



DOI: 10.5281/zenodo.7305767

UDC: 314.422.3-053.4:614.2(5-12)

MORTALITY UNDER FIVE YEARS ONE OF THE MAIN PUBLIC HEALTH ISSUES IN SOUTH-EAST ASIAP A NARRATIVE REVIEW

Alina Ferdohle¹, associate professor, Laura Berdaga²

¹ Chair of the Department of Social Medicine and Management "Nicolae Testemițanu", State University of Medicine and Pharmacy "Nicolae Testemițanu", Chișinău, Republic of Moldova

² Graduate 2022, State University of Medicine and Pharmacy "Nicolae Testemițanu", Chișinău, Republic of Moldova

Summary

Objective. In 2020, 5 million children died before reaching their 5th birthday, most of those deaths being preventable with the right resources and access to them. Investing in the health and wellbeing of the children of the world is an essential investment in the future and it is subsequently the main focus of numerous projects that have been implemented for decades by organizations globally.

Material and methods. A secondary-type narrative review was carried out in compliance with the requirements for such research. The bibliographic sources were taken from the PubMed, Medline, WHO library and Information Center InfoMedica library databases. Criteria for selecting sources included: 1) key-words: Child Mortality in Southeast Asia; Under-Five Mortality Rate; Millennium Development Goal; United Nations Children's Fund, United Nations; 2) sources published until 31 January, 2022.

Results. There was a significant decline of 76% in under-five mortality rate in Southeast Asia, in the last three decades. From 2000 to 2009, the mortality rate has decreased annually by 6.0%. In the last decade this number has decreased to an annual rate of reduction of 4.7%. A significant decline of over 50% has been obtained from 2000 until 2020, and a continuous, yet less rapid decrease in child mortality has been maintained. The target for 2030 set by the United Nations Sustainable Development Goals is for all regions to reach a rate of 25 deaths per 1000 live births. In 2020, according to data collected by the United Nations Children Fund and United Nations Inter-Agency Group for Child Mortality Estimation the Eastern and Southeast Asian regions had a child mortality rate of 14 deaths per 1000 live births, hence already reaching the target goal. Although the under-five mortality rate in Eastern and Southeast Asia has decreased considerably in the last 20 years and has reached in 2020 the Sustainable Development Goals country target goal, it is important to keep in mind that the data is averaged amongst all the countries that this region is comprised of. Thus, although the regional data looks promising, a noticeable gap can be noticed between the individual countries located in this region. The reduction in under-five mortality rates is unevenly distributed among and within the countries in the Southeast Asian region. In 2011, of the ten countries in the Association of Southeast Asian Nations, only Brunei, Singapore, and Malaysia had infant and child mortality rates below 10 per 1000 live births. Infant and under-5 mortality in Thailand and Vietnam have substantially declined to below 15 per 1000 live births, but the Philippines and Indonesia have seen a levelling off in rates to between 30 and 50 per 1000 live births. Myanmar, Cambodia, and Lao PDR still have mortality levels of 50-70 per 1000 live births in 2008, which are similar to the rates of their neighbors from more than two decades ago, and ranked among the highest for Asia.

Conclusion. A significant decline of 76% has been achieved in under-five mortality rate in Southeast Asia, in the years 2000-2020. Southeast Asia has reached in 2020 the Sustainable Development Goals 3.2 target, although a significant gap is present in the mortality rates of individual countries located in this region. The programmers with the most success in decreasing child mortality rates in Southeast Asia have been Millennium Development Goals and Sustainable Development Goals, implemented in 2000 and 2015, respectively. Furthermore, 11 million under-5 deaths could be prevented globally between 2020 and 2030, if all the countries work towards meeting the Sustainable Development Goals target on under-5 mortality. To further the progress in reducing the under-five mortality rate in underdeveloped countries in Southeast Asia, cooperation at all levels of society, ranging from families and communities to health care workers and governments is required.

Keywords: Under-Five Mortality Rate; Millennium Development Goal; Sustainable Development Goals; Association of Southeast Asian Nations; United Nations Children's Fund

Introduction

Investing in the health and wellbeing of the children of the world is an essential investment in the future. It has been, and always will be, one of the most important duties of our society, and it is consequentially the main focus of numerous projects that have been implemented for decades by organizations globally. More specifically from 2000 until 2020, sustainable global progress has been made to reduce the annual number of children dying before they reach the age of 5 from 12.6 million to 5 million. Still, in 2020, 5 million children died before reaching their 5th birthday, most of those deaths being preventable with the right resources and access to them [1, 2, 3]. High child mortality rates generally

indicate unmet needs in sanitation, medical care, nutrition, and education in the designated region. As outcome burdens develop at different levels such as societal, economical, familial, which create a long-lasting unfavorable effect on a society.

The under-five mortality rate (U5MR) is an important indicator of the level of child health as well as of a country's overall development. It is the probability of a child dying within the period from his birth until reaching the age of five. U5MR is not necessarily a rate as would be expected (*i.e. the number of deaths divided by the number of population at risk during a certain period of time*), but more of a probability of death, derived from a life table and expressed as rate per 1000

live births.

International goals such as Millennium Development Goals (MDG) and Sustainable Development Goals (SDG) have been developed by the United Nations (UN) in 2000 and 2015, respectively, with one of the target objectives being reducing child mortality. The extent to which these development goals have reached their targets concerning child mortality will be examined in the study. The MDG and SDG will be used as a framework for analysis, as they are the main global frameworks addressing child mortality in the last 22 years [4-8].

