a developing country like Burma (with a poor registration base) to register a crude death rate of less than 8 per thousand is most unlikely (United Nations, 1961, p.3). Therefore, towns registering crude death rates less than five are deleted and crude rates recalculated. After removing the abnormal death rates of less than five from the data the Burmese national average (1972-1974) crude death rate increased by one point. From the above instances we may generally conclude that crude death rates of towns in Burma are not reliable and are under-reported.

However, cities and capital towns are known to have better vital registration facilities. The crude death rates from these areas may be compared with the national average to give a better understanding of the mortality situation in Burma. Table 2.3(a) presents the crude death rate of capital towns in states and divisions. It is apparent that apart from four capitals (Pegu, Sagaing, Chin and Kayah) all other capitals have higher crude death rates than the national average. This proves that the national death rate should be higher than those published by the Vital Statistics Reports. The most interesting observation from Table 2.3(a) is that female mortality is higher than male mortality in Haka (capital of Chin State). One of the possibilities for such low

Table 2.3(a)
Crude Death Rates of State and Division Capitals
of Urban Burma, 1972-1974

Capital City	State/Division	Crude Death Rate Per 100	
		Male	Female
-	Union of Burma	10.4	8.8
Irrawaddy	Irrawaddy Division	13.6	12.1
Mandalay	Mandalay Division	13.3	11.8
Rangoon	Rangoon Division	10.6	9.3
Pegu	Pegu Division	9.6	8.3
Sagaing	Sagaing Division	9.6	9.1
Magwe	Magwe Division	13.6	11.2
Tennesserim	Tennesserim Division	13.6	11.2
Taunggyi	Shan State	14.8	12.2
Akyab	Arakan State	11.8	9.4
Moulmein	Mon State	16.4	13.7
Pa-An	Karen State	10.2	8.3
Myitkyina	Kachin State	18.7	13.5
Haka	Chin State	5.7	6.7
Loikaw	Kayah State	7.8	7.3

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census Report of Burma, Immigration and Manpower Department, Rangoon, Burma.

Table 2.3(b)

Observed and Standardized Crude Death Rates of Urban
Burma by State and Division for Both Sexes, 1972-1974

(Per 1000 Population)		
State/Division	Observed Rates	Standardized Rates
Irrawaddy Division	9.9	9.7
Mandalay Division	9.8	10.6
Rangoon Division	9.7	10.7
Pegu Division	8.8	8.9
Sagaing Division	8.9	9.4
Magwe Division	8.9	8.9
Tennesserim Division	9.0	9.3
Shan State	9.7	10.2
Arakan State	7.8	7.9
Mon State	11.5	11.3
Karen State	8.5	8.9
Kachin State	12.5	13.1
Chin State	4.8	6.0
Kayah State	8.1	8.9
Mean	9.1	9.6

Source: Calculated from (1) 1972-74 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon Burma.

(2) 1973 Population Census Report of Burma, Immigration and Manpower Department, Rangoon, Burma.

death rates in Chin State is substantial outmigration for medical facilities coupled with severe under-reporting of deaths.

To eliminate distortions in the data, age distribution is controlled and the observed crude death rates for 14 states and divisions are standardized. Standardization is done by the direct method. Age distribution of the total population is used as the standard. Corresponding rates are shown in Table 2.3(b). The observed mean average rate increased from 9.1 to 9.6 per 1000 population. Figure 2.2 shows the map of crude death rates of Urban Burma for both sexes by divisions and states for 1972-1974. The disparity in death rates among regions indicates a mal-distribution of resources and health facilities in Burma.

2.3 Age Specific Death Rates

Age specific death rates are considered to be better measures of mortality than crude death rates. The mortality behaviour of individual age groups may be observed from the specific death rates. These rates may be subject to a number of deficiencies such as under-reporting of deaths by age, and mis-reporting of deaths in some ages (Shyrock and Siegel, 1976, p.226). These deficiencies are known to exist in the Burmese vital registration data (Sundrum, 1957, p.8).

With irregular reporting and non-reporting from some towns in the Burmese registration system, under-registration might be the major deficiency. The proportion of age not stated and misreporting of age of the deceased might be checked to some extent with the compulsory holding of national registration cards introduced to the country since 1951 (Union of Burma, 1963, p.3). Moreover, Burmese generally have their horoscope made and this might help in recalling their date of birth. If, however, the age in the horoscope or registration card is wrongly entered initially then misreporting may be possible.

The age specific death rate is generally defined as the number of deaths to persons in a specific sex and age group during a year per 1000 mid year population in a specific sex and age group. For the present study the 1972-1974 three year period is chosen so that the population census taken in 1973 which is the middle year will provide the population by sex and age distribution which is necessary for computation of age specific death rates.

Age specific death rates are calculated for the Union of Burma and 14 regions composed of seven divisions and seven states. The 1972-1974 three years average number of deaths by age group of reporting towns is divided by the mid period 1973 census population of those towns. However, the age distribution by individual towns is not available and furthermore 1973 population data for some reporting towns are also lacking. Therefore, reporting towns where 1973 population data are not available are excluded from the study. The total populations of those reporting towns are distributed accordingly to various age groups applying the 1973 census urban population age distribution. The age unknown category is distributed on a pro-rata basis. However, the proportion is small and will not have much effect on the calculation.

The same procedure is applied in the calculation of the age specific death rate for the Union of Burma, total divisions and states but using respective age distributions. Table 2.4 shows the age specific death rate of the Union of Burma, total divisions and states. The age specific death rates of the Union of Burma follow the typical pattern of a 'U' shaped curve observed in most developing countries: high deaths occurring at the lowest and highest extreme ages. The rate rises slowly from the minimum of early teens (10-14 years) and increases rapidly with advancing age. The level of male mortality is higher in almost all age groups, except 1-4 years where females tend to have

Table 2.4
Age Specific Death Rates of Urban Burma,
Divisions and States, 1972-1974

Age Group	Union (Urban Total)		Divisions		States	
	M	F	M	F	M	F
0	68.7	57.4	71.3	59.9	59.2	48.5
1 - 4	10.6	11.1	10.1	10.9	12.8	12.6
5 - 9	3.2	3.2	2.9	2.9	4.7	4.7
10 - 14	1.8	1.4	1.7	1.2	2.6	2.2
15 - 19	2.4	2.0	2.2	1.8	3.5	2.7
20 - 24	2.9	2.6	2.6	2.3	4.4	3.9
25 - 29	3.4	3.0	3.2	2.7	4.8	4.4
30 - 34	4.7	4.0	4.3	3.6	6.8	5.9
35 - 39	6.5	5.1	6.1	4.9	8.9	6.0
40 - 44	9.6	6.5	9.0	6.1	12.6	8.4
45 - 49	12.4	8.2	12.0	8.0	13.8	9.2
50 - 54	18.2	11.0	17.5	10.9	21.1	10.9
55 - 59	23.2	14.5	23.3	14.6	22.2	13.6
60 - 64	35.5	22.5	35.6	22.9	34.4	19.0
65 - 69	45.7	31.3	46.4	31.7	39.6	26.9
70 - 74	68.7	49.5	71.0	51.3	55.3	35.7
75 - 79	95.0	72.8	96.7	75.2	79.7	53.8
80 - 84	155.2	117.1	165.2	126.1	103.3	70.9
85+	240.1	189.1	266.6	211.4	149.7	116.4

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census of Burma, Immigration and Manpower Department, Rangoon, Burma.

slightly higher mortality. The proportion of deaths of children aged 0-4 years to total deaths is shown in Appendix 2.3(a). Nearly 30-40 per cent of total deaths occur in the age group 0-4 years. Moreover, deaths under 1 year account for 15-25 per cent of all deaths. This indicates that a substantial child mortality rate exists within the country.

The percentage distribution of deaths by age of children 0-4 years is presented in Appendix 2.3(b). It was found that over half of the children who died at ages 0-4 years were infants under 1 year of age. The figures also reveal that male infant deaths exceed female infant deaths under 1 year of age. An interesting point to note is that in the case of age 1-4 years, the reverse was found to be true. The general tendency among Burmese Buddhists is to favour male children more female children because of their belief that males are superior to females in spiritual matters (Theodorson, 1968, p.20). In addition, the influence of Indian culture brought into the country in the early days of Burmese settlement may have contributed to the son preference (Regional Le May, 1964, p.31). The proportion of 0-4 deaths to the total deaths in some neighbouring countries like Thailand and India around the same period are nearly 24 per cent and 48 per cent respectively (for both sexes) (Rungpitarangsi, B, 1974, p.93; Padmanabha P, 1982, p.7).

Mortality difference by sex is not very wide in the young age groups. The gap starts widening at the 35-39 age group, getting wider and more pronounced in the older age group. The general belief that men have a higher risk of death than women is also found to be true in Burma, female mortality being lower than male mortality in all age groups. One of the observations is that female mortality rates at the child bearing ages of 20 to 35 years are found to be low, as can be expected in an urban community. Such rates are usually high in developing

countries, especially in farming households where housewives are overburdened with work in daily life (Takemune Soda, 1967, p.362).

The age specific death rates of Urban Burma by divisions and states which is also presented in Table 2.4 show that the division mortality more or less follows the Union pattern. The states also follow the same age pattern as Burma and Divisions but the level is higher. Age specific death rates of Urban Burma males and females for 1972-1974 is shown in Figure 2.3. The states are rural in nature with low socio-economic status and poor health facilities. Being aware of the problem, the Union of Burma Government has set up long and short term plans to narrow the socio-economic gap between states and divisions (Burma Socialist Program Party, 1972, p.36).

Mortality rates under one year of age are exceptionally low in the states. With the prevailing economic status, it is not possible to have such low infant mortality. Possibly it is due to severe under-registration, caused by several reasons. High illiteracy rate, weakness of the vital registration system and less stringent procedures (compared to cities) in burying the dead are possible factors. The death rate of females aged 1-4 years is found to be lower than males, in contrast to divisions. This may be because most of the people in the states are Christians (Union of Burma, 1973, p.20) and son preference might not prevail. Starting from the early ages of 1-4 years until 50-54 years, the mortality rates of the states are higher than of divisions. The reverse is the case for the remaining age groups. However, a plausible explanation is still lacking in this area.

Age specific death rates for both sexes by individual division and state may be seen in Figures 2.4(a) and 2.4(b). It was observed that Pegu Division, Arakan; Mon; Karen; Chin and Kyah States have very low infant mortality rates (Appendix 2.4(a) and 2.4(b)). This

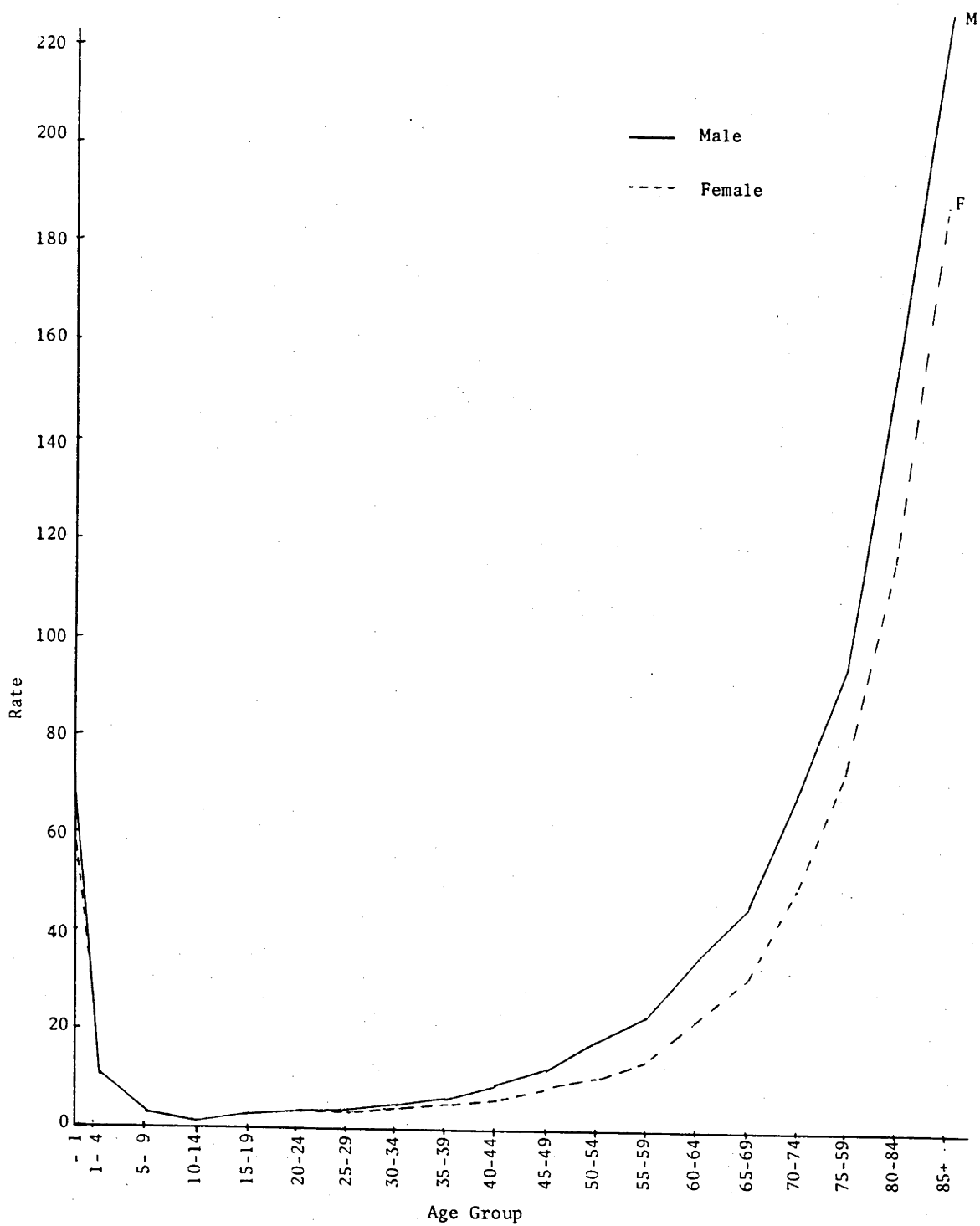


Figure 2.3
Age Specific Death Rates of Urban Burma Males and Females
for 1972-1974

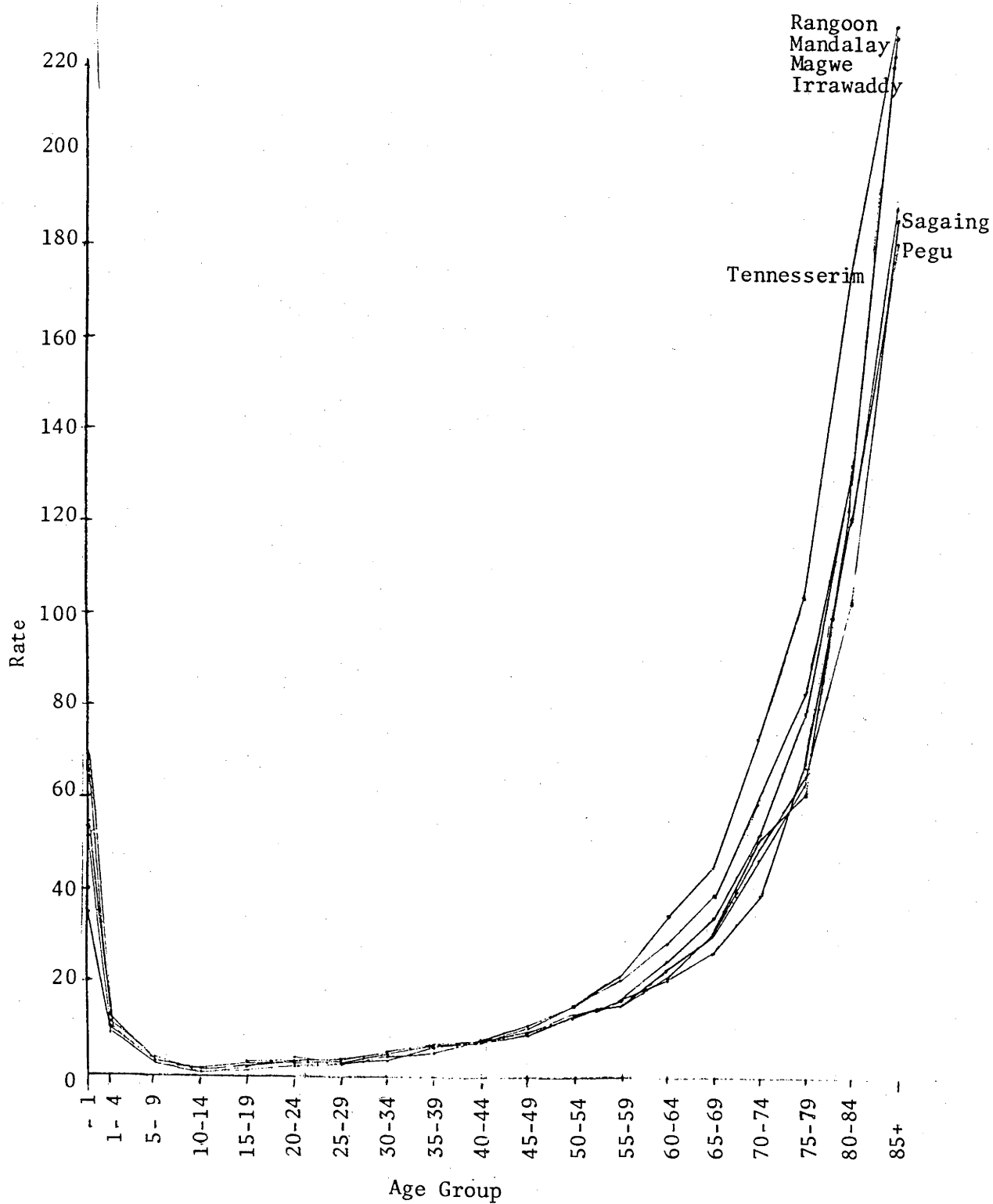


Figure 2.4(a)

Age Specific Death Rates of Urban Burma (Both Sexes)
by Divisions for 1972-1974

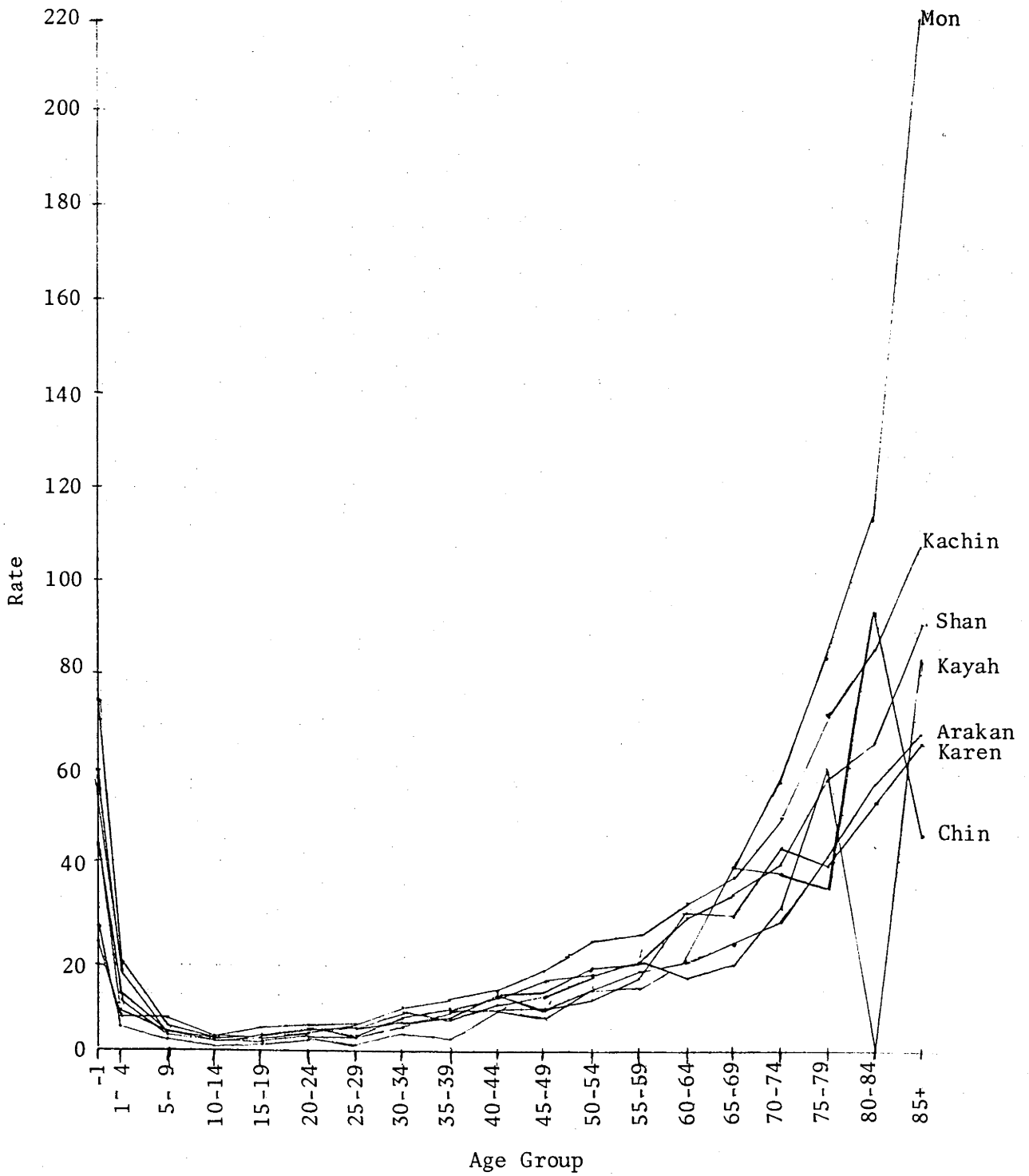


Figure 2.4(b)
Age Specific Death Rates of Urban Burma (Both Sexes)
by States for 1972-1974

may be due to the paucity of registration at young ages rather than any other reasons. However, data at older ages should be more reliable than for infant deaths.

2.4 Infant Mortality Rates

The infant mortality rate is the number of deaths occurring to infants under one year of age in a given calendar year per 1000 live births in the same year. Infant mortality rates are recorded every year in Burma in the Annual Vital Statistics Report published jointly by the Central Statistics Organisation and the Directorate of Health. They are also recorded in a report to the Pyithuhluttaw published by the Planning Department. It should be mentioned that although there exists two sources of information on the infant mortality rate, the rates calculated by the Central Statistics Organisation, regardless of their weaknesses, may be taken as the most reliable rates. Adjustments were made to allow for under-reporting of infant deaths in the calculation of rates by the Planning Department.

