CHILD MORTALITY DIFFERENTIALS OF SELECTED ETHNIC GROUPS IN MYANMAR, 1997-2007

Min Ko Ko, Yotthin Sawaengdee

Institute for Population and Social Research, Mahidol University, Nakhon Pathom 73170, Thailand

ABSTRACT: Child mortality is a key indicator not only of child health but also of the implementation of child survival interventions in Myanmar. This study is a descriptive analysis of mortality differentials in selected ethnic groups in Myanmar and background determinants to influence the child mortality. Mortality rates are calculated for a ten-year period from year 1997 March to 2007 March by using the data from three rounds of Fertility and Reproductive Health Surveys (FRHS); 1997, 2001 and 2007 conducted by Department of Population of the Ministry of Immigration and Population, Myanmar. The differentials include for five key indicators: neonatal, post-neonatal, infancy, child mortality and under five mortality rates. Children in Rakhine ethnic group are more likely to die than other counterparts of Kachin, Kayah, Shan ethnic group; and all ethnic groups had less accessible to the socio-economic determinants to reduce the child mortality in compared with Union. In addition, there may be a wide range of variation for determinants to influence the child mortality of ethnic groups in Myanmar. The findings suggest that maternal education, regional development and access to mass media and electricity, health personal for antenatal care, immunization coverage for children and diarrhea infection are important determinants of mortality risk factors for children in ethnic groups. Moreover, better reproductive health services, access to better health facilities, living standards and socioeconomic developments are likely to contribute to lower mortality in those ethnic groups. It is clear that the more favorable the determinant factors, the better the outcome of the health of the children and the less likely to die for children. In this study, there was no advanced statistical test performed to assess the relationships between the determinants and mortality of the children in ethnic groups. Moreover, it is unclear that how the respective determinant affect the outcome of the health status of the children. In conclusion, the results from this study are generally in the expected direction and consistent with the results of national figures from other sources and many other studies. Regional development and socioeconomic development should be undertaken to uplift of the health status of the ethnic group. Comprehensive poverty alleviation program and literacy campaigns should be implemented to equitable develop across different ethnic groups. Further research with advanced mortality statistics with primary data set of three rounds of FRHS is required to accurately measure the levels of mortality differentials in ethnic groups in Myanmar.

Keywords: Neonatal, Child mortality, Under five mortality rates, Ethnic groups, Myanmar

INTRODUCTION

Globally, 6.6 million children under age five died in 2012; nearly 18000 children die every day. In addition, inequities in child mortality between high income and low income countries remain large. In 2012 the under-five mortality rate (U5MR) in low income countries was 82 deaths per 1,000 live births-more than 13 times the average rate in high income countries (6 deaths per 1,000 live births). Reducing these inequities across countries and saving more children's lives by ending preventable child deaths are important priorities [1]. Children's health situation is one of the priority areas for Myanmar. Although trends of infant mortality rate (IMR) and U5MR for Myanmar are declining, the country's U5MR and IMR are the highest among ASEAN member countries [2].

* *Correspondence to: Yotthin Sawaengdee*
E-mail: yothin.saw@mahidol.ac.th

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Figure 1 Ethnic groups in the study