Encompassing Southeast Asia is a group of ten countries, all of which possess impressive diversity in religion, culture and history: *Brunei, Myanmar (Burma), Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand and Vietnam*. The socioeconomic development of the countries mentioned above is individual and varies in levels, as does their public health systems and child mortality rates. Diving deeper into this subject, the mortality of children under-five years of age remains to be a main issue for the region. Along with exploring the main causes and factors responsible for the levels of child mortality rates, this thesis will also study the different burdens faced by Southeast Asian countries associated with high child mortality rates [9-14].

Moreover, with the beginning of the Coronavirus Disease 2019 (COVID-19) pandemic, health systems world-wide have undergone many challenges in order to quickly and effectively resolve the current situation. The subsequent disruptions to vital care and health services have inevitably had an effect on U5MR, particularly in low and middle-income countries. Such mortality rates have also been indirectly affected by other effects of the pandemic, such as disruptions to preventative interventions like vaccination and nutrition, household income loss and lockdowns to name a few.

According to the report “Levels and Trends in Child Mortality, Report 2021” by the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), it is predicted that a high number of additional child deaths in the last years are linked to the indirect effects mentioned above [15, 16]. However, as the pandemic is still unfolding and not all countries have well-functioning and effective surveillance

and data systems, the long-term outcomes are still unknown and the real effects this pandemic has had on under-five mortality is uncertain [17, 18, 19]. To evaluate the health status of children, there are used a series of indicators both influenced by health determinants (genetics, environment, lifestyle, socioeconomic) and changed by protection, prevention, health promotion, public involvement, key partners, etc.

Each indicator explains only one aspect of the health state and their only use in this structure allows us to make an elaborated assessment of it [20].

Health status indicators are not unique for all states, they differ from country to country depending on the economic development, the level of the Health System development, predominant health problems, the policies implemented in this field and other particularities. The health status indicators used to keep under observation the objectives of the "Health for All" program of the WHO and the related European strategies are classified into: 1) psychosocial development indicators of children; 2) maternal mortality; 3) specific morbidity; 4) **infant mortality rate**; 5) inability to work (children with disabilities); 6) **the mortality rate for children and youth**; 7) **mortality rate under the age of 5**; 8) specific mortality; 9) life expectancy at a certain age; 10) mental and social pathology.

Mortality under the age of 5 (M0-5), as well as *infant mortality (M0-1)*, are some of the most representative and sensitive indicators of the children's health status during early age [20, 21]. For these reasons, the infant mortality dynamics (M0-1) and under-5 mortality (M0-5) were separately described. In the figure below, we can see the structure of the under-5 mortality indicator according to the children's age period.

The under-five mortality rate refers to the probability of dying before age 5 years per 1000 newborns. This indicator measures the risk of dying in infancy and early childhood. The aim of the scientific work is to analyze the levels and trends in under-five mortality rate in the Southeast Asia, the predominant causes and consequences, as well as underline key solutions according to their effectiveness in reducing child mortality rates.

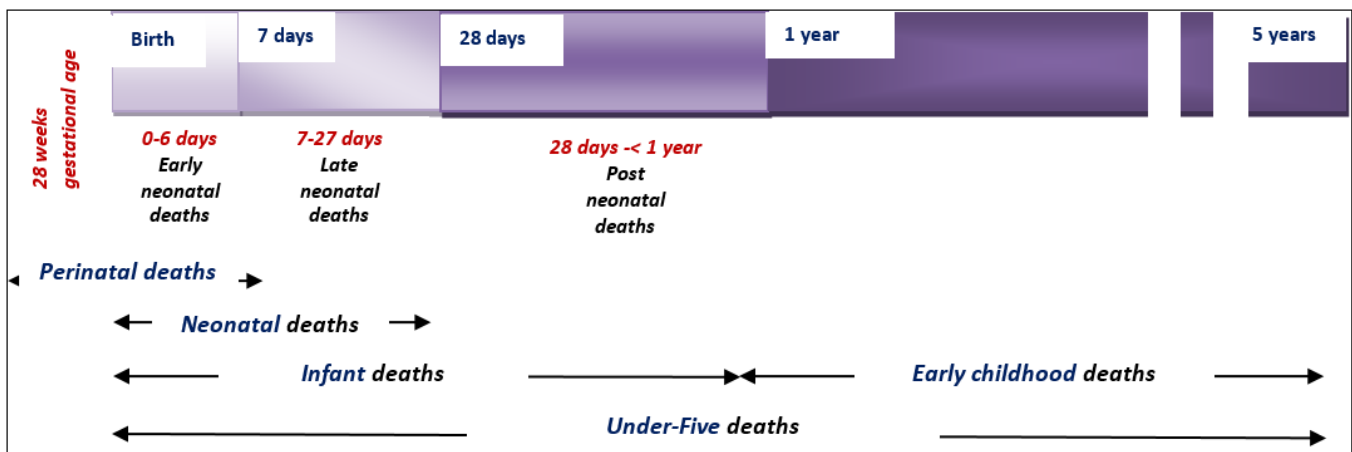


Figure 1. Mortality indicator under 5 years depending on age.