Infant mortality rates for the years 1940-1978 are presented in Table 2.5(a). The infant mortality rate in Burma during the study period seems to have declined. Mortality was high in 1940, reaching a peak in 1950. Those were the war-torn years of rehabilitation and the general economic level was very low. Dysentery and Diarrhoea were universal. Many diseases like smallpox, plague and cholera occurred in many districts. Maternal and child care practices were primitive. Half of all the children born alive in Burma died before they reached ten years of age (Knappen Tippetts Abbett Engineering Company Report, 1952, p.20).

Table 2.5(a)
Infant Deaths and Infant Mortality Rates for Both Sexes
Urban Burma, 1940-1978

Year	Reporting Towns	Infant Deaths	Infant Mortality Rate	
			(a)	(b)
			(Per 1000 Total Live Births)	
1940	N.A.	14116	272.7	N.A.
1950	N.A.	14297	304.0	N.A.
1955	66	13716	175.9	175.9
1960	61	12807	148.6	148.6
1961	70	11441	129.9	129.9
1962	64	11846	121.5	121.5
1963	50	11175	121.8	121.8
1964	78	13198	115.4	115.4
1965	104	15640	115.0	114.5
1966	119	13802	82.8	92.3
1967	145	11716	63.7	66.5
1968	152	11171	60.2	65.8
1969	128	11382	62.4	65.0
1970	139	10228	55.8	62.0
1971	138	11258	57.7	58.1
1972	126	11322	59.0	61.0
1973	170	9835	49.9	56.8
1974	178	9769	49.3	49.8
1975	164	9614	51.9	53.8
1976	145	8669	49.2	54.2
1977	115	8278	50.8	56.3
1978	159	8356	46.0	50.8

Notes: N.A. = Not available

(a) Given by the Ministry of Health

(b) Given by the Ministry of Planning

Source: Vital Statistics Report, 1978, P.4, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma. The report to Pyithuhluttaw, 1971/72, p.162, 1982/83, p.263, Ministry of Planning and Finance, Rangoon, Burma.

The infant mortality rate was cut down to half by 1960, reducing further to below 100 infant deaths in 1966. Possibly large investments in the social services by the Union Governments is associated with the falling infant mortality. The Revolutionary Government which came to power in 1962 also gave priority to health services. National health programs were launched for both the prevention and cure of diseases. The number of maternal and child health centres and the number of health personnel increased noticeably (Colombo Plan Report, 1962, p.29). In addition, integrated health services were implemented (Colombo Plan Report, 1963, p.42). Bringing all the medical services under one management improved health services which helped reduce infant deaths.

The infant death rate was halved again by 1970, and by 1978 less than 50 deaths per 1000 live births were registered. In general, it may be said that infant mortality in Burma had declined considerably, but the decline must be interpreted with caution due to the paucity of data. However, considering all weaknesses and assuming that the amount of under-registration had occurred in the same manner throughout the study period, the figures in Table 2.5(a) would at least give a broad indication of declining infant mortality in Burma. Figure 2.5 shows the infant mortality rates of Urban Burma for both sexes for 1940-1978.

The classification of infant deaths by days and months in 1966 and 1978 is presented in Table 2.5(b). 30 per cent of deaths occurred under 7 days of life in 1966 but higher percentages are observed in 1978. Table 2.5(c) shows the infant mortality rate by divisions and states for Urban Burma by sex for 1972-1974; regions having better registration facilities registering higher rates (e.g. Rangoon, Mandalay). Exceptional case being Chin Division recording an abnormally low rate of less than 20 infant deaths per 1000 live births, presumably caused by poor registration of deaths.

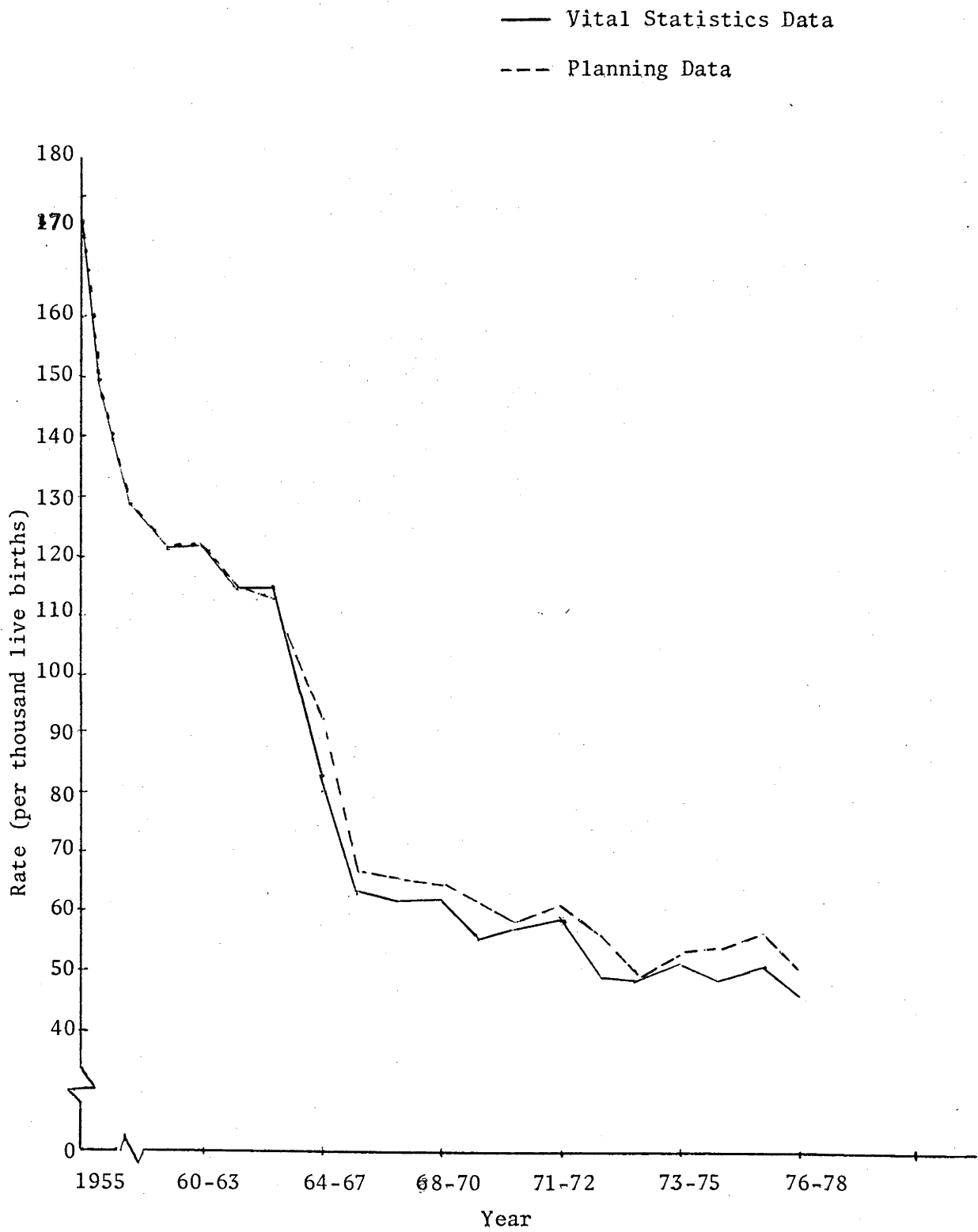


Figure 2.5
Infant Mortality Rates of Urban Burma (Both Sexes)
1940-1978

Table 2.5(b)
Proportion of Infant Deaths by Specific Age to
Death Under 1 Year for Urban Burma, 1966 and 1978

Age Group	Infant Deaths in Percentages			
	1966		1977	
	M	F	M	F
Under 7 days	29.6	28.1	36.4	34.5
7 - 27 days	16.3	15.9	20.0	20.9
Total under 28 days	45.9	44.0	56.4	55.4
28 days and under 3 months	22.6	20.6	14.2	13.6
3 - 5 months	15.1	16.4	11.4	12.3
6 - 11 months	16.4	19.0	18.0	18.7
Total 28 days - 11 months	54.1	56.0	43.6	44.6
Total under 1 year	100.0	100.0	100.0	100.0
N	7521	6136	4565	3781

Source: Calculated from Vital Statistics Report, 1966, p.118; 1978, p.97 published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Table 2.5(c)
Infant Mortality Rates by Division and State

Urban Burma, 1972-1974

State/Division	Infant Mortality Rate Per 1000 Live Births	
	Male	Female
1. Irrawaddy Division	51.9	44.6
2. Mandalay Division	68.5	64.7
3. Rangoon Division	65.3	54.0
4. Pegu Division	34.3	29.7
5. Sagaing Division	50.5	44.2
6. Magwe Division	46.2	42.1
7. Tennesserim Division	51.7	43.8
Division Average	58.3	50.4
8. Shan State	47.0	37.5
9. Arakan State	33.0	25.6
10. Mon State	65.3	57.0
11. Karen State	42.6	35.2
12. Kachin State	45.3	38.6
13. Chin State	19.1	17.9
14. Kayah State	20.4	25.8
State Average	48.1	40.7
Union of Burma Average	56.5	48.7

Source: Calculated from 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Average infant mortality rate for Urban Burma is estimated at 56.5 for males and 48.7 for females in 1972-1974. In general, neonatal and post-neonatal mortality over the period seems to have changed considerably, indicating that post-neonatal mortality has improved with social and economic development resulting from improvements in the standard of living, infant and child care, nutrition and health conditions. This is in agreement with the general belief that post-neonatal mortality is highly correlated with the exogenous factors and is most sensitive to improvements in the general health conditions. As infant mortality declines, deaths are increasingly concentrated in the neonatal period, particularly the early weeks of life, resulting from endogenous causes such as prematurity, birth injury and congenital malformations. Improvements in socio-economic conditions are conducive to a reduction in neonatal deaths as well, but they are not sufficient by themselves; obstetric and paediatric care and the provisions of institutional facilities are also required (Kwok Kwan Kit, 1982, p.272).

The increase in the neonatal death percentage in Burma in 1978 strongly indicates that health institutional facilities are not adequate to meet the demand. The role of the indigenous midwife also might be a factor. Although the proportion of trained medical personnel is growing, the traditional reliance on the indigenous midwife still exists. Over 22 per cent of the total live births in 1978 were attended by indigenous midwives and other unclassified attendants (Central Statistical Organisation, 1973, p.17). Due attention should be given to the role of the indigenous midwife in the Burmese health context.

Neonatal death is primarily a function of the first week of life. Infant mortality is heavily weighted by excessive numbers of deaths in the first month of life. A high percentage of deaths in the first four months are found in many field surveys of developing

countries, e.g. India, Guatemala and Barbados, etc (Gordan et al., 1967, pp.123-359).

The infant mortality rate, 1972-1974, for Burma is found to be much lower than in her neighbouring countries. India, Bangladesh and Thailand register infant mortality rates of 134, 140 and 76 respectively (Arriaga and Hobbs, 1982, p.159). The reason may be that infant mortality rates for Burma are calculated only for urban towns whereas the rates of her neighbours are for the whole country. Evidence suggests that in many Asian countries rural mortality is higher than urban (Ruzicka and Hansluwka, 1982, p.106). However, the differences in the infant mortality rate should not be so large, even when allowing for the fact that economic progress, measured by Gross Domestic Product, has grown at an annual rate of about 4 per cent since 1961/62 to 1977/78 (Union of Burma, 1972/73, p.1; Ministry of Foreign Affairs, Burma, 1980/81, p.1). Such low infant mortality is suspect. This is evident in the fact that perinatal mortality had increased in 1978 compared to 1966, which largely reflects the worsening conditions of the provision of institutional health facilities especially obstetric and paediatric care. Some improvements in this area might not meet the ever-growing demand. It is to be noted that maternal and child health care is quite successful in improving the infant mortality situation. Under post-natal care, mothers, six weeks after delivery, are persuaded to visit a post-natal clinic where health education is given on nutrition, diet, care of infant, personal hygiene and breast-feeding. Undernourished children and mothers are supplied with milk powder. B.C.G. and smallpox immunizations are given and Triple Antigen is also given at one month intervals between 3-6 months of age. Nutritional cooking demonstrations are given at special nutritional centres in the preparation and cooking

at low cost, nutritionally well balanced meals. Free lunch is provided to the children at some centres which serves as one of the major attractions. Although this program is growing in popularity, the lack of proper funding poses constraints for further expansion.

Some developments in hospital services are that special hospitals for children and women are open in cities such as Rangoon, Mandalay and Taungyi. In divisions separate obstetric and gynaecological units and paediatric and maternal wards are open, equipped with laboratory units, X-ray units, blood transfusion units and dehydration units to give intensive care for children with severe dehydration.

Progress in smallpox and tuberculosis immunization and advances in malaria eradication work can also contribute to declining infant mortality. A national smallpox eradication program was launched in Burma in 1963 over the entire country in three phases, the Attack Phase, the Organisation Phase, and the Maintenance Phase. Smallpox was totally eradicated in 1977 (Soe Thein, 1978 p.17).

Increased government spending on public health, the growing number of health personnel, and the easy access to health services may also contribute to the reduction of infant mortality. From 1961/62 to 1977/78 government expenditure on health services has increased more than fourfold. In a similar manner, the number of doctors and medical personnel have increased (Union of Burma, 1981/82, p.214; 1972/73, p.142).

It is to be concluded that infant mortality in Burma is declining, as in most of the developing countries. However, the existing infant mortality rates are suspiciously low. The rates of the neighbouring countries are observed to be much higher. With no previous research on infant mortality in Burma it is difficult to evaluate the present rates. They should be regarded with caution in view of statistical weaknesses.

It is most probable that the decline in infant mortality in Burma has been hastened by sustained economic development and improvement in socio-economic infrastructures, especially the availability of public health services.

2.5 Maternal Mortality Rates

The maternal mortality rate is the ratio of the number of deaths of mothers occurring within one month of childbirth to the total number of live births which took place in the same calendar year. Table 2.6 presents the 5 year average maternal mortality rate for 1954-1978. Both the rate calculated by the Ministry of Planning and Finance and that of the Central Statistical Organisation show that maternal mortality is declining in Burma. From 1964 the maternal mortality rate has shown a continuous downward trend, and has remained stable at the level of below 2 per thousand live births since 1969 (Figure 2.6). This indicates that conditions of maternal care have not improved through time or else have lost momentum since 1969.

Periods of high mortality in Burma may be due to poor maternal services and the shortage of well trained midwives and nurses. Traditional indigenous midwives, or 'let-the' as they are generally known in Burma, play an important role in birth attendance. Let-the are readily available and commonly attend births, especially those of uneducated poor families in Burma. The popularity of these untrained indigenous midwives might be the major cause of maternal deaths within the country. With the growing accessibility of health facilities and availability of modern medical personnel the popularity of let-the is gradually fading out. However, a substantial portion of birth attendance is still vested in their hands. In the city of Rangoon alone some 16 per cent of total live births were attended by let-the in 1977 (Central Statistical Organisation, 1977, p.31. Basing on this fact,

Table 2.6
Maternal Mortality Rates of Urban Burma,
1954-1978

Year	Maternal Mortality Rate Per 1000 Live Births	
	Central Statistics	Planning Department
1954-58	5.5	5.7
1959-63	4.2	4.2
1964-68	2.7	2.2
1969-73	1.7	1.3
1974-78	1.5	1.0

Source: Vital Statistics Report, 1978, p.104, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Report to Pyithuhluttaw on the financial, economic and social conditions of the Socialist Republic of the Union of Burma, 1971/72, p.162; 1982/83, p.263.

one can imagine the role of the let-the in other towns of Burma.

Old customs and beliefs in primitive pre-natal care and practices may also add to the problem. Some believe that drinking tumeric solutions and applying tumeric lotion help bring a contraction of the uterus after birth. Some go to extremes, such as making crude heat compresses with baked stones or bricks that are initially doused with water and then wrapped in cloth and later applied to the abdomen (Soe Thein, 1979, p.16).

In 1951/52 maternal health services were introduced in Burma which have progressed steadily. The number of maternal and child health centres grew from 194 in 1961/62 to 296 centres in 1977/78 (Union of Burma, 1979/80, p.203; 1972/73, p.142). The Revolutionary Government, being aware of the shortage of midwives and their shortcomings, trained midwives to meet the increasing demand. Hence the

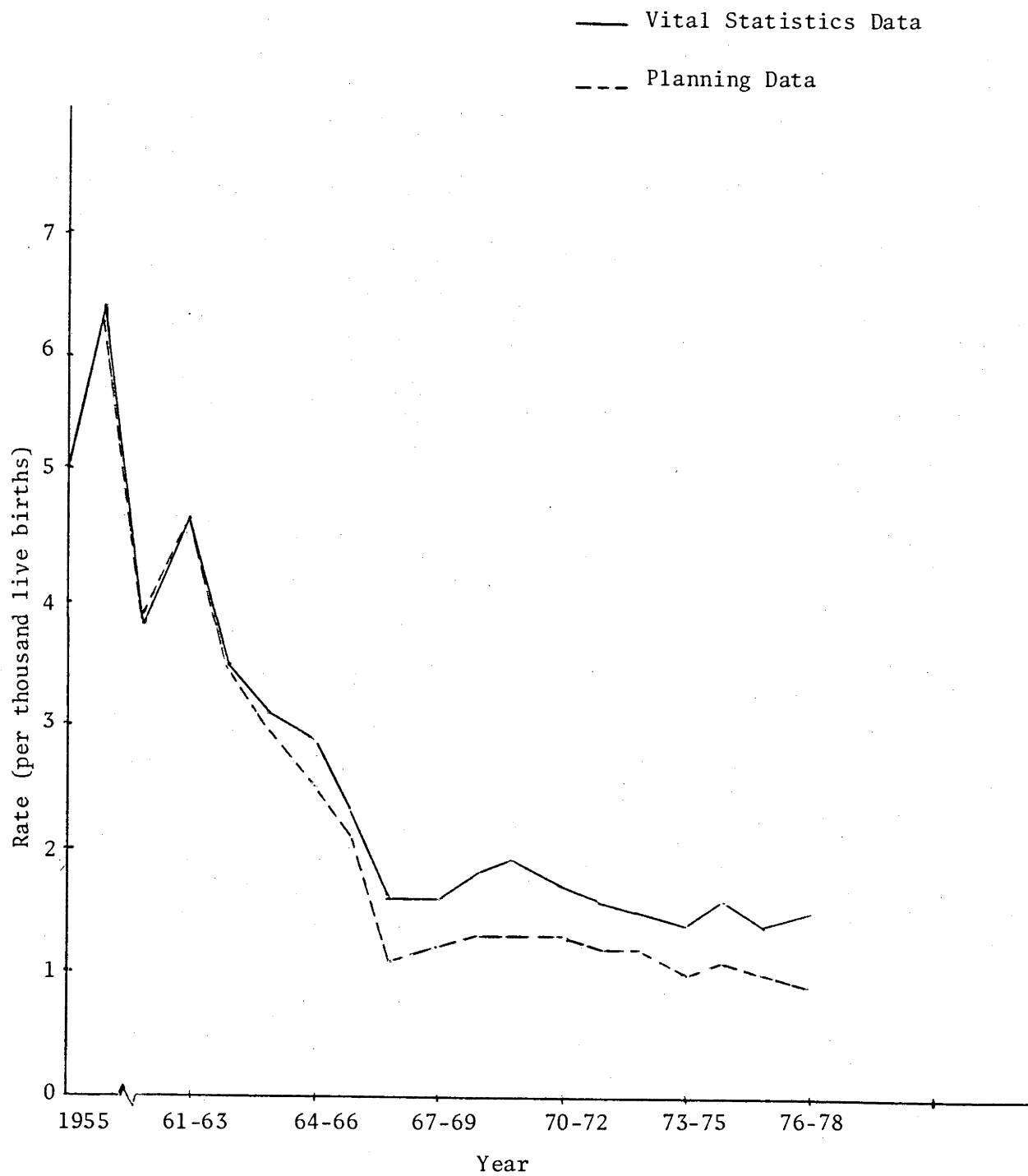


Figure 2.6
Maternal Mortality Rates of Urban Burma for 1955-1978

number of trained midwives increased from 308 persons in 1961/62 to 6428 persons in 1977/78 (Union of Burma, 1982/83, p.254; 1972/73, p.398). These might be factors effecting considerable improvements in maternal mortality during 1954-1978.

2.6 Summary

Due to the limitations of vital registration data nothing conclusive can be said about yearly changes in the total number of deaths. The annual increase may be an outcome of more deaths resulting from population growth or better reporting. Seasonal variations are also observed with more deaths occurring in rainy months. The observed crude death rates in Burma are under-reported and are therefore lower than the actual or perceived rates. Death registration is deficient in a number of ways and the death rates in some towns in states are found to be as low as one to three deaths per thousand. Crude death rates are higher in cities and capital towns where better registration facilities exist. Age specific death rates of the Union of Burma follow the typical pattern of a 'U' shaped curve observed in most developing countries; high deaths occurring at the lowest and highest extreme ages. The level of male mortality is higher in almost all age groups, except 1-4 years where females tend to have slightly higher mortality presumably due to son preference. Infant mortality during 1940-1978 shows a declining trend. High infant rates are recorded in cities and major urban towns having better registration facilities. The existing infant mortality rates for Burma are suspiciously low possibly due to deficient registration system. It is most likely that the decline in infant mortality in Burma has been hastened by sustained economic development and improvement in socio-economic infrastructure. Maternal mortality has also declined during 1954-1978. However, the conditions of maternal care has not improved substantially since 1969.

Abolition of traditional midwives and introducing an increasing number of trained midwives in the country are largely responsible for improvements in maternal mortality during 1954-1978. In general, despite weaknesses, mortality data on Burma broadly indicate a declining trend during 1950-1978.

CHAPTER 3

Causes of Death and Life Tables for Burma

3.1 Causes of Death

Cause of death in Burma is recorded in accordance with the International Classification of Diseases. To keep pace with the latest diagnostic practices as medicine advances the classification undergoes regular decennial revisions under the auspices of the World Health Organisation. Accordingly, the classification of cause of death in Burma varies with each decennial revision.

Relating mortality to the cause is an important aspect of mortality analysis, both from the medical and socio-economic point of view. The relative influence of specific causes as well as major leading causes can be identified for the assessment of possible mortality reduction.