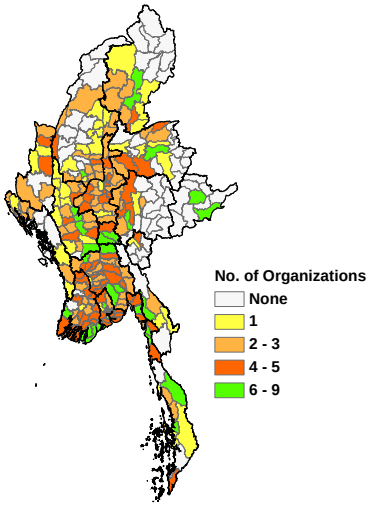


Figure 2 Reproductive health services in Union

Table 1 Background information of the selected ethnic groups

Background information	Kachin, Kayah, Shan			Raknine			Union		
	1997	2001	2007	1997	2001	2007	1997	2001	2007
Maternal education									
No schooling	35	34.2	23.7	42.3	40.7	36.2	24.4	21.5	14.2
Primary	38.5	37.5	41.3	46.8	48.8	40.1	50	52.1	51.1
Lower secondary	16.9	17.7	18.5	7.1	7.1	13.2	14.6	14.8	17
Upper secondary	6.8	6.5	10.5	2.7	2.2	5.1	7.4	6.7	9.1
University	2.7	4	5.9	1	1	5.2	3.7	3.7	7
Others	0	0.1	0	0	0.2	0.2	0	1.3	1.6
Current working status of mother	65.4	64.3	63.5	22.5	29.6	36.2	51.6	50.6	60.5
Access to electricity at home	39.3	38.6	51.6	7.6	16.9	16.3	25.4	27.6	33
Access to mass media									
No mass media	40.4	7.3	13.7	81.4	9.4	12.2	42.5	12.1	16.2
Newspaper/Magazine	23.6	26.5	25	7.7	22	17.2	24.3	27.8	26.8
Radio	35.9	25.9	27.7	10.1	12	15	30.8	25.3	27.2
Television	47.2	65.2	68.4	10.3	41.5	48.8	45.9	58.5	70.5
All three media	n.a	5	12.4	n.a	2.4	6.8	n.a	5.8	13.7
Age at first marriage for ever married women	19.8	20.2	21	17.8	18.9	19.4	20	20.4	21
Source of antenatal care by									
Doctor	11.5	13	17.5	5.6	2.3	6.2	11.5	10.7	13.6
Nurse/Midwife	64.3	61.1	67.9	42.3	72	47.3	64.3	64.9	66.2
TBA	4.4	3.3	1.2	13	3.8	5.7	7.3	7.4	3.6
No one	19.6	21.7	13.4	38.9	21.5	40.8	16.5	16.1	16.5
Assistance during delivery									
Doctor	10.9	19.5	23.6	4.2	4.4	6.2	11.5	13	17.4
Nurse/Midwife	49.2	48.8	50.1	26.3	27.5	24.1	44.9	44	46.5
TBA/Relatives	32.5	25.1	24.9	68.2	67.1	69.2	41.3	41.6	35.5
No one	7.5	6.4	1.3	1.1	0.6	0.6	2.3	1.2	0.6
Immunization EPI	79.2	85	68.6	62.2	67.8	37.8	79.2	80	66.9
Immunization (BCG + Polio + DPT + Measles)									
Measles immunization	80.6	86.4	84.3	63.5	74.8	60	81.1	83.9	83.6
Diarrhoea of children within 2 weeks	9.8	6.3	3.1	11.9	5.1	1.5	8.5	4.9	3.6

TBA= Traditional Birth Attendant, EPI= Expanded Programme of Immunization,
BCG= Bacillus Calmette-Guerin, DPT= Diphtheria Pertussis and Tetanus

Myanmar is a low-income country and was designated as one of the least developed country (LDC) in 1987. The population is around 60.38 million in 2011-2012 with the growth rate of 1.01 percent. About 70 % are living in the rural area whereas the others are living in urban area. The country is divided administratively, into Nay Pyi Taw Union Territory and 7 states and 7 regions [3].

Myanmar has 135 ethnic groups clustered into eight main groups (including the study groups of Kachin, Kayah, Shan and Rakhine). More than half of the working population is employed in agriculture. Poverty is still challenging in Myanmar. Imbalanced growth and development, inequalities between the rich and the poor, and narrow the development gap between state and regions, ethnic groups; and urban and rural areas, are critical challenges for Myanmar [4, 5]. Child mortality rates (CMR) are higher in the central plains, in rural areas, among families without formal education and among children from the poorest families [6].