Material and methods

A secondary-type narrative review was carried out. The bibliographic sources were taken from the PubMed, Medline, WHO library and InfoMedica library databases. Criteria for selecting sources included: 1) key-words: *Child Mortality in Southeast Asia; Under-Five Mortality Rate; Millennium Development Goal; United Nations Children's Fund, United Nations*; 2) sources published until January 2021. The synthesis included more than **53 bibliographic sources** [23-36]. The languages of publication of the selected bibliographic sources were English. The study is a literature review, providing a summary of findings regarding U5MR in Southeast Asia. More specifically, this study outlines its levels and trends, causes and consequences, the resultant burdens of high mortality rates, as well as solutions and their effectiveness in reducing U5MR from 2000-2021.

This paper presents studies carried out in the framework of: 1) the 2022 undergraduate thesis, **Laura Berdaga**, "Mortality Under Five Years One of The Main Public Health Issues in South-East Asia"; 2) PhD thesis in medicine with the theme "Management of care and supervision of a child under-5-year-old" [20, 21]. On the other hand, in the basis were also other works of the bachelor's theses of USMF

graduates, "Nicolae Testemițanu", with the undergraduate thesis: 1) Social inclusion of children with disabilities; 2) Maternal mortality as a medical and social problem; 3) Peculiarities of medical and social rehabilitation of children with disabilities; 4) Medical-social aspects of children with disabilities; 5) Medical and social aspects of epilepsy in children supervision, et al.

Results

In 2019, according to the World Health Organization (WHO), the global U5MR was of 32 deaths per 1000 live births [37]. In 2018, 5.3 million children died worldwide before their fifth birthday, 1.9 million of which occurred in the Eastern and Southern Asia regions [38], making it responsible for nearly 36%. There was a significant decline of 76% in U5MR in Southeast Asia, in the years 1990-2020. From 2000 to 2009, the mortality rate has decreased annually by 6.0%. However, in the last decade this number has decreased to an annual rate of reduction of 4.7% case [39, 40, 41]. The U5MR in Southeast Asia has declined over 50% from 2000 until 2020, and a continuous, yet slower decrease in child mortality has followed (see Table 1).

Table 1

Levels and trends in the under-five mortality rate, by Sustainable Development Goal region (South-Eastern Asia), 1990-2020 [16]

Region	Under-five mortality rate (deaths per 1.000 live births)							Decline (percent)
	1990	1995	2000	2005	2010	2015	2020	1990-2020
Europe	15	13	10	8	7	6	5	70
Northern Africa and Western Asia	75	62	50	40	33	29	25	66
Western Asia	65	53	42	33	26	26	22	67
Central and Southern Asia	124	108	91	74	59	46	37	71
Central Asia	71	72	61	43	30	23	19	73
Southern Asia	127	109	92	75	60	47	37	70
Eastern and South-Eastern Asia	57	49	40	29	22	17	14	76
Eastern Asia	51	45	35	23	15	10	7	86
South-Eastern Asia	72	58	48	40	33	28	24	67
World	93	87	63	76	51	43	37	61

Intriguingly, Eastern and Southeast Asia's child mortality rate is not amongst the highest in the world. In comparison to the other seven regions designated by SDG, Eastern and Southeast Asia had the third lowest U5MR in 2020 behind Europe and Northern America, and Australia and New Zealand. The target for 2030 set by the UN is for all regions to reach a rate of 25 deaths per 1000 live births.

In 2020, according to data collected by the United Nations Children Fund (UNICEF) and UN IGME, the Eastern and Southeast Asian regions had a child mortality rate of 14 deaths per 1000 live births, hence already reaching the target goal for 2030 [15, 42]. Although the U5MR in Eastern and Southeast Asia has decreased considerably in the last 20 years and has reached in 2020 the SDG country target goal, it is

important to keep in mind that the data is averaged amongst all the countries that this region is comprised of. Thus, although the regional data looks promising, a noticeable gap can be noticed between the individual countries located in this region. According to the World Bank's data, Singapore's U5MR was of 2.2 deaths per 1000 live births in 2020 [43]. The data also shows that in 2020 Cambodia had an U5MR of 25.7, Philippines – 26.4, Lao PDR – 44.1, and Myanmar – 43.7 case. All four of these countries had an U5MR above the SDG's target goal for 2030, as well as the mortality rates in Lao PDR and Myanmar in 2020 are above the annual world-average that was of 37 deaths per 1000 live births [43]. The U5MR in Lao PDR and Myanmar has had a continuous decrease since 2000 until 2020. Although these countries have the highest

mortality rates in Southeast Asia, their U5MR have declined throughout the years displaying progress being made annually. It is evident however, that this progress is not as intense as it was during 2000-2010. In both Lao PDR and Myanmar can be observed high initial rates with a downward trend that was greater between the years 2000-2011. The reduction in under-five mortality rates is unevenly distributed among and within the countries in the Southeast Asian region. In 2011, of the ten countries in the Association of Southeast Asian Nations (ASEAN), only Brunei, Singapore, and Malaysia had infant and child mortality rates below 10 per 1000 live births. Infant and under-5 mortality in Thailand and Vietnam have substantially declined to below 15 per 1000 live births, but the Philippines and Indonesia have seen a levelling off in rates to between 30 and 50 per 1000 live births. Myanmar, Cambodia, and Lao PDR still have mortality levels of 50-70 per 1000 live births in 2008, which are similar to the rates of their neighbors from more than two decades ago, and ranked among the highest for Asia [44].

