Chapter Two

UNDER-FIVE MORTALITY: AN OVERVIEW

2.1: Introduction

The state or condition of being subject to death, and the death is the act of dying. The relative frequency of deaths in specific population is death rate.

UN and WHO proposed definition of death is as follows: Death is permanent disappearance of all life at any time after birth has taken place.

A death can occur only after a live birth has occurred .This definition of death excludes death prior to live birth. These are so-called fetal death; fetal death is formally defined as disappearance of life, prior to the complete extraction from its mother of a product of conception irrespective of the duration of pregnancy. The term fetal death is employed in demographic practices to embrace stillbirth, miscarriage, and abortion in popular, medical, or legal usage. Classification of a child's life into well-defined periods has become an important standardization to determine the care and interventions necessary to increase the chances of child survival.

The childhood mortality defined as:

2.1.1: Neonatal Mortality

The probability of dying within the first month of life.

2.1.2: Infant Mortality

The probability of dying between birth and the first birthday.

2.1.3: Post Neonatal Mortality

The arithmetical difference between infant and neonatal mortality.

2.1.4: Under-five Mortality

The probability of dying between birth and the fifth birthday.   Child mortality is powerful indicators to measure overall health situation of a

country. In fact, infant and child mortality are also powerful social indicators.

The objective of this study is to find determinants of under-five mortality, so the designed questionnaire used to find the experiences of under-five mortality for each selected household, and it can be higher than an annual mortality rate for children less than 5 years of age.

The formula that used to calculate the percentage of under-five mortality used the number of families with experiences of the under-five mortality dived by the total number of selected households multiply by 100.

The under-five mortality rate is the number of deaths divided by the number of population at risk during a certain period of time and usually expressed as a rate per 1000 live births.

2.2: Under-five Mortality Rates Worldwide

Achievement of the millennium development goal (MDG) for child survival- MDG 4. Though some countries are on MDG target to reduce under-five mortality by two-thirds, the total number of child deaths has actually increased in 13 countries (UNICF, 2012). Around half of under-five deaths occur in only five countries: India, Nigeria, Democratic Republic of Congo, Pakistan and China, The leading causes of death among children under age five are pneumonia , preterm birth complications, and intrapartum related complications. Most of these complications are preventable with the correct interventions being implemented such as vaccines, adequate nutrition and basic medical and maternal care. (Danzhen Y, Jin RN, Tessa W.2012).

Ethiopia achieved MDG4. The under-five mortality decreased 69%, from 205 deaths per 1000 live births in 1990 to 64 deaths per 1000 live births in 2013. (The reduction of under-five mortality in Ethiopia was the result of

combined activities in health, nutrition, and non-health sectors. How Ethiopia achieved MDG 4 through multisectoral interventions (Jenny Ruducha et al, 2015). Malawi is estimated to have achieved its Millennium Development Goal (MDG) 4 target. The mortality rate in children under-five years decreased rapidly in the 10 districts from 219 deaths per 1000 live births in the period 1991–1995 to 119 deaths in the period 2006–2010.

Malawi provides a strong example for countries in sub–Saharan Africa of how high impact child health interventions implemented within a decentralized health system with an established community–based delivery platform. (J Glob Health, 2015)

2.2.1: Under-five Mortality Rates in MDGs and SDGs

The MDGs set targets to reduce the mortality rate for children under-five years by two thirds and the maternal mortality ratio by three quarters between 1990 and 2015, with special focus on the poorest countries. Overall, the world ended up reducing child mortality by an estimated 55% and maternal mortality ratio by 44%, while countries classified as "least developed" by the United Nations experienced a 60% decline in child mortality and 52% decline in maternal mortality.(UN Interagency Group for Child Mortality Estimation. 2017).

At least 10.1 million and as many as 19.4 million additional children's and mothers' lives are estimated to have been saved compared with pre-MDG trajectories.3 Many of the biggest improvements occurred in sub-Saharan Africa. (McArthur JW, Rasmussen K. Change of pace,2017).

The new goals, which apply to all countries and run to 2030, include one health goal, SDG 3—to "ensure healthy lives and promote wellbeing for all at all ages"—with 13 associated targets. Target 3.1 calls for the global maternal mortality ratio to be below 70 deaths per 100 000 live births, a 68% reduction in only 15 years. Target

3.2 calls for all countries to lower their child mortality to at most 25 per 1000 live births and their neonatal (age 0-28 days) mortality to at most 12 per 1000 live births.

2.3: Under-five Mortality Rates in Sudan

The main goals of (MDGs) is to reduce infant and under-five mortality. Specifically, the MDGs call for the reduction of under-five mortality by two-thirds between 1990 and 2015, and The Goal of the Sudan Health Sector Strategic Plan was to "improve health status and outcomes, especially for poor, underserved, disadvantaged and vulnerable populations"

Table 1.1 shows a decrease of under-five mortality rate for selected years 1970, 1990, 2000, 2010, and 2014.MICS shows the under 5 mortality in Sudan 68 pre 1000 birth lives and the under-five mortality of Khartoum state 49 per 1000 birth lives.