Ministry of Health (MOH) is trying to uplift the health status of the children by five year strategic plan for child health development in Myanmar (2010-2014) to reach Millennium Development Goals (MDG) 4. However, the challenges remain in the countries and do not cover the entire country, especially for some ethnic regions, still facing limited accessibility to health services to their children. Moreover, it is difficult to access the level and trends in the neonatal mortality rate (NMR), post neonatal mortality rate (PNMR), IMR, CMR among the ethnic groups. Even within the states and ethnic groups there is variation. In addition, there is fragmentation and considerable overlaps resulting from implementation of different projects in different areas in the country. And it is also stated that the shortage of human resources; it leads to gaps in training in reproductive and neonatal care to implement to reduce child mortality [3, 5, 6].

This paper examined child mortality differentials of selected ethnic groups in Myanmar over the period approximately 1997 through 2007. The data sources used consist of national samples of the Fertility and Reproductive Health Surveys (FRHS) of 1997, 2001 and 2007. The purposes are, first, to study basic determinants for child mortalities in those ethnic groups and Nation; second, to identify the existing reproductive health services in the ethnic groups; and third, to examine child mortality trends over time.

MATERIALS AND METHODS

The analysis in this paper is based on the publish data of three rounds of FRHS 1997, 2001 and 2007 conducted by Department of Population, Ministry of Immigration and Population in Myanmar [7-9]. The FRHS surveys performed similar questionnaires, and included a household questionnaire and an individual questionnaire. The individual questionnaire was administered to all ever-married women aged 15-49 years identified through the household questionnaire. The questionnaires used in FRHS 1997, 2001 and 2007 are nearly identical. The surveys are nationally representative surveys of 22687 households and 4177 ever married women aged between 15-49 years in 1997; 36808 households and 8288 ever married women in 2001; and 32416 households and 8352 ever married in 2007. The survey field works were conducted from March to May 1997 for 1997 FRHS, October to the middle of November 2001 for FRHS 2001 and December 2006 to March 2007 for FRHS 2007 respectively.

The surveys were designed to provide estimates for nine sub-national areas (domains) and their composition were the same as in 1997, 2001 and 2007 FRHS. In the study, three domains were used: Domain 1: Kachin/Kayah/Shan Ethnic Group, Domain 2: Rakhine Ethnic Group; and Domain 3: the Union which represents the whole country, Figure 1.

Descriptive analysis for those different ethnic groups to identify their mortality differentials and background determinants was used in the study. Geographical Information System (GIS) mappings provided by Department of Health (DOH), Myanmar, were used to identify the existing reproductive health services in those areas, Figure 2.

RESULTS

Basic determinants for ethnic groups

Maternal education: In the ten years period from 1997 to 2007, education status of mother has slightly increased in all study areas. As shown in Table 1, the illiteracy rate is the highest in Rakhine ethnic. Primary education status is not very different between the study groups and ethnic differences are found in middle school, high school and university. The study highlights that little proportion of them reached university education and most of them completed primary education.

Current working status of mother: Although the variation between Union and Kachin, Kayah and Shan ethnic are not significant, there are marked differences between Rakhine and other counterparts.

Access to electricity at home: Myanmar approximately 25 to 33 percent of households has electricity in the house. Although the electricity has

been increasing since 1997, most were lived without electricity at their home. In addition, there are large differences among ethnic groups, with nearly 51 percent of Kachin, Kayah and Shan ethnic group have electricity in their house while 16 percent in Rakhine ethnic group in 2007.

Access to mass media: Although accessibility to mass media has increased between 2001 and 2007, exposure to mass media is worse in the ethnic groups than Union; they were facing to access the mass media of newspaper, radio and television and Rakhine is the least to access mass media.

Age at first marriage: Age at first marriage in Myanmar increased continuously from 1997 to 2007. In Union, it has increased from 20 years from in 1997 to 21 years in 2007 while 19.8 years in Kachin, Kayah, Shan ethnic groups in 1997 to 21 years in 2007. As for ethnic differences, the widest is in Rakhine (2 years) in year 1997.

Source of antenatal care: Antenatal care (ANC) has an important influence on child mortality. During the three survey periods, the level of ANC services is very similar in Union. However, there are marked differences between the ethnic groups: less than 70 percent by skilled birth attendance in Rakhine vs more than 70 percents in counterparts. In addition, it must be noted that an increasing proportion of mothers receive no ANC from 21.5 in 2001 to 40.8 in 2007 in Rakhine ethnic.

