

**FACTORS CONTRIBUTING TO MALNUTRITION AMONG
CHILDREN UNDER FIVE YEARS IN THE MALDIVES**

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DECLARATION

The work contained in this report has not been previously submitted to meet requirements for an award or any other higher education institution. To the best of my knowledge and belief and hard work, this report contains my own work except where due reference is made.

Signature

Date

ABSTRACT

Children's Malnutrition in Maldives is still a major public health problem, showing a prevalence of 19% stunted and 16 % wasted 317% under nourished (MDHS, 2009) among children under five years. Moderate acute malnutrition affects worldwide resulting in life long adverse effects including increased mortality, suppressed immune system functions, and delayed growth and cognitive development. According to the WHO classifications the level for stunting, wasting and underweight are considered still high in the Maldives. The objective of this dissertation is to assess the factors(mothers education; wealth of household; and place of residence) contributing to malnutrition among children under five years in the Maldives in order to identify possible intervention that help in improving child malnutrition in the Maldives. The sample of 721 children in Urban and 1792 children in rural were collected from the MDHS and a data set was formulated for the study. This dissertation was guided by the modified model of theoretical frame work adopted from UNICEF conceptual framework for malnutrition. The framework provides connection between mothers education; wealth quintile; and place of residence which contributes to nutritional status under five years children. The relationship between rural and urban children's -2SD mild stunting status are same but rural children's -3SD stunting shows they are affected more than urban children. Wasting and underweight among rural children are much higher compare to urban children. Analysis of household wealth influence shows those who at lowest level have less stunted children as

compare the second and middle level of wealth. Wasting and underweight also shows similar pattern.

To compare the nutritional status in regions shows under nutrition is higher in Central and North Central region .Compare to Male' the under nutrition status is two times higher than those regions. The relationship of mothers education to children's nutritional status shows that children of mothers completing higher education had 3 times reduction in getting a stunted and underweighted child. As compare to no formal education of mothers, wasting children was higher among primary educated mothers. With the analysis of the result it has suggested to strengthen female education at schools where dropout rate is higher .Also provide nutrition education and proper child care practices training to mothers. Promote communication for behavior change using the hearth model to those regions. Conduct further research in-depth analysis on wealth quintiles.

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CHAPTER 1

INTRODUCTION

Back ground to the study

Malnutrition is said to be one of the consequences of social inequity, with the poor suffering more than the wealthy. Poor children and women are most at risk, and have the most difficulty breaking the vicious cycle.(DPH,2003).Malnutrition is the result of a combination factors including inadequate food intake and poor health which in turn results improper dietary practices, insufficient health services, an unhealthy environment, and inadequate care which include nutrition-related behaviors, feeding practices, food preparation and storage, home health care, hygiene and sanitation practices and care for girls and women should be assessed and analyzed to determine their role in preventing or causing malnutrition.(DPH,2003a).Several studies carried out in the Maldives, and growth-monitoring data shows that malnutrition has been and continuous to be prevalent in a fair proportion of young children and women of childbearing age. Under nutrition or insufficient nutrition indicated by underweight, stunting and wasting is reflected in the prevailing rates of infant, child and maternal mortality.(DPH,2003b). Malnutrition hits small children the hardest, and together with environmental factors, interferes with their growth and development, reduces their capacity to learn during childhood, and limits their possibilities to earn

during adulthood (DPH,2003c). High disease prevalence among children also leads to malnutrition. Children suffering from frequent illness may not have time to regain the lost weight from one episode of illness before the next episode occurs and reduces their appetites once again (DPH2003d). Undernourished children tend to have more severe illness, and take longer to recover, as a result of this such children do not recover from their malnutrition, and may become even more malnourished. This is known as the downward spiral of malnutrition and infection that eventually results severe and death(DPH,2003e).

1.1.1. Socioeconomic and demographic profile

The Republic of Maldives is an archipelago situated in the Indian Ocean, about 700 km southwest of Sri Lanka and India. It consists of 1992 low lying islands, which make up 26 natural atolls. Encompassing an area of 90 000 square kilometers, the Maldives is 820 kilometers in length from north to south and 130 kilometers from east to west at its widest point. Of the 1192 islands within this archipelago, only 196 are inhabited(88 resort and 25 commercial islands).

Ranging in size from single island atoll to a maximum of 16 inhabited islands, only 20 of the 26 atolls are inhabited. Most of the Maldives lies just above sea level. Consequently, the country faces a significant threat from the rising sea levels that are resulting from climate change, and this is the most important long-term challenge facing the country.

The 2006 population census recorded the population of the Maldives at 298 968, with a sex ratio of 103 males to every 100 females (M.P.N.D, 2008).One –third of the population (103 693) lived on the island of Male’, the nation’s densely

populated capital, with the remainder unevenly distributed across the other 195 inhabited islands. Over the past 15 years, the Maldives has made marked gains in terms of reducing its population growth rate. The introduction of family planning services and better educational opportunities has slowed the annual rate of population growth from 3.4% in 1985-1990 to 1.7% in 2000-2006. This has brought about a rapid change in the structure of the population, with the aging population more evidence. In the census of 1995 47% of the population was under the age of 14 years, but this figure had dropped substantially to 30 % by 2006(MPND, 2008a)

Over the past two decades, the birth and death rates of the Maldives have continuously declined. The crude birth rate fell from 35 per 1000 live births in 1997 to 22 per 1000 live births in 2008. During the same period, the death rate declined: in 1997 the crude death rate was 5 per 1000 population, but by 2008 this had fallen to 4 per 1000 population with the leading cause of death being cardiovascular diseases, respiratory diseases and cancer (M.P.N.D, 2008b)

1.1.2. Economic and Social Development

The past two decades have seen a rapid growth in the Maldivian economy, with the country's inhabitants making a swift transition from low-to middle income status. Primarily relying on two key sectors - tourism and fishing – the economy of the Maldives has continued to grow at a steady rate. Over the past 15 years, the GDP growth rate has averaged 7.9% the most rapid in in south Asia, and by 2008 per capita income had reached US\$ 1531(World Bank, 2009).

A number of important social changes have resulted from the economic growth. Rapid and unplanned urbanization of Male' has been seen one of the world's smallest capitals double its population in the past 16 years, from 55 000 inhabitants in 1990 to more than 100 000 in 2006, making it by far the most densely populated island in the country (MPND, 2008c). Much of this has resulted from inward migration from other atolls, due to the availability of better education, social services, and job opportunities in Male'.

1.1.3. Income and Poverty levels

Along with economic growth, living standards in the Maldives have increased substantially in the past two decades. Since 1997-1998 average household income per capita in the atolls has increased by over 50% and within Male', it has almost doubled. However, there is substantial discrepancy between the income levels of Male' and the atolls, with the median per capita household income of Male' being 2.3 times higher (MPND, 2004a)

Today, poverty in the Maldives is largely determined by geography and the imbalance of access to services, with remote islands far from Male' particularly deprived (WHO, 2007). The incidence of poverty in 2005 was the highest in the two northern regions-North and Central North –and the lowest in Male' and central region (ADB, 2007).