2.4: Determinants of Under-five Mortality

The risk factors for child mortality can be grouped as follows: socioeconomic status, maternal factors, behavioral factors, the impact of specific diseases, and personal illness control.)

2.4.1: Socioeconomic Characteristics

Numerous studies have shown a close association between child mortality and socio-economic status.

Socioeconomic factors and social class are fundamental determinants of human functioning across the life span, including development, well-being, and physical and mental health. These are all primary concerns for psychological research, practice, education, policy, and advocacy. In other

fields such as public health, epidemiology, and sociology, there has been exponential growth in work on socioeconomic status (SES). SES is often measured as a combination of education, income, and occupation. It is commonly conceptualized as the social standing or class of an individual or group. There are various theoretical and conceptual approaches to capturing critical aspects of social stratification.

1. Level of Education

Most research on the effects of social stratification has used educational attainment, income (personal or household), and/or occupation as indicators of SES. Education is perhaps the most fundamental aspect of SES. Higher levels of education are associated with better economic outcomes (e.g., likelihood of employment, income, less financial hardship), more social and psychological resources (e.g., greater sense of control, more social support), and fewer health risk behaviors (e.g., less smoking, greater exercise) (Ross & Wu, 1995). Elo and Preston (1996) showed that educational differences in mortality in the United States were substantial and remained significant, although somewhat weaker, when adjusted for income, marital status, and neighborhood effects.

2. Income

Income is a second dimension of SES. Though correlated with education, the association is only moderate. There are examples of highly educated but relatively poor individuals, as well as of high-school dropouts who have become financial successes. Income provides access to goods and services that can benefit health and adjustment. The most obvious service to which higher income provides access is health care, including mental health services. Conversely, lack of money creates particular challenges for individuals and families and may be a source of conflict and tension that

can have adverse effects on mental and physical health. Unlike educational attainment, which does not change once one has been credentialed, income may fluctuate substantially. Reductions in income may affect subsequent health status but also may be caused by poorer health (J. P. Smith, 1999). In addition to income, accumulated wealth and ownership of important assets, such as a house and a car, have also been linked to better outcomes and may show independent associations (Kington & Smith, 1997; Robert & House, 1996). The Clinical Epidemiology and Global Health confirmed the Effect of birth interval and wealth on under-five child mortality in Nigeria and shows Under-five child mortality is higher among children belonging to poor households and those having less than two years of birth interval. Around 16% under-five children belonging to low-income families die before reaching their fifth birthday, while in wealthy households this number is just 8%. Similarly, among those who are two years of birth interval, the number of deaths was almost double that of those whose birth interval was three or more years. The overall mortality decreased as household status and birth interval increases ,and cox regression predicting the impact of wealth (socio-economic) and birth interval on under-5 mortality in Nigeria. (Rajeshwari Biradara etal, 2013)

3. Occupation

Occupation provides information on other types of resources as well as on the time demands and other types of demands on the individual .Work itself can be beneficial; those who are unemployed have a greater risk of physical and mental illnesses. Although there may be selection effects for the "healthy worker," one can identify a number of benefits of employment. In addition to financial rewards, work roles and work relationships provide expanded social networks and meaningful sources of identity and pride.

These opportunities vary depending on the nature of the job, however. Higher SES occupations provide more challenge and also more opportunities for control over working conditions and use of a person's skills and abilities (Karasek &Theorell, 1990; Bosma H etal ,1997. Lower SES jobs are generally more physically hazardous, provide less autonomy, more often involve shift work, and can be routine and monotonous. Occupational status is not measured as easily as education and income. There are competing scales that reflect different theoretical perspectives on which aspects of occupation are most important. The Registrar General's Scale, widely used in Great Britain, orders occupations on the basis of the degree of skill involved, ranging from unemployed, through unskilled and skilled manual labor to professional.

4. The size of the households

The total number of household members (household size) has also been found to influence infant and child mortality. The expected effect of this variable is a priori ambiguous: while a larger number of household members could imply higher fertility levels and a fiercer competition for resources, a larger number of potential caregivers residing in an extended household may in fact decrease the risk of mortality. Results from the literature suggest that the latter effect outweighs the former.

