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A Descriptive Study of Under-five Mortality

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: The under-five mortality is a global problem, which is an important indicator to, demonstrate the quality of health services in a region or a country. The under-5 mortality rate is the probability of dying before five years of age (per 1,000 live births). In the 1990s under-five mortality rate was 12,7 million, but it decreased to 6,2 million in 2015. In Afghanistan due, to more than forty years of war and internal conflict, low socio-economic status, and high level of illiteracy, the under-five mortality rate is very high.
Objective: This study aimed to determine the mortality rate and it's causes in children under the age of five in Nangarhar Province.
Methods: This is a descriptive study conducted from 2018-2019 in Nangarhar University Teaching Hospital (NUTH). According to Health Management Information System (HMIS) data reports in the mentioned period, 9164 under five patients were admitted in the different wards of Nangarhar University Teaching Hospital.
Results: The mortality of 824 patients were recorded (824/9164) due to different causes, which contribute 9% of total mortality. Of the 824 deaths, 371 consisted of neonatal deaths, which make 45% of total mortality, the 55% (453/824) deaths have occurred between the age of 28 days and five years. The principal causes of neonatal deaths were 35 percent prematurity, 27 percent birth asphyxia, 24 percent sepsis, 8 percent malformation, and 6 percent was consisting of other diseases such as neonatal jaundice, neonatal tetanus, neonatal diarrhea, birth trauma, etc. In this, study the causes of death occurred in the age of 28 days to five years were 30 percent due to

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malnutrition, 22 percent pneumonia, 20 percent Diarrhea, 10 percent Measles, 6 percent Malaria, 8 percent Meningo-encephalitis and 4 percent due to other diseases like pertussis, poisoning, trauma, burns, pediatric cardiac disease, neoplastic disease, and others.

Conclusion: The data of our study has taken from the Health Management Information System (HMIS) department of the 2018-2019 years which was collected from different wards of Nangarhar University Teaching Hospital. The rate of under-five mortality was about 8.99 ~ 9%. The result of our study was different from other countries and the mortality rate may be changed from time to time. These changes belong to several factors such as variable definition, promotion of socio-economic status, risk factors, geographical situation, peoples' education level, availability of health services, and preventive measures.

Keywords: Under-five mortality rate; causes of mortality; Nangarhar University Teaching Hospital.

1. INTRODUCTION

The under-five mortality rate refers to the probability of a child born in a specific year or period dying before reaching the age of five; expressed per 1;000 live births [1]. Although the under-five mortality rate is decreased in the last decades; it is still a global health problem in developing countries; in the 1990s the under-five mortality rate was 93 per 1;000 in each live birth; but this rate is decreased to 43 per 1;000 in 2016; which show fifty percent declining in the mortality rate [2].

The declining of under-five mortality rate is the principal indicator of improving health services and shows the development and rectification of health services in a country [3]. On the report of UNICEF; 6.4 million under-five children are dying annually in the world; in which more than 50 percent are occurred in five south Asian countries (Afghanistan; India; Pakistan; Bangladesh; Maldives) and; about 2.8 million of these deaths are happening in the neonatal period [4].

According to Sustainable Development Goal-2030 (SDG-2030); the under-five mortality rate should be decreased to 25 per 1;000 live birth in 2030. Sustainable Development Goals -2030 has seventeen general goals; and the third goal of this strategy is "Good health and wellbeing" aiming to reduce under-5 mortalities to at least as low as 25 deaths per 1;000 live births in all countries by 2030 [5; 6]. It is worth mentioning that the under-five mortality rate was 216 per 1;000 live birth in the 1950s; but this mortality rate had decreased to 38.9 per 1;000 live births in 2017; this reduction in mortality varies from country to country [7].

As stated in the SDG-2030 strategy; under-five mortality would be reduced to 3.2 million by 2030; it's obvious that by the good health managements and global partnership the mortality rate has decreased from 12.7 million to 6.3 million from 1990 to 2015 if the above-mentioned global partnership and good health services were not achieved the under-five mortality rate may be increased to 60 million annually [4].

As we know; Afghanistan is a developing country in Asia. More than forty years of war have worsened the health system and created many problems in delivering efficient public health services. Poor socioeconomic status; low level of education and illiteracy; lack of safe water and sanitation; low immunization coverage; malnutrition; and deteriorating maternal and child health are the apparent examples; therefore; the under-five mortality rate is still high in Afghanistan [8; 9]. Although the global under-five mortality rate dropped from 93 deaths per 1;000 live births in 1990 to 39 in 2017; still the highest rate occurs in Afghanistan and sub-Saharan Africa; with under-five mortality of 97 and 76 deaths per 1;000 live births respectively in 2015 and 2017; leading to 2.7 million deaths in the region [10; 11]. Most of these deaths are related to poor public health care and lack of appropriate preventive measures. The leading causes of death among children under age five include preterm birth complications; pneumonia; intrapartum-related complications; diarrhea; and malaria [12].

More than fifty percent of the under-five mortality rate has occurred in five countries such as India 25%; Nigeria 13%; Pakistan 6%; Congo 5%; and China 4%. 6.3 million children die annually before the age of five years; and 3 million others died during delivery as a stillbirth which half are due to malnutrition; the infant mortality rate and under-five mortality rate from 2012 up to 2014 are shown in the following figure [10].