Rapid economic growth has substantially reduced overall poverty levels in the country and has largely eliminated absolute poverty. Using the international poverty lines of PPP\$1 and PPP\$ 2 per person per day, the poverty incidence in Maldives in 2004 was 4% and 7% respectively. These were the lowest rates in

south Asia. Nevertheless , despite the progress in poverty reduction, the population exhibits a high degree of vulnerability. There is high incidence of transient income poverty, with individuals moving in and out of the poverty status, rather than moving permanently out of poverty (ADB, 2007a).

1.1.4. Mothers Education

The education level of household members is among the most important characteristics of the household because education is associated with reproductive health behavior, including use of the contraception and the health of children. In Maldives, the official age for entry into primary school is 6 years. Primary school consists of 7 years of education, and secondary school consists of 5 years. Lower secondary level is defined as completion of grade 10 in secondary school.

Maldives has already achieved the Millennium Development Goal of providing universal primary education, and steps are being taken to provide education free of cost and to improve the quality of education (MOHF,2009).

Table 1.2-1: Educational attainment of female house holds population

Region	No education	Complete primary	complete lower secondary	Complete higher secondary
Male	14.9	10.6	29.8	3.6
North	28.4	12	20.6	0.2
North central	31.7	14.9	20.1	0.5
Central	28.5	17	18.3	0.5
south central	30.6	14.1	18.8	0.5
South	28	12	19.4	1
Urban	14.9	10.6	29.8	3.6
Rural	29.4	13.6	19.6	0.6

Result in the table shows that about one in four women have never attended school. Improvements over time can be seen by comparing the percentage of the population that has never attended school. As expected, women in urban areas have better education than those in rural areas. There is not much variation in educational attainment across regions except in Male, which has a better educated population than other regions. Only 15 percent of women in Male do not attend formal education compared with 28 to 32 percent in the other regions.

1.1.5. Wealth quintile

Information on household assets was used to create an index representing the wealth of the household interviewed in the MDHS. To construct the wealth index, each household asset for which information was collected in the survey was assigned a weight or factor score generated through principal components analysis and the resulting asset scores were standardized. The MDHS households were then assigned a standardized score for each asset, where the score differed depending on whether or not the household owned that asset. The scores were summed by household. Individuals were ranked according to the total score of the household in which they resided and divided into population quintiles. The wealth index has been compared with both poverty rates and gross domestic product per capita for India, and with expenditure data from household survey of the countries in this region. The evidence from those studies suggests that the assets is highly comparable to conventionally measured consumption expenditure

1.1.6. Under Nutrition

According to the 1995 MICS-1 survey, 44% of Maldivian children under the age of five years were undernourished 33% stunted and 17% wasted. The 2001 MICS-2 survey revealed significantly lower figures (33% undernourished, 25% stunted and 13% wasted) indicating that children's rights to adequate food, health and care, the three conditions necessary for good nutrition, are being met, but not adequately.

There are wider gaps between the rates of malnutrition in the rural and urban population. For example, according to MICS-1 (1995) stunting was just 10% among urban children, but 33% among rural children. Routine data for the past three years from growth monitoring charts of children less than three years indicate that there is persistent under nutrition of 30% among rural children.

In all islands health workers maintain regular growth monitoring and kept the records. Analysis of the growth charts reveals a small improvement in the nutritional status of the children less than five years of children over the years.

However it is necessary to do more by way of follow up on children with growth faltering. More work need to be done to assess or improve the nutritional status of the children less than five years.

1.1.7. Nutritional Status and related issues in the atolls and regions

Inadequate home management of childhood diseases also contributes to the problem of malnutrition. The proportion of children under 5 years of age suffered at least one episode of ARI within the previous two weeks. Similarly, the

proportion of children under five years of age who had episode of diarrhea during the previous two weeks.

The urban population also has 100% access to sanitation. However, for the atoll population, inadequate sanitation is a major area of concern. Sanitation facilities are either nonexistent or inadequate in most islands. Most of the households in the country use sanitary rooms for excreta disposal of which nearly half flush into pits or septic tanks, a process that contaminates the ground water (MICS 11, 2001).

Adult literacy rates are high, but access to information is limited, particularly in the atolls, resulting in low levels of awareness on important issues such as health, hygiene, nutrition and child care. Poverty in the Maldives is largely characterized by geographic disparities between Male' and other atolls. Personal incomes are significantly higher in Male' than in the atolls. Similarly, cost of living is also high in Male'. However access to quality economic and social services are still more accessible in the capital while social infrastructure are improving rapidly in the atolls.

Employment opportunities are also limited in the outer islands. These disparities have accelerated the trend of in-migration to Male', further narrowing the development prospects of outer islands, and simultaneously aggravating the living conditions in Male'. The small size of the country's economy and its vulnerability to external shocks have major implications, not only on macroeconomic development through deteriorated fiscal and external balances,

but also on the quality of the economy relies on earnings from export items to purchase imported goods.

1.2.Problem statement

Monthly monitoring of children's growth conducted in all the islands for children less than 3 years and many intervention programs have been conducted over the years. Nutritional status of children has also improved along with the indicators of Primary Health Care. Nutritional status of Maldivian children under five years has not improved in particular with other social and economic development indicators. Under nutrition still continue to persist with 19% of children under five years. It was observed that there is no statistically significant gender difference in the nutritional status of children under five years. It was a concern to study the underlying causes of nutritional status. This study was mainly focused on to find the level of influence with regard to household wealth and nutritional status of under five children also nutritional status of under five children by regions and the influences relating to mothers education level to nutritional status of under five years children. The data set was selected from the MDHS 2009. The data set should be based on the literature review and methodology of the study.

1.3.Objectives of the study

The objective of this study is to assess analysis and recommend on the nutritional status of under five years children on the following factors : mothers education ,

wealth quintile as well as the place of residence , contributing to nutritional status of under five years children in the Maldives.

In order to achieve the general objectives the following specific objectives were formulated:

1. To determine the anthropometrical factors of nutritional status of children under five years.
2. To find the association between mothers educations, wealth quintile, and place of residence and their contributions to nutritional status of children under five years.
3. To analyses the available evidence in literature on malnutrition and recommend the possible future actions.

1.4.Research question.

What are the factors; mothers' education; wealth quintile; place of residence contributing to nutritional status of children under five years in the Maldives.

1.5.Significance of the study

A data which was used to conduct the study is available in Maldives Demographic health survey. Data collection in MDHS was carried out in collaboration with relevant sectors of the local government using population sampling frames. All data are nationally representative. The data set that has used for this study was selected among the anthropometric data for mothers and children less than five years old. The purpose of this study is to find out the relationship between nutritional status and the development of mothers education, household wealth and place of residence. These proxies were never been studied yet in the Maldives in relation with nutritional status of children in particular.