The predominant causes and factors responsible for under-five mortality in Southeast Asia

In order to identify appropriate targets and interventions to address mortality in children under 5 years, a broad understanding of the causes of mortality among this age group is needed, both globally and in individual countries. This, however, proves to be a challenge, as some countries do not have well-functioning and essential registration systems that allow the direct reporting of underlying causes of death. Globally, according to WHO, the five leading causes of death among children under five in 2017 were preterm birth complications, acute respiratory infections, intrapartum-related complications, congenital anomalies and diarrhea. According to the data, 47% of these deaths were neonatal deaths [45]. Communicable and infectious diseases continue to be leading causes of under-five deaths, despite the fact that these are preventable conditions in our day and age. Globally, premature birth and birth complications such as birth asphyxia or trauma, pneumonia, diarrhea and malaria, remain the leading causes of preventable deaths of children under 5 years old.

In 2020, in Asia and the Pacific, the main causes of under-five mortality included pneumonia, diarrhea and malaria. An overlapping risk factor for these childhood illnesses in this region is malnutrition due to undernutrition, suboptimal breastfeeding and zinc deficiency.

The issue at hand is reported to be related to the access and availability of healthcare resources, as well as health-related education at a population level, linking it even further to the socio-economic status of the country. As further evidence to support this claim, the UNICEF-UN IGME 2021 report on child mortality provides data that shows that children born in low-income countries were 14 times more likely to die before their 5th birthday than children that were born in high-income countries such as Singapore. On average, children in low-income countries have an U5MR of 66 deaths per 1000 live births, compared to 5 deaths per 1000 live births in high-income countries [15, 46, 47].

As Singapore had the lowest mortality rate, and Lao PDR

and Myanmar had the highest, we have chosen to explore the predominant causes of under-five mortality in these countries, in order to gain a better understanding of the situation, furthermore creating a comparison. According to a report by the Statistics Singapore Newsletter, in 2019, the leading causes of infant deaths in 2017 were due to conditions surrounding birth. These include preterm births, complications of pregnancy, labor and delivery, and congenital anomalies [48].

The estimates made by the Institute of Health Metrics and Evaluation of Lao PDR in 2017, presumed that the most common causes of death in children under the age of five were neonatal deaths, lower respiratory infections and diarrheal diseases, accounting for about 80% of deaths. A large proportion of neonatal deaths occur during the first day after birth due to preventable conditions such as hypoxia or infectious diseases. Despite there being effective preventative measures and treatment available for these illnesses, that could dramatically decrease neonatal and under-five deaths in this country, the U5MR in Lao PDR remains, unfortunately, one of the highest in the region [49].

Furthermore, a contributing factor to the high U5MR in Lao PDR is the wide disparity in access to maternal and child health care. Generally, mothers in rural and under-developed regions do not have the same resources, opportunities or accessibility to healthcare as mothers in urban regions. It is estimated that only about 50% of women in rural areas receive sufficient antenatal care, in comparison to 90% in urban areas. This is due to the location of health centers as they are either too far away and require time and a mean of transport to reach it, making it less accessible to mothers who do not have a mode of transportation or cannot afford to take time off work. In other cases, it has been found that family members prevent these women to seek medical care due to either personal or cultural beliefs. Additionally, most women in poorer villages do not receive maternity leave from work, forcing them to choose between financial loss or breastfeeding their children, in which case most women cannot afford to take time off work.

Another factor that must be considered is that malnutrition contributes to a higher risk of death due to infectious diseases and according to the latest data, one in every three children in Lao PDR remains chronically malnourished. This issue remains a global one as an approximate of 45% of deaths among children under five, are linked to undernutrition [50].

In Myanmar, the U5MR is currently at 44 deaths per 1000 live births, 50% of which are neonatal deaths, as the neonatal mortality rate is at 22 deaths per 1000 live births [51]. The predominant causes of neonatal mortality in this country are preterm birth complications (32%), intrapartum related events (27%), sepsis and tetanus (15%), congenital anomalies (12%) and pneumonia (6%). The main causes leading to under-five mortality are preterm births, intrapartum-related events, pneumonia, congenital anomalies and diarrhea [47, 52]. According to a study done in 2014 by the ministry of health of Myanmar and UNICEF, among neonatal deaths the most common causes were prematurity, birth asphyxia, neonatal jaundice and neonatal sepsis. Among children

above 28 days to under five years, acute respiratory infections were the leading cause of death, followed by beriberi. In the rural areas specifically, the most common causes of death in this category were birth asphyxia and acute respiratory infections. There have been reported about 220 cases where interventions at home had been attempted for the illness of a child under five years. Of these cases, about 50% administered medication that was available at home, and 34% took herbal remedies. Lack of education and awareness of the importance of symptoms led to a delay in seeking proper treatment in 80% of cases. On average, patients waited 4.9-17.4 days before seeking professional medical care [53].

Taking a look at the data surrounding the main causes of under-5 mortality, all three previously mentioned countries have in common that a large percentage of these deaths are a result of neonatal and birth-related complications. Despite there being a significant gap in the U5MR of Singapore, Lao PDR and Myanmar, neonatal health is a common denominator not only in these Southeast Asian countries, but also globally.

It is thus important to look at the differences in causes, which are potentially responsible for the drastically different U5MR in these countries. As was mentioned before, the socioeconomic status of a country has a direct effect on under-five mortality, with higher mortality rates observed in developing low-income countries in comparison to high-income countries. Singapore is categorized by the World Bank as a high-income country, in comparison to Lao PDR and Myanmar which are considered as lower middle-income countries [29, 46, 50].