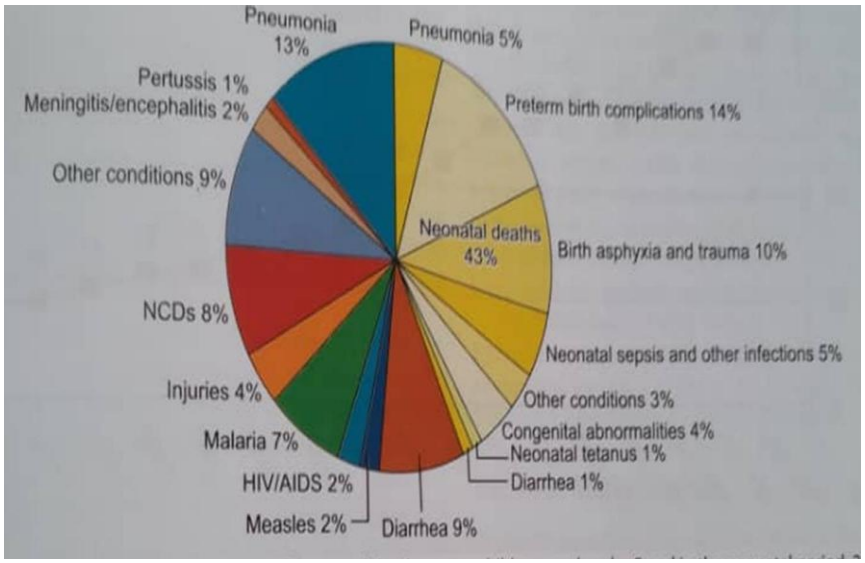

Fig. 1. Global distribution of causes of death among children aged under-five and the neonatal period 2012 [10]

Abbreviations: NCDs; nonconvertible debentures

Table 1. Under-five mortality rate per 1;000 in selected countries in 2013

Countries	Under-five mortality rank (maximum 1)	Under-five mortality rate	Neonate (0-27 days) mortality rate	Infant (0-1 year) mortality rate	Child (1-5 years) mortality rate
Afghanistan	16	97	36	70	22
Australia	167	4	2	3	1
Bangladesh	60	41	24	33	9
Bhutan	61	36	18	30	6
Brazil	118	14	8	12	2
China	122	13	8	11	2
Egypt	89	22	12	19	2
Ethiopia	39	64	28	44	20
Finland	185	3	1	2	1
France	167	4	2	4	0
Germany	167	4	2	3	1
India	47	53	29	41	12
Indonesia	76	29	14	25	4
Japan	185	3	1	2	1
Malaysia	142	9	4	7	2
Mali	7	123	40	78	45
Nepal	61	40	23	32	8
Niger	10	104	28	60	44
Pakistan	23	86	42	69	17
Singapore	185	3	1	2	1
Sri Lanka	134	10	6	8	2
Sweden	185	3	2	2	1
UK	160	5	3	4	1
USA	150	7	4	6	1
Zambia	21	87	29	56	31

Source: [10]

The above Table 1 shows that until 2013 Afghanistan experienced a high level of under-five mortality than other Asian countries.

1.1 Causes of Infant Mortality

The causes of neonatal death are low birth weight; infections; perinatal asphyxia; and congenital anomalies; while the causes of postnatal mortality are infections; diarrhea; acute respiratory infections; malnutrition; malaria; measles; and vaccine preventable diseases. Low birth weight is the most common cause of infant mortality; the following risk factors are related to high infant mortality e.g.; lack of breastfeeding; poor compliance with vaccination; illiteracy; poverty; and some social and cultural habits. We should interfere in all health services systems for decreasing the mortality rate of infancy. For this purpose; we should prepare the facilities of Reproductive Maternal Neonatal Child and Adolescent Health (RMNCAH) strategy [10;13].

For this approach; the health workshop should be prepared by the ministry of public health and national health workers who work for the maintaining of life; health of mothers & child in different fields. This approach has been done in India at the National level [10]. The main purpose of the RMNCAH strategy is to do practical work and care for the health of puberty girl; pregnant women; and children health; the above-mentioned services appear for us; how much puberty girls; pregnant women; and children have died and they show us that what is the preventive and practical measures of their death. It is obvious that the health condition of puberty girls has the main effect on pregnancy and also the health of pregnant women directly affect the health of her baby for this purpose; we should be care full for the health of girls; women; and child [10;14].

The following standards should be considered for prevention of under-five mortality rate; good nutritional status of the mother; good antenatal care (ANC); Safe delivery; Standard Facility Based Neonatal Care; Breastfeeding; vaccination; early diagnosis and treatment of related diseases; good family planning; Adolescent care; Safe and wholesome water supply; good sanitation; development of the socio-economic status of the people; health education and promotion of children rights and their mental health by national level; also the mothers are responsible to continues breastfeeding for two years[9;10;14) Since 1990; the global under-five mortality rate has declined by nearly half (53 percent from 90 deaths per 1;000 live birth to 43 deaths in 2015; over the same period the neonatal mortality rate has been reduced by 40 percent; from 33 deaths per 1;000 live births to 19 [15].