1.6.Scope of the Study

There were three questions to be answered in this study. The first question to be answered is how much of the mothers education contributes the children's nutritional status. The second question relates on the household wealth which depends on how much it influences to the nutritional status of the under five year old children. The third question is about the relationship with the residence and the nutritional status of the children under five years. To answer these question information was collected through literature searching and the official statistics and personal experiences in the field of nutrition.

1.7.Definition of terms

MICS	Multiple indicator cluster survey		
MDHS	Maldives Demographic health Survey		
PEM	Protein Energy Malnutrition		
WH	Weight for height	HA	Height for age
WA	Weight for age	SD	Standard deviation

CHAPTER 2

2. REVIEW OF LITERATURE

2.1 Conceptual Framework for malnutrition

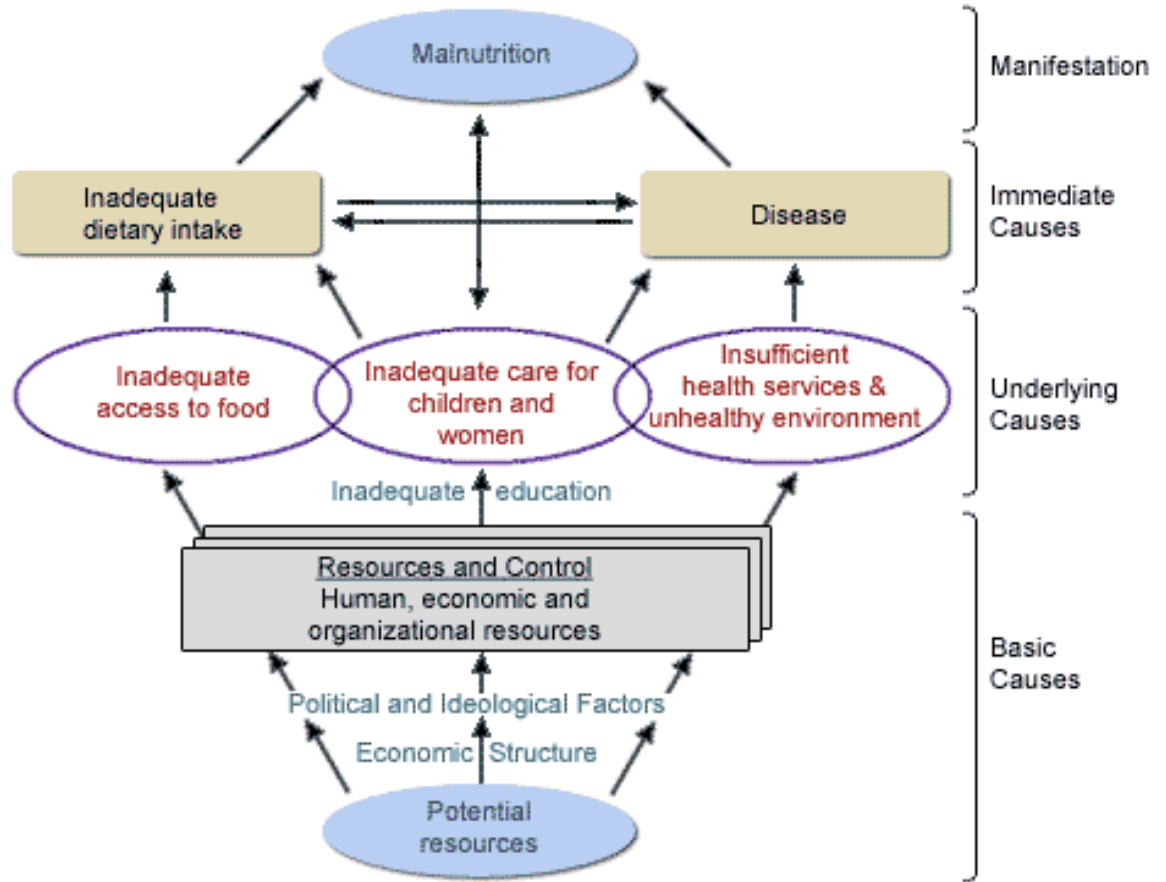


Figure 1: Modification based on UNICEF under five years malnutrition conceptual frame work

Nutritional Status as Manifestation, Mothers Education as underlying causes

Wealth quintiles as Resources and Place of Residence as Basic causes are conceptualized.

2.2 Previous Studies

2.2.1 Malnutrition under five years

It is widely recognized that the early years of childhood is of the great importance to human development. The under five years have been received increased attention and many have argued that the early years lay the foundation of the future development in all areas(McCain&Mustard,1993).Diet depravation during pregnancy of the mother appears to have great impact on development during foetal growth also protein deficiency and inadequate maternal intake of micronutrients are associated with intra-uterine growth retardation and adverse foetal growth(Kramer,2002). Pre natal malnutrition also has adverse effect on cognitive and psychological development (Smedler, A.C.et al,(1992). The importance of early years is based on the conceptualization of the child as a clear person and individual development is thought to be a clear process(Sroufe,1979). Early experiences will have an impact on later development and adulthood adjustment is often predictable from childhood behavior (Rutter,2002).There are direct and indirect chain effects and one set of early advantage may lead to further advantages and early disadvantages may lead to further disadvantages (Rutter,1994). The impact of early experience may also be subtle or complex, resulting in the individual being more vulnerable or resilient to various forms of stress (Bee, 2000). Neuroscience research has shown that early years of life in children is an important period in brain development as it is a period of formations that connects nerve cells into functioning circuit (Bruer,1999). This highlights the important of provision of positive and successful early experience

in life for children to promote their wellbeing. In this respect mothers are primary socializing agent of the child. The child's intellectual, physical development future attitudes, values, habits, health, behavior, lifestyle, and copying style are all primarily influence by the parents specially mothers education and status of wealth may play a crucial role since early life. Based on the above it is also to know how the nutritional status in early years influences a child's life and the contribution of wealth and mothers education.

2.2.2 Under nutrition and Nutritional Status

The ministry of health Maldives says children are its future, despite some achievements the nutritional status of Maldivian children is still an unacceptable level (MOH, 2010).The 1995 Multiple indicator cluster survey (MICS1) identified malnutrition as a serious public health problem in the Maldives(MOH 1995).It has highlighted the importance of continuous monitoring of children's growth and nutrition and the island health workers carefully maintained regular growth monitoring records(MOH, 1995a).The survey(MICS2) revealed nutritional status is a major determinant of the health and wellbeing of children and many other factors are associated with poor nutrition among children(MOH,2001).According to the survey on Multiple Indicator Cluster(MICS) stated the population of Maldivian children under five years of age who are underweight decreased from 43 percent in MICS 1 to 30 percent in MICS 2,whereas the proportion of severely stunted decreased from 30 percent in MICS 1 to 25 percent in MICS 2.The proportion wasted decreased from 17 percent to 13

percent during the same period. The survey also noticed the proportion of children who are underweight increases rapidly with child's age after the age 6-11 months. During the first six months of life when most babies are breast fed 2-6 percent are under nourished according to the three nutritional indicators (MOH, 2001a). It is noticed that at age 12-23 months, when most children have been weaned from breast fed Milk 17 percent of children are severely stunted and 9 percent of children are severely under weighted (MOH, 2001b). According to the national nutrition strategic plan 2008-2010 says it has witnessed impressive progress in the survival ,growth and development of children however malnutrition still persists at an unacceptably high level with potentially negative effects on the growth and development of thousands of children(MOH,2008a). Maldives is facing with an endemic malnutrition problem even though protein energy malnutrition (PEM) is no more a public health problem, under nutrition, stunting and wasting, continues to be problem (MOH 2006).