Bangladesh is one of the most densely-populated countries in the world and 150 million populations in 2007. Infant mortality in Bangladesh is one of the highest in Asian countries. There is substantial decline in the infant mortality rate in Bangladesh. It was 150 per 1000 live births in 1975, to 53 and under-five mortality is 71 in 2007 (UNESCAP, 2007). Life expectancy at birth is 60.7 years for male and 60.9 years for female (WHO, 2004). In the study of (Socio-economic Variables Affecting Infants and Children

Mortality in Bangladesh) it found educational status has positive effect on infant mortality. Respondent with primary, secondary and higher educated have 0.108 and 0.743 times lower risk of infant mortality than illiterate counterpart. Husband educational levels have significant effect on infant mortality. The risks of infant mortality for primary and secondary and above level husbands have 0.846 and 0.507 times less than risk the husbands of illiterate. Mothers and husbands occupation has significant effects on infant mortality. The odd ratio 1.415 and 3.277 was for "others" group which includes jobs, servants, street worker etc, and services group that they are 1.415 and 3.277 times higher risk have children losses at infant mortality than "housewife" groups. Similarly, the risk of infant mortality for service and other group which includes jobs, fisherman, unemployed retired etc, that they are 0.713, watch TV and listening radio also effects on infant mortality. In this case the odd ratio is 0.136 and 0.668. This means that infant mortality for household, which watch TV and listening radio to have 0.584 and 0.876 times less than risk household, which do not watch TV and listening radio. Moreover they become more conscious about their infant health as a result infant mortality declining.

Mother's education has significant positive effect on under-five mortality. Mother's educations in rural areas with primary and secondary and above levels of education are 0.303 and 0.374 times less risk than to have children losses at under-five mortality than the mothers with of illiterate. The category "primary education" has a lower likelihood of occur under-five mortality than those mothers who are secondary occur and above level of education. Similarly, the risks of under-five mortality for primary and secondary and above level of educational husbands have 0.589 and 0.463 times less risk than the husbands of illiterate. Couples occupation has

significant on under-five mortality. The odd ratio 5.024 and 3.228 was for services and "others" group which includes jobs, servants, and street worker etc, that they are 5.024 and 3.228 times higher risk have children losses at under-five mortality than "farmer" groups. Similarly, the risk of under-five mortality for service and other group that includes jobs, fisherman, unemployed retired etc, that they are 0.303 and 0.374 times less risk than the husband of farmer. Watches TV have also significant effect on under-five mortality; in this case odd ratio is 0.306 that means under-five mortality for family with watches TV had 0.306 times less than risk the family without watches TV. Higher national incomes were associated with lower under-five mortality rates. This association was significantly weaker for the poor compared with the rich (P = 0.014). Ethnic fragmentation was significantly more strongly associated with higher under-5 mortality among the poor compared with the rich (P = 0.027). The association between public spending on health and under-5 mortality was stronger for the poor (P = 0.0001). Skilled delivery attendance and immunization coverage among the poor were significantly more strongly related to public spending on health than such health care use among the rich (P = 0.0001 and P = 0.045, respectively). No differentials in the relative effect of female literacy, democracy, and state strength were observed. (*AJ Houweling et al, 2005*)

2.4.2: Maternal Factors

The maternal factors like (age , level of education , occupation , number of childbearing , and some chronic diseases that mother suffering from) are very important factors that have an effect on the under-five mortality ,and it appears in many previous study the greatest effect of this factors.

1. Age of Mothers

Child mortality increases, to an important extent, with births to very young or to very old mothers. Several studies from a variety of countries, relating maternal age to various aspects of pregnancy and child development, suggest that maternal age is a central variable influencing pregnancy outcome (Nortman, 1974; Reynolds, Wong & Tucker, 2006).

Roughly one third of all the women ages 20-24 in 10 of 11 Latin American countries, and half in Guatemala, have their first child before their 20th birthday (Alan Guttmacher Institute, 1994). Approximately one in five young women under 18 in Mexico and Bolivia have given birth. Rural, less educated women are more likely to give birth as adolescents. At present, this is being done as a part of the introduction of the new Reproductive Health Target under MDG 5. Although, at the regional level, there has been a decline in the adolescent fertility rate from 87 to 76 per 1,000, between 1990 and 2000, it has increased in some countries, particularly in urban areas. In urban Colombia, it has steadily increased from 59 per 1,000 in the DHS of 1986 to 79 per 1,000, in the most recent DHS, of 2005. In the Dominican Republic, it increased from 88 per 1,000 in 1991 to 116 per 1,000 in 2002 and from 71 to 104 in urban areas. In other countries, like Chile, adolescent fertility rose during the 1990s but has declined since then. Children born to very young mothers are more likely to be premature, to be low birth weight, and to suffer from complications at the time of delivery – particularly if the woman is younger than 15 years. In addition, many adolescents do not know how to obtain, or cannot afford, good prenatal and delivery care. Also, teenage births are likely to be first births, which always carry a higher risk than subsequent births (Alan Guttmacher Institute, 1998 b). However, evidence from several studies suggests that the association