1.2 Neonatal Mortality Rate

The neonatal mortality rate is the probability of dying before the first 28 days of birth [15]. The neonatal mortality rate is 44% of all under-five mortality rates [16]. Between 1990 and 2015 the number of newborn babies who died within the first 28 days of life declined from 5;1 million to 2;6 million [15]. More than 50% of infant death occur in the neonatal period; so priority should be given to the perinatal and neonatal periods. In India; the neonatal mortality rate is decreased by 40% in the past decade [15]. Another study shows that every year 4 million neonatal deaths occurred [17]. The causes of decreasing mortality rate are due to administration of tetanus vaccine for women; education and good experience of midwives; the experience of good health and practice for women; and accomplishment of delivery expert and strategy for newborn life [10;18].

1.3 Perinatal Mortality Rate

Mortality of 22nd -week fetus up to first seven days of newborn per 1;000 live birth is called perinatal mortality rate. About 5;5 million perinatal death occur each year in the world which 3 million of them are occurred during the last trimester of pregnancy; while 2.5 million remaining deaths occur in the first seven days of birth; which is called early neonatal mortality [10; 14] Perinatal mortality occurs mostly in developing countries; of which 25% have occurred in Africa. perinatal mortality is most common in African rather than in other developing countries [10]. The principal cause of the perinatal mortality rate is the poor nutritional state of pregnant women; the high complication of pregnancy due to the absence of health services; and also weak and poor follow-up delivery system [10;15]. According to the health information service; the mortality of child in 1990 was 91/1;000 live births whereas it decreased to 43/1;000 live birth in 2015; other studies which is done in 2014 show that the level of mortality is decreased from 17;6 million in 1990 to 6;9 million in 2015 [4].

In 2017 a study was conducted by WHO and appeared that there is 16;000 under-five mortality

rate per day in the world which is equal to 11 under-five mortality per minute in all the world [19]. In another research of WHO which was globally done in the 2015 year; the infant mortality rate in 1990 was 63/1;000 live births and fortunate this mortality rate is decreased to 32/1;000 live birth in 2015 [4] According to the World Bank; the prevalence of under-five mortality in South Asia was 53 per 1;000 live births in 1015 [20] Also; United Nations International Children's Emergency Fund (UNICEF) globally has studied in the 2014 year 5;9 million children have died; in which one million death occur on the first day of birth and 2 million other dying occur in up to first seven days of birth [10;15] The newborn period has the highest risk factor for mortality. A study has done by Bae at all in the 2003 shows that 60% under-five mortality occurred during the newborn period [21].

Research shows that 99 percent of under-five mortality occurs in countries that have low or medium daily income [22]. The UNICEF (2015) study shows that under-five mortality prevalence is common in South-Asian countries like Afghanistan; Bhutan; India; Nepal; Sri Lanka; Bangladesh; Maldives; and Pakistan [23]. A study by Abir. T. et al. [24] 2004-2011 years reveals that the risk factors for the under-five mortality rate in South -Asian countries are: environmental factors; social factors; behavioral factors; and biological factors [24]. Living in a rural area; Maternal work engagement; parent's low education level; sex of the child; unexpected pregnancy; use of contraceptives; smoking; etc.; are the risk factor related to the above-mentioned environmental and biological factors [9;24]. The most important under-five mortality causes in children are prematurity; pneumonia; intrapartum complications; Diarrhea; and Malaria [25; 26]. The study done by Lia et all. in 2016 has shown that perinatal asphyxia is the most common cause of under-five; mortality whereas congenital anomalies are very less cause under-five mortality [25;27]. The study which is conducted by the Center for Disease Control and Prevention (CDC) revealed that Diarrhea is the common cause of under-five death [4]. A study which is done by WHO in 2011 has revealed that the common cause of under-five mortality by percentage are 19 percent Pneumonia; 18 percent diarrhea; 8 percent Malaria; 4 percent Measles; 3 percent HIV/AIDS; and 37 percent by perinatal asphyxia; prematurity; and neonatal infections [4;10;15].

Table 2. Under-five mortality rate in some selected countries during 1990 and 2015

Countries	1990	2015
India	126	48
Sri Lanka	21	10
Thailand	37	12
Nepal	142	36
China	54	11
Bangladesh	144	38
Pakistan	139	81
United Kingdom (UK)	9	4
USA	11	7
Japan	6	3
Singapore	8	3
World	**90**	**43**

Source [16]

The expanded Program on Immunization (EPI) has been started in 1974; through this program routine vaccines such as BCG; Diphtheria; Pertussis; Tetanus (DPT); Polio; Measles) are applied and expanded [15]. recently in our country; Afghanistan Hepatitis B; Pneumococcal; Haemophilus influenza; and Rotavirus vaccines are also has been added to the National EPI Schedule [28]. The objective of EPI is 80% coverage in every country. Oral Rehydration Salt (ORS) is an effective and inexpensive method of treatment for diarrhea that prevent more morbidity and mortality in children. The mortality rate due to diarrhea was 1;2 million children in 2000 while the application of ORS has reduced the above mortality rate to 0;7 million in 2011 [15]. As mortality from diarrheal diseases and vaccine-preventable communicable diseases are decreased; pneumonia is the first cause of under-five mortality [15]. Integrated Management and Childhood and Neonatal Illness (IMNCI) guided as the strategy of reducing mortality e.g.; Diarrhea; Respiratory diseases; Measles; Malaria; and Malnutrition [15]. In some countries like India; the neonatal adapting strategy is prompted which; decreased the mortality rate and improved the growth and development of newborns [15]. There are different ways for preventing mortality rates in children like ORS for diarrhea; Antibiotic for sepsis; antimalarial and insecticides treated bed nets; vitamin A; treatment of Anemia; immunization; Breastfeeding; and Complementary feeding for healthy nutrition [15]. By 2035 all countries are responsible to decreased under-five mortality by national level to 10 or fewer newborn death per 1;000 live birth and also 10 or fewer still birth per 1;000 total birth [15].