The cause of mortality may be analysed by various rates and ratios, such as the cause specific death ratio and cause specific death rate. However, such measures will not yield plausible results for Burma due to the poor quality of data. The quality of data needs special consideration because meaningful results can only be achieved from good data.

Data on cause of death is subject to many defects. Major defects arise from under-registration of deaths, the high percentage of deaths not medically certified, and the large proportion of deaths falling into the category of senility, ill-defined and unknown cause, or to a residual category consisting of all other diseases (United Nations, 1967, p.35).

The proportion of deaths assigned to the unknown or ill-defined cause category usually serves as an indicator of the quality of cause of death data. The United Nations Statistical Office uses 25 per cent as a rule of thumb to govern the annual publication of mortality by cause of death in the Demographic Year Book (United Nations, 1961, p.8; 1968, p.456).

All of the abovementioned defects can be found in the Burmese cause of death data. The classification of cause by death in Burma is not satisfactory (Sundrum, 1957, p.9). The unknown or ill-defined cause category for Burma accounts for over 42 per cent of total deaths (Central Statistical Organisation, 1978, p.53). This indicates that the observed data are seriously deficient. Hence, such data need to be interpreted with some reservations.

In Burma a medical certificate of cause of death is certified by the following personnel: (a) Medical registrar (the registered medical doctor who attended the deceased); (b) other registered medical doctors who were not in attendance; (c) assistant health officers; (d) assistant vital registrar (non-medical practitioner) (Central Statistical Organisation, 1971, p.16).

The percentage distribution of persons certifying cause of death is presented in Table 3.1. According to this table only one-third of the total deaths are attended by medical practitioners, presumably doctors who are in attendance at government hospitals. In Burma most deaths occur at home. Deaths attended by a doctor are possibly those of sick persons hospitalised at the last stages of illness. Most deaths in Burma are certified by medical doctors acting as medical examiners and certifying cause of death on the strength of information provided by a third party. The emphasis is on whether or not death is due to

natural causes for the issue of a death certificate by the vital registration officer (who normally is a registered doctor) for disposal of the dead body.

Table 3.1
Proportion of Persons Certifying Cause of Death
for Urban Burma, 1966-1978

Year	Registered Doctor	Medical Registrar	Doctor not in Attendance	Other Persons	Total
1966	31.7	25.0	21.5	21.8	100.0
1967	32.7	20.0	18.8	28.5	100.0
1968	34.1	22.9	17.4	25.6	100.0
1970	38.7	21.7	23.3	16.3	100.0
1971	43.6	18.0	21.2	17.2	100.0
1972	46.6	22.2	12.6	18.6	100.0
1973	44.8	17.9	10.8	26.5	100.0
1974	38.9	18.3	12.8	30.0	100.0
1975	40.4	21.3	13.6	24.7	100.0
1976	33.1	21.9	14.8	30.2	100.0
1977	35.9	17.7	9.4	37.0	100.0
1978	37.1	23.7	8.5	30.7	100.0

Source: Vital Statistics Reports 1966-1978, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

The number of qualified medical practitioners in Burma was and still is small. Therefore, the classification of cause of death cannot be very satisfactory. The quality of cause of death data also lies in the hands of the vital registration officer in charge who, in most cases,

is the township medical officer. Negligence on the part of the vital registrar in paying significant attention to completing the cause of death on the medical certificate and not being conversant with the classification rules are known to be major causes of errors (Stritesky, J. et al., 1967, p.453). This might be exactly the case in Burma where township medical doctors are vested with lots of responsibilities from vital registration to accounting and general administration. Therefore, it is very likely that vital registration work is paid less attention than other high priority duties.

Table 3.2 shows the number of deaths from eight leading causes between 1965-1978. Despite the limitations of data a broad trend in mortality by cause of death is reasonably clear. Leading causes are pneumonia, tuberculosis, diseases of the heart, enteritis and diarrhoea diseases, cancer, accidents, perinatal mortality and bronchitis. Except some small changes in order of ranking in the relative importance of each disease to total deaths, the general pattern of cause of mortality groups remained almost the same throughout the study period. The logical interpretation of changes in ranking may possibly be due to better diagnosis, better reporting, or general improvement in the vital registration system.

The causes of death in the Union of Burma are grouped under 17 major groupings of the international classification (Appendix 3.1). The major percentage share of deaths was accounted for by symptoms and ill-defined conditions, infective and parasitic diseases, respiratory diseases, circulatory diseases, and causes of mortality in early infancy. This shows that Burma follows the typical pre-industrial society pattern. This pattern of causes also exists in the Philippines and Thailand (Hansluwka, H. and Ruzicka, L., 1980, p.15). The fall in ranking order of the perinatal mortality category indicates some gradual improvement

Table 3.2
Mortality From Eight Leading Causes
for Urban Burma, 1965-1978

Diseases Classified by ICD 'B' List	Absolute Numbers			Rate Per 1,000,000 Population		
	1965	1973	1978	1965	1973	1978
Pneumonia - B.32	6393	4889	5213	1943	808	774
Tuberculosis - B 5-6 (All forms)	3024	3338	3402	918	551	505
Diseases of the Heart - B.26-29	1784	3145	3386	542	519	503
Enteritis and Diarrhoea Diseases - B 24	1557	3142	3262	473	519	484
Perinatal Mortality - B 44	4455	2378	1988	1354	392	295
Cancer (All forms) - B 19-20	1575	2374	2157	479	392	320
Accidents - B 47-48	1301	2352	2086	395	388	310
Bronchitis and Emphysema - B 33	568	1387	1429	173	229	212

Source: Calculated from 1965, 1973, 1978 Vital Statistics Reports published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

of maternal and child care services. A reduction in the ill-defined cause group confirms some improvement in the vital registration system.

The eight leading causes of mortality treated in hospitals in 1978 are: ill-defined intestinal infections, malaria, pneumonia, tuberculosis, pyrexia of unknown origin, tetanus, toxic effects of substances chiefly non-medical as to source, and symptomatic heart diseases (Ministry of Health, 1980, p.13).

Since the mid-fifties the Burmese Government has given special attention to the prevention of malaria and tuberculosis diseases. Various aid and assistance was obtained from the World Health Organisations: anti campaigns were also launched. The opening of a second tuberculosis hospital in Rangoon in 1962 is the outcome of the anti-tuberculosis Program (Colombo Plan Conference Report, 1962, p.29). According to 1978/79 figures, over six million people were covered by the malaria Eradication Program (Union of Burma, 1979/80, p.205). It seems that the anti malaria and anti tuberculosis campaigns staged by the government are losing their momentum and further investigation is essential in this area.

3.2 Causes of Infant Death

Pneumonia, causes of perinatal mortality, infective and parasitic diseases, and enteritis and other diarrhoeal diseases make up over 50 per cent of deaths in 1978 (Appendix 3.2). Mortality due to infective and parasitic diseases has been controlled to a small extent but the remaining three major causes are still on the rise. In most countries of the world, pneumonia is one of the three leading causes of infant mortality, along with diseases of early infancy and gastro-enteritis. The death rate from pneumonia has been generally declining with the use of more potent chemicals and antibiotic drugs which have contributed

to a large degree to the reduction in infant mortality. This is also found to be true in Burma until 1973. However, some rise in deaths due to pneumonia in 1978 draw our attention to the volume of importation of medicine and its availability within the country. There is general acceptance as to the shortage of imported foreign medicine in the country. Some foreign medicine has been channelled into Burma from neighbouring countries through illegal trade. However, such illegal medicine is expensive, unreliable and often is of expired date. The Burmese pharmaceutical industry is also producing medicines for domestic use but the production capacity is too low to meet the growing demand. Expensive medicines may not be within the reach of low salary earners and easy availability often is not the case. A shortage of medicine might be the cause of the rise in mortality due to pneumonia.

Causes of perinatal mortality have increased in 1978 as compared to 1965 but the situation has improved since 1973. Both socio-biological and obstetric factors might be responsible. Postmortem studies were not carried out in Burma to give a clear understanding of causes of perinatal mortality. In general, some improvements in public health facilities and the social environment might be factors contributing to a proportional fall from 1973 to 1978. The increasing rate of perinatal mortality from 1965 to 1978 may be largely caused by improvements in the vital registration system because there were 104 registration towns in 1965 compared to 158 towns in 1978.

In 1978 all other infective and parasitic diseases have been on the increase compared to 1973. However, enteritis and other diarrhoeal diseases remain at the 1973 level, but higher than the 1965 level. This rise in the percentage of enteritis and other diarrhoeal diseases may be partly due to a better coverage of vital registration towns in 1978. It may also be due to malnutrition and an

inadequate supply of water in poor sub-urban and satellite towns. Water is very scarce in these areas and some even make a living from selling fresh water from artesian wells and tube wells.

3.3 Cause of Maternal Death

Causes of maternal death are categorised into four broad groupings as shown in Table 3.3. In order of ranking they are: causes relating to pregnancy; abortion; delivery and puerperium. Delivery complicated by postpartum haemorrhage and retained placenta death form over half of the maternal deaths due to causes relating to delivery category. Other abortions took a large proportion of 80 per cent of maternal deaths relating to various causes of abortion. Haemorrhage and other complications of pregnancy deaths are most prevalent in the cause category of maternal death relating to pregnancy. It will be observed that death from maternity was highest in the age group of early 20s followed by the late and early 30s respectively.

3.4 Life Tables for Burma

The progress made in the overall mortality level of a population as well as the risk of death at various ages may be expressed by the life table, which is generated from age specific mortality rates. The resulting values are used to measure mortality, survivorship and life expectation. The life table is a superior measure to the crude or age specific death rate. Life tables for Burma were included in the Census Report of India as early as 1911 (Census Report of India, 1911). Only a few scholars have attempted to construct life tables for Burma due to difficulties with limited data. Various estimates of life expectancy at birth for Burma between 1921-1978 from various sources are shown in Table 3.4. According to these published figures, it seems that mortality has improved over the period. However, the quality and

Table 3.3

Cause of Maternal Death by Age Group for Urban Burma, 1978

Cause and ICD Code Number	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	All Ages
1. Causes relating to pregnancy ICD 631-634, 639	12 (4.3)	21 (7.6)	8 (2.9)	12 (4.3)	17 (6.2)	5 (1.8)	2 (0.7)	1 (0.4)	78 (28.3)
2. Causes relating to abortion ICD 642, 644, 645	11 (4.0)	30 (10.9)	13 (4.7)	16 (5.8)	12 (4.3)	3 (1.1)	1 (0.4)	-	86 (31.2)
3. Causes relating to delivery ICD 650-653, 657, 659-661	8 (2.9)	18 (6.5)	11 (4.0)	19 (6.9)	25 (9.1)	16 (5.8)	2 (0.7)	-	99 (35.9)
4. Causes relating to puerperium ICD 670, 672, 673	2 (0.7)	3 (1.1)	5 (1.8)	-	2 (0.7)	1 (0.4)	-	-	13 (4.7)
All causes	33 (12.0)	72 (26.1)	37 (13.4)	47 (17.0)	56 (20.3)	25 (9.0)	5 (1.8)	1 (0.4)	276 (100.0)

Note: Figures in parenthesis are percentage to the total.

Source: Calculated from Vital Statistical Report, 1978, p.102, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Table 3.4
Expectation of Life at Birth for Urban Burma
By Sex and Source, 1921-1978

Period	Source	Life Expectation at Birth e_0	
		Male	Female
1921-31	U Khint Maung ¹	34.9	36.8
1921-31	Central Statistical Organisation ²	30.6	31.0
1921-31	United Nations ³	30.6	31.0
1954	U Aung Win ¹	40.8	43.8
1954	United Nations ³	43.8	51.6
1961	U Khin Maung Thwin ⁴	45.1	47.0
1964	U Aung Myint Thein and U Thein Tun ⁵	48.7	52.8
1965	U Aung Myint Thein and U Thein Tun ²	47.1	50.0
1971	Central Statistical Organisation ²	55.9	59.1
1974	Central Statistical Organisation ²	56.3	60.2
1978	Ministry of Planning and Finance ⁶	59.3	64.0
.....			

- Source:
1. Abridged life table, Burma (urban area), 1954, p.5, Directorate of Health Services 1961, Rangoon, Burma.
 2. Statistical Year Book 1975, p.55, Central Statistical Organisation, Rangoon, Burma.
 3. Demographic Year Book 1966, p.572; 1981, p.426. United Nations.
 4. Expectation of Life, 1969, p.240, Statistics Department, Institute of Economics, Rangoon, Burma.
 5. Abridged life table, Rangoon extended area Burma, 1964. Central Statistical and Economics Department, Rangoon, Burma.
 6. Report to the Pyithuhluttaw 1983/84, p.229, Ministry of Planning and Finance, Rangoon, Burma.

reliability of published life tables are rather suspect. The major weakness of published life tables is the influence of stochastic variations in the results due to the use of single year vital statistics and estimated population rather than the census. An attempt is made to overcome such weaknesses by the construction of new life tables for Burma for 1972-74.

The age specific death rates derived from the results of the three year average (1972-1974) vital statistics returns covering over 88 per cent of the total urban population (Vital Statistics Reports 1972, 1973, 1974) and the 1973 Census Population provide the basis for the construction of abridged life tables for various regions of Burma. A total of 15 sets of life tables are estimated separately, one at the Union level plus seven life tables each for divisions and states. Life tables for the Union of Burma for both sexes for 1972-1974 are shown in Appendix 3.3(a) and 3.3(b).

At the Union level, life expectancy at birth was estimated at 57.3 years for males and 59.3 years for females. The derived new life table values also conform closely to the published estimates of the same period, the corresponding rates being 56.3 years for males and 60.2 years for females. Life expectation at selected ages for both sexes by each division and state of Burma for 1972-1974 is shown in Table 3.5. Life expectation at birth varied between different regions, ranging from 55.2 to 64.5 years for males and 58.2 to 64.5 years for females. Life expectation was highest in Chin State and lowest in Kachin State. Expectation of life at age 10 is quite consistent among divisions and

Table 3.5

Expectation of Life of Urban Burma by Divisions and States, 1972-1974

Division/State	e ₀			e ₅			e ₁₀			e ₂₀			e ₄₀			e ₆₀		
	M	F		M	F		M	F		M	F		M	F		M	F	
Union of Burma	57.3	61.8		58.3	62.9		54.2	58.8		45.2	49.8		28.3	32.7		14.7	17.4	
Irrawaddy Division	59.0	61.7		60.0	62.6		55.9	58.6		46.9	49.7		30.2	32.9		15.9	17.5	
Mandalay Division	55.7	60.8		57.5	63.3		53.4	59.3		44.4	50.1		27.3	32.8		14.1	17.5	
Rangoon Division	57.1	61.2		58.5	62.4		54.2	58.2		45.0	48.8		27.2	31.0		13.0	15.8	
Pegu Division	59.3	64.4		58.7	64.0		54.7	60.0		46.0	50.9		30.0	34.2		16.4	18.8	
Sa Division	57.8	63.8		58.3	64.6		54.2	60.6		45.5	51.9		29.4	35.1		15.9	19.2	
Magwe Division	59.7	64.5		59.9	64.7		55.7	60.5		46.8	51.5		30.1	34.5		16.3	18.6	
Tennesserim Division	58.6	63.5		59.3	64.4		55.4	60.6		46.3	51.5		30.6	35.1		16.9	19.7	
Shan State	55.2	62.7		55.7	63.2		51.8	59.3		43.3	50.6		27.8	34.9		15.8	20.7	
Arakan State	59.7	66.1		58.5	64.9		55.4	62.2		47.1	54.0		32.0	38.4		19.0	22.8	
Mon State	54.8	58.2		57.3	60.8		53.4	57.2		44.6	48.0		28.3	31.7		15.0	17.4	
Karen State	58.8	62.7		59.0	62.4		55.1	58.5		46.5	49.8		31.7	34.2		18.0	20.0	
Kachin State	49.5	57.6		51.0	58.9		47.4	55.5		39.2	47.9		24.6	33.2		14.3	19.3	
Chin State	64.8	70.8		62.5	68.6		58.4	64.0		48.8	54.7		30.4	37.4		13.6	21.9	
Kayah State	59.0	67.2		57.0	66.5		53.1	62.8		44.9	54.2		29.3	39.3		18.1	26.0	

Source: Calculated from (1) 1972-74 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

states as well as among the sexes. Expectation of life at age 60 is highest among males in Arakan State and lowest in Chin State. For females, it is highest in Kayah State and lowest in Rangoon Division. Mortality differentials among states vary by up to 15.3 years of male expectation of life at birth and 13.2 years of female. However, variation is not spectacular between the divisions where differences of up to 5 years for male and 3.5 years for female were observed.

It would appear from 1972-1974 estimates that life expectation at birth for males has increased by 8.6 years and for females by 9 years during the ten year period 1964-1977 (Union of Burma, 1980/81, p.203). However, as mentioned earlier, the death registration statistics in Burma are poor and, therefore, the expectation of life values discussed here should be interpreted cautiously.

3.5 Summary

Causes of death are recorded in accordance with the International Classification of Diseases. However, the quality is poor and is subject to many defects. Leading causes of death in the country are pneumonia, tuberculosis, diseases of the heart, enteritis and diarrhoea diseases, cancer, accidents, perinatal mortality and bronchitis. The general pattern of causes of mortality groups remained almost the same throughout the study period 1965-1978.

There is limitation of data problem in constructing life tables for Burma. Therefore, the quality and reliability of official life tables are rather suspect. However, they tend to indicate improvement in mortality conditions and gains in life expectation, with females enjoying the larger share.

CHAPTER 4

Future Perspectives

4.1 The Observed Mortality Situation

The persistence of high mortality around 1950 may be explained by the fact that those were the years of political unrest and the war rehabilitation period. Many died in the insurgency and internal armed conflicts among various political groups. The economic conditions were poor and the state of public health was deplorable. The diseases of Smallpox, Cholera and Plague were annual occurrences in many districts. Tuberculosis, Malaria, Venereal Diseases and all types of enteric diseases were responsible for a great annual toll of lives. It was estimated that eight million people suffered from Malaria fever and about 25 per cent of the total population was venereally infected in large towns. One out of every 200 in the population died of Tuberculosis every year in some areas. Dysentery and Diarrhoea were almost universal (Knappen Tippetts Abbett Engineering Company Report, 1952, p.20). Such poor health conditions and the low economic level during the 1950s were responsible for high mortality. Primitive practices of maternal and child care added to the problem. The inadequate supply of medical services for prevention and treatment of ill-health further worsened the situation (Knappen Tippetts Abbett Engineering Company Report, 1952, p.20).

Economic conditions in Burma gradually improved in the 1960s. Most of the rehabilitation works were under way and some improvements in public health were achieved (Colombo Plan Report, 1964, p.45). The government expanded the program of health activities in the 1960s by protecting ten million people from Malaria; the new Tuberculosis hospital

was built in Rangoon; and twenty-one anti-VD teams were at work for the control of venereal diseases. The administration of health services was re-organised. Between 1963-64 and 1965-66 the number of hospitals increased by 118 and the number of medical personnel by 1630 persons (Colombo Plan Report, 1966, p.63). Special programs were launched for the prevention of diseases, especially Tuberculosis, Malaria, Smallpox, Trachoma etc. Nursing and midwifery training schools were also opened (Colombo Plan Report, 1963, p.41). There was also an expansion of maternal and child health services. These improvements combined to bring mortality down to half the 1950 level by 1978. The crude death rate was cut almost in half and the infant mortality rate and maternal mortality rate fell by over 50 per cent and 40 per cent respectively. During the study period, however, the pace of mortality reduction slackened after 1967 and the fall was more gradual in later years (Central Statistical Organisation, 1978, p.4).

The fall in mortality between 1950-1978 may be due largely to the control of epidemics which normally took a heavy toll of life. The Government of the Union of Burma is committed to a policy of induced economic and social developments and places great emphasis on improving the health and decreasing the death rate of the people (Hauser and Kitagawa, 1954, p.). Health schemes covering both the prevention and cure of diseases were introduced. Special programs for the control, prevention and eradication of communicable diseases were implemented continuously throughout the period, especially for major epidemic diseases like Malaria, Smallpox, Tuberculosis, Plague and Cholera (Colombo Plan Report, 1967, p.52).

Improvements in mortality in Burma during 1950-1978 is partly due to the overall economic development of the population, since economic

conditions generally influence the level of mortality (Preston, 1965, p.231). On the other hand, mortality reduction in Burma, as in many developing countries, is attributed largely to the importation of modern medicines and techniques enabling the implementation of preventive and mass public health programs at low cost (Ruzicka, L.T. and Hansluwka, H., 1982, p.126; United Nations, 1976, p.153). Economic gains were made possible by various economic development programs, particularly during the last two decades under the Burma Socialist Program Party. From 1961-62 to 1973-74, Gross Domestic Product grew at an annual rate of 3.5 per cent. Much greater gains were recorded in later years with Gross Domestic Product growing at an annual rate of over 5 per cent (Union of Burma, 1974/75, p.1; 1977/78, p.2). Expectation of life also increased with the improvement in general mortality. The annual gain in life expectancy at birth was approximately one year for both sexes between 1964 and 1978 (Table 3.4 p.60). The percentage increase was more prominent up until 1965 but stabilized after 1971.

