

Pregnancy—reducing maternal deaths and disability in Sri Lanka: national strategies

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The declining trend in the maternal mortality rate (MMR) from the 1930s to the late 1990s resulted from several strategies implemented within and outside the health sector. Expansion of both field-based and institutional services through the past decades contributed to improved geographical access and provision of 'free' services improved economic access. These led to increased use of antenatal and natal services provided by trained midwives and other personnel followed by improvements in the availability of specialized care and emergency obstetric care. Integration of family planning and other inputs to the maternal health programme has yielded positive results. The role of the private sector is limited to provision of a component of antenatal services. The organization for service provision and an information system made significant contributions towards improvement. The commitment of the health sector to provide services free of charge supported by non-health inputs, especially female education, has enabled Sri Lanka to make gains in maternal health.

Introduction

Sri Lanka is an island in the Indian ocean with a population of 18.7 million¹ spread over a land area of 62,705 square kilometres. Currently, a country with a parliamentary democratic system of government, Sri Lanka was under colonial rule during the period 1505–1948, first under Portuguese rule, then Dutch followed by British, who colonized the whole country. In 1931, some degree of autonomy was given to the nationals under the Donoughmore constitution, until the country became independent in 1948.

Sri Lanka is often considered as a low income country with a per capita GNP of US\$ 823 in 2002² and with relatively good health indicators, a maternal mortality rate (MMR) of 0.23 and an infant mortality rate (IMR) of 16.3 per 1000 live births in 1996. The life expectancy for females is higher, 75.4 years compared with 70.7 years for males for the period 1996–2001, and the literacy level is comparatively high (90.1%)

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compared with the other countries of the region, with female literacy being 87.9%³.

Development of maternal health services—historical background

Development of specific services for mothers in Sri Lanka can be traced back to ancient and medieval times. According to ancient chronicles, the first maternity home was probably established between 522 and 524 AD⁴.

The Portuguese introduced the western system of medical care to the country in 1505. The Dutch, who ruled the country from 1658 to 1796, established a few hospitals in the Maritime Provinces. The present day health services of Sri Lanka aimed at provision of the 'western' system of medicine evolved from the military and estate medical services introduced by the British, during the period when they ruled Sri Lanka.

The earliest indication of a health service aimed specifically at mothers and children was the establishment of a Maternity Hospital in 1897. The next recorded maternal and child health activity was the setting up of a Public Health Department in the Colombo Municipal Council in 1902 and the establishment of a Maternal and Child Health (MCH) Department in 1906. In 1927, the midwifery services in the Colombo Municipality were re-organized by training all midwives working in the Municipality.

The inauguration of the Donoughmore Commission in 1931, with a Minister in charge of all health services, gave a new impetus to all activities related to health services. At this time, the prevailing health situation showed a high incidence of communicable diseases and poor health standards, with a MMR of 20.3 and IMR of 176 per 1000 live births. The periodic census carried out provided data related to population, which enabled an assessment of some indicators on maternal and child health status.

By this time, Sri Lanka had experience of the positive economic impact of a preventive programme aimed at the community, clearly demonstrated with the helminthiasis control programme. This led to the establishment of a 'Health Unit' on an experimental basis in 1926, emphasizing preventive and promotive health activities aimed at the community level. A team of field level health workers working with a Medical Officer carried out the activities, which included provision of maternal and child care at community level.

A health unit could be described as a defined geographical area, hence with a defined population, under a Medical Officer of Health (MOH). Several categories of health workers work as a team with the MOH, namely the Public Health Nurse (PHN), Public Health Inspector (PHI) and Public Health Midwife (PHM). The MCH services were to be provided

at domiciliary level and at clinics established at ‘health centres’ (field level service outlets), within the health unit area. The PHM was responsible for antenatal, natal and postnatal services.

The Medical Ordinance of 1927 made provisions for registration of midwives, which was made a legal requirement. The enactment requiring compulsory registration of births and deaths enacted in 1897 provided data from these registrations which could be used to assess problems related to maternal and child mortality. By 1931, the provisions in the Medical Ordinance referring to the registration of midwives were enforced only in the Colombo Municipality.

Trends in maternal mortality

In 1931, the available indicators on maternal and child health were far from satisfactory—a MMR of 21.4 and an IMR of 175 per 1000 live births. Changes in the MMR between 1931 and 1947 (pre-independence era) show a declining trend, except for the sharp increase in 1935 to 26.5, attributed to the malaria epidemic which led to high mortality in all age groups (Fig. 1).