Hopefully; if Afghanistan achieves the Millennium Development Goals and SDG-2030; there will be an increased level of education; reduction of poverty and hunger; improved child and mother health; and termination of imposed war in the future in Afghanistan. In this way; we will decrease mortality to an acceptable number. For the past fifty years; Nangarhar University Teaching Hospital has been providing secondary and tertiary level health services to the community through medical professors and specialist doctors in various fields of medicine. Every year about 6000 to 9000 under fiver year patients have been admitted to this hospital.

At the moment it is not obvious that how many under-five years' patients have died annually in Nangarhar University Teaching Hospital; and what are the causes of their death. Our study aims to find out the under-five mortality rate and their causes; therefore; the Pediatric and Public Health departments of Nangarhar Medical Faculty decided to conduct a study on the above-mentioned purposes. This study has carried by Associate Professor Dr. Massihullah Massih and Senior Teaching Assistant Dr. Mohammad Haroon Rahemi.The ultimate goal of our research is to give information about the under-five mortality rate and their causes to our medical staff; national health management information system (HMIS) directorate; and for the national level to prepare good health Policies for prevention and declining the rate of under-five mortality.

2. MATERIALS AND METHODS

This study is conducted at the Nangarhar University Teaching Hospital (NUTH) between 2018 and 2019. In this hospital; too many patients from the eastern zone of Afghanistan especially from Nangarhar; Kunar; Laghman; and Nuristan provinces are admitted. Annually about 7000-9000 under-five patients are admitted in the NUTH. All the data of Inpatient Department (IPD) are collected by the responsible of collecting of data (Chief of department and head nurse); then the collected data are reported weakly to Death Review Committee (DRC) and Health Management Information System (HMIS) department.

Our study has done by Descriptive method. All under-five patients that who were admitted in the different ward of Nangahar university teaching hospital; were registered; and at the same time a complete medical history; physical examination; and possible laboratory investigations have been done by physicians.

Each department has a registration unit for admitted patients; beside the above-mentioned registration we filled a separate questionnaire form; which was previously tested for this purpose. The questionnaire form contained the all questions related to the object of this study. The important question in the questionnaire form include the name of patient; father name; sex; age; address; weight; gestational age of newborn; date of admission; diagnosis at admission; date of discharge; lab investigation form; transferred patients; defaulter patient; cure rate; death rate and status of patient during discharge.

Inclusion criteria: all the patients who were under the age of five years; lived at the Eastern zone (Nangarhar; Kunar; Laghman; Nuristan provinces); and registered at Nangahar university teaching hospital HMIS department.

Exclusion criteria: the patient who had not been admitted to the Nangahar university teaching hospital HMIS department; transferred out patients; and defaulter patients.

The sampling method of our study was the universal sampling method. All the patients had selected who were Registered during the study period (2018-2019). The analysis of the data was done by MS. Excel Program of Computer.

The operational definitions of variables of this study are as follow:

The definition of mortality indicators is the following [10; 13;14;18]

Infant mortality rate: it is the number of deaths between birth and one year of age in a year expressed per 1;000 live births during that period.

Neonatal mortality rate: the number of deaths among live births during the first 28 days of life per 1;000 live birth births in that year.

Early neonatal mortality rate: the number of neonatal deaths less than seven days of life expressed as per 1;000 live births in that year.

Late neonatal mortality rate: the number of neonatal deaths between seven days and 28

completed days of life expressed as per 1;000 live births in that year.

Post neonatal mortality rate: the number of deaths of 29 days to less than one year of age expressed per 1;000 live births in that year.

Perinatal mortality rate: the number of deaths of a fetus after 28 completed weeks of gestation plus the number of early neonatal deaths per 1;000 total births in that year.

Stillbirth rate: the number of stillbirth's weightings over 1000g at birth per 1;000 total births (live and stillbirths) during that year.

It should be mentioned that perinatal and neonatal mortality rates are related to mother cares; and the infant mortality rate depends on health service and population life conditions [10]

$$Under\ five\ Mortality\ rate = \frac{number\ of\ deaths\ in\ children\ aged\ 0-5\ years\ during\ a\ year}{total\ number\ of\ children\ born\ live\ in\ that\ year} X\ 1000$$

Neonatal death: neonatal death includes all death within 28 days' age (exclude if the baby has completed 28 days) [18].

Birth Asphyxia: baby has gasping and inadequate breathing or no breathing at 1-minute [18].

Preterm (premature): preterm is defined as a baby with a gestation of less than 37 completed weeks (up to 36 weeks or less than 259 days)[18].

Sepsis screen: Sepsis screen is considered as positive; when two or more parameters are positive [18].