In 1990 an estimated one out of three children (177 million) under five years in the developing world were or had been malnourished at one stage in their lives. The diagnosis was based on a weight-for-age below two standard deviations (SD) median. In countries where the prevalence of malnutrition is high, the total number of malnourished children has increased with an increase in population (Torun and Chew, 1994, p.951) Nutritional status of an individual is often the result of many interrelated factors. It is influenced by the adequacy of food intake both in term of quality and quantity and also by the physical health of the individual (Park, 1997,p.424) stated.

Nutritional status of children is usually assessed in three ways:

1. Measurement of growth and body composition (anthropometric indicators)
2. Analysis of the biochemical content of blood and urine (biochemical indicators)
3. Clinical examinations of external physical signs of nutrient deficiencies (clinical indicators)

Among the three methods of assessment above, anthropometric measurement is a common and easy way to assess health and nutrition status and it can be measured by a nonprofessional person with given sufficient training. (Park, K, 1997).

Nutritional status can be measured using anthropometric measurements even in less advanced cases of malnutrition. The benefit of these measurements is that they are less invasive and costly than biochemical evaluation. If anthropometric measurements are recorded over a period of time they reflect the pattern of growth and development. Anthropometric data can be collected by non-medical personnel, given sufficient training. (Park's, 1997, page 424). Simple measurements of weight, height and waist circumference can identify individuals who are overweight, thin, stunted in growth or wasted. Simple anthropometry cannot however, determine if a malnourished infant is overhydrated or underhydrated. Despite this, body weight is the best and most reliable of all anthropometric measurements (Garrow, 2005, p.74).

Underweight, stunting, and wasting are the indicators widely used to measure the under five years children's nutritional status with WHO Multicenter Growth Reference Study in anthropometric assessment of the WHO Growth

Standards(De Onis et al 2009).The choice of which anthropometric measurements to use depends on their simplicity, accuracy and sensitivity. The availability of measuring instruments and existence of reference standards for comparison are also important. International or universal standards such as the NCHS/WHO (national Centre for health statistics) and newer version of WHO growth standards (MGRS) Multicenter Growth Reference Study for children under five years can be used because most children have the potential to grow the same regardless of ethnic background and the relationship of weight and height stay relatively constant in healthy children and the reference standards are not an ideal or target but just use for comparison. Most of the countries growth charts are now modified and prepared according to the MGRS (WHO,2006).

Both the NCHS/WHO and MGRS/WHO use standard deviation (SD) from the median and the results are referred to Z-scores. A child who has Z-scores within - +1SD is within the normal range. Children with the lower portion of these rangers are classified as moderately malnourished. Children who are more than 3SD below the normal have severe malnutrition (WHO,,2006a).The new WHO reference Standard(MGRS) came use into effect in 2006.Maldives was selected among in the south east Asia region to develop these standards. Totally six region were selected to develop the standards. The NCHS standards were only based on the standard of that country. The main idea of the new standard is to see how children should be growing for the best of health outcome, rather than just showing how average child is growing. The new standards also take into consideration the use of length and height and body mass index(BMI),which was

never used in the NCHS standards. The Maldivian growth charts were also include length or height for age, weight for age and weight for length or height. The growth charts are available for boys and girls, infants to one year and children under five years of age. The new WHO standards also look at the milestones that children reach specific ages, whereas milestones were not part of the NCHS standards (WHO, 2006b)

Table 2.2-1: nutritional status

General Malnutrition	Low Weight for Age
Stunting	Low height for Age
Wasting	Low Weight for height

2.2.3 Stunting

Stunting is a measure of linear growth. Stunting refers shortness, and also be called failure to thrive or growth faltering, which refers to slow weight gain or inadequate growth in the infant and young child. Height for age is considered a measure of past nutrition, because a child who is short today, may be did not have adequate nutritional intake at some point in the past(Baker-Henningham, GranthamMcGregor,2004,p.253)

Stunting is a greater problem than underweight and wasting and is an indicator of nutritional deficiencies or status. It is an illness that occurred during times growth and development usually in infants and children younger than five years

(UNICEF,2009) Stunting is the first clinical sign of malnutrition and affects about 195 million children younger than five years in the developing world(Piercecchi-Marti et al.,2006). Growth failure is marked by both thinness and shortness. Nutritional growth faltering is not only due to underfeeding but also due to infection, psychological disturbances, and mother's education, socio economic deprivation (Williams, 2005, p.401).Stunting is a cumulative process that starts in utero, and there is substantial evidence that intrauterine growth is a strong predictor of postnatal growth (De Onis. M. et al., 2000).

2.2.4 Wasting

Wasting is a measure of acute or short-term exposure to a negative environment. It is sensitive to changes in calories intake or the effects of disease. Wasting can be calculated without knowing the age of the child. Weight for height is a measure of current body mass. It is the best index to use to reflect wasting malnutrition, when it is difficult to determine the exact ages of the children being measured. A child is considered malnourished if any of the above indexes fell below two standard deviation of the median value. Severe malnutrition is when the indexes fall below three standard deviation of the median value (WHO 2006c).Wasting is the weight of the sick child compared to that of a normal child of the same height (Golden and Golden, 2000,p.518) In developing countries 13% of the children younger than five years are wasted and 5% are severely wasted. Africa and Asia are the two region where wasting rate is higher than 15%.(UNICEF,2009a,p.21)

2.2.5 Underweight

Underweight is the most common assessment of children's nutrition status. The underweight child is important presentation of protein energy malnutrition, which is missed a lot of times(Wittenberg,2004,p.203).When a diet is insufficient in protein or energy there will be a slowing down of linear height, failure to gain weight or weight loss(wittenberg,2004a,p.203),and this is seen when the child is exposed to an acute food shortage(Golden and Golden,2000a,p.517-518).These children are underweight and undersize, while at the same time they have relatively normal body proportions, e.g. weight-to –height ratios(Golden and Golden,2000b,p.517-518).Underweight children can also be stunted, wasted or both(UNICEF,2009b,p.13). Weight for age is a simple index, but this index does not take height into account. Underweight children must be identified early through regular growth monitoring of weight and height (UNICEF, 2009c, p.13) When growth monitoring is done and child presents with a weight for age below the third percentile (less than 80% expected weight or less than 90% expected height), the child must be suspected of being malnourished (Wittenberg, 2004b, p.204).Underweight children have a dietary deficiency that is not severe and therefore do not produce a clinical disease or symptoms. There are no real physical signs and the serum albumin is only slightly reduced. Underweight children are however, still very susceptible to infections, such as gastro-enteritis, respiratory disease, measles. (Wittenberg, 2004c, p.204). Children who are taller would be expected to weigh more than other children, just as children who are shorter would be expected to weigh a little less and still be healthy.(WHO,2006d).