Assistance during delivery: Assistance delivery by skilled personnel is an important factor of child mortality. Overall, the percentage of births that were delivered by skilled personnel (doctors and nurses/midwife) increased during the study. However, significant regional differences also exist in providing assistance during delivery. Traditional birth attendant is popular for the assistance of the delivery in Rakhine; provided for about 67-69 % of their delivery. For the three survey periods, the proportion of assistance during delivery from "no one" declines in all study groups.

Immunization to children: The percentage of children fully immunized (Expanded Programme of Immunization (EPI) scheduled by World Health Organization (WHO) show the increasing trend from 1997 to 2001, followed by decrease in 2007. The immunization coverage was not enough for children for the Union and ethnic children. Moreover, there are wide gap among the ethnic groups and Rakhine is worsen to access the immunization for their children. The similar trends were found in measles immunization programme and only 60 % of Rakhine children were immunized with measles vaccination in 2007. In addition, the prevalence in Rakhine ethnic was the lowest with respect to all immunization and measles immunization.

Diarrhoea within 2 weeks among the children: The study shows that the prevalence of diarrhea in two weeks has declined from 1997 to 2007. The proportion of children with diarrhoea is the highest in Rakhine state in 1997 and followed by other ethnic groups, compared with the whole nation. On the other hand, the greatest declining rate is found in Rakhine (from 12 percent in 1997 to 1.5 percent in 2007) followed by counterpart ethnic groups (from 10 percent in 1997 to 3 percent in 2007).

Existing reproductive health services in the ethnic groups

In the study, reproductive health services covered 75 % of the Union (247 out of 330 townships), 56% of the Kachin ethnic (10 out of 18 townships), 29% of the Kayin (2 out of 7 townships), 35 % of the Shan ethnic (each 43 % in South and North, 20 % in East) and 59 % of the Rakhine ethnic (10 out of 17 townships) during 2007. Although the reproductive services coverage of Kachin, Kayah and Shan ethnic group was relatively lower than counterparts, the background determinants and mortality of children were better than Rakhine ethnic groups and Union data.

Mortality trends between selected ethnic groups and Union

The Table 2 shows the mortality differential between ethnic groups and Union. With regard to NMR, the study found the decreasing trends from 2001 to 2007. In 2007, Union has the highest mortality of 34 per 1000 live births followed by 28 for Kachin, Kayah, Shan and 23.6 per 1000 live births in Rakhine ethnic group. In the study, PNMR has decreasing trends from 2001 to 2007, but slight distinct in Union. Union has the highest mortality of 32 per 1000 live births followed by 27 for Rakhine and 18 per 1000 live births in Kachin, Kayah, and Shan ethnic group. Like PNMR, similar trends were found in IMR; from 1997 to 2007. It state that IMR was decreased yearly and Kachin, Kayah, Shan group has the best indicator followed by Rakhine ethnic group and Union.

In 1997, CMR is highest in Kachin, Kayah, Shan group followed by Rakhine and Union. The ethnic difference is wide among years; distinct for Kachin, Kayah, Shan group. On the other hand, the CMR are nearly equal among the regions in 2007. Regarding U5MR, regional differential is fluctuated as Rakhine is the highest in 1997,

Table 2 Child Mortality Differential in selected ethnic groups

Study area	NMR		PNMR		IMR			CMR			U5MR		
	2001	2007	2001	2007	1997	2001	2007	1997	2001	2007	1997	2001	2007
Union	43.1	33.8	33.5	32.4	81.12	76.6	66.1	37.47	20.6	10.9	115.55	97.3	77
Kachin, Kayah, Shan	43.4	28	29.9	18	72.56	73.2	46	55.09	38.4	9	123.56	118.7	55
Rakhine	45.6	23.6	40.8	27.3	95.54	86.4	50.9	43.84	18	12.4	135.19	110.2	63.4

NMR= Neonatal Mortality Rate, PNMR= Post-neonatal Mortality Rate, IMR= Infant Mortality Rate, CMR= Child Mortality Rate, U5MR= Under 5 Mortality Rate

Kachin, Kayah, Shan in 2001 and nation in 2007. In addition, the study found the decreasing trend of U5MR rate in study areas.