An effective control programme with DDT spraying brought the situation under control⁵. Other than this unusual occurrence, the decline continued until 1947, when the MMR was approximately 50% of that in 1931.

During the early post-independence period, from 1948 up to 1960, the decline in MMR continued, from 6.3 in 1948 to 3.4 in 1960, *i.e.* a 46% decline. The next 15 years from 1962 to 1977 saw a more marked decline, 3.0 in 1962 to 0.8 for 1977, and a further reduction occurred in the years that followed.

Leading causes of maternal deaths varied (Table 1). During the period 1931–1947, sepsis and convulsions were the leading causes of death, with haemorrhages being next in order of importance. In the early 1950s, toxæmia of pregnancy became the leading cause and by the mid-1960s, haemorrhages of pregnancy and childbirth were the most important cause of maternal deaths, with anaemia, sepsis and toxæmia being the other major causes⁶. In recent decades, the important contribution made by deaths due to abortions and attributed to ‘other causes’ has shown an upward trend.

National level strategies for reduction in maternal mortality and disability

When Sri Lanka gained independence in February 1948, several social welfare schemes that included food subsidies, free education system,

Trends in Maternal Mortality 1931-1996

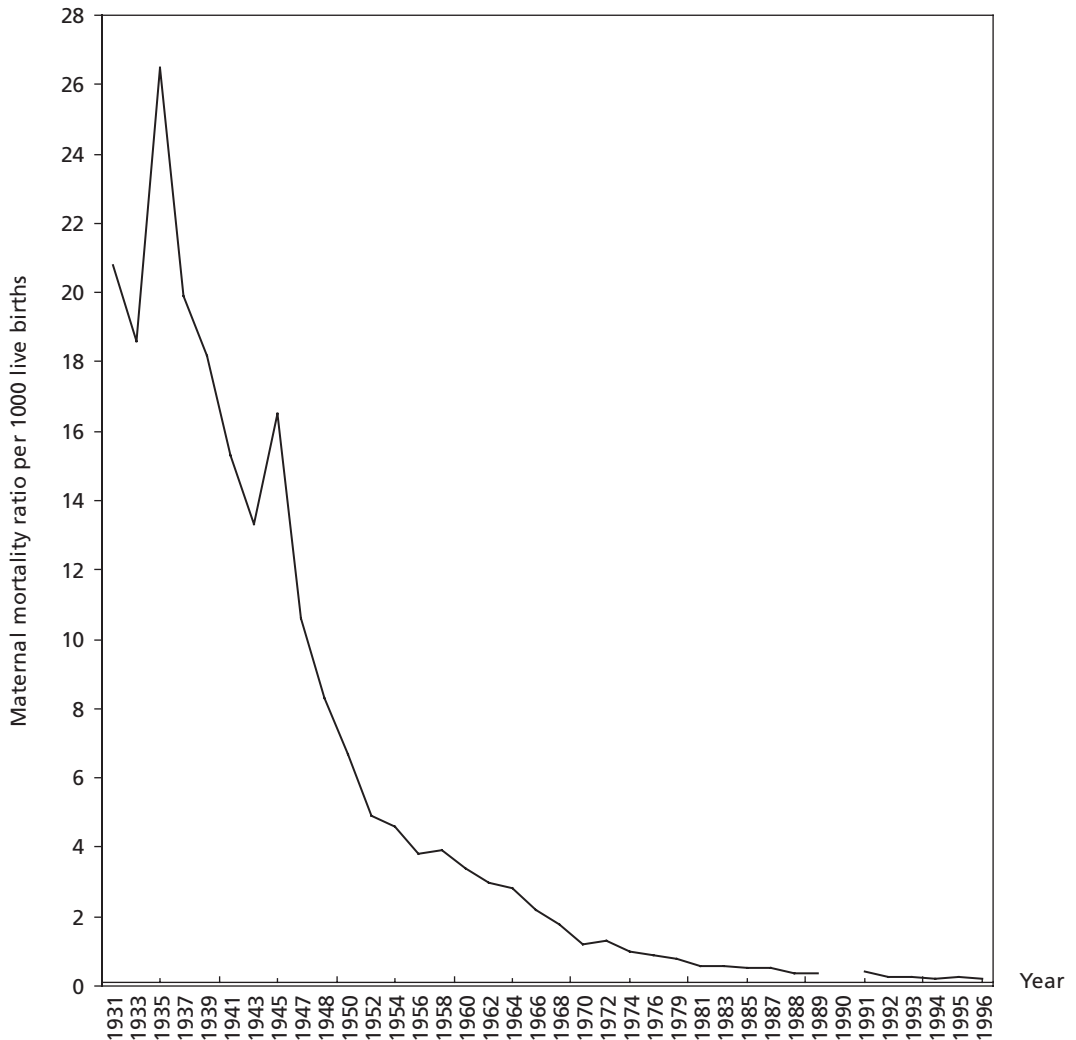


Fig. 1 Trend of MMR during the period 1931–1996.

food supplementation and a health service provided free of charge were available and continued after independence. The Department of Medical Services established before independence was responsible for planning and implementing health services in the state sector.

Over the past seven decades, several strategies were adopted by the health sector and by other sectors that contributed to the lowering of maternal mortality, with morbidity and disability gaining attention in recent years.

Table 1 Percentage contribution made by selected causes, to maternal mortality, 1930–2000

Year	Abortion	Sepsis	Haemorrhage	PIH	Other	Total
1930	0.82	36.45	2.94	47.27	12.51	100.00
1935	0.89	32.51	3.14	50.01	13.46	100.00
1940	1.56	29.76	7.00	47.25	14.53	100.10
1945	1.34	24.55	8.24	46.19	19.68	100.00
1950	1.47	20.15	21.39	28.72	28.07	99.82
1955	2.88	17.66	22.52	30.48	26.46	100.00
1960	2.74	11.43	28.79	24.77	32.27	100.00
1965	2.38	9.73	28.39	26.92	32.58	100.00
1970	6.17	13.46	30.65	25.42	24.30	100.00
1975	6.23	6.23	33.25	28.05	26.23	100.00
1980	10.74	4.81	18.52	35.56	30.37	100.00
1985	11.17	3.05	31.47	23.86	30.46	100.00
1991	11.26	1.32	43.05	18.54	25.83	100.00
1995	17.28	1.23	48.15	3.70	29.63	100.00
1996	6.25	1.25	35.00	2.50	55.00	100.00
1999 ^a	8.69	4.89	20.11	12.50	53.80	99.99
2000 ^a	13.22	4.76	19.57	7.40	55.02	99.97

Sources: Reports from the Registrar General's Department.

^aData from the Family Health Bureau, Ministry of Health.