Lao PDR has a population of 7 million people, 70% of which live in rural, under-developed areas. Similarly, data reported in 2020 shows that Myanmar has also an approximation of 70% of its population living in rural areas. On the other hand, as of 2018, Singapore has no rural population.

In 1990 in Brunei, Singapore, Malaysia and Thailand, infant and under-5 mortality rates were already at or below 20 per 1000 live births. As these countries are the most economically advanced in the region, they have had the opportunity to invest in their health systems over time, resulting in lower U5MR. These countries have managed to achieve low rates of mortality between the MDG baseline year 2000 and 2008. Therefore, it can be safely presumed that lack of access to proper health-care centers and physicians, and reduced coverage of effective interventions such as immunization, the number of children dying before they reach the age of five remains high in countries where a large majority of the population live in rural under-developed areas where access to quality health care is limited [29, 46, 50].

In Myanmar, emphasis has been made on the importance of access to health services provided by the state to all children, making improving the health status of children a major priority for the Government of the Union of Myanmar and the Burmese Ministry of Health. Activities such as training, provision of logistics and human resources, and supervision have been executed as part of projects and programmes that focus on child health in Myanmar [53]. These efforts have all contributed to decreasing U5MR.

In Lao PDR, the decreasing trend of U5MR is associated with improved coverage of interventions to prevent or treat the leading causes of under-five mortality and immunization. Improvement in the socioeconomic conditions of the country has also had an indirect effect on reducing deaths in children before the age of five. Moreover, higher rates of early and exclusive breastfeeding may have contributed to reducing the rate of mortality. More specifically, under the MDG, the following steps have been taken that have made an impact in reducing the mortality rates: essential immunizations, vitamin A supplementation, use of bed-nets to reduce and prevent malarial infections. At an economic, environmental and educational level, the percentage of population living below the poverty line has been reduced, the *per capita* income has increased, female literacy percentage has increased as well as access to clean water and sanitation has also been improved.

The slower decline in U5MR both in Lao PDR and Myanmar is attributed to the fact that mortality declines are generally slower in poorer, more rural and less educated areas. Given that about 70% of the population in these countries are located in such areas, a greater reduction in under-five mortality rates requires time, and progress is thus understandably slower [29, 46, 50].

Additionally, although a relatively small number of direct COVID-19 deaths have been reported among children and young people, they may be at increased risk of indirect death resulting from disruptions to services, decreased utilization of health services (due to lockdowns or fear of contracting the virus) or economic contractions [53].

The programmes implemented with the highest impact on reducing child mortality

The Millennium Development Goals were introduced more than two decades ago, when the UN and the global community set a number of goals aimed at combating multiple global issues such as disease, poverty, hunger and environmental degradation. In order to reduce the rate of child mortality, a specific target was set, MDG 4, calling for a reduction in U5MR of two-thirds until the year 2015 [13]. Although the global target was not reached by 2015, more than 60 countries reduced their U5MR from the implementation of MDG [53].

In order to maintain progress, global initiatives were taken in the post-MDG era that intensified mobilization of resources and monitoring. The SDGs were established by the UN General Assembly in the year 2015, with the aim of furthering the progress already made by the MDGs whilst including additional important goals for 2030. The UN Global Strategy for Women's, Children's and Adolescent's Health, established in 2016 built on the SDGs to create a more focused set of goals to end preventable deaths of neonates and children under the age of 5 [15].

More specifically, the SDG child survival targets aim to achieve a U5MR of 25 or fewer deaths per 1000 live births by 2030, and an neonatal mortality rate (NMR) of 12 or fewer deaths per 1000 live births by 2030, globally [16]. The first 28 days of life is the most crucial period for a child's survival and almost half of all under-five deaths that occurred worldwide

in 2020, occurred during this period. At a global level, U5MR are declining faster than NMR, despite the fact that neonatal death is responsible for approximately half of under-five deaths worldwide. So far, the significant progress made by the implementation of both the MDGs and SDGs is evident in the data. There has been a 58% reduction in the annual number of global under-5 deaths, as they declined from 12.5 million in 1990 to 5.2 million in 2019. Furthermore, the global U5MR decreased from 93.0 deaths per 1000 live births in 1990 to 37.7 in 2019, a reduction of 59% [17]. In 2019, the vast majority of under-5 deaths were attributed to two regions, South Asia being one of them, alongside sub-Saharan Africa as they represented 26% and 55% respectively, of the global under-5 deaths. To reach the target SDG goals in both Lao PDR and Myanmar, multiple plans and programmers have been implemented by the UN in collaboration with the local governments and the ministries of health in order to achieve the SDGs by 2030. At a global level, 122 out of 195 countries have achieved the SDG U5MR target in 2019. It is expected that another 20 countries will achieve the target by 2030, meanwhile the remaining 53 countries will need to accelerate progress in order to do so. As for NMR, 116 countries have already reached the target goal, whilst 16 are on track, and 63 at risk of not reaching the SDG NMR goal. It is estimated that 11 million under-5 deaths could be prevented between 2020 and 2030, if all the countries meet the SDG target on under-5 mortality [16].