between higher risks of child mortality and young maternal age persists even when birth order and socioeconomic status are held constant. Adolescent fertility is related to child mortality, in part because young (under age 16 or 17) teen mothers' bodies often have not yet fully matured: a pregnant teenager who is still growing may be competing for nutrients with the fetus (Reichman & Pagnini, 1997). Furthermore, teenagers are much more likely to have poor nutritional habits (UN Millennium Project, 2006: 9). Govindasamy et al. (1993) also emphasize that adolescent women are less likely to provide adequate care for their infants and children, because they often lack the maturity, education, and resources to do so. Adolescents frequently have poor information about sexuality and reproduction and little access to family-planning and reproductive health services. As the UN Millennium Project (2006: 2) suggests, the use of contraceptive devices among adolescents has been on the rise, but data from 94 national surveys, taken over the past decade, demonstrate that in these countries the unmet need of adolescents is over two times higher than that of the general population.

Reynolds, Wong and Tucker (2006) used logistic regression analysis of DHS data for 15 developing countries and examined adolescents' use of antenatal care, delivery care, and infant immunization services compared with the use of these services by older women. In Latin America, controlling for parity allowed differences between adolescents and older women to emerge. In the region, the proportion of teenage women who are mothers or currently pregnant is about 13–25%. Younger women may be less likely to use either antenatal care or delivery care, or to have their infants immunized. According to the authors, delay in seeking care, in reaching adequate health facilities, and in receiving appropriate care at

facilities is a well-known barrier to care for all women. This may be especially pronounced for young women, who may have little knowledge and experience in seeking care. Furthermore, women who are pregnant for the first time – including most pregnant adolescents – are more susceptible than women with higher-order pregnancies to malarial parasitic infection, which is associated with anemia, abortion; stillbirth, premature birth and low birth weight (see section 6.1. of the chapter on MDG 6). One hypothesis for explaining such differences in age, which needs to be confirmed by further analyses, is that women's status and power are disproportionately lower among adolescents than among older women (Reynolds, Wong & Tucker, 2006).

This conducted a comprehensive literature search to quantify maternal variables, most of them quantify (such as age, level education, occupational), and most of them agree with categorization of level education, occupational, marital status of mothers variables and quantitative age to perform the pivariate and multivariate analysis and construct the indicators of maternal factors .

2. Level of Education of Mother

Providing a basic education, especially to girls, will also be crucial to building on the gains of the recent past. Improving access to education is an essential building-block for increasing the number of trained health workers, particularly at the community level. And universal basic education reduces poverty and contributes to economic growth by increasing productivity. Education also helps build the kind of behaviours and habits that have a positive impact on an individual's health. Children who complete basic education eventually become parents who are more capable of providing quality care for their own children and who make better use of

health and other social services available to them. Evidence indicates that when girls with at least a basic education reach adulthood, they are more likely than those without an education to manage the size of their families according to their capacities, and are more likely to provide better care for their children and send them to school. Achieving universal primary education is itself a Millennium Development Goal.

Although the results of our studies in the selected countries show that under-five mortality rates of children born to mothers without formal education are higher than the mortality rates of children of educated mothers, it appears that differences in mortality were reduced over the past two decades. In selected countries for our study, we noticed a significant decline in mortality among children of non-educated mothers compared to the decrease in mortality rates among children of educated mothers during the period of 1990–2010. The results show that the decline in mortality of children under five years was much higher among the children born to mothers who have never received formal education—112 points drop in Malawi, over 80 in Zambia and Zimbabwe, 65 points in Burkina Faso, 56 in Congo, 43 in Namibia, and 27 in Guinea, Cameroon, and 22 to 15 in Niger. However, we noted a variation in results among the countries selected for the study—in Burkina Faso (OR = 0.7), in Cameroon (OR = 0.8), in Guinea (OR = 0.8) and Niger (OR = 0.8). It is normally observed that children of mothers with 0–6 years of education are about 20% more likely to survive until their fifth year compared to children of mothers who have not been to school. Conversely, the results did not reveal significant differences between the under-five deaths of children born to non-educated mothers and children of low-level educated mothers in Congo, Malawi and Namibia. (. Aristide Romaric Bado1 and A. Sathiya Susuman ,2016)

3. Occupation of mother

The occupation is important factor of that might associate with energy poverty to influence under-five mortality. (Ogada ,2014), effectively used the concept of proximate determinants in his study of under-five mortality in major cities of three countries which are Nairobi in Kenya, Kigali in Rwanda and Dar-salaam in Tanzania. Secondary data from the Demographic Health Survey of the three countries whose cities were covered in the study was used for the data analysis. His result showed that socio-economic determinants do not influence the occurrence of under-five mortality, but act through the proximate determinants to indirectly influence under-five mortality. This effect was seen through the type of birth where multiple births was negatively statistically significant in the presence of socio-economic factors.(level of education and occupation of mother and the income of the family.