2.2.6 Mothers Education

Women who receive even minimal education are generally more aware than those who have no education of how to utilize available resources for the improvement of their own nutritional status and that of their families. Education may enable women to make independent decisions, to be accepted by other household members, and have greater access to household resources that are important to nutritional status (ACC/SCN, 1990).

Female education also plays a major role in malnutrition of under-five year old children. According to (UNICEF, 2001), the decrease in percent of underweight children in developing countries is due in part of educating women on prevention of malnutrition. Studies have shown that higher maternal education is related to better nutrition and survival rates in children (Mora and Nestel 2000). Low female literacy rates were associated with wasting in a Filipino study (Allen and Gillespie 2001). (Frongillo et al, 1997) mentioned an inverse relationship between low prevalence of stunting and high female literacy rate in Asia. Vitamin A deficiency in preschool children was correlated with lower level of mothers education in a study in Costa Rica (Carvajal et al. 2003) Kemmer et al. (2003) found a 58.3% literacy rate among mothers and 46% stunting rate in the Burmese refugee camps in Thailand. The female literacy rate in Thailand in 2000 was 94%, far higher than rates in Burmese camps (UNICEF, 2002).

Women's education have contributed by far the most to reductions in child malnutrition, accounting for 43% of the reduction in the years between 1970-1995, while improvements in per capita food availability contributed about 26% (Smith and HaddadL,2000). According to UNESCO(2005)primary school age children of uneducated mothers are more than two times as likely to be out of school as children of mothers with some education(UNESCO, 2005a).The movement children experience food insecurity and poverty, it causes inadequate food intake which leads to the development of the child. These issues are among the most urgent social issues affecting households and children(Crowther,2008)Better maternal knowledge leads to better childcare practices, seeing as maternal education is associated with breastfeeding for longer than six months and delayed introduction solid foods(Kalanda et al.,2006)There are three ways how school education and knowledge can influence the child's health and nutritional status, which are formal education leads directly to higher knowledge of mothers and literacy acquired in school ensures that mothers are more capable of identifying health problems in children also when mothers have attended school they are more aware of modern diseases and where to get help and information.(Cristiaensen and Alderman,2001).Even though nutrition knowledge is not gained in the class room, the school education that mothers receive can help with caring for children and the house household. Both female and male education can have appositive effect on the child's nutritional status. Knowledge can lead to a higher household income and better nutritional status when the education is linked with strategies to improve both. Maternal nutritional

knowledge matters even more when the child falls within the high-risk group of younger than three years(Christiaensen and Alderman,2001a),as there is an association between low maternal literacy and poor nutritional status of children 3-23 months (UNICEF,2009).The level of education, economic factors, gender disparities, and political and ideological factors are the basic determinants of malnutrition. Education and information influences the extent to which available resources in a household are used to fulfill the feeding, psychosocial development, hygiene, sanitation and other care practices.(DPH,2003f) Therefore if females are educated it is assumed that their caring practices will improve, resulting in improvement of their children's nutrition. Increasing maternal education is expected to decrease child malnutrition because maternal education is negatively correlated with increased fertility and positively correlated with both maternal well-being and knowledge about nutrition and child health (DPH, 2003g).

2.2.7 Wealth quintile

The economic status of a household is an indicator of access to adequate food supplies, use of health services, availability of improve water sources, and sanitation facilities, which are prime determinants of child and maternal nutritional status(UNICEF,1990).A study of the DHS survey conducted in developing countries(Loaiza,1997) and a study in Ethiopia(Teller and Yamir,2000) showed that women from low economic status households were the most affected by malnutrition..

When the household income decreases it is usually the women who try earning extra wages. This causes the mother to have less time for childcare and ensuring the children eat healthy food. If the female children are also sent out to look for work, this results in poor school attendance, which influences education, leading to poor knowledge and caring practices for her own family (UNICEF, 2009). Uneducated mothers with low socio-economic status have trouble preparing infant formula correctly and the milk will be too expensive to give sufficient amounts as financial situation in the household forces the mother to use diluted cow's milk (Berdanier, C.D. (1995). Getaneh et al. (1998) also found an association between protein energy malnutrition and poor housing conditions in Ethiopia. The household economic position has a significant impact on the risk of a child being stunted and underweight (Zere and McIntyre, 2003). The most educated women come from high socioeconomic strata of the society. They tend to have better work opportunities and high incomes compared to non-educated women. Educated women are also more likely to marry husbands with high education level and belong to high socio-economic class of the society (Barrett and Browne, 1996). The father's occupation is the best indication of income and there was an association between protein energy malnutrition and father being a laborer (Saito et al., 1997) having a low income job. Iqbal Hussain et al. (1999) found a significant association between low household incomes, parental illiteracy and small family size. In this study there was a close to significant association between room density and the prevalence of malnutrition.

2.3 Methodological issues

Literatures are reviewed through searching Hinari and Google as well as PubMed. Related information's such as reports, text books, journals manuals in work place are searched and relevant information are gathered. Also subscribed and received books manuals articles, magazines, Journals in hand are also scanned for the relevant information required for this report. The collected data are gathered to answer the question selected for this study.

Inferential statistics are used to make a statement of MDHS data collected based on population sample on children's growth. Chi square method is used to evaluate the frequency of data using 2 x2 tables. The data from urban and rural children's nutritional status are compared and results are formulated. The critical value was used to check the significance of the data. The data observed and estimated were attached in the Results chapter with the chi square formula.

Descriptive statistics such as graphs and percentages are used to summarize the quantitative data. Recommendations are formulated with the information collected through literature review and the data used in MDHS.

In MDHS, height and weight measurements of less than five years age children, and taking age into consideration, were either converted into Z- scores based on the National Centre for Health Statistics (NCHS) or WHO Multi center Growth Reference Study reference(MGRS) population recommended by the world Health

Organization. Those below -2 standard deviations of the NCHS or MGRS median reference for height-for-age, weight-for age, and weight-for-height are defined as stunted, underweight, and wasted, respectively. In this study all three indicators are used to describe the level of child malnutrition and the relationship between maternal and child nutritional status. Low height –for –age or stunting, measures linear growth retardation and cumulative growth deficit and indicates the effect of past or chronic nutritional insult in the life of the child. It is not mentioned how they are calculated in MDHS survey report.

The estimates from a sample survey are affected by two type of errors: no sampling errors and sampling errors. No sampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the Maldives Demographic and Health Survey 2009

(2009MDHS) to minimize this type of error, no sampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors on the other hand ,can be evaluated statistically. The sample of respondents selected in the 2009 MDHS is only one of many samples that could have been selected from the same population ,using the same design and expected size .Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are measure of the

variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

A sampling error is usually measured in terms of the standard error for a particular statistic (mean, percentage, etc.), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of plus or minus two times the standard error of the statistic in 95 percent of all possible samples of identical size and design.