4.2 Evaluation of Vital Rates

Mortality rates derived from Burmese vital statistics data are not reliable as the vital registration system is deficient in many ways (Section 1.8). Therefore, the observed rates from the vital statistics need to be evaluated to test the accuracy and to check whether they agree with the actual or anticipated rates. The main difficulty in evaluating the Burmese vital rates is the lack of prior knowledge or norms to compare. Thus, the actual mortality rate in Burma is not known. It is not possible to know the actual mortality situation without a nationwide demographic survey or a sound vital registration system. However, if data from two successive censuses are available the intercensal survivorship method can be applied in estimating the mortality (Brass,

1975, p.106). For the present study this approach was not possible because, although two censuses have been conducted (1973 and 1983), the 1983 census population by age group has not been published at the time of writing. Moreover, neither direct nor indirect checks have been made to test the quality of Burmese registration data. In general, the observed vital rates, subject to various constraints, served as pointers to an improved mortality situation in Burma during 1950-1978. But this still needs to be verified. The application of most of the demographic techniques is severely handicapped by the supply of data in the Burmese context. The present analysis is based largely on the vital statistics data, and if the amount of under-registration could be measured, the accuracy of prevailing vital rates can be tested and the mortality situation in Burma can be estimated. Many techniques have been developed to test the amount of under-registration of vital statistics and the majority of them rely largely on the assumption of a stable population. It can be considered that the stability assumption is valid for Burma as a whole. Burma can be considered a closed population because the indigenous Buddhist population did not migrate outside the country very much (Sundrum, 1957, p.36). Burma had natural fertility, unchecked by any devices other than old customs such as abstinence and breast-feeding, and a high mortality disturbed only by epidemics at certain periods. After the Second World War, immigration rules were very strict and external migration either in or out became negligible. This was further supported by the fact that a stability test carried out for the 1921, 1931 and 1973 age distributions of Burmese censuses approximated a stable population (Daw Tin Tin Nyunt, 1978, p.47). Also, the size of the foreign population did not change very much between 1953 and 1973 and hence the 1973 population can be

regarded as stable (Union of Burma, 1957, pp.58/59; Union of Burma Census, 1973, p.21). However, whether the urban population of Burma can be regarded as stable is a difficult matter to resolve. It must be recalled (Section 1.6) that urban towns in Burma do not possess any particular characteristics or follow the definition of towns in an international setting. Except large cities like Rangoon and Mandalay which more or less possess some characteristics of towns, others are more rural in nature than can be termed typical of urban towns, therefore urban rural differences are small (Hauser and Kitagawa, 1952, p.105). Under such conditions it is plausible to assume that the Burmese urban population has also been stable. Various growth based techniques for estimating completeness of death reporting are therefore applicable to Burmese urban data.

As an initial investigation of vital rates, stable population analysis method is employed and death rates estimated for both urban and total population of Burma (United Nations, 1966, p.61). The corresponding rates are calculated as 15.7 and 13.9 for urban males and females, the rates for total population yielded slightly lower results with 14.1 for male and 13.7 for female deaths per thousand (Appendix 4.1(a)-4.1(d)). The results obtained from both urban and total Burma population further strengthen the fact that the observed vital rates are under-enumerated and lower than expected. Much reliance can be placed on the result of this analysis because Burmese population is growing at the constant annual rate of approximately 2 per cent per annum. This is supported by the fact that the annual growth rate of the population is estimated as 2.3 per cent in the 1973 census and 2.02 per cent in the

1983 census (Working Peoples Daily, 1983, p.1).

The completeness of death registration is estimated using the Brass growth balance equation, Preston-Coale, Preston and Hill, Courbage and Fargues, and Carrier methods (Brass, 1975, p.117; Preston-Coale et al., 1980, p.179; Preston and Hill, 1980, p.349; Courbage and Fargues, 1980, p.165; Carrier, 1958, p.149). The results are shown in Table 4.1 (calculations are shown in Appendix 4.2(a)-4.2(j)).

Table 4.1
Observed and Adjusted Death Rates for Urban Burma
1972-1974

Technique	Crude Death Rate (Per 1000)		Percentage Deficiency	
	Male	Female	Male	Female
Observed	10.4	8.8	-	-
<u>Adjusted By:</u>				
Brass Growth Balance Equation	13.9	13.6	25.4	35.5
Preston-Coale	14.2	13.8	27.1	36.3
Preston and Hill	14.4	13.9	27.3	36.7
Courbage and Fargues	17.1	16.7	38.9	47.6

Source: Calculated from 1972-1974 Vital Statistical Reports published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Percentage deficiency of registration for the urban Burma is estimated at 25-40 per cent of the urban population. All of the growth based methods except the Courbage and Fargues method yield similar results. It may be that some of the basic assumptions implied in this method are not met in the case of Burma.

The results markedly point out that under-registration of female deaths is much more prominent than male deaths. Table 4.1 also shows the derived crude death rates estimated for urban Burma by applying correction factors obtained from the abovementioned indirect techniques of estimating mortality. The adjusted rates for the urban Burmese males ranged between 13.9 to 17.1 and for females from 13.6 to 16.7 deaths per thousand. The derived crude death rates are found to be higher than the observed rates by approximately 5-7 points for urban Burmese population of both sexes.

Although vital registration exists in urban areas only, crude death rates can also be estimated for the Union of Burma by applying some of the abovementioned indirect techniques. The ultimate aim of the manipulation is to see how the value of the rates will be if all Burma age data are used in the calculations investigated. The derived crude death rates based on these techniques ranged from 13-15 for males and 12-13 for females (Appendix 4.3(a)-4.3(d)). The results obtained from various indirect techniques confirm the perceived notion that official vital rates are lower than the actual or the expected rates.

Age specific death rates for Urban Burma for both sexes for 1972-1974 are corrected by applying the correction factor derived from the Preston-Coale method. This method is selected because it gives the median value of correction factor. Corrected death rates by age and sex are shown in Table 4.2. Infant death rates are now recorded as 94 deaths for males and 90 deaths for females per 1000 live births of each sex. Death rates in the 1-4 year age group are higher for females

Age Specific Death Rates Before and After Correction,

Urban Burma, 1972-1974

Age Group	Death Rates per 1000			
	Before Correction		After Correction	
	Male	Female	Male	Female
All Ages	10.4	8.8	14.2	13.8
Under 1	68.7	57.4	94.1	90.1
1 - 4	10.6	11.1	14.5	17.4
5 - 9	3.2	3.2	4.4	5.0
10 - 14	1.8	1.4	2.5	2.2
15 - 19	2.4	2.0	3.3	3.1
20 - 24	2.9	2.6	4.0	4.1
25 - 29	3.4	3.0	4.6	4.7
30 - 34	4.7	4.0	6.4	6.3
35 - 39	6.5	5.1	8.9	8.0
40-44	9.6	6.5	13.2	10.2
45 - 49	12.4	8.2	17.0	12.9
50 - 54	18.2	11.0	24.9	17.3
55 - 59	23.2	14.5	31.8	22.7
60 - 64	35.5	22.5	48.6	35.3
65 - 69	45.7	31.3	62.6	49.1
70 - 74	68.7	49.5	94.1	77.7
75 - 79	95.0	72.8	130.2	114.3
80 - 84	155.2	117.1	212.6	183.8
85+	240.0	189.1	328.8	296.9

Note: Excludes towns where 1973 census population is not available
Preston-Coale Method, correction factor for male = 1.37 and
female = 1.57.

Source: Calculated from (1) 1972-1974 vital statistics reports,
Central Statistical Organisation and the Directorate of
Health, Rangoon, Burma.

(2) Burma Population Census 1973, Immigration and Manpower
Department, Rangoon, Burma.

than for males. Females in the childbearing age group were found to have higher death rates than males, as expected. This was not the case before correction. In general, it is observed that the corrected age specific mortality pattern follows the pre-industrial country pattern.

4.3 Analysis of Life Tables

Model life tables serve as a primary aid to the estimation of demographic parameters for countries with limited data. United Nations has suggested a procedure to smooth or adjust the data for perceived errors when death rates by age and sex are available with the help of logit transformation applying the first principal component vector (United Nations, 1982, p.16). Life table values of Burma were smoothed and the pattern determined by the said procedure. Model life tables for developing countries were selected particularly on the grounds that the age and sex mortality pattern of Burma will follow the past mortality experience of the developing countries. The n^q_x ratios observed and families of model life tables (Latin American, Far East, South Asian, Chilean, general pattern) were then compared to select the appropriate pattern. n^q_x values were selected on the basis of expectation of life at age 10 (United Nations, 1982, p.5). Figures 4.1(a) and 4.1(b) show the deviation of probability of dying (n^q_x) of Burmese males and females from various patterns of the life table families.

It is observed that Burmese males resemble the South Asian and General pattern of the five families; it is a better fit than to the General pattern because of wider variations before the central age of 12.5 years in the South Asian pattern. Burmese females resemble the Latin American and general pattern. At the central age of 12.5 years and onwards, the deviation of the two families is almost negligible. However, before the central age of 12.5 years the general pattern shows

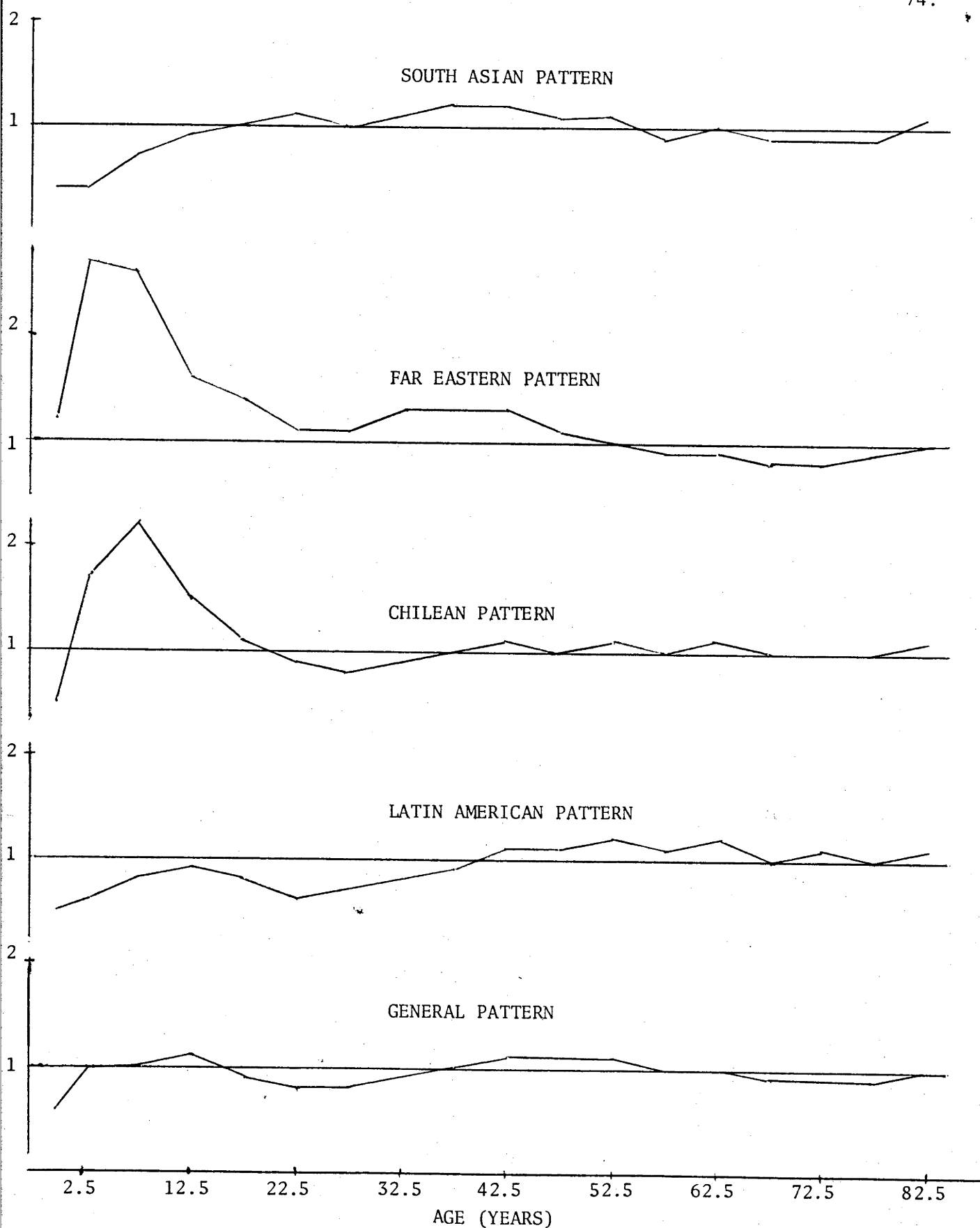


Figure 4.1(a)

Deviation of Urban Burma Males Age Specific Death Rates
From Various Patterns of the Life Table Families
1972-1974

Note: nq_x^o is the observed mortality rate between exact ages x , $x + n$

nq_x^s is the standard mortality rate between exact ages x , $x + n$

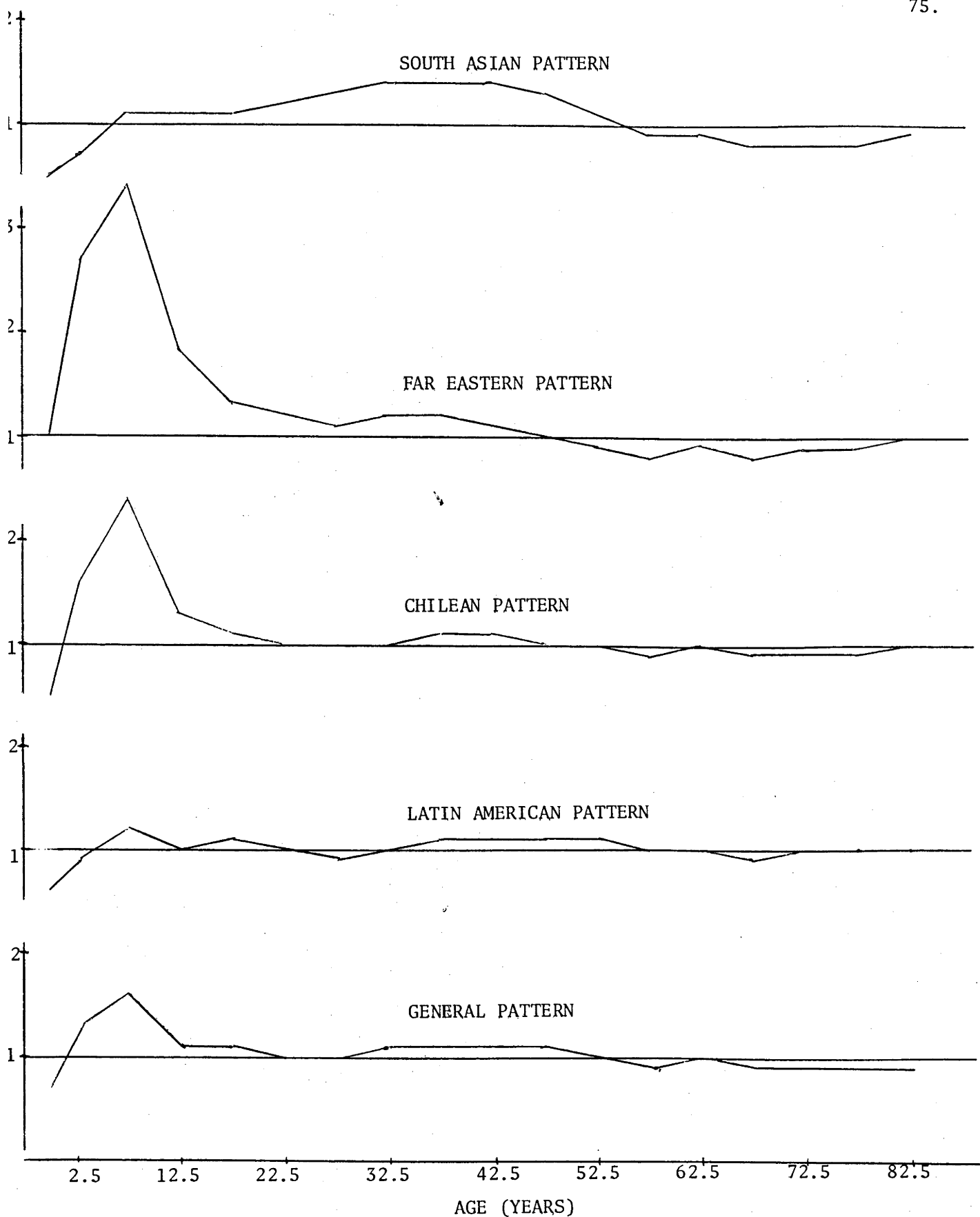


Figure 4.1(b)

Deviation of Urban Burma Females Age Specific Death Rates
From Various Patterns of the Life Table Families
1972-1974

Note: nq_x^o is the observed mortality rate between exact ages $x, x + n$.
 nq_x^s is the standard mortality rate between exact ages $x, x + n$.

wider deviation than the Latin American. This suggests that the Burmese female mortality pattern is a closer fit to the Latin American pattern than others.

After the selection of a life table pattern most suitable to the observed life table values of 1972-74 for Burma for both sexes, the observed data were smoothed against the standard life table pattern with the help of logit transformations as suggested by the United Nations (United Nations, 1982, p.16). The observed value of Burmese males and females are smoothed against the Latin American and General pattern respectively, for the perceived errors, and the result is shown in Appendix 4.4. The probability of dying for Burmese males and females for 1972-1974 is shown in Figure 4.2(a) and 4.2(b). The graph figure depicting the observed and smoothed data shows larger variations of male mortality as compared to female. Female smoothed data coincide exactly with the observed at the central age of 7.5 years until 47.5 years. The observed data are highly distorted at younger age groups resulting in low infant and child mortality. The estimated infant mortality for Burma is nearly 90 and 80 deaths for males and females respectively. Both observed and smoothed data show the minimum death rate at age groups 10-24 for both sexes.

The following table provides the expectation of life at various ages based on observed and adjusted age specific death rates (see Appendix 4.5(a) and 4.5(d) for calculations).

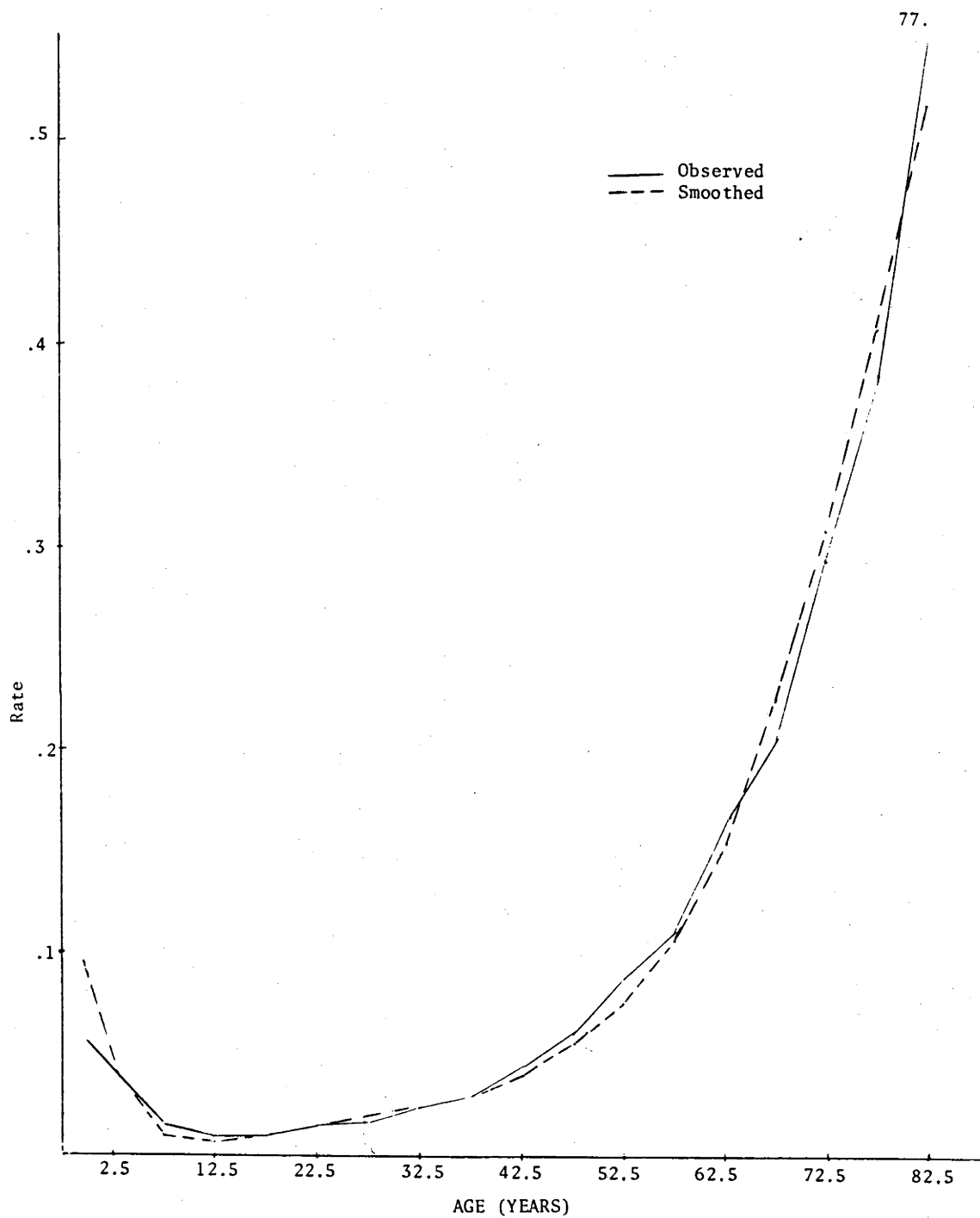


Figure 4.2(a)

Probability of Dying of Urban Burma Males Between
Observed and Smoothed Data, 1972-1974

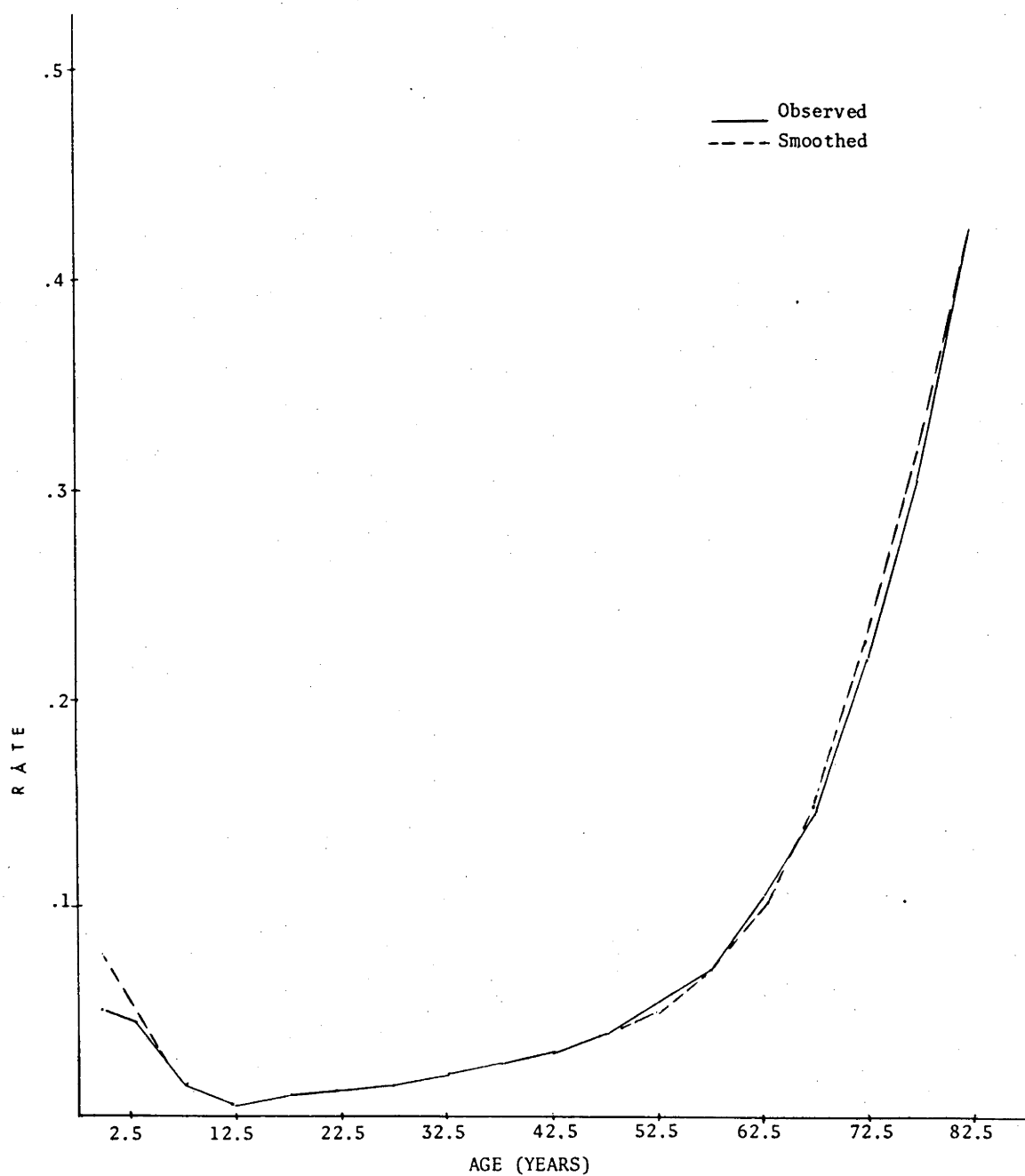


Figure 4.2(b)

Probability of Dying of Urban Burma Females Between
Observed and Smoothed Data, 1972-1974

Table 4.3
Expectation of Life at Various Ages
for Urban Burma, 1972-1974

	Males				Females			
	e_o^o	e_{10}^o	e_{20}^o	e_{50}^o	e_o^o	e_{10}^o	e_{20}^o	e_{50}^o
Observed	57	54	45	21	62	59	50	25
Adjusted by model life table	56	54	45	21	60	59	50	25
Adjusted by Preston- Coale method	50	50	41	18	52	52	44	21

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census of Burma, Immigration and Manpower Department, Rangoon, Burma.