Discussion and Key solutions to addressing under-five mortality

As about 50% of deaths amongst children aged under five years occur in the very first month of life, children born to mothers who have not received quality health-related education, born into poor or rural families are the most vulnerable and face the highest mortality risk. An estimated 70% of newborn deaths are preventable with simple and inexpensive interventions. Preventing these deaths, therefore, requires cooperation at all levels of society, ranging from families and communities to healthcare workers and governments [18]. Recommendations made by UNICEF Myanmar in 2014 in a study, include that health systems have a greater focus on reducing deaths caused by non-infectious preventable diseases such as prematurity, low birth weight and birth asphyxia, whilst at the same time hastening the progress made concerning infectious diseases. Myanmar needs to focus on the quick scaling-up of evidence-based interventions that reduce neonatal mortality [12].

There are different levels at which interventions can vary in impact, and most of the high impact interventions to reduce NMR are effectively provided at health facilities rather than at community level. UNICEF thus further recommended that Myanmar strengthens its health facilities and reverses the proportion of home to facility-based deliveries. They advocate for multifaceted interventions which focus on strengthening the health system in order to provide an increase in services, a better enabling environment, adequate knowledge among caregivers and a strong demand for those services [46, 50].

As access to quality healthcare services is not always a

viable option for all communities, ensuring access to all moving forward can be done by two approaches: investing in health centers particularly in rural and remote areas and strengthening existing health facilities. These measures should be considered alongside increasing the amount of qualified health workers. Furthermore, the aim should be to provide integrated preventative, curative and well promoted services to communities that are under-served in order to reduce the inequity in health care access. As children in the poorest quantile are 3.6 times more likely to die before reaching the age of 5 than those in the wealthiest quantile, overcoming this equity gap would have a high impact on reducing U5MR and is thus a crucial aspect to focus on. Reaching high-risk populations is essential for continuing mortality declines going forward. Thus, it is equally essential to educate mothers about all of the health services available to them, and encouraging proven methods of optimizing their child's health and development such as breast-feeding [19].

Conclusions

A significant decline of 76% has been achieved in U5MR in Southeast Asia, in the years 2000-2020. From 2000 to 2009, the mortality rate has decreased annually by 6.0%. However, in the last decade this number has decreased to an annual rate of reduction of 4.7%. Southeast Asia has reached in 2020 the SDG 3.2 target. The U5MR calculated for the region is averaged amongst multiple countries with vastly different socioeconomic backgrounds, and a significant gap is present in the mortality rates of individual countries located in this region.

Access and availability of healthcare resources, nutrition, as well as health-related education at a population level are predominant factors responsible for U5MR in Southeast Asia. Children born in low-income countries were 14 times more likely to die before their 5th birthday than children that were born in high-income countries. Regionally, the main causes leading to under-five mortality are preterm births, intrapartum-related events, pneumonia, congenital anomalies and diarrhea. Despite there being a significant gap in the U5MR of Singapore, Lao PDR and Myanmar, neonatal health is a common denominator in child mortality not only in these Southeast Asian countries, but also globally. Furthermore, malnutrition contributes to a higher risk of death due to infectious diseases, a predominant cause of death for children under five in Southeast Asia.

The programmers with the most success in decreasing child mortality rates in Southeast Asia have been MDG and SDG, implemented in 2000 and 2015, respectively. There has been a 58% reduction in the annual number of global under-5 deaths, as they declined from 12.5 million in 1990 to 5.2 million in 2019. Furthermore, the global U5MR decreased from 93.0 deaths per 1000 live births in 1990 to 37.7 in 2019, a reduction of 59%. Many lives have already been saved with the help of these development goals, and 11 million under-5 deaths could be prevented globally between 2020 and 2030, if all the countries work towards meeting the SDG target on under-5 mortality.

To further the progress in reducing U5MR in under-developed countries in Southeast Asia, cooperation at all levels of society, ranging from families and communities to health care workers and governments is required. Existing health systems are encouraged to focus on reducing deaths caused by non-infectious preventable diseases, and to

address neonatal mortality as a priority as it is reported to be responsible for nearly half of the deaths of children under five years in the region. Recommendations by the UN include providing integrated, preventative, curative and well promoted services to communities that are under-served in order to reduce the inequity in health care access.