DISCUSSION

Reduced child mortality is one of the MDGs (MDG-4- reduce child mortality by two thirds) for 2015 [10-12]. The findings confirmed that there are significant disparities among the ethnic groups. In the ten years period from 1997 to 2007, all CMR in ethnic groups has fallen distinctly with positive achievement as shown in Table 2.

For Kachin, Kayah and Shan ethnic, child mortalities were lowest for post natal, infancy in three rounds of FRHS 1997, 2001 and 2007. But their CMR and U5MR were relatively higher (CMR of 55/1000 LB in 1997, 3/1000 LB in 2001 and U5MR of 119/1000 LB in 2001 than Rakhine and Union.

In Myanmar, 73 per cent of all under-five deaths occurred in infancy (0–11 months) and 27 per cent in the 1–4 years age group. During infancy, 34 per cent of the deaths occurred in the neonatal period. Among the neonate deaths, more than two thirds occurred during the first seven days after birth, most within three to four days of the onset of the first signs of illness [2, 3, 5, 6, 10, 11, 13]. Therefore, the child mortality in present study reflected the similar trends in all aspects of child mortalities of other studies [14-18]. It is clear that the neonatal mortality is essential to reduce the infant and U5MR of a country; and proper child health intervention should be focused on neonate.

Like other studies, access to education for mothers, RH services, electricity, mass media, and immunization programmes to children are major factors contributing to the reduction in child mortality in the present study [16, 18-20].

There is notable difference in the educational status of mothers of ethnic groups. Rakhine mothers are the poorest educational status among study area. Moreover, the educational status is no remarkable improvement within 10 years from 1997 to 2007 in that region. According to other countries' studies like Thailand's ethnic group, Nepal, India and Bangladesh, the children of educated mothers experienced lower mortality than children of uneducated mothers, after controlling to other factors. They said that mothers with limited education are more likely to contribute to higher mortality of their children [16, 18, 21, 22]. Although this study has no advanced statistical test to identify the relationships between the education status and mortality, the information in the study supports that with increasing level of educational attainment of the mother, the child mortality rates decline.

In addition, Rakhine ethnic group is the lowest occupation status of ever married women throughout the study. It may be the cultural differences among the study groups and job opportunities that affect working status of mothers [14, 16].

Olayinka stated that the important role of mass media to reduce the maternal and child mortality. He mentioned that mass media and electricity can influence the society by encouraging good practice to health [23]. Throughout the study period, about 93 % of Rakhine ethnic group lived without access to mass media of television, newspaper and radio. In addition, only 17 % of them had electricity at home. The study pointed out that the ethnic groups of Myanmar are needed to improve their socio-economic and living standards. Because of limited socio-economic development, they cannot access to health information and services. Moreover, the poor condition of ethnic groups cannot afford health care and in turn to cause the child mortality.

Regarding the findings of reproductive health services, it was consistent with the other findings related with ethnicity differential of child mortality and health services that can positively impact on child mortality [15, 21, 24]. This may be due to the governments maternal and child health programs need to equitable supply of reproductive health services to narrow the gap among the ethnic

groups. Although the reproductive health services covered 59 % in Rakhine state, most of them relied on traditional birth attendants (TBA) for their antenatal care instead of skilled birth attendant (SBA).

The term 'skilled attendant' refers exclusively to people with midwifery skills (for example, doctors, midwives, and nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage, or refer obstetric complications [25]. A study in Ghana showed that children whose mother received antenatal care from a skilled health personnel of doctor, nurse or midwife, had better chance to live than whose mothers received antenatal care from traditional birth attendants (TBA) [26]. Because of geographical constraints and other socio-economic challenges for the present study area, the ethnic people have limited to access skill health personnel for their delivery.