Neonatal Sepsis: the baby who had clinical signs of sepsis with positive sepsis screening is called of neonatal sepsis [18].

Malnutrition: the patients who were under weight; wasting; and stunting were defined as malnutrition [13].

Pneumonia: the patient who have cough; fever and tachypnea by who cut off and positive radiological finding [13].

Malaria: a patient with fever and positive slide of malaria [14].

Measles: if the child had suffered from more than 5 days of fever; Kopliks spot's associated with skin rash is called Measles [13].

Diarrhea: diarrhea is as a change in consistency and frequency of stool; i.e liquid or watery stool; that occur more than three times a day [13; 14]

Table 3. The sepsis screen [18]

Parameter	Abnormal value
Total leukocyte count	< 5000/mm3
Absolute neutrophil count	Low count as per Manroe chart for term Infants and Mouzinho chart for VLBW babies.
Immature or bond cells to total neutrophil ratio	0.2
Micro-ESR	>10 mm 1st hour
C-reactive Protein (CRP)	>1mg /dL

3. RESULTS

Our study is conducted in Nangarhar University Teaching Hospital to determine the number and causes of under-five mortality in Nangarhar province. During 2018-2019 (one year) total 9164 under-five patients were admitted in different ward of NUTH. From the 9164 patient 824 (824/9164) 9 percent of patient were died due to different causes.

Table 4. Total number & percentage of admitted and died patients during 2018-2019 in Nangarhar University Teaching Hospital

No	Admitted patients	Number of patients	Percentage
1	Recover patients	8340	91 %
2	Died patients	824	9 %
	Total patients	9164	100 %

Table 5. Total number & percentage of neonatal and under-five died during 2018-2019 in Nangarhar University Teaching Hospital

No	Died patients	Number of patients	Percentage
1	Neonatal mortality	371	45 %
2	Mortality form 29th day to 5 years	453	55 %
Total Under-five mortality		824	100 %

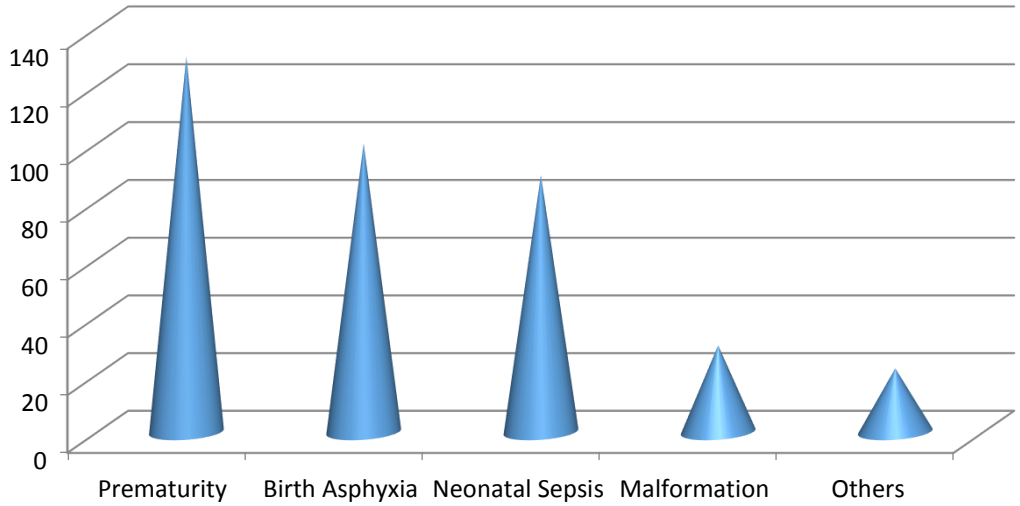

Fig. 2. number and causes of neonatal mortality

The 4th Table show that under-five mortality was about 9 percent in Nangarhar University Teaching Hospital during one year. From the total died 824 patients 317 (45%) were neonatal; and 453 (55%) were under-five child.

Table 5th shows that more than fifty percent of mortality had occurred in patients aged between 28 days to 5 years old children.

Fig. 2 shows that the cause of newborn babies were the following causes; 130 (35%) prematurity 100 (27%) Birth Asphyxia; 89 (24%) neonatal sepsis; 30 (8%) congenital malformations and the remains 22 (6%) were by other causes; like Neonatal Jaundice; Neonatal Diarrhea; Neonatal Pneumonia; Neonatal Tetanus and birth injuries.