CHAPTER 3

3. METHODOLOGY

3.1 Research Design

This study is focusing mainly on the associations between the educational determinants of mothers and the nutritional status of children under age five years and the wealth determinants of the households contributing to malnutrition in the Maldives. The analysis in this dissertation is based on Data available in the Maldives demographic health survey that was conducted in 2009(MOH, 2009).The standard instruments which were used MDHS survey to collect data on mothers education and children's nutritional status, the information on households living conditions such as housing characteristics and childhood morbidity to know the wealth of the family. The data is based on national samples that have been collected using questionnaires and allows for breakdowns by urban and rural and major regions.(MOH,2009)

Maldives first Demographic and health survey (MDHS) was carried out by the Ministry of health.(MOH,2009) The survey was funded by the government of Maldives, UNFPA, UNICEF, and the WHO and technical assistance was provided by ICF Macro(MOHF,2009)

3.2 Population and sample

The 2009 Maldives DHS is based on probability sample of 7515 households. (MOH, 2009) The sample was designed to produce representative data on households, women and children for the country as a whole, for urban and rural areas, for the six geographical regions, and for each of the atoll of the country. (MOH, 2009) The 2006 Maldives population and housing census provided the sampling frame for 2009 MDHS (MOH, 2009) The MDHS sample was a stratified multistage sample selected in two stages from the census frame (MOH 2009). In the first stage 270 census blocks were selected using a systemic selection with probability proportional to the number of residential households residing in the block (MOH, 2009) Stratification was achieved by treating each of the 21 atolls as sampling stratum (MOH, 2009). Samples were selected independently in each stratum according to appropriate allocation (MOH 2009). In the second stage of sampling residential households were selected in each of the selected census blocks. Household selection involved an equal probability systemic selection of fixed number of households: 28 households per block (MOH 2009). Households were selected from the household listings created in the census, but to allow all households an opportunity to be included in the sample, listings were sent to island offices for updating prior to making household selections for the MDHS (MOH, 2009).

All ever married women age 15-49 in the sample of MDHS households who were either usual residents of the household or visitors present in the household on the night before the survey were eligible to be interviewed (MOH 2009). Other

interviewees include the DHS model questionnaires were modified to reflect concerns pertinent to the Maldives in the areas of population, women and children's health, family planning and others (MOH, 2009). Questionnaires were translated from English to Dhivehi (local language) basic information was collected on the characteristics of each person listed, including their age ,sex, education, and relationship to the head of the household(MOH2009) .The household questionnaire was also designed to collect information on characteristics of the households dwelling unit(MOH,2009). In addition, height and weight measurements of ever-married women age-15-49 and children age 6-59 months were recorded in the household questionnaire to assess their nutritional status.(MOH,2009)

3.3 Instrumentation

A pre-test was conducted in 2008 in Male' and Thinadhoo Island. The training team consisted of consultants from ICF Macro and staff from the MOH. The pre-test provided the opportunity to review questionnaire content and language, logistics, equipment needs, and general protocols for the survey. Lessons learned from the pre-test also served as training of enumerators for the upcoming main survey.

Based on the experience from previous surveys field work was planned to be completed in four months. However, this was the first ever its kind and need to cover a large number of islands. Furthermore, with the administrative constraints and the high turnover of field staff lengthened the duration of fieldwork took place over a period of ten months.

3.4 Data collection

A total of 7515 households were selected in the sample of which 7137 were found to be occupied at the time of data collection. The difference between the number of households selected and the number of occupied usually occurs because some households are found to be vacant or non-existent. The number of occupied households successfully interviewed was 6443 and the response rate was 90 percent. The households interviewed in MDHS a total of 8362 ever-married women were identified as eligible for the individual interview, but the interviews were completed with 7131 women resulting response rate of 85 percent.

To ensure data quality in fieldwork, the following steps were followed:

1. Check the accuracy and quality of household listing.(The field team updated the household list)
2. Observe interviews.(Team supervisors observed some interviews)
3. Edit all questionnaires.(The team field editor checked completed questioners)
4. Re-interview households.(The team supervisor conducted a re-interview)
5. Field – check tables.(To monitor the performance level of the field teams)
6. Monitoring field work by the central office.(Survey coordinator visits each team)

Following completion of all fieldwork, completed questionnaires were sent to the MOH central office by various means. All programs for processing the MDHS data were prepared using the Census and survey processing system. Data entry was conducted at the MOH.

3.5 Framework for data analysis

With regard to measures nutritional status of children in this work the analysis will be on children's nutritional status with prevalence of malnutrition, and mother's educational status and the wealth of the household, which contributes to nutritional status of the children less than five years.

3.5.1 Mothers education

Mothers education and knowledge will be assessed by using the data available with the

MDHS survey data on mothers' education. The variables will be based on no formal education, primary, secondary, more than secondary education. These variables will be based on the relation of the three anthropometric indicators of the nutritional status. They will be formulated in a percentage table and will be presented on a graph.

3.5.2 Wealth Quintile

Household socioeconomic status will be checked by using the wealth quintile data available in MDHS. These data will be formulated in a table with percentages. The lowest second, middle, fourth, highest will be checked with the percentages. They will be compared with the three anthropometric indicators.

3.5.3 Nutritional status of children under five years

The nutritional status of children under five years will be assessed by collecting the data available in MDHs. The anthropometric data will be collected and

formulated in Table forms .The percentages of them will be used for the study. They will be used in various forms to compare them such as urban and rural, and on regional compares also wealth quintile of the households.

3.5.4 Place of Residence

The urban and rural status of nutritional status of under five year old children will be used by getting the data from MDHS. The tabular forms of available data will be used to formulate chi square in order to compare the urban and rural anthropometric data. The p values will be used for the analysis and compares.

In order to accurately capture the quality of malnutrition in children, four dependent variables and three anthropometric indicators of less than five years of children are used in the MDHS. They are weight for age, height for age, weight for height. These variables are measured as standard deviation from the medium of the MGRS standard of the world health organization.

Measurements of children were taken for 2513 children under 5 years of age who were present in MDHS households at the time of survey.

This will be based on cross sectional prevalence study of children less than five years of age. To know the relationship between nutritional status and the mother's education. Data will be analyzed by descriptive statistics.

CHAPTER 4

DATA ANALYSIS AND RESULTS.

$$X^2 = \sum \frac{(o - e)^2}{e}$$

Table 3

The above chi square formula has been applied to calculate the following data.