Bibliography

1. World Health Organization. Child Mortality (under 5 Years). 2022. Available from: www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-under-5-mortality-in-2020
2. World Health Organization. United Nations Children's Fund. Every Newborn: an action plan to end preventable deaths. Available from: <https://www.healthynewbornnetwork.org/resource/every-newborn-action-plan/>
3. World Health Organization. Indicator Metadata Registry Details. Available from: www.who.int/data/gho/indicator-metadata-registry/imr-details/67
4. World Health Organization. Under-Five Mortality Rate. Available from: www.who.int/healthinfo/indicators/2015/chi_2015_26_mortality_under5.pdf
5. UN. Millennium Development Goals. Goal 4: REDUCE CHILD MORTALITY. Available from: <https://www.un.org/millenniumgoals/childhealth.shtml>
6. UN. Sustainable Development Goals. Available from: <https://sdgs.un.org/>
7. UN. Transforming our world: the 2030 Agenda for Sustainable Development. New York: United Nations, 2015. Available from: <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>
8. UN. United Nations Millennium Declaration. New York: United Nations, 2000.
9. Axelson H, Gerdtham UG, Ekman B, Dinh TPH, Alfvén T. Inequalities in reproductive, maternal, newborn and child health in Vietnam: a retrospective study of survey data for 1997–2006. *BMC Health Serv Res.* 2012;12(1):456. doi:10.1186/1472-6963-12-456
10. Chao F, You D, Pedersen J, Hug L, Alkema L. National and regional under-5 mortality rate by economic status for low-income and middle-income countries: a systematic assessment. *Lancet Glob Health.* 2018;6(5):e535–e547. doi:10.1016/S2214-109X(18)30059-7
11. Etikan I, Babatope O, Bala K, Ilgi S. Child Mortality: A Comparative Study of Some Developing Countries in the World. *Int J Clin Biostat Biom.* 2019;5:022. doi:10.23937/2469-5831/1510022
12. Gwatkin D, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. Socio-economic differences in health, nutrition, and population in Vietnam. The World Bank; Washington, DC: 2007.
13. Gwatkin D, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. Socio-economic differences in health, nutrition, and population in Indonesia. The World Bank; Washington, DC: 2007.
14. Gwatkin D, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. Socio-economic differences in health, nutrition, and population in Cambodia. The World Bank; Washington, DC: 2007.
15. United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME). Levels and Trends in Child Mortality: Report 2021. Estimates developed by the United Nations Inter-Agency Group for Child Mortality Estimation. United Nations Children's Fund, New York, 2021. Available from: <https://www.who.int/publications/m/item/levels-and-trends-in-child-mortality-report-2021>
16. UNICEF, Myanmar (MMR) – Demographics, Health & Infant Mortality. UNICEF, data, 2020. Available from: <https://data.unicef.org/country/mmr/>
17. Limwattananon S, Tangcharoensathien V, Prakongsai P. Equity in maternal and child health in Thailand. *Bull World Health Organ.* 2010;88(6):420–427. doi:10.2471/BLT.09.068791
18. Liu L, Hill K, Oza S, et al. Levels and causes of mortality under age five years. In: *Disease Control Priorities, Third Edition (Volume 2): Reproductive, Maternal, Newborn, and Child Health.* The World Bank; 2016:71–83. doi:10.1596/978-1-4648-0348-2_ch4
19. Malherbe H, Aldous C, Woods D, Christianson A. The contribution of congenital disorders to child mortality in South Africa. In: Padarath A, King J, Mackie E, Casciola J, eds. *South African Health Review 2016.* 19th ed. Durban: Health Systems Trust, 2016:137–152. doi:10.7196/SAMJ.2016.v106i8.11129
20. Ferdohleb A. Management of care and development of a child under-5 years old. PhD thesis. Chisinau, 2009:188. <http://www.cnaa.md/thesis/13783/>
21. Ețco C, Ferdohleb A, Stefanet S. Management of care and supervision of a child under-5-year-old: (Monograph). Chisinau, 2011:214. Available from: <https://library.usmf.md/ro/library/economie-management-si-psihopedagogie-medicina/etco-c-ferdohleb-stefanet-s-managementul>
22. United Nations Human Rights, WHO. Mortality among children under five years of age as a Human Rights Concern. Switzerland, 2013:24. Available from: www.ohchr.org/sites/default/files/Documents/Issues/Women/WRGS/Health/StudyMortalityAmongChildren.pdf
23. WHO RO – SEA. Improving maternal, newborn and child health in the South-East Asia Region. Data source: Basic indicators: health situation in South-East Asia, World Health Organization, South-East Asia Region. WHO New Delhi, 2005:84. Available from: <https://apps.who.int/iris/handle/10665/205324>
24. Bhutta ZA, Ahmed T, Black RE, et al. What works? Interventions for maternal and child undernutrition and survival. *Lancet.* 2008;371(9610):417–440. doi:10.1016/S0140-6736(07)61693-6
25. Bhutta ZA, Ali S, Cousens S, et al. Alma-Ata: Rebirth and Revision 6 Interventions to address maternal, newborn, and child survival: what difference can integrated primary health care strategies make? *Lancet.* 2008;372(9642):972–989. doi:10.1016/S0140-6736(08)61407-5
26. Black RE, Cousens S, Johnson HL, et al. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet.* 2010;375(9730):1969–1987. doi:10.1016/S0140-6736(10)60549-1
27. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year?. *Lancet.* 2003;361(9376):2226–2234. doi:10.1016/S0140-6736(03)13779-8
28. Boschi-Pinto C, Young M, Black RE. The Child Health Epidemiology Reference Group reviews of the effectiveness of interventions to reduce maternal, neonatal