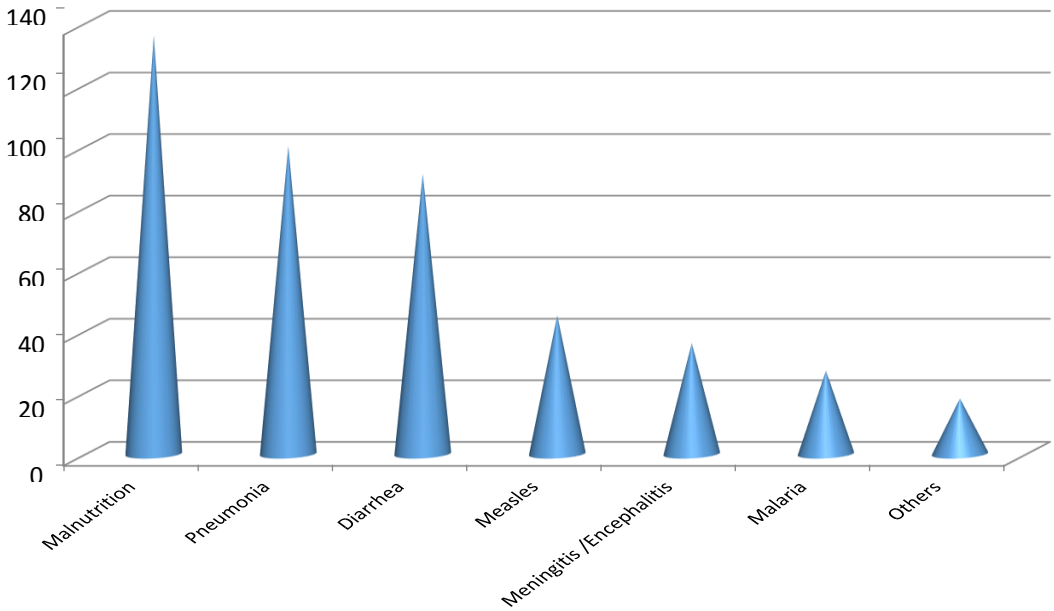

Fig. 3. Causes and percentage of under-five mortality

Also 453 (55%) death was due to other causes who were between the age of 28 day up to five year; the percentage of causes of the death has shown in the following image.

Fig. 3 shows the causes of under-five mortality; 136 (30%) malnutrition; 100 (22%) Pneumonia; 91 (20) Diarrhea; 36 (8%) Meningitis/Encephalitis; 45 (10%) Measles; 27 (6%) Malaria; other 18 (4) mortality was due to whooping cough; poisoning; injuries; heart failure; cancer.

4. DISCUSSION

According to recent studies; the global burden of under-five mortality has decreased by two million between the years 2000 and 2010; pneumonia; diarrhea; and measles contributed most to the overall reduction [29]. The overall 15-year prevalence of under-5 mortalities in South Asian countries was 10% [30].

Globally different studies have been done by WHO; UNICEF; and other researchers about the under-five mortality rate. Various sociodemographic characteristics; such as poverty; the age of mother; wealth index; place of residence; working status; education level of parent's; and maternal and child factors; such as sex of the child; wanted last-child; contraceptive use; currently pregnant; and tobacco use; changing in health services; variable types; risk factors; and distribution of health services are influence under-five mortality rate [4; 15,30,31].

Our study has shown that the overall under-five mortality rate was about 9 percent (9/1;000 live births); the newborn (0-28 day) mortality rate was 45 percent; and the mortality rate in the children aged between 28 days and 5 years was 55 percent. We compare our study findings with some other researches as following:

The study which is done in Pakistan by National Institute of Population Studies (NIPS) and ICF; (Pakistan Demographic and Health Survey 2017-18) has revealed that under-five mortality was 7;4 percent (47/1;000) live births [32]. The under-five mortality rate is higher in Afghanistan than in Pakistan; the first reason may be due high sample size in the above study (PDHS 2017-18) which is done in Pakistan; other reasons are inappropriate health care; low education level; unsafe drinking water and poor sanitation; low immunization coverage and finally poor socio-economic status of people in Afghanistan. Also; in above-mentioned study the neonatal mortality rate in Pakistan was 42 per 1;000 live birth and infant mortality rate was 62 per 1;000 live birth. The results of both studies are the same.

Other studies which is conducted in Bangladesh by National Institute of Population Research and Training (NIPORT); and ICF (Bangladesh Demographic and Health Survey 2017-18) shown that the under-five mortality rate is 4.5% (45 deaths per 1;000 live births); the infant mortality rate is 38 deaths per 1;000 live births; the neonatal mortality rate is 30 deaths per 1;000 live births; it accounts for 67% of all under-5 deaths [33] the under-five-mortality rate is lower in Bangladesh than Afghanistan; the reason maybe high level of education of parent's; good fulfillment of MDG-4 by Bangladesh; Good maternal and newborn care; good immunization coverage and others.

According to the world bank's under-five mortality rate estimation; the under-five mortality rate is still higher in Afghanistan than their neighbor countries like Iran; Turkmenistan; Uzbekistan; Tajikistan; China; and India [20].

In our study the major causes of neonatal mortality were; 35 percent prematurity; 27 percent birth asphyxia; 24 percent neonatal sepsis and 14 percent was other causes. Also; the major causes of under-five mortality (from 28 days to five years of birth) were; 30 percent malnutrition; 22 percent Pneumonia; 20 percent Diarrhea and 28 percent other causes.

A study which is done in 2017 by Nasir Imran et all in Pakistan shows that the most common cause of neonatal mortality was 30;4% perinatal asphyxia; 28% neonatal sepsis which is similar with our study result [34] ; also in the same study the causes of under-five mortality rate (exclude neonatal period) were 17 percent due to pneumonia; 17 percent due to diarrhea; that is also similar with a little difference with our study; the causes of low mortality rate due to pneumonia and diarrhea in Pakistan than Afghanistan is improvement of health services in high level of socio-economic status [34].