2.4.3: Behavioural Factors

The term "behavioural" refers to overt actions; to underlying psychological processes such as cognition, emotion, temperament, and motivation; and to bio behavioral interactions. The core area of behavioral that have a major and explicit focus on the understanding of behavioral processes, or on the use of these processes to predict or influence health outcomes or health risk factors. Risk factors "behavioral" defined as any particular behavior or behavior pattern which strongly yet adversely affects health.

  Several behaviors that exert a strong influence on health are reviewed in this section: tobacco use, alcohol consumption, physical activity and diet, sexual practices, and disease screening.

Among the behavioral determinants, (Cornelia Kaldewei, 2011) only find meaningful associations for the smoking variable and for breastfeeding, but

not for the type of delivery facility (possibly owing to the apparent response bias). According to the statistics, infant mortality is much higher if the mother smokes, and it is lower if an infant has been breastfed for at least six months.

1. Prenatal Care:

Prenatal care is a type of preventative care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child. Refers to the regular medical and nursing care recommended for women during pregnancy.

During check-ups, women will receive medical information over maternal physiological changes in pregnancy, biological changes, and prenatal nutrition including prenatal vitamins.

(Diego, 2009) About 40% of women had inadequate or partially inadequate prenatal care. After adjustment for other covariates, including satisfaction with the pregnancy, women having an unplanned pregnancy were significantly more likely to have had inadequate care than women who had planned their pregnancy (odds ratio, 2.0). Not living with the child's father (2.8) and dissatisfaction with pregnancy (2.1) were also associated with inadequate use of prenatal care. Women having their second or higher order birth were significantly more likely to report inadequate use of prenatal care than women having their first birth (3.9–9.0). Household income was inversely associated with inadequate use of care. Infant mortality has decreased nationwide; however, our national rates still log behind those of other industrialized countries, especially the rates for minority groups. This

study evaluates the effect of prenatal care and risk factors on infant mortality rates in Chicago. Pearson chi 2 analysis and odd ratios (ORs) were computed. Infant mortality rate (IMR) in Chicago decreased from 17 in 1989 to 12.6 in 1995 (P < .0001). Some factors increased IMR several fold: prematurity (OR 17.43), no prenatal care (OR 4.07), inadequate weight gain (OR 2.95), African-American ethnicity (OR 2.55), and inadequate prenatal care (OR 2.03). Compared with no care, prenatal care was associated with lower IMR; however, early care was associated with higher IMR and ORs than later care. These results demonstrate prenatal care is associated with lower IMR; however, compared with late prenatal care, early care does not improve IMR. Further studies should evaluate whether improving the quality of care improves IMRs.(P. A. Poma , 1999)

2. Breastfeeding

Exclusive breastfeeding means the child receives no liquids or solids other than breast milk, except vitamins, mineral supplements, or medicines. Partial breastfeeding means the child receives some breast milk, regardless of how much. The most important benefit of breastfeeding is the infant's immediate survival. Literature on breastfeeding's effect on infant mortality from diarrhea infection, respiratory infection, and other causes is summarized below.

(Arifeen S et al .2001) revealed There were 180 infant deaths (107 per 1,000 live births), 26 (14%) due to diarrhea and another 10 (6%) due to diarrhea plus acute respiratory infections. Proportional hazards regression was used to relate infant feeding method at the previous visit (up to month 3) to subsequent infant diarrhea death, adjusting for birth weight and parity. Many other confounding variables were tested for significance and

excluded. Infants who were partially breastfed or not breastfed had a risk of diarrhea death 3.94 times greater (95% CI: 1.47–10.57) than exclusively breastfed infants. The risk of death due to diarrhea among predominantly breastfed infants was also higher but not statistically different from that of exclusively breastfed infants (hazard ratio: 2.22; CI: 0.67–7.37).

 (Betran AP, 2001) In Latin America and the Caribbean, exclusive breastfeeding for the first 3 months of life and partial breastfeeding for the remainder of the first year, can prevent 55% of infant deaths related to diarrhea disease and acute respiratory infection. Among infants aged 0–3 months, 66% of the deaths from both diseases were prevented by exclusive breastfeeding, while 32% of deaths among those aged 4–11 months were prevented by partial breastfeeding. Overall, 13.9% of all-causes infant mortality in Latin America and the Caribbean (approximately 52,000 deaths a year) could be prevented by exclusive breastfeeding for the first 3 months of life and partial breastfeeding for the remainder of infancy. Overall Latin American and Caribbean estimates of preventable mortality from diarrhea disease for infants 0–3 months and 4–11 months were 0.78 and 0.33, respectively, and the estimates from acute respiratory infection were 0.57 and 0.31 for infants aged 0–3 months and 4–11 months, respectively. In Latin America and the Caribbean, 7.1% and 6.8% of deaths of infants aged 0–11 months caused by diarrhea disease and acute respiratory infection, respectively, could be prevented by exclusive breastfeeding for at least the first 3 months and partial breastfeeding thereafter for the remainder of the first year.