Expansion of facilities for service provision

Field health services

The initiative taken in 1926 to provide field-based health services though a system of health units was continued, so that by 1952 the health unit areas covered the entire country and the role of the untrained midwife at the village level diminished. With the available evidence pointing to the positive contribution made by the health units to reduction in MMR in the early years of its implementation, two important policy decisions were taken to improve the MCH services. They were the introduction of health education as a component of such services and the integration of MCH services with other activities carried out in health units, *e.g.* sanitation, prevention of communicable diseases⁷.

Institutional health facilities

These were developed throughout the island, leading to the establishment of a network of institutions ranging from General Hospitals at the highest level to Rural Hospitals at the lowest. Thus, the number of state sector hospitals increased from 112 in 1931 to 263 in 1955⁸.

Facilities available at the institutions were improved with access to specialized services in the higher level of hospitals, which served as referral centres. This strategy enabled easier geographical access to services and provision of services free of charge enabled economic access. Availability of a satisfactory road network enhanced the accessibility. In addition to

the institutions of the Department of Health Services available for deliveries, several local authorities, especially the Municipalities, provided Maternity Homes, where deliveries were attended to by trained midwives⁹.

The high levels of maternal mortality reported in the pre-independence years, *i.e.* 1931–1947, were mainly due to sepsis and convulsions which contributed to approximately 84% of all maternal deaths, indicating the need for skilled antenatal care and trained assistance at childbirth¹⁰.

Provision of antenatal care

During the late pre- and early post-independence periods, antenatal services through clinics held at government institutions continued along with the expansion of the health unit system to provide domiciliary services for pregnant women by trained field midwives and antenatal clinics held in ‘health centres’ in health units.

Improving availability of skilled attendance at birth

This was a key strategy adopted through both expansion of the health unit system which provided assistance from trained midwives in home-based deliveries and by increasing the availability of facilities for institutional deliveries. By 1958, about 58% of the births were attended to by skilled personnel, of which 25% were deliveries in the home. The percentage of institutional deliveries showed a sharp upward trend in the decades that followed, increasing to 92% of all deliveries taking place in institutions in the year 2001¹¹.