As a consequences, EPI coverage has relatively low in children who delivered by TBA because skilled health personnel is only responsible person to complement for routine and supplementary immunization in Myanmar. Myanmar's EPI was launched in the 1980s and quickly raised immunization coverage, dramatically reducing the incidence of vaccine-preventable diseases. The programme has been most successful against polio, now virtually eliminated from Myanmar. In the study, there are large disparities in immunization coverage among the ethnic groups. As consequences, children in Rakhine ethnic groups are less likely to access routine immunization for preventable diseases of BCG, Polio, DPT, Hepatitis B, Measles than children in other ethnic groups and children in the rest of the country. According to findings, there are regional disparities too, with Rakhine State having the lowest level of access to immunization coverage at 38 percent in contract with 67 percent for Union and 69 percent for Kachin, Kayah and Shan State.

For measles vaccination, Rakhine has the lowest coverage (60%) in 2007, while the highest coverage was achieved in Kachin, Kayah and Shan ethnic group 84 per cent, followed by the Union at 84 per cent. However, the children in these ethnic groups could not prevent for vaccine-preventable diseases because of low coverage; and these diseases could lead more prevalent in the ethnic groups.

Diarrhoea is a leading cause of morbidity and mortality in Myanmar. If not properly treated, it can cause severe dehydration and lead to death. The Overall and Cause Specific Under-Five Morality Survey 2002-2003 reported that more than 90 percent of the deaths during the post-neonatal period were attributed to a single cause.

Diarrhoea was one of the main direct causes among children under-five children. In this study, the prevalence of diarrhea within 2 weeks is slightly higher in national figure in 2007 than ethnic groups, but ethnic disparities are far greater-from a 20 percent in Rakhine up to 12 percent in Kachin, Kayah, Shan group in 1991. There are also moderate regional variations, with coverage particularly high in Rakhine State (12 per cent) compared with 10 percent in other ethnic groups in 1997. But, children in Kachin, Kayah, Shan ethnics' children had affected diarrhea two times than Rakhine ethnic in 2007. On the other hand, the extent of diarrhea in the population may be affected by seasonal factor because the data collection periods were different among surveys. Thus, the prevalence of diarrhea may not be accurately measured by the survey.

These figures clearly show that even though there have been improvements in terms of fallen trends of mortality in children and rising trends of determinants for the study area, vigorous efforts are needed to attain the MDG targets and to uplift of the health status of children in Nation.

LIMITATION OF THE STUDY

The data from the study come from published data of FRHS 1997, FRHS 2001 and FRHS 2007. Therefore, the study could not perform to analyze with advanced statistical analysis. Although the questionnaires used in FRHS 1997, 2001 and 2007 are nearly identical, the neonatal mortality and post neonatal mortality data were not included in 1997. Moreover, it could not be possible to subtract the data from FRHS surveys. It means that, in FRHS surveys, they used in separate domains 1 to 9. Domain 7 includes Rakhine ethnic group and Domain 1 includes 3 ethnic groups of Kachin, Kayah and Shan ethnic groups. In addition, the study could not analyze for other domains because other domains are combined with ethnic and non-ethnic groups. Because of the secondary and published data, the study could not check the validity and reliability of the data.

RECOMMENDATION AND CONCLUSION

Myanmar government should invest more their GDP on health, education and infrastructure sectors not only for the whole nation but also for specific to different ethnic groups; to increase in line with the goals of the country. In addition, the benefits of economic progress of Myanmar should be shared

equitably across different ethnic groups. On the other hand, there is a need to prioritize key primary health care interventions that can reduce neonatal and child mortality for different ethnic growths in Myanmar. A comprehensive approach for different ethnic groups needs to be taken, in which issues related to poverty alleviation programme, rural and border development programmes.

Literacy campaign, regional development and socioeconomic development plans should be undertaken to uplift of the health status of the ethnic group with community centered approach. Greater coordination is needed among government departments at all levels. An improved data gathering system should be implemented to assess inequities among ethnic groups and communities and to bridge between the gaps. To conclude that, further research with advanced mortality statistics is required to accurately measure the levels of mortality differentials in ethnic groups in Myanmar.

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