3. Smoking

Tobacco companies have gradually shifted their market from high- to low-income countries, where people are less informed about the health risks of

tobacco use and antismoking policies are relatively weak. Environmental tobacco smoke increases respiratory disease in children. The relationship between paternal smoking and child health has not been well characterized in developing countries. (Beyer, Brigden, Eds, 2003).

(Rosenberg ,2003) found mothers who smoked during pregnancy had nearly twice the risk of an infant death or low weight birth as mothers who did not smoke .The risk associated with maternal smoking was more than five times as high .

(Pollack 2000) Researchers assessed the effects of maternal smoking on birth outcomes among singletons and twins by linking twins with their siblings in a 1995 Perinatal Mortality Data Set.

Among singleton births there were significant associations between maternal smoking and infant mortality in both the 1-10 cigarettes/day group (adjusted relative risk: 1.60; CI 1.38-1.85) and the >10 cigarettes/day group (1.73; CI 1.45-2.01) when compared to non-smokers. No significant associations were observed when evaluating twins.

(Blair 1996) A two-year population based case-control study of 195 babies who died and 780 matched controls investigated the effects of exposure to tobacco smoke and of parental consumption of alcohol and illegal drugs as risk factors for sudden infant death syndrome. Significantly more index than control mothers smoked during pregnancy. Paternal smoking had an additional independent effect when other factors were controlled for. The risk of death rose with increasing postnatal exposure to tobacco smoke, which an additive effect among those had also exposed to maternal smoking during pregnancy. The population attributable risk was over 61%, which implies that the number of deaths from the syndrome could be reduced by almost two thirds if parents did not smoke.

4. Alcohol

Heavy alcohol consumption during pregnancy can lead to a combination of physical and mental birth defects called fetal alcohol syndrome (FAS), which affects newborns.

Sudanese women rare usage of alcohol after separation Southern Sudan from Sudan

2.4.4: Personal Illness Control

The personal illness control specific preventive and sickness care actions. The concept of personal illness control come from personal control which consists of a person's beliefs about how well he or she can bring about good events and avoid bad events. This concept has far-reaching consequences. Current psychological theory and research suggest that such beliefs do more than simply predict future behavior; they determine it (Bandura, 1992). Personal control may underlie all forms of behavior change, including those required for the promotion of health.

Personal control is a theory form the 198Os, but its origins go back more than half a century. Within the social sciences, concepts akin to personal control have been proposed throughout the years, often in response to overly mechanistic theories of human behavior. Concern with personal control has usually arisen as a correction to theories which view people as passive organisms whose behavior is strictly determined, whether by biological, environmental, and/or social forces. Positive correlations between personal control and health have been found by a large number of investigators in different fields (Deli, 1975).

1. The action When Child Sick

About 80 per cent (UNICEF, 2002) of health care in developing countries occurs in the home – and the majority of children who die do so at home, without being seen by a health worker.

Recent estimates suggest that nearly 80 per cent of under-five deaths occur in sub-Saharan Africa and South Asia, and about half of the deaths, in one of five countries: India, Nigeria, Democratic Republic of the Congo, Pakistan, and China (Black et al. 2010).

The fact that a large proportion of child deaths are caused by preventable and treatable infectious diseases is symptomatic of dysfunctional health systems in the developing world.

A number of studies attempted to demonstrate the indirect causes of childhood illnesses, but none of them proved as influential in formulating public policy as the framework proposed by Moseley and Chen. Coupled with early motherhood, poor nutrition including anemia, low use of antenatal care and skilled delivery care potentially aggravates the chances of child deaths. (Freedman.2007)

2. Immunization

Population-based studies suggest that poor access to health care, which results in delayed attendance at a health facility or none at all, may be a key determinant of mortality of under 5 years of age in developing countries. And Programs of population-wide vaccinations resulted in the eradication of smallpox; elimination of polio and control of measles, rubella, tetanus, diphtheria, hemophilic influenza type b, and other infectious diseases.

In one of the classical debates in the demography and history of health care, McKeown (1976) argued that medical advances played only a minor role in the mortality reductions that occurred in England since the 18th century.

Later work has diminished the relevance of this thesis, first, because mortality decline during the 20th century has undoubtedly been spurred to a major extent by specific developments in the health area, and second because even in the 18th and 19th centuries more public health measures were implemented than McKeown recognizes. Preston (1996: 532), for example, agrees that "specific therapeutic medical treatments have played a minor role in mortality reduction in Western countries", but considers that: Relatively little else of the McKeown thesis has survived. The weight of evidence suggests that public health measures, such as smallpox vaccination and the purification of milk, played an important role."