Statistics of Urban and Rural under five Children's Nutritional Status Data

	O	E	(O-E)	(O-E)	[(O-E) ² /E]	χ^2
HA(-2SD)	44.702	46.24	1.538	2.365	0.051	0.075
	676.298	674.755	1.543	2.380	0.003	
	116.480	114.937	1.543	2.380	0.020	
	1675.520	1677.062	1.542	2.377	0.001	
HA(-3SD)	113.197	135.819	22.622	511.750	3.767	6.521
	607.803	585.180	22.623	511.800	0.895	
	360.192	337.569	22.623	511.732	1.515	
	1431.808	1454.430	22.622	511.754	0.351	

	O	E	(O-E)	(O-E)	[(O-E) ² /E]	χ^2
WH(-3SD)	5.77	18.11	12.34	152.28	8.40	12.06
	715.23	702.89	12.34	152.28	0.22	
	57.34	45.00	12.34	152.28	3.38	
	1734.66	1747.00	12.34	152.28	0.06	
WH(-2SD)	51.92	76.590	24.678	609.003	7.951	12.475
	669.088	644.409	24.679	609.053	0.945	
	215.040	190.040	24.679	609.053	3.199	
	1576.960	1601.638	24.677	608.954	0.380	
WA(-3SD)	7.931	23.869	15.983	254.019	10.642	15.434
	713.069	697.130	15.938	254.051	0.364	
	75.264	59.325	15.938	254.051	4.282	
	1716.736	1732.674	15.938	254.019	0.146	
WA(-2SD)	78.589	124.861	46.272	2141.097	17.142	29.082
	642.411	596.138	46.273	2141.190	3.591	
	356.608	310.335	46.273	2141.190	6.899	
	1435.392	1481.664	46.272	2141.092	1.445	

Source: Authors Calculation based on MDHS 2009 Survey Data.

The relationship between rural and urban children's -2SD stunting status has no deference but rural children's -3SD severely stunting shows the effect is more than urban children. The other nutritional status are significantly higher than urban.

	Wealth quintile					
	Stunted		Wasted		Underweight	
	HA (-3SD)	HA(-2SD)	WH (-3SD)	WH(-2SD)	WA(-3SD)	WA(-2SD)
Lowest	7.4	21.9	2.8	12.7	4.8	24.3
Second	7.3	23.1	3.8	11.4	5	19
Middle	4.9	17.6	3.3	12.8	3.7	19.3
Fourth	6.7	15.4	0.9	7.1	1.6	12.5
Highest	5.6	15.7	1.6	8.7	0.9	10.5

Sources: MDHS 2009 survey Data

Analysis of wealth quintile shows there is no significant level of stunting as compares the all level. The lowest level has less stunted as compare to the next higher level. It may not be count as such it has significant level of stunting.

Table 5

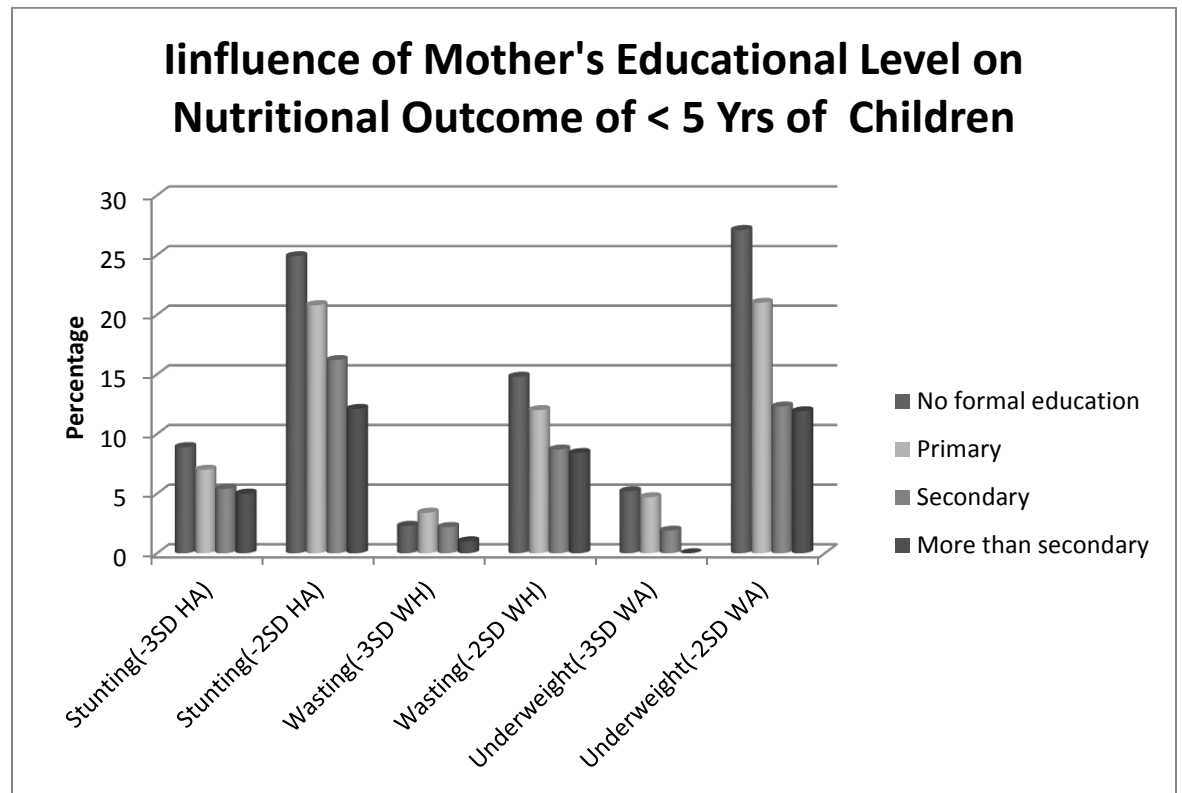
Place of Residence By Region

	Stunting		Wasting		Underweight	
	HA(-3SD)	HA(-2SD)	WH(-3SD)	WH(-2SD)	WA(-3SD)	WA(-2SD)
Male'	6.2	15.7	0.8	7.2	1.1	10.9
North	4	15.7	2.3	11.8	2.7	18.4
North Central	7.9	22.7	3.4	14.5	5.7	24.4
Central	8.5	20.9	5.7	14.1	4.8	18
South Central	7.7	20.9	2.6	10.2	3.7	19.9
South	4.7	19.9	2.8	8.4	3.4	15.9

Source: MDHS 2009 survey Data

To compare the nutritional status in regions shows under nutrition is higher in central and North Central region .To compare Male 'the under nutrition is two times higher than the other regions.

Figure 2



The relationship of mothers education to children's nutritional status shows that children of mothers completing higher education had 3 times reduction in getting a stunted and underweight child. As compare to no formal education of mothers wasting children were higher among primary educated mothers.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Summary of Main findings.

Table 3 presents the chi square analysis used to study the existence of relation between the urban and rural children and selected variables are presented in the table. The result shows there is no significant association exists between urban and rural children's stunted status. Specially the children among -2SD height for age group. It has been also considered there is significant association exist in the stunting with -3SD height for age group. Wasting and underweight result shows extremely significant association exists in the rural and urban children.