- and child mortality. *Int J Epidemiol.* 2010;39 Suppl 1(Suppl 1):i3-i6. doi:10.1093/ije/dyq018
29. Ministry of Health Lao PDR, PMNCH, WHO, World Bank, AHPSP and participants in the Lao PDR multistakeholder policy review. *Success Factors for Women's and Children's Health: Lao PDR.* 2014:35. Available from: <https://apps.who.int/iris/handle/10665/178630>
30. Tabassum T., Mohammad KA. The impact of socio-economic and demographic factors on under-five child mortality in Bangladesh. *Imperial Journal of Interdisciplinary Research.* 2016;2(8):626-631.
31. Nimalan Arinaminpathy, Abhinav Sinha, Anupkumar R. Anvikar, Arjun K. Joseph, Gagandeep Kang, Isabel Frost, Jyoti Joshi, Chand Wattal, Neeraj Goel, Anita Kotwani, Subhash Hira, Shivangi Pawar and Ramanan Laxminarayan. *Infectious Diseases in the South-East Asia Region.* CDDEP, 2021:136. Available from: <https://cddep.org/wp-content/uploads/2021/02/infectious-diseases-in-the-south-east-asia-region.pdf>
32. Sohail H, Neupane S. Prevalence of and factors associated with under-5 mortality in South Asia. *Int Health.* 2019;11(2):119-127. doi:10.1093/inthealth/ihy065
33. Soleman SR. The trends of neonatal mortality rate among South East Asia Countries from 2000-2017. *Dis Prevention and Public Health J.* 2020;14(2):90. doi:10.12928/dpphj.v14i2.1912
34. Streatfield PK, Khan WA, Bhuiya A, et al. Cause-specific childhood mortality in Africa and Asia: evidence from INDEPTH health and demographic surveillance system sites. *Glob Health Action.* 2014;7:25363. doi:10.3402/gha.v7.25363
35. Tai N, Htut SHT, Swe T. Impact of Use of Health Care on Under-5 Child Mortality among States and Regions: Analysis of the 2015-16 Myanmar Demographic and Health Survey. 2019;147. <https://dhsprogram.com/publications/publication-wp147-working-papers.cfm>
36. Tangcharoensathien V, Patcharanarumol WP, Aljunid SM, et al. Health-financing reforms in South East Asia: challenges in achieving universal coverage. *Lancet.* 2011 [https://doi:10.1016/S01406736\(10\)618909](https://doi:10.1016/S01406736(10)618909)
37. OECD and World Health Organization. *Health at a Glance: Asia/Pacific Measuring Progress Towards Universal Health Coverage.* OECD Publishing, Paris, 2020:146. <https://doi.org/10.1787/26b007cd-en>
38. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development 2015.* Available from: <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
39. United Nations, Department of Economic and Social Affairs, Population Division. *World Mortality 2019: Highlights (ST/ESA/SER.A/432).* Available from: https://www.un.org/en/development/desa/population/publications/pdf/mortality/WMR2019/WMR2019_Highlights.pdf
40. United Nations Statistics Division. *Natality - Concepts and Definitions .* Available from: <https://unstats.un.org/unsd/demographic/sconcerns/natality/natmethods.htm#:~:text=Live%20birth%20is%20the%20complete,definite%20movement%20of%20voluntary%20muscles%2C>
41. The World Bank. *Mortality Rate, under-5 (per 1,000 Live Births).* Available from: <https://data.worldbank.org/indicator/SH.DYN.MORT?start=2000&view=map>
42. Acuin CS, Khor GL, Liabsuetrakul T, et al. Maternal, neonatal, and child health in southeast Asia: towards greater regional collaboration. *Lancet.* 2011;377(9764):516-525. doi:10.1016/S0140-6736(10)62049-1
43. World Health Organization. *Child Mortality and Causes of Death? 2022* Available from: www.who.int/data/gho/data/themes/topics/topic-details/GHO/child-mortality-and-causes-of-death
44. World Health Organization. *Newborn Mortality. 2021.* Available from: www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-mortality-report-2021
45. WHO, MCEE, *Estimates generated by the WHO and Maternal and Child Epidemiology Estimation Group (MCEE).* Available from: <http://data.unicef.org>
46. Statistics Singapore Newsletter. *Trends in Infant Mortality Rate and Related Indicators,* Available from: www.singstat.gov.sg/-/media/files/publications/population/ssn119-pg7-8.pdf
47. Horiuchi, Sayaka. *Causes of Child Mortality and Health Issues in Laos. 2019.* Available from: www.childresearch.net/papers/health/2019_02
48. Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. Socio-economic differences in health, nutrition, and population within developing countries: an overview. *Niger J Clin Pract.* 2007;10(4):272-282.
49. UNICEF. *Lao People's Democratic Republic (Lao) - Demographics, Health & Infant Mortality.* UNICEF, data, 2020. Available from: <https://data.unicef.org/country/lao/>
50. The Republic of the Union of Myanmar Ministry of Health. *Study on Cause of Under-Five Mortality.* UNICEF, 2014. Available from: www.unicef.org/myanmar/media/3941/file/Study%20in%20Cause%20of%20Under-five%20Mortality.pdf
51. UNICEF. *Preventing Malnutrition in Laos.* UNICEF, 2018. Available from: www.unicef.org/stories/preventing-harmful-effects-malnutrition-lao-pdf
52. United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME). *Levels and Trends in Child Mortality: Report 2020.* Estimates developed by the United Nations Inter-Agency Group for Child Mortality Estimation, United Nations Children's Fund, New York, 2020. Available from: <https://www.unicef.org/reports/levels-and-trends-child-mortality-report-2020>
53. You D, Hug L, Ejdemyr S, et al. Global, regional, and national levels and trends in under-5 mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Inter-agency Group for Child Mortality Estimation [published correction appears in *Lancet.* 2015 Dec 5;386(10010):2256]. *Lancet.* 2015;386(10010):2275-2286. doi:10.1016/S0140-6736(15)00120-8

Received – 20.09.2022, accepted for publication – 06.11.2022

Corresponding author: Alina Ferdohleb, e-mail: alina.ferdohleb@usmf.md

Conflict of interest Statement: The authors report no conflicts of interest in this work.

Funding Statement: The authors report no financial support.

Citation: Ferdohleb A, Berdaga L. Mortality under five years one of the main public health issues in South-East Asia: a narrative review. *Arta Medica.* 2022;84(3):32-39.