(Mukelabai, 2004) The Latin American and Caribbean region reached the goals related to measles immunization coverage, and their coverage is also better than that of any other region, surpassing that of industrialized countries (UNICEF, 2005 a). Routine measles immunization coverage has increased from 76% in 1990 to 93% in 2003, and the region had the largest average annual rate of increase in coverage between 1990 and 2003: 1.3 percentage points. Worldwide, the coverage has slowly risen to 75% in 2003 and it is estimated that about 4% of the deaths among children under 5 are due to measles (WHO, 2005).

Bello, R. A. (2014) shows an inverse of post natal care shows relationship with child mortality, the result however conform to a priori criteria. Based on the result, a 1percent increase in post natal care will reduce child mortality rate with about 105percent. The result also was significant at 5percent with $P<0.05$, hence we conclude that post natal care is a major determinant of child mortality in Oyo state.

Rustein, (2000) in his comparison of DHS from 62 developing countries showed that increases in the percentage of   births that received   medical

care at delivery were associated with decreasing mortality during first year of life .an increase in prenatal care were associated with decreases of mortality among those under- 5 years .also Rustein, (2000) pointed out that an increase in the percentage of children vaccinated against measles was associated with a decline in infant mortality and with mortality at age >1.he went further to show that increases in percentage of the children receiving medical attention for diarrhea ,acute respiratory illness ,and fever were associated with the decline of mortality.

3. Diseases

A disease is an abnormal condition that affects the body of an organism. It is often construed as a medical condition associated with specific symptoms and signs (Dorland, 1890). It may be caused by factors originally from an external source, such as infectious disease, or it may be caused by internal dysfunctions, such as autoimmune diseases. In humans, "disease" is often used more broadly to refer to any condition that causes pain, dysfunction, distress, social problems, or death to the person afflicted, or similar problems for those in contact with the person. In this broader sense, it sometimes includes injuries, disabilities, disorders, syndromes, infections, isolated symptoms, deviant behaviors, and a typical variations of structure and function, while in other contexts and for other purposes these may be considered distinguishable categories. Diseases usually affect people not only physically, but also emotionally, as contracting and living with many diseases can alter one's perspective on life, and one's personality.

In many cases, the terms disease, disorder, morbidity and illness are used interchangeably. (US, 2010). In some situations, specific terms are considered preferable. Death due to disease is called death by natural causes.

Every year approximately 10 million children under 5 years of age die throughout the world, mostly in developing countries. every 1000 children born in sub-Saharan Africa, approximately 170 die, compared with less than 10 of those who are born in developed countries.

The most important diseases that have an effect on under-five mortality are malaria, diarrhea, and acute respiratory infection.

a. Malaria

Malaria, the world's most important parasitic infectious disease, is transmitted by mosquitoes which breed in fresh or occasionally brackish water.

The symptoms of malaria include fever, chills, headache, muscle aches, tiredness, nausea and vomiting, diarrhea, anemia, and jaundice. Malaria is caused by four species of Plasmodium parasites (P. falciparum, P. vivax, P. ovale, and P. malariae). People get malaria after being bitten by a malaria-infected Anopheles mosquito.

Today, malaria occurs mostly in tropical and subtropical countries, particularly in Africa south of the Sahara, South-East Asia, and the forest fringe zones in South America. The ecology of the disease is closely associated with the availability of water, as the larval stage of mosquitoes develops in different kinds of water bodies. The mosquito species vary considerably in their water-ecological requirements, (sun-lit or shaded, with or without aquatic vegetation, stagnant or slowly streaming, fresh or brackish) and this affects the disease ecology. Climate change (global warming) appears to be moving the altitude limits of malaria to higher elevations, for example in the East African highlands and Madagascar.

WHO estimates 300-500 million cases of malaria, with over one million deaths each year, The main burden of malaria (more than 90%) is in Africa

south of the Sahara with an estimated annual number of deaths over 1 million. (WHO.2001)

Where malaria prospers most, human societies have prospered least. The global distribution of per-capita gross domestic product shows a striking correlation between malaria and poverty, and malaria-endemic countries also have lower rates of economic growth. There are multiple channels by which malaria impedes development, including effects on fertility, population growth, saving and investment, worker productivity, absenteeism, premature mortality and medical costs.

Malaria is an important cause of mortality among children in Africa, but the relation between malaria transmission intensity and child mortality remains controversial (*Payne.1976)*

Plasmodium falciparum infection is an important cause of the high childhood mortality rates in sub-Saharan Africa. Increasingly, the contribution of P. falciparum-associated severe anemia to pediatric mortality is being recognized while the impact of chloroquine resistance on mortality has not been evaluated. To address the issues of pediatric mortality, causes of death among hospitalized children less than five years of age in western Kenya were identified using standardized clinical examinations and laboratory evaluations. Follow-up examinations were conducted to determine the child's clinical status post hospitalization. Of the 1,223 children admitted to Siaya District Hospital from March to September 1991, 293 (24%) were severely anemic (hemoglobin level < 5.0 g/dL). There were 265 (22%) deaths; 121 (10%) occurred in-hospital and 144 (13%) occurred out-of-hospital within eight weeks after admission; 32% of all deaths were associated with malaria. Treatment for malaria with chloroquine was associated with a 33% case fatality rate compared with