Expectation of life at birth for urban Burmese males and females after adjusting the n^q_x values is estimated at 56 years for males and 60 years for females. A fall of 1 year for males and 2 years for females has been observed after adjustment. However, when age specific death rates are adjusted by the Preston-Coale method by a factor of the extent of under-registration, expectancy of life at birth of males falls by 7 years and females by 10 years compared to the observed. This vividly shows that the official life expectancies are rather exaggerated and not reliable. (Adjusted life tables for Urban Burma by sex for 1972-1974 are shown in Appendix 4.5(a)).

Some of the stable population techniques are attempted just for the application and comparison of results. Various methods yield different results. The Carrier method gives level 15-16 of the Coale and Demeny model life tables (Model West) for males, and level 14-15 for females. The corresponding life expectancy is 52-54 years for males and 53-55 years for females. The results from the stable population analysis method approximated level 14 (Model West) for both sexes, with a life expectation of 50 years for males and 53 years for females. In summary, it may be said that the life expectancy of Urban Burma ranged approximately between 50-57 years for males and 52-62 years for females. The lower limit roughly represents the stability assumption and the upper limit the vital registration data. The adjusted life table values by Preston-Coale method of 50 years for males and 52 years for females seems the most acceptable values of the alternatives.

4.4 Medical Facilities

Generally, mortality may be viewed as a health indicator. It is essential to assess the health policy and health facilities when analysing the mortality situation of a country. The health policy of Burma was laid down by the Burma Socialist Program Party in 1975. The highlights are (1) to get medical treatment for every citizen in the Socialist Republic of the Union of Burma; (2) to raise the health status of the working people and to provide medical treatment within the country for all diseases; (3) to narrow the gap between rural and urban areas in the availability of health services; (4) to get equal health benefits for working people whether rich or poor; and (5) to promote both curative and preventive health services and to give priority to preventive measures (Unpublished Report, 1981, p.41, Ministry of Planning and Finance).

Health policies are implemented by the Department of Health and the principal tasks are (1) to provide good coverage of health and medical care services to all parts of the country with special considerations for the rural population (which constitutes over 76 per cent of the total population); (2) to integrate the curative and preventive health services and to ensure maximum effectiveness in the delivery of health services; and (3) to provide adequate and qualified health personnel in proportion to the demand for health services (Unpublished Report, 1981, p.10, Ministry of Planning and Finance).

The objectives of the Health Department have not been fully accomplished because the Burmese health sector also faces major drawbacks such as insufficient funding, inadequate infrastructure and scarcity of sufficient personnel, as is often the case in many South Asian countries (Hansluwka and Ruzicka, 1980, p.2). However, the Health Directorate has been successful in producing medical doctors for the country, but their quality is somewhat doubtful. Training of medical doctors is facilitated by the Rangoon and Mandalay Medical Institutes. Less than 200 medical doctors graduated in 1964-1965, while over 500 doctors graduated in 1977-1978 (Ministry of Health, 1981, p.44). The supply of doctors increased to more than two-and-a-half times the number 13 or 14 years ago, exceeding the number that can be absorbed annually by the government. In addition, there are seven nurse-midwifery schools, 16 midwifery schools, one lady health visitor school, one paramedical school, and one health assistant training school for training other medical personnel.

Preventive and curative health services were given priority for the purpose of raising public health standards. Relevant disease eradication and control programs were also emphasized. Malaria eradication programs, Tuberculosis, Venereal Disease, Leprosy, Filariasis, and

Trachoma control programs were extended (Ministry of Planning and Finance, 1982, p.249). The evaluation of each program is often lacking and some programs continue normal routine work. Concentration on disease areas is recommended rather than focussing on the entire population. Wider coverage was gained for some of the disease control and eradication programs during the last 13-14 years period, particularly for Tuberculosis and Malaria eradication. Less than 0.2 million people were covered in the Malaria eradication programs in 1964/65 compared to 6.6 million people in 1977/78. The number of B.C.G. vaccinated persons also more than doubled (Ministry of Planning and Finance, 1972/74, p.144; 1981/82, p.208). The re-appearance of Malaria as a major cause of morbidity in Burma calls for some reconsideration of the effectiveness of existing disease eradication and control programs (Department of Health, 1978, p.11).

With a view to expanding health services, further primary health care and basic health services programs were introduced in the Peoples' Health Plan of 1978-1982. Health facilities are to be transmitted to the village level. The 1982-86 Peoples' Health Plan was based on the experience gained from the initial plan of 1978-1982. This experience led the 1982-86 plan to emphasize community involvement, health education, maternal and child care, early detection and management of diseases, and the use of appropriate health technology. It further suggested the utilization of volunteer health workers, the mobilization of community resources, and promotion of traditional medicine to serve as the essential means to support limited government resources (Ministry of Health, Burma, 1981, p.1).

Health facilities in Burma have improved over the years with more government spending on the health sector. Per capita health expenditure rose from 2.5 kyat in 1962-63 to 10.4 kyat in 1979-80 (Ministry of Health, 1981, p.3). The number of physicians per 100,000 population was 10 in 1965 and 19 in 1975 (Hansluwka and Ruzicka, 1980, p.5). The availability of hospital beds per 100,000 population increased from around 64 beds in 1964 to 85 beds in 1975. Medical personnel per 100,000 population also increased from an average of 38 persons in 1975-76 to 43 persons in 1979-80. Accordingly, it is also planned to increase various types of health service centres such as rural health centres, maternity and child health centres, primary and secondary centres, school health teams, indigenous medicine centres and dispensaries (Ministry of Planning and Finance, 1980/81, p.194; 1982/83, p.254). Medical treatment at all government hospitals, clinics or dispensaries is free. Every town which is the headquarters of a district has a civil hospital which functions as a general hospital. Medical authorities are trying their best to meet the growing demand with the limited resources available. Whether the speed of growth in the health sector will meet the growing demand is still not known.

4.5 Non-Medical Facilities

Non-medical facilities existing in the country must also be considered when assessing the mortality situation. Education is closely associated with mortality and past evidence shows that the educational attainment of parents, especially mothers' education, exerts a great influence on the mortality experience of the child. Infant mortality is high in mothers with low educational status (Aphichat Chamratrithirong, 1982, p.177; D'Souza and Bhuiya, 1982, p.200; Dutta and Kapur, 1982, p.215; Caldwell, 1979, p.413). The lower literacy levels of Burmese females might contribute to high infant mortality in Burma. The literacy level is lowest among females in the states (Burma Census, 1973, p.22).

The large rural population (75 per cent rural) may also be associated with high mortality in Burma (Burma Census, 1973, p.15). The Burmese Government is trying to raise the literacy level and has prescribed in Section 152 of the State Constitution that every citizen has the right to education and that every citizen shall have compulsory basic education (Foreward, 1983, p.8).

Since 1964, literacy campaigns have been launched throughout the country as a national movement with the aim of achieving full national literacy by the year 1990. So far, 215 townships (out of 283) have achieved full literacy (Foreward, 1983, p.8). The campaigns launched in 1964 finally reached Chin State in 1978. This points to the fact that due to various constraints the states are the last to benefit in most socio-economic progress. Therefore, differentials in the educational level will persist between divisions and states resulting in higher mortality in most of the states.

The Burmese Government is aware of socio-economic regional differentials and is aiming to narrow the gap by investing in rural development work such as rural water supply, construction of roads and bridges, and land reclamation, with the help of the people. Government and public investment in 1977/78 (16.4 million kyat) was more than double that of 1966/67 (8.8 million kyat) (Ministry of Planning and Finance, 1978/79, p.57). However, this investment is not very substantial to meet the growing demand and it is believed that differentials will still persist among regions and be more significant between divisions and states.

In rural Burma, especially in the dry zone area, water is scarce and this is often associated with an outbreak of disease resulting from the use of unclean water. To solve this problem a rural water supply

program was undertaken by the Agriculture Mechanization Department to provide safe drinking water in dry zone rural areas. The program was funded by foreign aid and grants and 1977/78 figures reveal that over 8000 tube wells have been drilled and nearly 6000 villages have benefitted from the program. The successful implementation of such programs in other parts of Burma will surely cut down to some considerable extent mortality in the future.

Food production is growing in Burma and cereal production in 1978/79 increased by over 20 per cent of the level in 1969/70 (Ministry of Planning and Finance, 1979/80, p.68), with the successful introduction of high yielding varieties at a national scale and this program will continue in the future. Therefore, a major shortage of food is not very probable.

The nutritional status of the Burmese people living in some survey areas is low. Data are still lacking at the national level to confirm this point. However, various surveys indicate that the current nutritional problems identified as of major significance are protein energy malnutrition, nutritional anaemia (especially iron deficiency anaemia) and iodine deficient goitre (Unpublished Health Report, 1980, p.1).

Expenditure on education in 1978/79 has increased to almost two-and-a-half times the 1965/66 level but the demand is still very large: a class of 45-50 pupils to a teacher is the usual case. School and classroom facilities are still in great demand. The government is trying to improve the level of education by reintroducing English as the medium of instruction from the 1983 academic year. Political awareness and mass participation is called for development of the educational level. However, it will take at least a decade to get sufficient qualified teaching staff and resources to achieve the goal of furthering the

educational level. Significant advances in non-medical facilities are not expected to influence the present mortality situation in the short run. Future mortality will depend largely on the outcome of the programs launched by the government.

4.6 Remarks for Data Improvement

Incompleteness of death registration in Burma cannot be erased but the following recommendations are suggested for future improvement. More stringent laws and regulations are necessary to stop people from hiding death from registration. Closer co-operation and co-ordination between the registration agency (Directorate of Health) and data collection agency (Central Statistical Organisation) are necessary. The relative importance of death registration and its usage at the national level should also be stressed to the registration personnel, paying more or equal attention to registration work in addition to other duties would also aid the solution. The supply of adequate vital registration staff as well as registration forms and the provision of appropriate training facilities at various levels are also necessary.

To help solve this problem, expansion of the vital statistical project has been undertaken by the UNFPA but the development is slow. The objective should be to achieve better coverage rather than expansion. Regular reporting from death registration towns should be encouraged rather than expansion to more towns with irregular reporting. The emphasis should be on the recommendation that the Health Directorate stresses prompt reporting of death registrations to the Central Statistical Organisation.

Difficulties posed by geographic regions coupled with transportation and communication problems will continue to exist and possibly cannot be solved by short-term measures. However, agencies

responsible for the publication of death registration data should attempt to collect the information by conducting demographic surveys at the regional level rather than by relying on the usual vital registration practices. Information about the role of death registration in the sphere of health, at the national and individual level, through mass media would be an additional asset. Providing basic food items for death ceremonies at subsidised prices to the households of deceased persons should also be encouraged to attract more registration.

It is believed that death registration will be more successful if put under the proper guidance of local administrative councils and Burma Socialist Program Party organisations. Propaganda for death registration and more publicity about the subject, under Party leadership, guidelines and mechanisms is a promising aid for future death registration.

CHAPTER 5

Summary and Conclusions

This study has found that the death registration system in Burma is deficient in many ways and that the published rates are lower than the perceived rates (by over 30 per cent for males and over 40 per cent for females). Deaths are more severely under-reported in the states, especially Chin and Kayah states, than in the divisions. The average mortality experience during the period between 1965-1978 reveals that mortality has been declining, but stabilized after 1971. The Burmese mortality pattern follows the pre-industrial country pattern with high mortality at extreme ages. Mortality in the states is higher than in the divisions. Leading causes of death are Pneumonia, Tuberculosis, diseases of the heart, Enteritis and Diarrhoea. Malaria has reappeared as a leading health problem in the country. Institutional and organisational changes are required to further develop the death registration system. For such measures it is suggested that the death registration system be put under the proper guidance of the Burma Socialist Party Program mechanism which should express the relative importance of the work at the national and individual household level. Drastic changes in the medical and non-medical facilities are not expected although some advances are being attempted by the government for further improvement in such sectors with limited resources. Predicting the future mortality situation is very difficult because of defective data. However, there are indications that mortality reduction has stabilized since 1971 and further improvement is not expected for a considerable period.

It is very unlikely that death registration in Burma can progress well with the existing staff and organisational network unless further

expansion of trained manpower and autonomy be given to meet the challenging tasks of registering death events over the entire country. More co-operation and co-ordination between the departments is also necessary. Better understanding of the aim and objectives of death registration by the general public will be a big help. More publicity about the subject under the proper guidance of Burma Socialist Program Party is a promising aid for the future death registration of Burma.

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Appendix 1.1

Crude Death Rates of Urban Burma by Towns in Divisions and States

1972-1974

IRRAWADDY DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
I. Irrawaddy Division ¹	674379	330889	343490	6694	3499	3195	9.93	10.6	9.3
1. Bassein	126041	62096	63945	1617	846	771	12.8	13.6	12.1
2. Ngathaing Gyaung	12421	6107	6314	177	86	91	14.3	14.1	14.4
3. Myaung-myay	31405	14900	16505	446	229	217	14.2	15.4	13.2
4. Kyaiklat	23655	11670	11985	310	167	143	13.1	14.3	11.9
5. Henzada	82531	39942	42589	1060	559	501	12.8	14.0	11.8
6. Moulmeingyun	34233	14847	15386	381	205	176	12.6	13.8	11.4
7. Wakema	28483	13854	14629	306	161	145	10.7	11.6	9.9
8. Yandoon	21788	10650	11138	228	116	112	10.5	10.9	10.0
9. Maubin	37494	18272	19222	379	194	185	10.1	10.6	9.6
10. Bogale	43417	21311	22106	437	225	212	10.1	10.6	9.6
11. Danubyu	19815	9503	10312	175	86	89	8.8	9.0	8.6
12. Thabaung	5536	2673	2863	48*	26	22	8.5	9.7	7.7
13. Kyonpyaw	15332	7651	7681	130	68	62	8.5	8.9	8.1
14. Einme	11644	5825	5819	94	47	47	8.1	8.1	8.1
15. Dedaye	14995	7470	7525	112*	58	54	7.5	7.8	7.2
16. Laymyethna	9371	4628	4743*	69**	40	29	7.4	8.6	6.1
17. Pyapon	37456	18715	18741*	261	136	125	7.0	7.3	6.7
18. Kyangin	10637	5275	5362*	73	43	30	6.9	8.2	5.6
19. Ngaputaw	8919	4436	4483*	59*	33	26	6.6	7.4	5.8
20. Pantanaw	11997	5984*	6013*	64	32	32	5.3	5.4	5.3
21. Nyanauing	22215	11116*	11099	111	58	53	5.0	5.2	4.8
22. Labutta	27534	13895	13639	67	37	30	2.4	2.7	2.2
23. Yegyi	28084	13577	14507	64*	33	31	2.3	2.4	1.7
24. Kyaunggone	13376	6492	6884	26**	14	12	1.9	2.2	1.7

* 1973/74 2 years average data ** 1973 single year data

¹ Excluding Kyomange; Dava

Appendix 1.1

MANDALAY DIVISION	POPULATION				NUMBER OF DEATHS				CRUDE DEATH RATE			
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Both Sex	Male	Female	Female
11. Mandalay Division ²	885296	447842	437454	8704	4726	3983	9.8	10.6	9.8	10.6	9.1	9.1
1. Mandalay	417938	212722	205216	5234	2820	2414	12.5	13.3	12.5	13.3	11.8	11.8
2. Pyinmana	42877	21419	21458	563	304	259	13.1	14.4	13.1	14.4	12.1	12.1
3. Myingyan	70162	34968	35194	977	529	448	13.9	15.1	13.9	15.1	12.7	12.7
4. Singu	3593	1730	1863	36**	24	12	10.0	13.9	10.0	13.9	6.4	6.4
5. Nyaung-u	12858	6315	6543	185	96	89	14.4	15.2	14.4	15.2	13.6	13.6
6. Thabeikkyin	3180	1705	1475	28***	17	11	8.8	10.0	8.8	10.0	7.5	7.5
7. Kyaukse	22860	11285	11575	200	106	94	8.8	9.4	8.8	9.4	8.1	8.1
8. Maymyo	58059	31663	26396	441	243	198	7.6	7.7	7.6	7.7	7.5	7.5
9. Myitnge	6801	3388	3413	47	29	18	6.9	8.6	6.9	8.6	5.3	5.3
10. Singaing	4464	2172	2292	25*	11	14	5.6	5.1	5.6	5.1	6.1	6.1
11. Pyawbwe	18520	9022	9498	93	49	44	5.0	5.4	5.0	5.4	4.6	4.6
12. Yamethin	19560	9546	10014	98*	67	31	5.0	7.0	5.0	7.0	3.1	3.1
13. Mahlaing	12315	5852	6463	57*	32	25	4.6	5.5	4.6	5.5	3.9	3.9
14. Kyaukpadaung	21648	10694	10954	98*	54	44	4.5	5.1	4.5	5.1	4.0	4.0
15. Tada-u	7955	3841	4114	32	16	16	4.0	4.2	4.0	4.2	3.9	3.9
16. Meiktila	48502	22119	23383	293	137	156	6.4	6.1	6.4	6.1	6.6	6.6
17. Lewe	18813	8179	8634	70	35*	35*	4.2	4.3	4.2	4.3	4.1	4.1
18. Myittha	10653	5302	5351	41	19*	22	3.9	3.6	3.9	3.6	4.1	4.1
19. Thazi	15375	7574	7801	57	31	26	3.7	4.1	3.7	4.1	3.3	3.3
20. Mogoke	34212	18401	15811	80	57**	23	2.3	3.1	2.3	3.1	1.5	1.5
21. Amarapura	31532	15796	15736	43	22**	21	1.4	1.4	1.4	1.4	1.3	1.3
22. Madaya	8419	4149	4270	11	4***	7	1.3	1.0	1.3	1.0	1.6	1.6

* 1973/74 2 years average data

** 1973 single year data

** 1974 single year data

*** 1972/74 2 years average data

*** 1972 single year data

2 Excluding Elar; Ngathayauk

Appendix 1.1

RANGOON DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
III. Rangoon Division ³	2209174	1120143	1089031	21353	11577	9776	9.7	10.3	9.0
1. Rangoon City	2027256	1030142	997114	20212	10953	9259	10.0	10.6	9.3
2. Syriam	37096	18167	18929	456	243	213	12.3	13.4	11.3
3. Mtantabin	5020	2549	2471	53	30	23	10.6	11.8	9.3
4. Kyauktan	14848	7405	7443	118	62	56	8.0	8.4	7.5
5. Thongwa	20316	9999	10317	112	58	54	5.5	5.8	5.2
6. Kungyangone	11659	5806	5853	60*	30	30	5.2	5.2	5.1
7. Taikkyi	21865	10801	11064	98	63	35	4.4	5.8	3.2
8. Twante	27508	13682	13826	99	56	43	3.6	4.1	3.1
9. Kayan	24321	12070	12251	73	35	38	3.0	2.9	3.1
10. Hlegu	13910	6874	7036	37	25	12	2.7	3.6	1.7
11. Kawa	5375	2648	2727	35	22	13	6.5	8.3	4.8