To have a positive impact on the outcome, the expansion of services to improve antenatal and natal care has to be linked with adequate utilization of the services provided. This point is clearly made by the Director General of the Department of Medical Services in his reports in the mid-1940s where he states that ‘there has been an encouraging demand from the public for improved facilities for maternal care, not only in Colombo but throughout the island specially in rural areas’¹².

Enforcement of legal enactments that necessitated registration of midwives

This was expanded to areas outside Colombo. Registration of vital statistical data was continued and formed the basis on which the services could be evaluated.

With further decline in the MMR and with haemorrhages of pregnancy becoming important causes of maternal mortality, it became necessary to adopt strategies that would address these needs. Development and expansion of the facilities for blood transfusion took place during the late 1950s and 1960s¹³. In addition, PHMs were trained to administer ergometrine orally, and PHNs and nurses in smaller hospitals were allowed to give ergometrine parenterally.

By 1959, with a lower MMR, the importance of maternal morbidity was emphasized. Proper antenatal care for early detection of toxæmia and programmes for the prevention of anaemia were considered important and given emphasis accordingly.

Family planning

The family planning (FP) programme was gradually integrated into the MCH services of the Department of Health Services, and the services were provided by the personnel of the Department of Health, mainly through the MOH and field staff.

Family planning activities became an integral part of the services provided by the state sector by 1965 and this led to a well organized family planning service throughout the country which included counselling services, sale of contraceptives at field level, provision of other services (IUCD insertions, DMPA injections) at field level clinics and facilities for sterilization (both males and females) at different levels of institutions. Data from the Demographic and Health Surveys conducted in 1987, 1993 and 2000 show a consistent upward trend in contraceptive prevalence rates: 55% in 1987, 61% in 1993 and 70% in 2000¹⁴⁻¹⁶.

Training of personnel

Several categories of personnel were required for the provision of services outlined above. They included medical officers, PHNs, midwives and other relevant categories in the curative institutions. Medical Officers were trained at the Ceylon Medical College, established in 1870. With the establishment of the University of Ceylon, the Medical College became the Faculty of Medicine of the University in 1942. Facilities for training of Medical Officers expanded with the establishment of a second medical school in 1960 and four more medical schools in the next few decades.

Training of midwives commenced in two centres in 1931, the duration of training being 18 months. By 1947, the number of such training centres had increased to six. Training of PHNs was conducted at the Health Unit at Kalutara. The number of training institutes for nurses and midwives increased within the next two decades and the facilities for field training of the PHNs and PHMs at the 'Institute of Hygiene' at Kalutara were improved. The number of posts in categories concerned with the provision of preventive health services was increased gradually.

Establishment of postgraduate medical education in Sri Lanka in the mid-1970s is yet another important aspect of human resource development. All training programmes were funded entirely by the state.

Organization of the maternal care programme

Availability of an organizational structure for provision of maternal health services at the time of independence and the political commitment at the highest level for implementation of welfare measures were crucial factors that influenced the programme aimed at improving maternal health.

State sector

By 1960, the state sector health services responsible for the major component of the maternal care services identified the need for development of appropriate policies and programmes to further improve the situation. Following the recommendations of a committee appointed to re-organize the HCH services, a full time Medical Officer (MCH) was appointed in 1961 to intensify MCH work and a maternal and child health advisory committee under the chairmanship of the Deputy Director of Public Health Services. A special committee to investigate all maternal deaths was appointed in 1960 and a data collection form to be used in this investigation was developed.

In the next few decades, with the changing needs and emphasis on a wider scope for prevention of maternal mortality and disability, changes were made in the organizational structure for provision of maternal care. These included the establishment of the Family Planning Bureau in 1965, followed by the appointment of an Assistant Director, MCH to be in charge of MCH activities including family planning, 2 years later. In 1972, following the integration of the organization of MCH services with the FP services at the policy making level, the Family Health Bureau was established. In recent years, emphasis has been placed on increasing the availability of specialist services and for improved provision of facilities for emergency obstetric care.

Private sector

Though there are no data on the contribution made by the private sector to maternal health services, it can be assumed that their main contribution is in the provision of antenatal care. The Demographic and Health Survey of 2000 reports that in the year 2000, 5.5% of all deliveries took place in private hospitals¹⁶.