11%   for   children   treated   with   more   effective   regimens (pyrimethamine/sulfa,   quinine,   or   trimethoprim/sulfamethoxazole   for   five days). The risk of dying was associated with younger age (P < 0.0001) and severe anemia (relative risk [RR] = 1.52, 95% confidence interval [CI] = 1.22, 1.90), and was decreased by treatment with an effective anti malarial drug (RR = 0.33, 95% CI = 0.19, 0.65). Effective drug therapy for P. falciparum with regimens that are parasitocidal in areas with a high prevalence of severe anemia and chloroquine resistance can significantly improve the survival of children in Africa(**. Zucker, 1996**).

Malaria infection during pregnancy has been said to cause infant mortality indirectly through its contribution to low birth weight and premature delivery, and it has been estimated that it would be responsible for 75,000–200,000 infant deaths in the sub-Saharan region (Greenwood, 1989).

b. Diarrhea

Diarrhea disease is the second leading cause of death in children under five years old, and is responsible for killing around 760 000 children every year. Diarrhea can last several days, and can leave the body without the water and salts that are necessary for survival. Most people who die from diarrhea actually die from severe dehydration and fluid loss. Children who are malnourished or have impaired immunity as well as people living with HIV are most at risk of life-threatening diarrhea.

Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Frequent passing of formed stools is not diarrhea, nor is the passing of loose, "pasty" stools by breastfed babies.

Diarrhea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene.

Interventions to prevent diarrhea, including safe drinking-water, use of improved sanitation and hand washing with soap can reduce disease risk. Diarrhea can be treated with a solution of clean water, sugar and salt, and with zinc tablets.

There are three clinical types of diarrhea:

- Acute watery diarrhea – lasts several hours or days, and includes cholera;
- Acute bloody diarrhea – also called dysentery.
- Persistent diarrhea – lasts 14 days or longer.

Approximately 39% of the global diarrhea deaths in children aged 5 years may be attributable to rotavirus infection. Two rotavirus vaccines were recently introduced to the market, with evidence of efficacy in the USA, Europe and Latin America. We sought to estimate the effectiveness of these vaccines against rotavirus morbidity and mortality. All studies showed reductions in hospitalizations due to rotavirus or diarrhea of any etiology, severe and any rotavirus infections and diarrhea episodes of any aetiology in children who received rotavirus vaccine compared with placebo. Effectiveness against very severe rotavirus infection best approximated effectiveness against the fraction of diarrhea deaths attributable to rotavirus, and was estimated to be 74% (95% confidence interval: 35–90%). (Munos, 2010).

c. Acute respiratory infection

Acute respiratory infection is a serious infection that prevents normal breathing function. It usually begins as a viral infection in the nose, trachea (windpipe), or lungs. If the infection is not treated, it can spread to the entire respiratory system.

Acute respiratory infection prevents the body from getting oxygen and can result in death.

The disease is quite widespread. It is particularly dangerous for children, older adults, and people with immune system disorders. According to the World Health Organization (WHO), acute respiratory infections kill an estimated 2.6 million children annually every year worldwide. (WHO)

Acute respiratory infections (ARI) particularly lower respiratory tract infections (LRTI) are the leading cause of death among children under five years of age and are estimated to be responsible for between 1.9 million and 2.2 million childhood deaths globally. Forty-two percent of these ARI-associated deaths occur in Africa (Williams ,2002). Despite its importance in regard to morbidity as well as childhood mortality, the epidemiology and pathogenesis of LRTI, particularly in Africa, remains understudied and consequently underappreciated. Although structured management programs coordinated by the World Health Organization (WHO) made some strides during the 1980s and early 1990s toward reducing childhood mortality from LRTI (Sazawal and Black 2003; WHO 1990), the HIV epidemic in many countries of Sub-Saharan Africa has reversed many of these gains (Walker, Schwartlander, and Bryce 2002). Despite the recognition of LRTI as the leading cause of childhood mortality in Sub-Saharan Africa (Williams 2002),

The epidemiological study which has been carried out in urban and rural areas of West Tripura district, to determine the incidence, causes, risk factors, morbidity and mortality associated with (ARI) and impact of simple case management in children under 5 years of age. The annual attack rate (episode) per child was more in urban area than in rural area. Monthly incidence of ARI was 23% in urban area, 17.65% in rural area. The overall incidence of ARI was 20%. The incidence of pneumonia was 16 per 1000 children in urban area and 5 per 1000 in rural area. The incidence of pneumonia was found to be the highest in infant group; 3% of ARI cases in rural area and 7% in urban area developed pneumonia.