A study which is done by Rahbar M. et all in Iran shows that the most common cause of under-five mortality rate was respiratory infections; [35]. which the result is similar with our study. Also; a study with is conducted by El Arifeen S. et all. in Bangladesh has revealed that the total under-five death among neonate was 39 percent; and the

most common cause of death in neonate were 21 percent birth asphyxia; 11 percent prematurity; 33 percent neonatal sepsis. Also; in this study the overall mortality among all under-five children were 31 percent serious infections; 21 percent ARI; and 22 percent death were due to malnutrition [36]. the difference between the result of each study is may be due to sample size; geographical situation; antenatal care; post-natal care; delivery care; case definition; date of research and variety of socioeconomic situations in Bangladesh from Afghanistan; for these differences further research should be done.

This study has done only in Nangarhar University Teaching Hospital in which the sample size was 9162 under-five patients; while other studies which were conducted by WHO; Unicef; NGOs; and other researchers that has done by various sample size and different date and geographical places. Totally the under-five rate was higher in Afghanistan than other countries. According to some studies the result of our research was similar with the result of other researchers in developing countries; including Afghanistan.

Also some difference was revealed with the result of other researchers that maybe depend on the following factors: Poor health services; low level of health education; insecurity; lack of ANC; PNC and delivery care; unsafe water and poor sanitation; low coverage of vaccination program (EPI); poor socio- economic status and etc.; are all the reasons; for high level of underfive mortality.

It's worth mentioning that the mortality of malaria is decreased in the recent year in Nangarhar province; Afghanistan; the reason for decreasing the mortality rate of Malaria is due to Application of bed nets; monitoring of malaria positive cases and also the application of integrated management of childhood illness (IMCI) treatment protocol of malaria in all health facilities. It should bear in mind that the prevalence of mortality due to pneumonia and diarrhea were still high in our study; the reasons was mentioned above. This area needs the attention of national and Global health agencies.

5. CONCLUSION

Overall newborn mortality rate was 45 percent; the major causes of newborn death were prematurity; perinatal asphyxia; and neonatal sepsis. whereas the common causes of under-five mortality rate (from 28 days up to five years) were due to Malnutrition; Pneumonia; Diarrhea; Measles; Malaria; and others. The reasons for under-five mortality are not only medical but also have social and economic dimensions. attention to health systems strengthening; attention to family and community practices and coordinated initiatives across several social sectors to meet local specific imperatives; are therefore needed for accelerating progress towards meeting the Millennium Development Goals. However; data on causes of death tend to be limited in developing countries; including Afghanistan. The vital registration systems are deficient in coverage and most deaths occur outside the health system; where cause of death is unreported.

The under-five mortality rate of a country is depended on good health services; education; and socio-economic status. If health services are provided in standard qualities for people; ensure good security; ensure quality education and improve the economic status of people; without any doubt the under-five mortality may be decreased effectively. In under-five mortality; the high mortality rate was between the age of 28 days up to five years old age i.e.; percent.

Hope Afghanistan will be one of the developed countries in the future in the world. For 2030 the mortality rate may be decreased from 6.2 million to 3.2 million by the strategic plane of Sustainable development goals.

ETHICAL APPROVAL

The ethical approval of this article has endorsed by Research Review Committee (RRC) of Medical faculty of Nangarhar University. In the collected data the mortality rate is approved by the Death Review Committee.

CONSENT

As per international standard or university standard; patient's written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. UNICEF. The under-five mortality rate: The indispensable gauge of child health; 2016.

Available:http://www.unicef.org/sowc08/docs/sowc08_panels.pdf
Accessed Jan 2020.