* 1972/73 2 years average data

+ 1973/74 2 years average data

³ Excluding Hmawbi

Appendix 1.1

PEGU DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
IV. Pegu Division ⁴	568730	277996	290734	5024	2725	2299	8.8	9.8	7.9
1. Pegu	123586	60535	63051	1103	580	523	8.9	9.6	8.3
2. Nyaung-U	23691	11760	11931	370	207	163	15.6	17.6	13.7
3. Prome	69940	34648	35292	912	517	395	13.0	14.9	11.2
4. Shwegin	14123	7138	6985	169	94	75	12.0	13.2	10.7
5. Kyauktaga	10457	5026	5431	124	71	53	11.9	14.1	9.8
6. Toungoo	59352	28992	30360	635	347	288	10.7	12.0	9.5
7. Gyobingauk	16116	7735	8381	142	71	71	8.8	9.2	8.5
8. Paunde	24279	11686	12593	202	98	104	8.3	8.3	8.3
9. Zigon	13027	6341	6686	111*	58	53	8.5	9.2	7.9
10. Shwedaung	14183	6778	7405	124	64	60	8.8	9.4	8.1
11. Pyu	23342	11570	11772	181	107	74	7.8	9.3	6.3
12. Latpudan	23241	11212	12029	174	97	77	7.5	8.7	6.4
13. Daik-u	19667	9546	10121	146	72	74	7.4	7.5	7.3
14. Htantabin	5900	2911	2989	42*	25	17	7.1	8.6	5.7
15. Yedashe	10654	5076	5578	82*	48	34	7.7	9.5	6.1
16. Tharawaddy	30716	15025	15691	189*	115	74	6.2	7.7	4.7
17. Thanatpin	11707	5640	6067	56	25	31	4.8	4.4	5.1
18. Thonze	20698	10136	10562	90	44	46	4.4	4.3	4.4
19. Natatlin	15514	7409	8105	66	37	29	4.3	5.0	3.6
20. Okpo	10285	4972	5313	36*	16	20	3.5	3.2	3.8
21. Minhla	9511	4603	4908	28**	13	15	2.9	2.8	3.1
22. Thegon	2904	1401	1503	8*	3	5	2.8	2.1	3.3
23. Waw	15837	7856	7981	34	16	18	2.2	2.0	2.3

* 1973/74 2 years average data

4

Excluding Nonyo; Nadauk; Tharawaw; Kanyutkwin

** 1973 single year data

SAGAING DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
V. Sagaing Division ⁵	290460	144020	146440	2588	1416	1172	8.9	9.8	8.0
1. Sagaing	36207	17728	18479	338	170	168	9.3	9.6	9.1
2. Khamti	5102	2886	2216	73	47	26	14.1	16.3	11.7
3. Mawlaik	6617	3347	3270	84	48	36	12.7	14.3	11.0
4. Monywa	81882	40663	41219	993	512	481	12.1	12.6	11.7
5. Kawlin	12844	6321	6523	132**	82	50	10.3	13.0	7.7
6. Búdalin	3796*	1843	1953	36*	21	15	9.5	11.4	7.7
7. Ye-u	10594	5268	5326	98	56	42	9.3	10.6	7.9
8. Mingin	3633	1748	1885	33	17	16	9.1	9.7	8.5
9. Katha	18266	9174	9092	165	98	67	9.0	10.7	7.4
10. Myinmu	10621	5114	5507	90	49	41	8.5	9.6	7.5
11. Shwebn	43386	21718	21668	312	184	128	7.2	8.5	5.9
12. Wuntho	7565	3781	3784	45*	28	17	5.9	7.4	4.5
13. Kanbalu	7428	3606	3822	43*	27	16	5.8	7.5	4.2
14. Kalewa	6751	3440	3311	38	20	18	5.6	5.8	5.4
15. Paungbyin	4955	2449	2506	22***	12	10	4.4	4.9	4.0
16. Tigyang	7259	3371	3888	25*	14	11	3.4	4.2	2.8
17. Khin-u	5923	2867	3056	18*	5	13	3.0	1.7	4.3
18. Tamu	6483	3317	3166	16*	13	3	2.5	3.9	1.0
19. Ngazun	6333	3107	3226	17**	9	8	2.7	2.9	2.5
20. Salingyi	4815	2272	2543	10*	4	6	2.1	1.8	2.4

* 1973/74 2 years average data

*** 1972/74 2 years average data

** 1973 single year data

5 Excluding Thaugdat; Chaung-u; Kalembo; Myotha

Appendix 1.1

MAGWE DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
VI. Magwe Division ⁶	324451	160377	164074	2827	1561	1317	8.7	9.7	8.0
1. Magwe	35242	17559	17683	436	238	198	12.4	13.6	11.2
2. Minbu	12679	6202	6477	185	102	83	14.6	16.5	12.8
3. Yenangyaung	26249	13205	13044	360	193	167	13.7	14.6	12.8
4. Salin	9468	4564	4904	168*	88	80	17.7	19.3	16.3
5. Thayetmyo	19901	9975	9926	215	111	104	10.8	11.1	10.5
6. Pauk	5950	2881	3069	62	33	29	10.6	11.5	9.5
7. Pakokku	58132	28344	29788	520	281	239	8.9	9.9	8.0
8. Ngape	2614	1276	1338	26**	16	10	9.9	12.5	7.5
9. Taungdwingyi	34027	16923	17104	233	112	121	6.9	6.7	7.1
10. Chauk	46554	23498	23056	300	168	132	6.4	7.2	5.7
11. Natmauk	10324	5022	5302	71**	45	26	6.9	8.9	4.9
12. Mindon	4122	1990	2132	27**	19	8	6.6	9.6	3.8
13. Setotaya	2881	1436	1445	18**	11	7	6.3	7.7	4.8
14. Aunglannmyo	25789	12542	13247	137	76	61	5.3	6.1	4.6
15. Seikpyu	3914	1905	2009	20**	8	12	5.1	4.2	6.0
16. Gangaw ¹⁵	6451	3161	3290	31*	15	16	4.8	4.8	4.9
17. Pwintbyu	4656	2320	2336	22**	14	8	4.7	6.0	3.4
18. Yesagyo	15498	7574	7924	47**	31	16	3.0	4.1	2.0

* 1973/74 2 years average data

** 1973 single year data

⁶ Excluding Kama; Myaing; Sinbyuayun; Ngathayauk

Appendix 1.1

TENNESSERIM DIVISION	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE			
	Both Sex		Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female	
VII. Tennesserim Division	156069	77151	78918	1409	773	636	9.0	10.0	8.1	
1. Mergui	67351	33380	33971	833	454	379	12.4	13.6	11.2	
2. Tennesserim	3100	1596	1504	37	19	18	11.9	11.9	12.0	
3. Kawthaung	6044	3278	2766	60	43	17	9.9	13.1	6.2	
4. Palaw	11233	5510	5717	43	23	20	3.8	4.2	3.5	
5. Tavoy	60435	29512	30923	421	225	196	6.9	5.8	6.3	
6. Thayetchaung	7906	3869	4037	15**	9	6	1.9	2.3	1.5	

** 1973 single year data

Appendix 1.1

SHAN STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
YIII. Shan State ⁸	283550	146902	141448	2803	1624	1179	9.7	11.1	8.3
1. Taunggyi	74995	38227	36768	1013	566	447	13.5	14.8	12.2
2. Kyaukse	28558	14418	14140	417	232	185	14.6	16.1	13.1
3. Hsipaw	13472	6966	6506	172	104	68	12.8	14.9	10.5
4. Kalaw	15308	8047	7261	164	96	68	10.7	11.9	9.4
5. Namkham	12450	6095	6355	103*	62	41	8.3	10.2	6.5
6. Lashio	69567	35811	33756	546	336	210	7.8	9.4	6.2
7. Kentung	33369	16845	16524	233*	137	96	6.9	8.1	5.8
8. Muse	7450	3628	3822	44	24	20	5.9	6.6	5.2
9. Hsenwe	4851	2357	2494	28*	14	14	5.8	5.9	5.6
10. Yengan	2641	1332	1309	15*	11	4	5.7	8.3	3.1
11. Loilem	10868	5578	5290	44	26	18	4.1	4.7	3.4
12. Kutkai	14821	7598	7223	24*	16	8	1.6	2.1	1.1

+ 1972/73 2 years average data

* 1973/74 2 years average data

8 Excluding Tachilaik; Nyaungshwe; Hseseng; Aungban; Pektin; Nampan; Lawsauk

Appendix 1.1

ARAKAN STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
IX. Arakan State ⁹	194709	95940	98769	1523	857	666	7.8	8.9	6.7
1. Akyab	89580	44410	45170	946	521	425	10.6	11.7	9.4
2. Rathedaung	4789	2250	2539	52	28	24	10.9	12.4	9.5
3. Sandaway	10725	5100	5625	92*	58	34	8.6	11.4	6.0
4. Minbya	14196	6987	7209	121*	69	52	8.5	9.9	7.2
5. Kyaukpyu	17899	9042	8857	107	62	45	5.9	6.9	5.1
6. Myohaung	20839	10391	10448	114	57	57	5.5	5.5	5.5
7. Kyauktaw	13340	6439	6901	51+	31	20	3.8	4.8	2.9
8. Cheduba	6899	3247	3652	21++	14	7	3.0	4.3	1.9
9. Maungdaw	16442	8074	8368	16++	14	2	1.0	1.7	0.2

+ 1972/73 2 years average data

* 1973/74 2 years average data

++ 1973 single year data

9 Excluding Ponagyun; Buthidaung; Rumree; Myeban

Appendix 1.1

MON STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
X. Mon State ¹⁰	305725	151694	154031	3509	1866	1643	11.5*	12.3	10.7
1. Moulmein	171970	84595	87375	2578	1383	1195	15.0	16.4	13.7
2. Thadon	51025	25447	25578	638	342	296	12.5	13.4	11.6
3. Kyaikto	25544	12992	12552	165	81	84	6.5	6.2	6.7
4. Bilin	12564	6605	5959	54*	19	35	4.3	2.9	5.9
5. Kyauksemyaw	8933	4378	4555	34	21	13	3.9	4.8	2.9
6. Muddon	35689	17677	18012	40**	20	20	1.1	1.1	1.1

* 1973/74 2 years average data

** 1973 single year data

¹⁰ Excluding Thanbyuzayat; Kanawet; Martaban; Ampherst

Appendix 1.1

KAREN STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
XI. Karen State	62266	31031	31235	526	284	242	8.4	9.2	7.7
1. Pa-an	30004	14936	15068	284	155	129	9.5	10.4	8.6
2. Kawkareik	20962	10480	10482	192	102	90	9.2	9.7	8.6
3. Thandaung	4561	2234	2327	23	13	10	5.0	5.8	4.3
4. Kyar-in-Seik-Kyi	6739	3381	3358	27	14	13	4.0	4.1	3.9

KACHIN STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
XII. Kachin State ¹²	97969	49239	48730	1226	707	519	12.5	14.4	10.7
1. Myitkyina	43630	22038	21592	703	411	292	16.1	18.7	13.5
2. Bhamo	22804	11484	11320	324	179	145	14.2	15.6	12.8
3. Putao	6020	3201	2819	54*	30	24	8.9	9.4	8.5
4. Mogaung	9336	4627	4709	58	36	22	6.2	7.8	4.7
5. Shwegu	9320	4583	4737	57	36	21	6.1	7.9	4.4
6. Momauk	6859	3306	3553	30*	15	15	4.3	4.5	4.2

* 1973/74 2 years average data

¹² Excluding Mohnyin

CHIN STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
XIII. Chin State	31749	16048	15701	153	86	67	4.8	5.4	4.3
1. Haka	5007	2614	2393	34	18	16	6.8	6.9	6.7
2. Mindat	5450	2960	2490	36	22	14	6.6	7.4	5.6
3. Falam	6921	3384	3537	29	16	13	4.2	4.7	3.7
4. Matupi	3366	1715	1651	14	7	7	4.2	4.1	4.2
5. Tiddim	7183	3462	3721	26*	13	13	3.6	3.7	3.5
6. Paletwa	3822	1913	1909	14++	10	4	3.7	5.2	2.1

* 1973/74 2 years average data

++ 1973 single year data

Appendix 1.1

KAYAH STATE	POPULATION			NUMBER OF DEATHS			CRUDE DEATH RATE		
	Both Sex	Male	Female	Both Sex	Male	Female	Both Sex	Male	Female
XIV. Kayah State ¹⁵	22939	12234	10705	186	106	80	8.1	8.7	7.5
1. Loikaw	20948	11153	9795	159	89	70	7.6	7.9	7.2
2. Shardaw	1068	587	481	16	10	6	15.0	17.0	12.5
3. Phasaung	923	494	429	11+	7	4	11.9	14.2	9.3

+ 1973/74 2 years average data

¹⁵ Excluding Prusoe; Demtsoe

Source: Calculated from 1972-74 Vital Statistics Reports published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.1
Number of Deaths by Sex and Ratio
for Urban Burma, 1965-1979

Year	Reporting Towns	Number of Deaths		Ratio of Male to Female Death
		Males	Females	
1965	104	28981	25010	116
1966	119	29361	25902	113
1967	144	28188	24478	115
1968	153	29515	25729	115
1970	139	27324	23170	118
1971	138	29175	25163	116
1972	126	29598	25266	117
1973	168	31452	26288	120
1974	178	32967	27855	118
1975	164	33699	29353	115
1976	145	32776	28168	116
1977	115	29631	24958	119
1978	159	31418	26196	129
1979*	158	32008	27522	116

Source: (1) Vital Statistics Reports 1965-1978, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

*(2) Compiled from death returns, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.2

Number of Deaths by Sex by Month for Urban Burma, 1975-1979

Month	Number of Male Deaths					Number of Female Deaths				
	1975	1976	1977	1978	1979	1975	1976	1977	1978	1979
Jan.	2653	2766	2548	2543	2520	2255	2424	2162	2149	2114
Feb.	2318	2262	2248	2396	2202	2043	1980	1874	1906	1916
Mar.	2489	2524	2376	2584	2664	2202	2065	1946	2055	2065
Apr.	2591	2469	2330	2632	2461	2160	2016	1889	2135	2025
May	2801	2590	2270	2723	2660	2249	2238	1762	2330	2109
June	3226	2598	2553	2787	3064	2878	2364	2103	2310	2698
July	3285	3026	2884	2931	3120	3027	2709	2486	2452	2838
Aug.	2932	3107	2839	2791	2785	2600	2731	2609	2440	2438
Sept.	2685	2841	2472	2422	2550	2359	2450	2139	2216	2212
Oct.	3006	2726	2347	2470	2855	2661	2320	1927	2080	2495
Nov.	2678	2858	2244	2384	2544	2313	2304	2002	1931	2169
Dec.	3035	3009	2520	2755	2883	2606	2567	2059	2192	2443
Total	33699	32776	29631	31418	32008	29353	28168	24958	26196	27522

Source: Compiled from Death Returns, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.2(a)

Seasonal Index of Male Deaths for Urban Burma, 1975-1979

Months	1975	1976	1977	1978	1979	Total	Average (Row)	Adjusted Index
Jan.	-	101.5	96.1	98.5	97.2	393.3	98.3	98.3
Feb.	-	83.1	85.3	92.8	84.7	345.9	86.5	86.5
Mar.	-	92.3	91.1	100.2	90.7	374.3	93.6	93.6
Apr.	-	90.4	90.4	101.9	93.7	376.4	94.1	94.1
May	-	95.0	89.5	105.0	100.4	389.9	97.5	97.5
June	-	95.1	102.5	106.9	115.1	419.6	104.9	105.0
July	116.8	111.2	116.8	111.9	-	456.7	114.2	114.2
Aug.	104.2	114.5	114.7	107.0	-	440.4	110.1	110.1
Sept.	95.4	105.0	99.3	93.5	-	393.2	98.3	98.3
Oct.	106.9	101.2	93.5	95.9	-	397.5	99.4	99.4
Nov.	95.7	106.9	88.3	92.9	-	383.8	96.0	96.0
Dec.	109.9	112.9	98.0	107.0	-	427.8	107.0	107.0
Total							1199.9	1200.0

Source: Calculated from Death Returns, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.2(b)

Seasonal Index of Female Deaths for Urban Burma, 1975-1979

Months	1975	1976	1977	1978	1979	Total	Average (Row)	Adjusted Index
Jan.	-	102.1	97.1	98.8	96.6	394.6	98.7	98.5
Feb.	-	83.7	84.8	88.0	86.9	343.4	85.9	85.7
Mar.	-	86.6	88.7	95.4	93.7	364.4	91.1	90.9
Apr.	-	85.2	87.3	99.0	91.2	362.7	90.7	90.5
May	-	95.2	82.3	107.9	93.8	379.4	94.9	94.7
June	-	100.6	100.1	106.8	118.6	426.1	106.5	106.3
July	123.4	115.9	119.6	113.2	-	472.1	118.0	117.8
Aug.	105.8	117.7	125.4	112.7	-	461.6	115.4	115.2
Sept.	96.3	105.9	102.5	102.3	-	407.0	101.8	101.6
Oct.	109.2	100.8	91.7	96.2	-	397.9	99.5	99.3
Nov.	95.1	101.2	93.8	89.9	-	280.0	95.0	94.8
Dec.	108.2	114.2	95.0	101.7	-	419.2	104.8	104.6
Total							1202.3	1200.0

Source: Calculated from Death Returns, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.3(a)

Proportion of Deaths of Children Aged 0-4 Years to Total
Deaths and Percentage Share of Deaths Under 1 Year, 1966-1978

(In Percentages)			
Year	Male	Female	Both Sex
1966	38.1 (25.8)	39.0 (24.0)	38.5 (25.0)
1967	34.8 (23.4)	35.1 (20.9)	34.8 (22.2)
1968	36.5 (21.0)	37.3 (19.3)	36.9 (20.2)
1970	34.5 (21.0)	35.4 (19.4)	34.9 (20.3)
1971	33.8 (21.0)	35.3 (20.3)	34.5 (20.7)
1972	33.2 (21.1)	34.3 (20.1)	33.7 (20.6)
1973	28.5 (17.1)	31.3 (17.0)	29.9 (17.0)
1974	29.5 (16.3)	32.1 (15.8)	30.8 (16.1)
1975	29.5 (15.5)	31.8 (15.0)	30.6 (15.2)
1976	26.6 (14.6)	27.7 (13.9)	27.1 (14.2)
1977	26.0 (15.3)	28.5 (15.0)	27.2 (15.2)
1978	25.9 (14.6)	28.2 (14.4)	27.1 (14.5)

Note: Figures shown in parentheses indicate contribution of under 1 year deaths to total deaths in 0-4 age group.

Source: Calculated from 1966-1978 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.3(b)
Percentage Proportion of Child Deaths by Specific
Age to 0-4 Year Deaths, 1966-1978

Period	Under 1 Year		1 Year		2 Years		3 Years		4 Years	
	M	F	M	F	M	F	M	F	M	F
1966	67.8	61.7	10.9	12.4	8.6	10.7	7.5	8.9	5.3	6.3
1967	67.3	59.5	10.6	12.6	9.9	12.5	7.6	9.6	4.6	5.8
1968	57.5	51.9	11.6	12.6	13.5	16.1	10.9	11.7	6.5	7.8
1970	60.8	54.8	11.3	11.9	11.6	14.4	9.3	11.4	6.9	7.5
1971	62.3	57.6	11.3	12.0	11.4	13.8	9.1	9.9	5.9	6.8
1972	63.4	58.8	11.2	12.1	11.0	13.1	8.7	9.2	5.6	6.9
1973	59.9	54.4	12.2	13.0	11.2	13.0	10.0	12.0	6.7	7.6
1974	55.1	49.3	12.7	12.8	12.6	14.5	11.6	14.0	7.9	9.4
1975	52.6	47.0	12.1	13.5	13.1	14.8	12.4	13.9	9.8	10.8
1976	54.7	50.1	11.6	12.5	12.8	14.2	11.6	12.9	9.3	10.3
1977	58.7	52.7	11.0	12.7	10.8	13.3	11.6	12.0	8.0	9.4
1978	56.2	51.2	13.5	14.1	11.9	13.9	10.8	11.8	7.7	8.9

Source: Calculated from 1966-1978 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 2.4(a)
Age Specific Death Rates by Division for Males and Females
Urban Burma, 1972-1974

Age Group	Irrawaddy		Mandalay		Rangoon		Pegu		Sagaing		Magwe		Tennesserin	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	55.2	46.3	69.7	62.9	72.0	58.8	37.7	31.5	59.7	48.3	56.6	50.2	57.3	46.7
1 - 4	11.2	12.0	11.8	12.8	9.9	10.9	9.8	10.1	10.6	10.9	9.5	8.8	10.4	11.4
5 - 9	3.2	3.3	3.1	3.1	2.5	2.6	3.5	3.3	3.1	3.3	2.8	2.6	4.0	3.8
10 - 14	1.6	1.7	1.8	1.3	1.5	0.9	2.0	1.5	1.9	1.8	1.5	1.2	1.9	1.2
15 - 19	2.4	2.4	2.2	2.0	1.8	1.3	2.9	2.0	3.2	2.9	2.6	2.5	1.8	2.0
20 - 24	3.1	3.1	2.2	2.2	2.1	1.9	4.0	2.7	3.7	2.5	2.9	2.8	4.7	3.3
25 - 29	3.8	3.3	3.8	3.1	2.3	2.2	4.1	3.6	4.2	3.0	3.6	2.8	4.1	3.4
30 - 34	4.7	4.1	4.3	3.7	3.4	3.1	5.8	4.2	6.7	3.6	5.1	3.7	6.9	4.1
35 - 39	5.8	5.3	7.2	4.4	5.0	4.6	8.3	5.4	7.3	6.1	6.7	5.3	6.8	6.3
40 - 44	8.5	6.4	10.5	6.5	8.3	5.9	9.8	5.9	9.9	5.8	9.0	5.9	8.6	5.9
45 - 49	10.2	8.0	14.7	7.4	11.7	8.8	11.5	7.5	13.6	6.5	11.7	5.9	11.3	7.9
50 - 54	14.9	11.0	18.9	11.1	18.5	11.6	17.2	10.4	15.2	9.4	16.7	9.4	15.9	9.7
55 - 59	19.9	12.4	27.4	14.7	25.2	17.9	19.2	11.9	21.9	9.6	18.3	11.5	21.3	11.6
60 - 64	27.5	23.0	39.1	21.1	42.9	27.5	29.4	19.0	47.8	16.6	30.2	17.7	23.2	19.9
65 - 69	38.7	29.8	49.8	32.0	55.6	37.4	36.6	26.2	40.6	24.4	37.3	24.6	31.4	21.9
70 - 74	59.3	46.6	69.7	50.8	88.4	62.1	59.3	42.4	60.8	38.7	59.3	44.4	47.8	31.9
75 - 79	88.0	71.2	99.4	72.1	120.0	93.0	70.0	60.9	85.2	49.7	65.3	58.2	81.7	53.2
80 - 84	137.3	129.2	167.0	109.0	214.2	147.9	110.9	98.3	121.1	120.7	126.5	122.2	154.1	92.5
85+	237.9	203.9	284.4	189.8	324.4	242.7	205.8	172.1	209.2	175.9	229.4	215.3	196.1	169.7

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census of Burma, Immigration and Manpower Department, Rangoon, Burma.