Information system

Introduction of a system for registration of births and deaths as early as 1897 was the first step in the development of an information

system. In the early post-independence era, such information formed the basis on which service requirements were identified, planned and implemented.

With further development of MCH services, data collection systems for monitoring the services were developed, based on the needs. Introduction of a comprehensive MCH/FP information system in 1986 enabled data from field level MCH activities to be assessed. This system has been further revised in the year 2000, to include information on the wide range of activities included under the family health programme, focusing on mothers and young children.

Completeness of registration of births and deaths has been considered to be satisfactory¹⁷. However, several circumstances have led to a deterioration of coverage of maternal deaths¹⁸. In recent years, alternative approaches were used to collect data on maternal deaths, through reports from field staff and from institutions. Maternal deaths were made notifiable in 1989. Maternal death investigations have been carried out since 1989. MMR for the year 2000, calculated on the basis of such reporting, was 57 per 100,000 live births, indicating under-reporting¹⁹.

International organizations

The contribution by international organizations towards the national strategies ranged from support for development of physical facilities, provision of supplies and equipment to supporting training programmes locally and overseas and consultancy services. All funds available for maternal health activities are channelled through the Family Health Bureau of the Ministry of Health.

Non-governmental organizations (NGOs)

The role of NGOs in MCH activities was through provision of services and/or by assisting in community mobilization programmes and other support programmes for improvement of maternal care.

Contributions made by the programmes outside the health sector

In Sri Lanka, there were several welfare programmes that existed at the time of independence. Some of these programmes have been considered to have made a major contribution to the success of the programmes implemented through the health sector.

Educational reforms

With the introduction of Educational Ordinance of 1939 and the reforms that came into effect in the early 1940s, a free education system was gradually introduced on a national scale, affording equal opportunities for both males and females. The introduction of the free education system is considered to have had a long-term beneficial effect on the health status at national level, especially for the health of mothers and children. It has been suggested that the empowerment of women and education have been two key factors that have influenced the utilization of health services which contributed to the decline in the MMR²⁰.

Food subsidies

The Food Commissioner's Department set up in 1942 was given the task of distributing 2.5 pounds of rice per week per person at subsidized rates. This scheme, though not specifically targeted to mothers and children, could be considered to have had an impact on the MCH status by ensuring availability of a proportion of the nutrient requirement to a given family, especially during the war years. The food subsidy scheme underwent many changes in subsequent decades and has minimal inputs at the present time.

Food supplementation programmes

One of the earliest food supplementation programmes was the milk feeding scheme aimed at improving the nutritional status of pregnant women and pre-school children, introduced in the mid-1940s, by the Food Commissioner's Department in collaboration with the Department of Medical Services. During the past four decades, the ongoing programme has been the Thripasha programme implemented through the health services, whereby a food supplement based on corn and soya is provided to pregnant and lactating women.

Maternity Benefits Ordinance

The Maternity Benefit Ordinance No. 32 of 1939 enabled all employed women except casual employees to have access to maternity benefits: mainly maternity leave on pay for 6 weeks. Amendments to this ordinance in 1946 and 1952 revised the period of employment which entitled an employed woman to the above benefits. Further amendments made in 1978 and 1986 were mainly for the benefit of the infant and the young child.

Current status of maternal health and maternal health services

In spite of major changes in the economic policies, the government of Sri Lanka continued to provide a health service to the population, free of charge and training of all health personnel required for the services in the state sector has been under the free education system. Some of the key indicators related to maternal health as of 2001 are given in Table 2.

The Family Health Bureau is responsible for planning, co-ordinating, monitoring and evaluating the programme provision of family health services through the health infrastructure of the Ministry of Health. In addition, it provides support services for programme implementation by way of in-service training, provision of supplies and equipment for family health programmes and technical guidance.

Even though the indicators on maternal health are relatively satisfactory at the national level, it is necessary to pay attention to ‘within country’ variations, with several districts reporting high values¹¹.