2. UNICEF W. Levels and trends in child mortality: report 2017. Estimates developed by the UN Inter-agency Group for child mortality estimation New York: United Nation's Children Fund; 2017.
3. Black RE; Levin C; Walker N; Chou D; Liu L; Temmerman M; Group DR. Reproductive; maternal; newborn; and child health: key messages from disease control priorities 3rd edition. The Lancet. 2016 Dec 3;388(10061):2811-24.
4. Sohail. H 2017: Prevalence and risk factor and risk factor associated with under-five mortality: a multi country comparative study in south Asia GLOBAL health master thesis pp (1-75)
5. Lozano R; Fullman N; Abate D; Abay SM; Abbafati C; Abbasi N; Abbastabar H; Abd-Allah F; Abdela J; Abdelalim A; Abdel-Rahman O. Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet. 2018 Nov 10;392(10159):2091-138.
6. Nations U. The Sustainable Development Goals 2016. eSocialSciences; 2016 Nov. Available:https://www.un.org/sustainabledevelopment/health/
Accessed Oct 2020.
7. Dicker D, Nguyen G, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, Abbastabar H, Abd-Allah F, Abdela J, Abdelalim A. Global; regional; and national age-sex-specific mortality and life expectancy; 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017. The lancet. 2018 Nov 10;392(10159):1684-735.
8. Ministry of Public Health; Afghanistan and ICF. 2019. Afghanistan Service Provision Assessment 2018-19: Key Findings. Rockville; Maryland; USA: Ministry of Public Health; Afghanistan and ICF.
9. Van Malderen C; Amouzou A; Barros AJ; Masquelier B; Van Oyen H; Speybroeck N. Socioeconomic factors contributing to under-five mortality in sub-Saharan Africa: a decomposition analysis. BMC Public Health. 2019 Dec;19(1):1-9.
10. Parthasarathy A; Menon PS; Nair MK. IAP Textbook of pediatrics. Jaypee Brothers Medical Publishers; 2019 Feb 4.
11. 11.UN Inter-Agency Group for Child Mortality Estimation. Levels & Trends in child mortality. Report 2018. United nations Children's fund 2018.
12. 12.Liu L; Oza S; Hogan D; Chu Y; Perin J; Zhu J; Lawn JE; Cousens S; Mathers C; Black RE. Global; regional; and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals. The Lancet. 2016 Dec 17;388(10063):3027-35.
13. Paul VK; Sinha A; Bagga A. 2019. Ghai essential pediatrics.
14. Kliegman RM; Toth H; Bordini BJ; Basel D. Nelson Pediatric Symptom-Based Diagnosis E-Book. Elsevier Health Sciences; 2017 Mar 8.
15. Park's K. Park's text book of preventive and social medicine.
16. 16.UNICEF W. Levels and trends in child mortality: report 2011. Estimates developed by the UN Inter-agency Group for child mortality estimation New York: United Nation's Children Fund; 2013.
17. Lawn JE; Osrin D; Adler A; Cousens S. Four million neonatal deaths: counting and attribution of cause of death. Pediatric and Perinatal Epidemiology. 2008 Sep;22(5):410-6.
18. Singh M. Care of the new born revised 8ed. CBS Publishers & Distributors Private Limited; 2017 Nov 30.
19. UN Interagency Group. Estimates developed by the UN Inter-agency group for child mortality estimation: Report; 2015. Available:https://www.unicef.org/media/files/IGME_report_2015_child_mortality_final.pdf accessed 2 August 2019.
20. World Bank. Mortality Rate-Under-5. Available:https://data.worldbank.org/indicator/SH.DYN.MORT
accessed 15 Aug 2019.
21. Akinyemi JO, Bamgboye EA; Ayeni O. New trends in under-five mortality determinants and their effects on child survival in Nigeria: A review of childhood mortality data from 1990-2008. African Population Studies. 2013 Apr 19;27(1).
22. 22.WHO. Perinatal and Neonatal Mortality for the Year 2000: Country; Regional and Global Estimates.WHO; Geneva: 2006. Available:https://apps.who.int/iris/handle/10665/43444

Accessed Aug; 2019.
23. Carvajal-Vélez L, Amouzou A, Perin J, Maïga A, Tarekegn H, Akinyemi A, Shiferaw S, Young M, Bryce J, Newby H. Diarrhea management in children under five in sub-Saharan Africa: does the source of care matter? A Countdown analysis. BMC Public Health. 2016 Dec;16(1):1-4.
24. Abir T, Agho KE, Page AN, Milton AH, Dibley MJ. Risk factors for under-5 mortality: evidence from Bangladesh Demographic and Health Survey; 2004–2011. BMJ Open. 2015 Aug 1;5(8):e006722.
25. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, Lawn JE, Cousens S, Mathers C, Black RE. Global; regional; and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals. The Lancet. 2016 Dec 17;388(10063):3027-35.
26. UN Inter-agency Group for Child Mortality Estimation. Levels & Trends child mortality. Report 2018. United nations Children's fund 2018.
27. Wang H, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abera SF, Abraha HN, Abu-Raddad LJ, Abu-Rmeileh NM; Adedeji IA. Global; regional; and national under-5 mortality; adult mortality; age-specific mortality; and life expectancy; 1970–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2017 Sep 16;390(10100):1084-150.
28. World Health Organization. Afghanistan: WHO and UNICEF estimates of immunization coverage: 2019 revision. Available:https://www.who.int/immunization/monitoring_surveillance/data/afg.pdf
29. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, Rudan I, Campbell H, Cibulskis R, Li M, Mathers C. Global; regional; and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. The lancet. 2012 Jun 9;379(9832):2151-61.
30. Sohail H, Neupane S. Prevalence of and factors associated with under-5 mortality in South Asia. International health. 2019 Mar 1;11(2):119-27.
31. Rahman MS; Rahman MS; Rahman MA. Determinants of death among under-5 children in Bangladesh. Journal of Research and Opinion. 2019 Mar 30;6(3):2294-302.
32. NIPS I. Pakistan demographic and health survey 2017-18. Islamabad; Pakistan; and Rockville; Maryland; USA: NIPS; ICF. 2019.
33. NIPORT I. Bangladesh Demographic and Health Survey 2017–18: Key Indicators. Dhaka; Bangladesh; and Rockville; Maryland; USA. 2019.
34. Nisar MI, Ilyas M, Naeem K, Fatima U, Jehan F. Cause of death in under 5 children in a demographic surveillance site in Pakistan. Online Journal of Public Health Informatics. 2017;9(1).
35. Rahbar M, Ahmadi M, Lornejad HR, Habibelahi A, Sanaei-Shoar T, Mesdeaghinia AR. Mortality causes in children 1–59 Months in Iran. Iranian Journal of Public Health. 2013;42(Supple1):93.
36. El Arifeen S, Akhter T, Chowdhury HR, Rahman KM, Chowdhury EK, Alam N. Causes of death in children under five years of age. Chapter. 2005;9: 125-33.

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