Appendix 2.4(b)
Age Specific Death Rates by State for Males and Females
Urban Burma, 1972-1974

Age Group	Shan		Arakan		Mon		Karen		Kachin		Chin		Kayah	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	65.8	50.4	27.5	19.1	79.9	68.8	47.6	38.3	63.9	53.8	27.6	25.1	37.3	50.6
1 - 4	12.2	12.1	7.9	7.5	15.6	16.8	10.8	9.5	20.0	16.5	5.7	5.2	7.8	9.3
5 - 9	4.3	3.6	6.5	7.5	4.1	4.5	3.9	3.7	5.8	5.7	2.9	1.4	3.9	4.1
10 - 14	2.6	1.9	3.7	2.8	2.1	1.6	1.5	2.5	3.1	3.8	0.5	0.6	2.6	2.2
15 - 19	3.8	2.8	3.2	3.2	2.7	1.7	4.1	2.3	5.1	5.3	1.1	1.8	4.7	2.5
20 - 24	5.3	4.1	3.6	4.1	3.7	3.5	3.8	4.2	6.3	4.8	2.3	2.3	5.8	3.1
25 - 29	5.3	4.6	5.3	5.1	4.0	3.4	6.1	5.2	6.7	5.0	0.0	2.6	2.0	5.4
30 - 34	6.5	5.8	7.5	4.9	5.3	5.6	8.4	8.2	10.1	9.2	4.7	2.9	9.1	4.7
35 - 39	8.5	5.8	9.4	5.3	8.4	6.6	9.4	2.9	12.8	7.8	1.1	4.3	7.4	9.3
40 - 44	14.9	9.8	10.6	5.6	10.3	8.7	13.6	9.9	17.7	8.2	9.6	6.7	12.9	10.1
45 - 49	14.9	9.0	10.2	7.4	13.5	10.5	9.4	9.2	22.3	9.5	9.3	5.7	18.9	9.3
50 - 54	23.4	10.2	19.1	6.8	19.0	13.4	12.6	8.9	31.1	15.6	16.8	6.3	22.3	7.5
55 - 59	22.8	13.0	17.1	9.7	22.9	15.1	15.9	15.8	32.5	15.9	18.9	13.2	23.1	14.8
60 - 64	38.4	18.2	24.9	12.8	35.2	22.8	32.2	25.8	44.7	19.7	27.5	11.2	25.0	6.1
65 - 69	41.3	26.5	27.7	17.7	43.5	34.7	34.1	22.6	50.4	24.5	46.5	31.2	26.0	9.4
70 - 74	51.4	30.0	36.6	21.0	65.5	49.6	42.6	43.8	74.0	31.8	41.6	34.8	38.9	25.2
75 - 79	71.0	47.8	55.6	31.2	94.2	73.2	40.4	38.8	92.3	58.3	79.6	0.0	123.1	29.5
80 - 84	104.3	43.3	58.8	54.7	131.1	99.5	69.6	35.8	71.0	92.2	108.5	74.4	0.0	0.0
85+	105.7	83.1	70.9	65.3	237.6	205.5	54.5	75.6	126.7	92.6	91.8	0.0	79.1	86.2

Source: Calculated from (1) 1972-1974 vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census Report of Burma, Immigration and Manpower Department, Rangoon, Burma.

Appendix 2.4(c)
Age Specific Death Rates for Both Sexes
Urban Burma, 1972/74-1978

Age Group	Age Specific Death Rates Per 1000 Population		Percentage Change 1972/74 - 1978
	1972/74*	1978	
0	63.1	38.0	- 39.8
1 - 4	10.8	9.3	- 13.9
5 - 9	3.2	2.8	- 12.5
10 - 14	1.6	1.4	- 12.5
15 - 19	2.2	2.1	- 4.5
20 - 24	2.8	2.8	+ 0.0
25 - 29	3.2	3.5	+ 9.4
30 - 34	4.3	3.9	- 0.1
35 - 39	5.8	4.8	- 9.3
40 - 44	8.0	6.5	- 18.8
45 - 49	10.3	9.6	- 6.8
50 - 54	14.5	12.7	- 12.4
55 - 59	18.8	17.7	- 5.9
60 - 64	28.6	26.5	- 7.3
65 - 69	37.8	36.0	- 4.8
70 - 74	57.8	56.2	- 2.8
75 - 79	82.2	88.8	+ 8.0
80 - 84	132.4	143.8	+ 8.6
85+	209.1	295.1	+ 41.1

* 1972, 1973, 1974 3 years average data

Source: Calculated from (1) 1972-1974 and 1978 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census of Burma, Immigration and Manpower Department, Rangoon, Burma.

Appendix 3.1

Cause of Death Classified Under 17 Major Headings,

Urban Burma, 1965-1978

Major Class and ICD Abbreviated B List Number	Absolute Number			Percentage to Total Causes		
	1965	1973	1978	1965	1973	1978
I Infective and parasitic diseases - B 1-B 18	5568	9911	10954	10.3	17.1	19.0
II Neoplasms - B 19-B 20	1575	2374	2157	3.0	4.1	3.7
III Endocrine, Nutritional and metabolic diseases - B 21-B 22	957	1357	1547	1.8	2.3	2.7
IV Blood and blood forming organs - B 23	1194	819	633	2.2	1.4	1.1
VI Diseases of nervous system and sense organs - B 24	195	220	230	0.4	0.4	0.4
VII Diseases of circulatory system - B 25-B 30	2181	4447	4740	4.0	7.7	8.2
VIII Diseases of respiratory system - B 31-B 33	6970	6249	6643	12.9	10.8	11.5
IX Diseases of digestive system - B 34-B 37	798	1041	1084	1.5	1.8	1.9
X Diseases of genito urinary system - B 38-B 39	501	322	313	0.9	0.6	0.5
XI Complication of childbirth and puerperium - B 40-B 41	425	321	272	0.8	0.5	0.5
XIV Congenital anomalies - B 42	129	154	127	0.2	0.3	0.2
XV Certain causes of mortality in early infancy - B 43-B 44	4455	2578	2210	8.3	4.5	3.9
XVI Symptoms and ill-defined conditions - B 45-B 46	25516	25107	24257	47.3	43.5	42.1
EXVII Accidents, poisoning and violence - BE 47-BE 50	1953	2840	2450	3.6	4.9	4.3
Total Causes - B 1-BE 50	53991	57740	57617	100.0	100.0	100.0

Source: Calculated from 1965, 1973, 1978 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 3.2

Infant Deaths by 14 Leading CausesUrban Burma, 1965-1978

Causes and ICD Abbreviated B List No.	Percentage to Total Causes		
	1965	1973	1978
1. Pneumonia - B 32	18.8	15.9	19.1
2. Other causes of perinatal mortality - B 43	19.1	25.1	23.8
3. All other infective and parasitic diseases - B 18	7.7	5.2	7.1
4. Enteritis and other diarrhoeal diseases - B 4	4.4	8.5	8.5
5. Birth injury, difficult labour, etc. - B 43	3.8	2.0	2.7
6. Bronchitis and Asthma - B 33	0.9	0.4	0.6
7. Anaemias - B 23	0.6	0.2	0.2
8. Meningitis - B 24	0.3	0.5	0.6
9. Other tuberculosis, including late effects - B 5, B 6	0.3	0.3	0.4
10. Intestinal obstruction and hernia - B 36	0.2	0.4	0.5
11. Diphtheria - B 8	0.2	0.2	0.1
12. Measles - B 14	0.2	0.2	0.3
13. Bacillary Dysentery and amoebiasis - B 3	0.1	Nil	0.02
14. Other form of heart diseases B 29	0.1	0.3	0.6
Total causes in absolute number B1 - BE 50	15640	9835	8356

Source: Calculated from 1965, 1973, 1978 vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 3.3(a)

Abridged Life Table for Urban Burma Males for 1972-1974

Age (x)	$l(x)$	1000 Q(x)	D(x)	L(x)	P(x)	T(c)	E(x)
0	100000.0	56.50	5650	95549	0.926015*	5733914	57.339
1	94349.7	41.44	3910	367459	0.968893**	5638365	59.760
5	90440.1	15.90	1438	448605	0.987487	5270906	58.281
10	89001.8	9.07	807	442992	0.989523	4822301	54.182
15	88194.8	11.90	1049	438351	0.986796	4379310	49.655
20	87145.4	14.53	1266	432562	0.984228	2940959	45.223
25	85879.6	17.04	1463	425740	0.979863	3508397	40.853
30	84416.5	23.29	1966	417167	0.972284	3082656	36.517
35	82450.3	32.25	2659	405605	0.960540	2665489	32.328
40	79791.6	46.91	3743	389600	0.946643	2259884	28.322
45	76048.2	60.12	4572	368812	0.926832	1870285	24.593
50	41476.5	87.06	6222	341827	0.901997	1501473	21.007
55	65254.1	109.99	7178	308327	0.864726	1159646	17.771
60	58076.5	163.68	9506	266618	0.817121	851320	14.659
65	48570.7	205.84	9998	217859	0.755093	584702	12.038
70	38573.0	294.10	11344	164504	0.668754	366842	9.510
75	27228.6	383.87	10452	110013	0.552250	202338	7.431
80	16776.4	551.44	9251	60754	0.341955***	92326	5.503
85	7525.3	1000.00	7525	31571	0.000000	31571	4.195

* P(Birth); ** P(0-4); *** T(85)/T(80)

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Population Census of Burma, Immigration and Manpower Department, Rangoon, Burma.

Abridged Life Table for Urban Burma Females for 1972-1974

Age (x)	$\ell(x)$	10000 Q(x)	D(x)	L(x)	P(x)	T(x)	E(x)
0	100000.0	48.67	4867	96054	0.9322228*	6184894	61.849
1	95132.6	43.60	4148	370060	0.968144**	6088840	64.004
5	90985.0	16.09	1464	451266	0.988448	5718780	62.854
10	89521.3	6.94	621	446053	0.991561	5267514	58.841
15	88899.8	9.95	884	442289	0.988602	4821462	54.235
20	88015.6	12.87	1132	437247	0.986140	4379173	49.754
25	86883.3	14.87	1292	431187	0.982797	3941926	45.370
30	85591.6	19.57	1675	423770	0.977603	3510739	41.017
35	83916.2	25.28	2121	414278	0.971506	3086969	36.786
40	81795.2	31.80	2601	402474	0.964048	2672691	32.675
45	791914.4	40.24	3187	388004	0.953224	2270217	28.666
50	76007.4	53.58	4073	369855	0.938304	1882212	24.764
55	71934.7	70.27	5055	347036	0.912152	1512357	21.024
60	66879.9	106.76	7140	316550	0.874843	1165320	17.424
65	59740.1	145.76	8708	276932	0.819576	848770	14.208
70	51032.6	221.01	11278	226967	0.740519	571839	11.205
75	39754.1	308.87	12279	168073	0.633032	344872	8.675
80	27475.2	451.03	12392	106396	0.398211***	176799	6.435
85	15083.1	1000.00	15083	70403	0.000000	70403	4.668

* P(Birth),

** P (0-4)

*** T(85)/T(80)

Appendix 4.1(a)

Estimation of Mortality by Stable Population Analysis for Males

Urban Burma for 1972-1974

Age (x)	C(x) Proportion Up to Age x	Values of C(x) per 100 Male Stable Population				Interpolated Level		Ranking Level
		LEVEL I	LEVEL II	LEVEL J	LEVEL II	r = .02	r = .025	
						r = .02	r = .025	r = .023
5	14.9	14 = 14.67	13 = 14.98	20 = 14.86	19 = 15.08	13.3	19.81	17.21
10	28.8	11 = 28.8	11 = 28.8	18 = 28.52	17 = 28.89	11.0	17.24	14.76
15	41.2	10 = 41.09	9 = 41.81	16 = 41.02	15 = 41.51	9.9	15.63	13.34
20	52.0	10 = 51.46	9 = 52.26	15 = 51.80	14 = 52.36	9.3	14.64	12.50
25	60.8	10 = 60.49	9 = 61.34	15 = 60.69	14 = 61.28	9.6	14.81	12.73
30	67.7	11 = 67.48	10 = 68.30	17 = 67.14	16 = 67.73	10.7	16.05	13.91
35	73.8	12 = 73.48	11 = 74.23	17 = 73.72	16 = 74.30	11.6	16.86	14.76
40	79.7	12 = 79.29	11 = 80.02	17 = 79.37	16 = 79.92	11.4	16.40	14.40
45	84.7	12 = 84.27	11 = 84.92	16 = 84.69	15 = 85.17	11.3	15.98	14.12
								12.50

Note: The level of mortality ranged between Level 12 to Level 17 in the West Model life table. The median value is Level 14.12.

Level	r = .02		r = .025		r = .023	
	B.R.	D.R.	B.R.	D.R.	B.R.	D.R.
14	36.01	16.01	40.62	15.62	-	-
15	34.71	14.71	39.21	14.21	-	-
14-12	35.85	15.85	40.45	15.45	37.69	15.69

Appendix 4.1(b)

Estimation of Mortality by Stable Population Analysis for Females

Urban Burma for 1972-1974

Age (x)	C(x) Proportion Up to Age x	Values of C(x) per 100 Female Stable Population										Interpolated Level	Ranking Level	
		r = .02					r = .025							
		LEVEL I		LEVEL II		LEVEL I		LEVEL II		LEVEL I				LEVEL II
5	14.6	14 = 14.41	13 = 14.71	20 = 14.55	19 = 14.77	13.36	19.77	17.21	17.21	17.21	r = .02	r = .025	r = .023	r = .023
10	28.3	11 = 28.31	11 = 28.31	18 = 27.97	17 = 28.36	11.00	17.15	14.69	14.98	14.98				
15	40.4	10 = 40.41	10 = 40.41	16 = 40.32	15 = 40.85	10.00	15.84	13.50	14.81	14.81				
20	51.1	10 = 50.55	9 = 51.37	15 = 50.99	14 = 51.60	9.33	14.82	12.62	14.69	14.69				
25	59.7	10 = 59.41	9 = 60.27	16 = 59.12	15 = 59.75	9.66	15.07	12.91	14.38	14.38				
30	66.4	11 = 66.26	10 = 67.09	17 = 66.05	16 = 66.67	10.83	16.43	14.19	14.19	14.19				
35	72.4	12 = 72.14	11 = 72.90	17 = 72.57	18 = 71.98	11.65	17.20	14.98	13.50	13.50				
40	78.2	12 = 77.91	11 = 78.62	17 = 78.18	16 = 78.74	11.59	16.96	14.81	12.91	12.91				
45	83.3	12 = 82.87	11 = 83.52	16 = 83.51	17 = 83.0	11.34	16.41	14.38	12.62	12.62				

Note: The level of mortality ranged between Level 12 to Level 17 in the West Model life table. The median value is Level 14-38

Level	r = .02		r = .025	
	B.R.	D.R.	B.R.	D.R.
14	34.64	14.64	39.21	14.21
15	33.35	13.35	37.81	12.81
14-38	34.15	14.15	38.68	13.68
			36.87	13.87

Appendix 4.1(c)

Estimation of Mortality by Stable Population Analysis for Males

Union of Burma for 1972-1974

Age (x)	C(x) Proportion Values of C(x) per 100 Male Stable Population Up to Age x	Interpolated Level										Ranking Level
		r = .025										
		LEVEL I		LEVEL II		LEVEL I		LEVEL II		r = .023		
		r = .02										
				r = .025								r = .023
						r = .025						r = .023
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Note: The level of mortality ranged between Level 11 to Level 16 in the West Model life table. The median value is Level 15.28

Level	r = .02		r = 0.25		r = .023	
	B.R.	D.R.	B.R.	D.R.	B.R.	D.R.
15	34.71	14.71	39.21	14.21	-	-
16	33.49	13.49	37.90	12.90	-	-
15.28	34.37	14.37	38.84	13.84	37.05	14.05

Estimation of Mortality by Stable Population Analysis for Females

Union of Burma for 1972-1974

Age (x)	C(x) Proportion Up to Age x	Values of C(x) per 100 Female Stable Population						Interpolated Level		Ranking Level
		r = .02		r = .025		r = .02		r = .02	r = .025	r = .023
		LEVEL I		LEVEL II		LEVEL I		LEVEL II		
5	14.92	13 = 14.71	12 = 15.04	19 = 14.77	18 = 15.00	12.37	18.35	15.96	12.07	12.07
10	28.74	11 = 28.31	10 = 28.87	17 = 28.36	16 = 28.77	10.23	16.07	13.73	12.65	12.65
15	40.92	10 = 40.41	9 = 41.14	15 = 40.85	14 = 41.41	9.30	14.88	12.65	12.83	12.83
20	51.45	9 = 51.37	8 = 52.24	15 = 50.99	14 = 51.60	8.91	14.25	12.07	13.73	13.73
25	59.76	10 = 59.41	9 = 60.27	15 = 59.75	14 = 60.40	9.59	14.99	12.83	14.47	14.47
30	66.21	12 = 65.47	11 = 66.26	17 = 66.05	16 = 66.67	11.06	16.74	14.47	14.69	14.69
35	72.22	12 = 74.14	11 = 72.90	18 = 71.98	17 = 72.57	11.90	17.60	15.32	15.32	15.32
40	77.89	13 = 77.22	12 = 77.91	18 = 77.63	17 = 78.18	12.03	17.53	15.33	15.33	15.33
45	83.13	12 = 82.87	11 = 83.52	17 = 83.00	16 = 83.51	11.60	16.75	14.69	15.96	15.96

Note: The level of mortality ranged between Level 12 to Level 15 in the West Model life table. The Median value is Level 14.47.

Level	r = .02		r = .025		r = .023	
	B.R.	D.R.	B.R.	D.R.	B.R.	D.R.
14	34.64	14.64	39.21	14.21	-	-
15	33.35	13.35	37.81	12.81	-	-
14.47	34.03	14.03	38.55	13.55	36.74	13.74

Appendix 4.2(a)

Estimation of Mortality by Brass Growth Balance Equation
for Urban Burma Males, 1972-1974

Age Group	Population	Deaths	Proportions of Persons Under Age (x)	Proportions of Deaths Under Age (x)	Population Ratios	Death Rates
0- 4	510202	9620	.1493	.3070	.0338	.0075
5- 9	473193	11326	.2878	.3493	.0369	.0084
10-14	423436	672	.4118	.3707	.0395	.0098
15-19	370454	785	.5202	.3958	.0410	.0116
20-24	301542	767	.6085	.4202	.0401	.0136
25-29	235403	716	.6774	.4431	.0403	.0158
30-34	208651	849	.7385	.4702	.0457	.0186
35-39	199468	1148	.7969	.5068	.0535	.0223
40-44	171629	1457	.8471	.5533	.0598	.0268
45-49	140679	1535	.8883	.6023	.0686	.0327
50-54	121224	1938	.9238	.6641	.0819	.0404
55-59	92019	1887	.9507	.7243	.0950	.0513
60-64	68038	2138	.9706	.7926	.1135	.0647
65-69	45969	1863	.9841	.8520	.1397	.0852
70-74	30134	1830	.9929	.9104	.1839	.1154
75-79	14614	1231	.9972	.9497	.2175	.1623
80-84	6526	898	.9991	.9783		
85+	3193	679				

$$r = 2.3$$

$$f = 1.43$$

$$k = \frac{1}{f}$$

Completeness of registration 'K' = 70.1 per cent

Appendix 4.2(b)

Estimation of Mortality by Brass Growth Balance Equation
for Urban Burma Females, 1972-1974

Age Group	Population	Deaths	Proportions of Persons Under Age (x)	Proportions of Deaths Under Age (x)	Population Ratios	Death Rates
0- 4	498229	8707	.1464	.3290	.0332	.0061
5- 9	464742	1322	.2831	.3789	.0359	.0067
10-14	410670	500	.4038	.3978	.0383	.0079
15-19	366245	643	.5114	.4221	.0395	.0092
20-24	291003	666	.5970	.4473	.0379	.0107
25-29	228665	610	.6642	.4703	.0380	.0123
30-34	205201	716	.7245	.4974	.0428	.0142
35-39	196141	881	.7821	.5306	.0499	.0168
40-44	173754	981	.8332	.5677	.0556	.0202
45-49	141675	1023	.8749	.6064	.0623	.0245
50-54	123350	1192	.9111	.6514	.0724	.0305
55-59	95546	1232	.9392	.6979	.0833	.0387
60-64	76689	1540	.9617	.7561	.1019	.0496
65-69	55952	1550	.9782	.8147	.1289	.0661
70-74	39703	1759	.9899	.8811	.1725	.0912
75-79	19794	1282	.9957	.9296	.2011	.1269
80-84	9750	1016	.9985	.9680		
85+	4941	848				

$$r = 2.3$$

$$f = 1.62$$

$$k = \frac{1}{f}$$

Completeness of registration 'K' = 61.8 per cent.

Appendix 4.2(c)
Estimation of Mortality by Preston-Coale Method
for Urban Burma Males 1972-1974

Age	P(x,x+4)	D(x,x+4)	Population x and Over	Deaths x and Over	Population Proportions x and Over	Proportion of Deaths x and Over
0	510202	9620	3416374	31339	1.00000	1.00000
5	473193	1326	2906172	21719	0.85066	0.69303
10	423436	672	2432979	20393	0.71215	0.65072
15	370454	785	2009543	19721	0.58821	0.62928
20	301542	767	1639089	18935	0.47977	0.60423
25	235403	716	1337547	18169	0.39151	0.57976
30	208651	849	1102144	17453	0.32261	0.55691
35	199468	1148	893493	16604	0.26153	0.52982
40	171629	1457	694025	15456	0.20315	0.49319
45	140679	1535	522396	13999	0.15291	0.44670
50	121224	1938	361717	12464	0.11173	0.39772
55	92019	1887	260493	10526	0.07625	0.33588
60	68038	2138	168474	8639	0.04931	0.27566
65	45969	1863	100436	6501	0.02940	0.20744
70	30134	2042	54467	4638	0.01594	0.14799
75	14614	1374	24333	2596	0.00712	0.08284
80	6526	696	9719	1222	0.00284	0.03901
85	3193	526	3193	526	0.00093	0.01679

$r = 2.3$ $f = 1.37$ $K = \frac{1}{r}$

Completeness of Registration 'K' = 73 per cent.