Special groups

The inter-district variations in the MMR within Sri Lanka could be attributed, to a large extent, to the presence of selected population

Table 2 Key health-related indicators—Sri Lanka

Indicator	Year	Data	Source
Life expectancy at birth	1996–2001		Department of Census and Statistics
Total		73.0	
Female		75.4	
Male		70.7	
Total fertility rate (per woman)	1995–2000	1.9	Demographic and Health Survey 2000
Maternal mortality rate (per 10,000 live births)	1996	2.3	Registrar General's Department
Pregnant women immunized with tetanus toxoid (%)	2001	88.7	Epidemiological Unit
Percentage of deliveries attended by trained personnel	2000	96	Demographic and Health Survey 2000
Percentage of live births in government hospitals	2001	92.0	Medical Statistics Unit
Women of childbearing age using contraceptives (%)	2000		Demographic and Health Survey 2000
Modern methods		49.5	
Traditional methods		20.5	
Per capita health expenditure (Rs)	2001	1.6	Department of Health Services
Public Health Midwives (per 100,000 population)	2001	24.9	Medical Statistics Unit
Hospital beds per 1000 population	2001	3.1	Medical Statistics Unit

Source: Annual Health Bulletin 2001, Ministry of Health, Sri Lanka.

groups, the two main groups being those in the plantation sector and those affected by the ongoing conflict situation.

Plantation sector

The plantations of Sri Lanka date back to the colonial times when South Indian labour was brought to work in the labour intensive tea plantations. The health of the immigrant worker was the responsibility of the plantation management. The unsatisfactory health status of the immigrant labour led to the enactment of the Medical Wants Ordinance No. 17 of 1875. This specified the provisions to be made by the employer towards meeting the obligation to provide medical care. There were no special provisions for MCH services under this Ordinance. Provision of MCH services should have been a high priority as a major component of the work force included women of child-bearing age.

In the 1930s, the services were provided through a system of dispensaries and a few hospitals, in charge of estate dispensers and apothecaries. In the 1940s, some persons residing on the estates were trained as midwives. There were no major changes in the provision of MCH services in the estates, until the acquisition of estates by the government, under the Land Reform Law, in 1974/75. In 1974, the Family Health Bureau of the Ministry of Health commenced on an estate MC service.

The development of maternal health services was similar to those in the non-estate health services. Trained midwives, family welfare supervisors, Assistant Medical Practitioners and Estate Medical Assistants provided the services. Women were provided with transport facilities and paid leave to attend antenatal clinics.

With changing economic policies and the restructuring of the plantation industry, the management of the plantations was gradually transferred to the private sector, so that by 1998, with the exception of a few estates managed by the state sector, all others were managed by the private sector, which led to a complete change in the management of health and welfare services²¹. In the mid-1990s, the MMR was in the range of 0.9–1.9 per 1000 live births, higher than the reported figure for Sri Lanka. The difficult terrain and the long distances that these mothers had to travel to government institutions that provide emergency obstetric care may have contributed to some of these deaths. The future plans for the provision of maternal health services (a component of the total package of health care) seem to be uncertain, with some commitments being made by the state for providing such services.

Conflict-affected areas

The existence of a conflict situation in the northern and eastern part of Sri Lanka dates back nearly two decades. The districts of the north and east were the areas that were most involved in the conflict and the areas adjoining these districts were also affected to some extent. Assessment of the current status of the health services indicates the need for targeted programmes especially for the displaced populations, disruption of health services to varying degrees, non-availability of personnel and inadequate data on population and health status²².

Limited data indicate a higher maternal mortality ratio and a high proportion of home deliveries (19.4% for the North East and 41% for Batticaloa district) along with a higher total fertility rate of 2.6 (Sri Lanka 1.9), all indicating that developing appropriate strategies is an urgent need.

Challenges for the future

With much emphasis placed on health sector reforms in recent years and the constraints faced by the state sector for provision of health care, maintaining the coverage and quality of maternal health services is indeed a challenge.

In the current scenario, where the MMR is relatively low, improving the quality of data not only for maternal mortality but also for morbidity is a priority. It is necessary to consider improving the current system of maternal death audit by establishing a system for confidential inquiry into maternal deaths.

Information available in recent years indicates the increasing importance of 'indirect causes' of maternal deaths, indicating the need for innovative strategies to minimize such events.

Maternal morbidity is still an area that has not received adequate attention in the MCH services in Sri Lanka, even though some initiative has been made in this regard, in recent years. Though there is a widespread network of institutions in Sri Lanka, equity in geographical access to emergency obstetric care still needs to be considered²³. Another challenge will be to develop appropriate programmes to reduce inter-district variations in MMR with special reference to the plantation sector and the conflict-affected areas.

Acknowledgement

We wish to thank Dr Madura Wickrama for assistance in collating data.

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