Appendix 4.2(d)
 Estimation of Mortality by Preston-Coale Method
 for Urban Burma Females 1972-1974

Age	$P(x, x+4)$	$D(x, x+4)$	Population x and Over	Deaths x and Over	Population Proportions x and Over	Proportions of Deaths x and Over
0	498229	8707	3402050	26468	1.00000	1.00000
5	464742	1322	2903821	17761	0.85355	0.67104
10	410670	500	2439079	16439	0.71694	0.62109
15	366245	643	2028409	15939	0.59623	0.60220
20	291003	666	1662164	15296	0.48858	0.57791
25	228665	610	1371161	14630	0.40307	0.55274
30	205201	716	1142496	14020	0.33583	0.52970
35	196141	881	937295	13304	0.27551	0.50264
40	173754	981	741154	12423	0.21786	0.46936
45	141675	1023	567400	11447	0.16678	0.43230
50	123350	1192	425725	10419	0.12514	0.39365
55	95546	1232	302375	9227	0.08888	0.34861
60	76689	1540	206829	7995	0.06080	0.30206
65	55952	1550	130140	6455	0.03825	0.24388
70	39703	1936	74188	4905	0.02181	0.18532
75	19794	1411	34485	2969	0.01014	0.11219
80	9750	850	14691	1559	0.00432	0.05889
85	4941	709	4941	709	0.00145	0.02679

$$r = 2.3 \quad f = 1.57 \quad K = \frac{1}{r}$$

Completeness of Registration 'K' = 64 per cent.

Appendix 4.2(e)

Estimation of Mortality by Preston and Hill Methodfor Urban Burma Males, 1972-1974

Age	Total Urban Population	All Reported Deaths	Proportion of Deaths d(a)	Mid-Point of Interval (a)	d(a) x e ^{r(a)} r = 0.023
0	94035	5725	.1827	0.3	.1840
1- 4	416167	3896	.1243	3.0	.1332
5- 9	473193	1326	.0423	7.5	.0503
10-14	423436	672	.0214	12.5	.0285
15-19	370454	785	.0251	17.5	.0375
20-24	301542	767	.0245	22.5	.0411
25-29	235403	716	.0229	27.5	.0431
30-34	208651	849	.0271	32.5	.0572
35-39	199468	1148	.0366	37.5	.0867
40-44	171629	1457	.0465	42.5	.1236
45-49	140679	1535	.0490	47.5	.1461
50-54	121224	1938	.0618	52.5	.0267
55-59	92019	1887	.0602	57.5	.2259
60-64	68038	2138	.0682	62.5	.2871
65-69	45969	1863	.0594	67.5	.2806
70-74	30134	1830	.0584	72.5	.3095
75-79	14614	1231	.0393	77.5	.2336
80-84	6526	898	.0287	82.5	.1914
85+	3193	679	.0217	88.46	.1660
Total	3416374	31340			2.8321

$$\text{Crude Death Rate} = \frac{31340}{3416374} = .00917346$$

Estimated Completeness of Death

$$\text{Registration} = \frac{(2.8321-1)(.00917346)}{.023} \times 100$$

$$= 73 \text{ per cent}$$

Source: Calculated from (1) 1972-1974 Vital Statistics Report, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma

(2) 1973 Census Report, Immigration and Manpower Department, Rangoon, Burma.

Appendix 4.2(f)

Estimation of Mortality by Preston and Hill Methodfor Urban Burma Females, 1972-1974

Age	Total Urban Population	All Reported Deaths	Proportion of Deaths d(a)	Mid-Point of Interval (a)	d(a) x e ^{r(a)} r = 0.023
0	92106	4691	.1772	0.3	.1784
1- 4	406123	4016	.1517	3.0	.1625
5- 9	464742	1322	.0500	7.5	.0594
10-14	410670	500	.0189	12.5	.0252
15-19	366245	643	.0243	17.5	.0363
20-24	291003	666	.0252	22.5	.0423
25-29	228665	610	.0231	27.5	.0435
30-34	205201	716	.0271	32.5	.0572
35-39	196141	881	.0333	37.5	.0789
40-44	173754	981	.0370	42.5	.0983
45-49	141675	1023	.0386	47.5	.1151
50-54	123350	1192	.0450	52.5	.1505
55-59	95546	1232	.0465	57.5	.1745
60-64	76689	1540	.0582	62.5	.2450
65-69	55952	1551	.0586	67.5	.2768
70-74	39703	1759	.0665	72.5	.3524
75-79	19794	1282	.0484	77.5	.2877
80-84	9750	1016	.0384	82.5	.2561
85+	4941	848	.0320	88.46	.2448
Total	3402050	26469			2.8849

$$\text{Crude Death Rate} = \frac{26469}{3402050} = .0077803$$

Estimated Completeness of Death

$$\text{Registration} = \frac{(2.8849-1)(.0077803)}{.023} \times 100$$

= 64 per cent

Source: Calculated from (1) 1972-1974 Vital Statistics Reports, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

(2) 1973 Census Report, Immigration and Manpower Department, Rangoon, Burma.

Appendix 4.2(g)

Estimation of Mortality by Courbage and Fargues Methodfor Urban Burma Males, 1972-1974

a	b	i(a,b)	Death Rate at Ages Above a		Rate of Under- Registration	Correction Factor
			Adjusted m(a +)	Registered m(a +)		
(1)	(2)	(3)	(4)	(5)	(6) = $\frac{(4)-(5)}{(4)}$	(7) = $\frac{(4)}{(5)}$
1	50	.4866	12.6	7.7	38.9	1.6
1	60	.3373	13.4	7.7	42.5	1.7
5	50	.5738	12.1	7.5	38.0	1.6
5	60	.3977	13.5	7.5	44.4	1.8

Appendix 4.2(h)

Estimation of Mortality by Courbage and Fargues Methodfor Urban Burma Females, 1972-1974

a	b	i(a,b)	Death Rate at Ages Above a		Rate of Under- Registration	Correction Factor
			Adjusted m(a +)	Registered m(a +)		
(1)	(2)	(3)	(4)	(5)	(6) = $\frac{(4)-(5)}{(4)}$	(7) = $\frac{(4)}{(5)}$
1	50	.4785	12.6	6.6	47.6	1.9
1	60	.3672	11.9	6.6	44.5	1.8
5	50	.5866	11.8	6.1	48.3	1.9
5	60	.4502	12.5	6.1	51.2	2.0

Appendix 4.2(i)

Estimation of Mortality by Carrier Method
for Urban Burma Males 1972-1974

Age	D a,b	Mid Interval	Estimate of (1-r) ^{a,b} r = .023	D a,b (1-r) ^{a,b} (2):(4)=(5)	Sum of Col.5 Cumulative from Bottom	$lx(l_1 = 10000)$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1-14	5894	4	.9111	6469	84371	10000(l_1)
15-44	5722	29.5	.5034	11367	77902	9233(l_{15})
45+	13999	67	.2104	66535	66535	7886(l_{45})

Note: Total urban population and all reported deaths

From Coale and Demeny Life Table, Model West

Level	e_1^0	$l_0 = 100,000$			$l_1 = 10,000$	
		l_1	l_{15}	l_{45}	l_{15}	l_{45}
14	55.56	87547	79734	64599	9108	7379
15	57.29	88864	82018	67936	9230	7645
16	59.02	90143	84234	71283	9344	7908
17	60.78	91379	86377	74627	9453	8167

1. Observed $l_{15} = 9233$, falls in level 15.03 of Coale and Demeny Life Table, Model West and e_1^0 value is 57.34
2. Observed $l_{45} = 7886$, falls in level 15.92 of Coale and Demeny Life Table, Model West and e_1^0 value is 58.88

Source: Calculated from 1972-74 Vital Statistics Reports published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 4.2(j)

Estimation of Mortality by Carrier Method
for Urban Burma Females 1972-1974

Age	D a,b	Mid Interval	Estimate of $(1-r)^{a,b}$ $r = .023$	$\frac{D a,b}{(1-r)^{a,b}}$ (2):(4)=(5)	Sum of Col.5 Cumulative from Bottom	$lx(l_1 = 10000)$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1-14	5838	4	.9111	6408	69728	10000(l_1)
15-44	4497	29.5	.5034	8933	63320	9081(l_{15})
45+	11443	67	.2104	54387	54387	7800(l_{45})

Note: Total urban population and all reported deaths

From Coale and Demeny Life Table, Model West

Level	e_1^0	$l_0 = 100,000$			$l_1 = 10,000$	
		l_1	l_{15}	l_{45}	l_{15}	l_{45}
13	55.66	88169	78771	63656	8934	7220
14	57.65	89452	81387	67158	9098	7505
15	59.63	90661	83740	70686	9236	7797
16	61.59	91823	85980	74175	9364	8078

1. Observed $l_{15} = 9081$ falls in level 13.89 of Coale and Demeny Life Table, Model West and e_1^0 value is 57.43
2. Observed $l_{45} = 7800$ falls in level 15.01 of Coale and Demeny Life Table, Model West and e_1^0 value is 59.65

Source: Calculated from 1972-1974 Vital Statistics Reports published by the Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 4.3(a)

Estimation of Mortality by Brass Growth Balance Equation Methodfor Union of Burma Males for 1972-1974

Age Group	Population	Deaths	Proportions of Persons Under Age (x)	Proportions of Deaths Under Age (x)	Population Ratios	Death Rates
0- 4	2127734	9620	.1524	.3070	.0347	.0018
5- 9	1975913	1326	.2939	.3493	.0379	.0021
10-14	1761969	672	.4201	.3707	.0396	.0024
15-19	1442923	785	.5234	.3958	.0387	.0028
20-24	1135581	767	.6048	.4202	.0366	.0033
25-29	884402	716	.6681	.4431	.0367	.0038
30-34	815471	849	.7265	.4702	.0422	.0043
35-39	794586	1148	.7834	.5068	.0504	.0051
40-44	730791	1457	.8357	.5533	.0571	.0061
45-49	579833	1535	.8773	.6023	.0640	.0073
50-54	517465	1938	.9143	.6641	.0756	.0088
55-59	387127	1887	.9421	.7243	.0879	.0107
60-64	323737	2138	.9652	.7926	.1109	.0134
65-69	214634	1863	.9806	.8520	.1361	.0171
70-74	153791	1830	.9916	.9104	.1906	.0240
75-79	68884	1231	.9966	.9497	.2126	.0329
80-84	33019	898	.9989	.9783		
85+	14913	679				

r = 2.3

f = 6.57

 $K = \frac{1}{f}$

Completeness of Registration 'K' = 15.2 per cent

Appendix 4.3(b)

Estimation of Mortality by Brass Growth Balance Equation Method
for Union of Burma Females for 1972-1974

Age Group	Population	Deaths	Proportions of Persons Under Age (x)	Proportions of Deaths Under Age (x)	Population Ratios	Death Rates
0- 4	2106443	8707	.1492	.3290	.0338	.0015
5- 9	1952588	1322	.2874	.3789	.0365	.0016
10-14	1719193	500	.4092	.3978	.0384	.0019
15-19	1488063	643	.5145	.4221	.0388	.0022
20-24	1172906	666	.5976	.4473	.0367	.0026
25-29	911147	610	.6621	.4703	.0369	.0029
30-34	849280	716	.7223	.4974	.0421	.0034
35-39	800144	881	.7789	.5306	.0493	.0040
40-44	739461	981	.8313	.5677	.0553	.0048
45-49	579259	1023	.8723	.6064	.0613	.0058
50-54	526239	1192	.9096	.6514	.0721	.0072
55-59	394404	1232	.9375	.6979	.0830	.0091
60-64	338221	1540	.9615	.7561	.1047	.0119
65-69	231513	1550	.9778	.8147	.1294	.0157
70-74	173426	1579	.9901	.8811	.1802	.0226
75-79	77890	1282	.9956	.2996	.1944	.0303
80-84	41799	1016	.9986	.9680		
85+	19763	848				

r = 2.3

f = 7.01

 $K = \frac{1}{f}$

Completeness of Registration 'K' = 14.3 per cent

Appendix 4.3(c)

Estimation of Mortality by Preston-Coale Methodfor Union of Burma Males for 1972-1974

Age	P(x,x+4)	D(x,x+4)	Population x and Over	Deaths x and Over	Population Proportions x and Over	Proportion of Deaths x and Over
0	2127734	9620	13962773	31339	1.00000	1.00000
5	1975913	1326	11835039	21719	0.84761	0.69303
10	1761969	672	9859126	20393	0.70610	0.65072
15	1442923	785	8097157	19721	0.57991	0.62928
20	1135581	767	6654234	18936	0.47657	0.60423
25	884402	716	5518653	18169	0.39524	0.57976
30	815471	849	4634251	17453	0.33190	0.55691
35	794586	1148	3818780	16604	0.27350	0.52982
40	730791	1457	3024194	15456	0.21659	0.49319
45	579833	1535	2293403	13999	0.16425	0.44670
50	517465	1938	1713570	12464	0.12272	0.39772
55	387127	1887	1196105	10526	0.08566	0.33588
60	323737	2138	808978	8639	0.05794	0.27566
65	214634	1863	485241	6501	0.03475	0.20744
70	153791	1876	270607	4638	0.01938	0.14799
75	68884	1262	116816	2762	0.00837	0.08815
80	33019	855	47932	1501	0.00343	0.04789
85+	14913	646	14913	646	0.00107	0.02062

r = 2.3

f = 5.57

 $K = \frac{1}{f}$

Completeness of Registration 'K' = 18 per cent

Appendix 4.3(d)

Estimation of Mortality by Preston-Coale Methodfor Union of Burma Females for 1972-1974

Age	P(x,x+4)	D(x,x+4)	Population x and Over	Deaths x and Over	Population Proportions x and Over	Proportion of Deaths x and Over
0	2106443	8707	14121739	26468	1.00000	1.00000
5	1952588	1322	12015296	17761	0.85084	0.67104
10	1719193	500	10062708	16439	0.71257	0.62109
15	1488063	643	8343515	15939	0.59083	0.60220
20	1172906	666	6855452	15296	0.48545	0.57791
25	911147	610	5682546	14630	0.40240	0.55274
30	849280	716	4771399	14020	0.33788	0.52970
35	800144	881	3922119	13304	0.27774	0.50264
40	739461	981	3121975	12423	0.22108	0.46936
45	579259	1023	2382514	11442	0.16871	0.43230
50	526239	1192	1803255	10419	0.12769	0.39365
55	394404	1232	1277016	9227	0.09043	0.34861
60	338221	1540	882612	7995	0.06250	0.30201
65	231513	1550	544391	6455	0.03855	0.24388
70	173426	1905	312878	4905	0.02216	0.18532
75	77890	1388	139452	3000	0.00987	0.11336
80	41799	879	61562	1612	0.00436	0.06091
85+	19763	733	19763	733	0.00140	0.02771

r = 2.3

f = 6.52

 $K = \frac{1}{f}$

Completeness of Registration 'K' = 15.3 per cent

Appendix 4.4

Probability of Dying (n^q_x) for Urban BurmaMales and Females for 1972-1974

Age	Observed n^q_x		Smoothed n^q_x	
	Male	Female	Male	Female
0	.05650	.04867	.08974	.07762
1	.04144	.04360	.03843	.04935
5	.01590	.01609	.01238	.01309
10	.00907	.00694	.00811	.00684
15	.01190	.00995	.01216	.00917
20	.01453	.01287	.01732	.01291
25	.01704	.01487	.01977	.01596
30	.02329	.01957	.02354	.01946
35	.03225	.02528	.03000	.02413
40	.04691	.03180	.03990	.02882
45	.06012	.04024	.05470	.03643
50	.08706	.05358	.07694	.04819
55	.10999	.07027	.10833	.06934
60	.16368	.10676	.15582	.10255
65	.20584	.14576	.22319	.15694
70	.29410	.22101	.31011	.23118
75	.38387	.30887	.41193	.32389
80	.55144	.45103	.52631	.45353

Source: Calculated from 1972-1974 Vital Statistics Report, Central Statistical Organisation and the Directorate of Health, Rangoon, Burma.

Appendix 4.5(a)
Abridged Life Tables for Urban Burma Males
(Adjusted by Preston-Coale Method) 1974-1974

Age (x)	L(x)	1000 Q(x)	D(x)	L(x)	P(x)	T(x)	E(x)
0	100000.0	94.10	9410	93626	.885077*	5027280	50.273
1	90590.0	56.45	5114	348912	.955232**	4933654	54.461
5	85476.1	21.78	1862	422727	.982845	4504742	53.638
10	83614.6	12.43	1039	415475	.985611	4162015	49.776
15	82575.4	16.38	1352	409496	.981918	3746540	45.371
20	81223.2	19.82	1610	402092	.978727	3337044	41.085
25	79613.6	22.76	1812	393538	.972905	2934952	36.865
30	77801.8	31.53	2453	382876	.962531	2541413	32.665
35	75348.5	43.60	3285	368529	.946412	2158538	28.647
40	72063.3	64.03	4614	348781	.927402	1790008	24.839
45	67449.0	81.75	5514	323460	.901085	1441227	21.368
50	61935.0	117.61	7284	291465	.868210	1117767	18.047
55	54651.0	147.86	8081	253053	.820058	826302	15.120
60	46570.1	217.59	10133	207518	.758688	573250	12.309
65	36437.1	271.64	9898	157441	.682297	365732	10.037
70	26539.5	380.95	10110	107422	.578264	208290	7.848
75	16429.3	487.62	8011	62118	.450163	100868	6.140
80	8418.0	671.26	5651	27963	.278370***	38750	4.603
85	2767.3	1000.00	2767	10787	.000000	10787	3.898

* P(Birth)

** P(0-4)

*** T(85)/T(80)

Appendix 4.5(b)
Abridged Life Tables for Urban Burma Females
(Adjusted by Preston-Coale Method) 1972-1974

Age (x)	$l(x)$	1000 Q(x)	D(x)	L(x)	P(x)	T(x)	E(x)
0	100000.0	90.10	9010	93791	.883373*	5209925	52.099
1	90990.0	67.38	6131	347895	.948759**	5116133	56.227
5	84859.4	24.71	2097	419054	.982085	4768238	56.190
10	82762.2	10.94	906	411546	.986845	4549184	52.550
15	81856.4	15.39	1260	406133	.982170	3937638	48.104
20	80596.6	20.31	1637	398891	.978238	3531505	43.817
25	78959.9	23.25	1836	390210	.972899	3132619	39.673
30	77124.3	31.05	2394	379635	.964906	2742404	35.558
35	74729.8	39.27	2935	366312	.955560	2362768	31.617
40	71795.0	49.82	3577	350033	.943944	1996456	27.808
45	68218.3	62.62	4272	330412	.927454	1646423	24.135
50	63946.5	83.14	5316	306442	.905089	1316011	20.580
55	58630.2	107.75	6318	277357	.866270	1009569	17.219
60	52312.6	162.84	8519	240266	.811304	732212	13.997
65	43793.8	219.58	9616	194929	.733741	491946	11.233
70	34177.7	326.07	11144	143027	.626890	297018	8.690
75	23033.2	442.90	10202	88662	.495405	153991	6.686
80	12831.7	615.33	7896	44419	.309493***	64328	5.013
85	4935.9	1000.00	4936	19909	.000000	19909	4.033

* P(Birth)

** P(0-4)

*** T(85)/T(80)

Appendix 4.5(c)

Abridged Life Tables for Urban Burma Males

(Adjusted by the Model Life Tables for Developing Countries) 1972-1974

Age (x)	$l(x)$	1000 Q(x)	D(x)	L(x)	P(x)	T(x)	E(x)
0	100000.0	89.74	8974	93807	.897494*	5583709	55.837
1	91026.0	38.43	3498	354940	.969211**	5489903	60.311
5	87527.9	12.38	1084	434930	.989742	5134962	58.667
10	86444.3	8.11	701	430469	.989873	4700032	54.371
15	85743.2	12.16	1043	426109	.985276	4269563	49.795
20	84700.6	17.32	1467	419835	.981466	3843454	45.377
25	83233.6	19.77	1646	412054	.978364	3423618	41.133
30	81588.0	23.54	1921	403139	.973268	3011564	36.912
35	79667.5	30.00	2390	392362	.965125	2608426	32.741
40	77277.4	39.90	3083	378679	.952851	2216064	28.677
45	74194.1	54.70	4058	360824	.934493*	1837385	24.765
50	70135.6	76.94	5396	337188	.907993	1476561	21.053
55	64739.4	108.33	7013	306164	.869285	1139373	17.599
60	57726.2	155.82	8995	266144	.813341	833209	14.434
65	48731.3	223.19	10876	216466	.738809	567065	11.637
70	37855.0	310.11	11739	159927	.648322	350600	9.262
75	26115.8	411.93	10758	103684	.545715	190673	7.301
80	15337.9	526.31	8083	56592	.349548***	26989	5.664
85	7274.9	1000.00	7275	30407	.000000	30407	4.180

* P(Birth)

** P(0-4)

*** T(85)/T(80)

Appendix 4.5(d)
Abridged Life Tables for Urban Burma Females

(Adjusted by the Model Life Tables for Developing Countries) 1972-1974

Age (x)	$l(x)$	1000 Q(x)	D(x)	L(x)	P(x)	T(x)	$E(x)$
0	100000.0	77.62	7762	94367	.903045*	5992043	59.920
1	92238.0	49.35	4552	357156	.964649**	5397677	63.940
5	87686.1	13.09	1148	435561	.990014	5540521	63.189
10	86538.2	6.84	592	431211	.991999	5104960	58.991
15	85946.3	9.17	788	427761	.988969	4673749	54.330
20	85158.2	12.91	1099	423042	.985575	4245987	49.860
25	84058.8	15.96	1342	416940	.982304	3822945	45.479
30	82717.2	19.46	1610	409562	.978228	3406005	41.176
35	81107.5	24.13	1957	400645	.973554	2996443	36.944
40	79150.4	28.82	2281	390049	.967431	2595798	32.796
45	76869.3	36.43	2800	377346	.957793	2205749	28.695
50	74069.0	48.19	3569	361421	.941496	1828403	24.685
55	70499.6	69.34	4888	340277	.914651	1466982	20.808
60	65611.1	102.55	6728	311235	.871725	1126705	17.172
65	58882.7	156.94	9241	271311	.809101	815470	13.849
70	49641.7	231.18	11476	219518	.726523	544159	10.562
75	38165.5	323.89	12561	159924	.623816	324641	8.506
80	25804.1	453.53	11703	99763	.394338***	164717	6.383
85	14101.2	1000.00	14101	64954	.000000	64954	4.606

* P(Birth)

** P(0-4)

*** T(85)/T(80)