It was concluded the prevalence of wasting and underweight was higher among rural children. There is no significant difference between urban and rural in -2SD moderate stunting. But as it compare to severe stunting the rural children is much higher than urban children

Table 4. Wealth Quintile: presents the percentage distribution of children below -2 SD for the three anthropometric measures (wasting, Stunting and underweight) with relation to influencing wealth quintile the socio economic characteristics. Based on the distribution of the stunting-3SD, the lowest quintile is (7.4%) and the second wealth quintile is (7.3%) which do not show much change. In the -3SD

stunting category second wealth quintile shows 23.1% and the lowest quintile shows less children (21.9%). The Wasting of -3 SD in lowest quintile is 2.8% and the second level quintile is 3.8%. The wasting of -2SD middle quintile group is 12.8% children and lowest quintile is 12.7%. The underweight of -3SD second quintile group is 5% and lowest quintile is 4.8%. The underweight of -2SD middle income group is 19.3% and second quintile group is 19%. Analysis of house hold wealth quintile shows those who at lowest level have less stunted children as compare the second and middle income level. Wasting underweight also show similar pattern. But there are no significant change in wealth quintile.

Table 5 Place of Residence or Region: shows the distribution of children under five years nutritional status among the regions. The highest stunting -3SD is recorded (8.5%) in the central region. The lowest is 4% in north region. Stunting-2SD is highest in central and south central region (20.9%) The lowest is in Male, and North region (15%). Wasting -3SD is highest in Central Region(5.7%). The lowest in wasting -3SD is in Male (0.8%). Wasting -2SD is highest in north central region (14.5%) and 14.1 % in central region. Underweight-3SD is highest in North central region (5.7%). Underweight -2SD the highest is also in north central region 24.4%). The Relationship of mother's education to nutritional status shows that children of mothers completing higher education had 3 times reduction in getting a stunted and underweight children. As compare to no formal education mothers wasting children is higher among primary educated mothers.

Figure 2 shows the influence of mother's education level on nutritional outcome of under five children. The education level of mothers is classified in to four

categories. They are no formal education ,primary, secondary, more than secondary education. The figure 2 in the graph clearly shows the mothers children's stunting, and wasting decreases as the level of mothers education increases. Children whose mother have never attended school have the highest level of wasting while children whose mothers have secondary or more than secondary education have the lowest level of wasting. There is no systematic relationship between wasting level and wealth quintile.

The prevalence of stunting was higher among rural children (20. %) as compared to urban children (16 %).The proportion of children with stunting fell as mothers education increases eg. among mothers with low education 15% children were stunted compared to 8.% respectively to mothers with higher education. A sharp decline in stunting was observed with increase in mothers wealth . Underweight was lower whose children born to mothers having high house hold income. Underweight was higher among mothers who have lower education. There was no clear pattern seen in stunting among the regions with nutritional status. The pattern was neither seen generally to those of wasting.

Although all three measures of under nutrition were higher than would be expected. The highest prevalence was found in stunting. As this was most prevalence form of under nutrition in Maldives. Several variables were found to have a significant influence on prevalence of stunting. The children being stunted among urban areas are lower than for children in rural areas. Education increases the stunted decreased.

5.2 Discussion

Child health has a prominent role in shaping and defining the structure of a society. It shapes quality of future capital, helps population stabilization and future economic growth, and was among other factors. In the case of Maldives there have been marked improvements over the past decade in the nutritional status of children but much work still need to be done. In order to further decrease level of childhood malnutrition policy framework must be established which incorporates short term long term and medium term strategies to solve nutritional problems, the intervention strategies would be comprehensive, culturally sensitive, and malnutrition is a public health concern which would be addressed various level of the government.

5.2.1 Situation of Children's Nutritional status in urban and rural

There is still major differences exist between rural and urban nutritional status. Specially wasting and underweight of the under five children. As the data compared with rural and urban stunting shows slight similarity in urban and rural. The other two anthropometric measures are widely different between urban and rural. The differences usually exist between Male'(urban) and other islands(rural). Particularly between north, north central with some indicators shows extreme variation. The north region children may not consume much fish

as the region is respectively depend on tourism which may significantly lower nutritional status than other regions. In contrast however the north has higher level of employed staff than other region. These indicate that nutritional status and the nutritional intakes across the Maldives is greatly varied.

5.2.2 Influences of wealth quintile on nutrition out come under five years of children.

It was showed that the lowest wealth quintile and the second lowest wealth quintile in relation to nutritional status have similar effect. Similar percentages of stunting are existed in both the quintiles. Wasting and underweight also existed in a similar pattern in both the quintile. Wasting was found more in middle quintile. Nutritional status is the consequences of social inequity. It is also a combination of multiple hidden factors including inadequate food intake also poor health; these in turn are results of improper dietary practices, insufficient health services, and unhealthy environment and inadequate care. Nutrition related behaviors, including feeding practices, food preparation and storage, home health care, hygiene and sanitation practices and care for women and girls should also assessed to determine their role in preventing the nutritional status of under-five children. The wealth quintile also plays a major role in the nutritional status of children. Limited variety of foods and limited frequency of meals summarize the food habits of the Maldivian population. A typical family may eat just two or three times per day, which is insufficient for young children. Inadequate home management of childhood diseases also contributes to the nutritional status of under five children. In the capital city Male ‘where working mothers go to work leaving their children

to a care taker or a domestic servant .These expatriate servants may not communicate properly with the children. Adequate care may not be given in those circumstances to the children.This could be the reason as the wealth quintile changes the nutritional status of the children may not change.Specially the stunting status unchanged most of the times. Factors affecting the level of the wealth quintile should be further evaluated in order to find the in depth causes of the problem.

5.2.3 Nutritional status of children less than 5 years by regions

Nutritional status is poor in the central and north central regions as compare to other regions .Stunting is similar in south central specially in its mild or moderate form. The three anthropometric measures are generally poor in those regions. There are multiple causes which affects the nutritional status in the regions. Each region is different in demographically geographically and economically .A number of social changes have resulted from economic growth. Rapid and unplanned urbanization of Male' has seen one of the world's smallest capital .The population has doubled in the last couple of decades making it by far the most densely populated island in the country. Much of this has resulted from inward migration from other atolls due to the availability of better education, social services and job opportunities. Health care services, poor house hold environments account for the burden of disease, particularly acute respiratory and diarrheal disease as well as caring practices. The traditional sources of water Maldivians have been harvest rainwater. There are still water shortages during dry

and hot season (iruvai) in some of the islands. The method of collecting water may not be safe most of the households

5.2.4 Influence of mothers education level on nutritional outcome of under-five years children.

Mother's education is one of the major factor which influences children's nutritional status. The data which has formulated in this study also reveals there is significant contribution of mother's education and the nutritional status. Children whose mothers have never attended school have highest level of wasting children. Few mothers have had opportunity to study further in the islands. Most of those who have had any formal education have complete only primary education especially in the islands. The share of having only minimal or formal education is slightly higher among females. Gender difference could be marginal in opportunities in education. The literacy rate could be higher in female age groups in almost all regions. According to the MICS 2001 the literacy rate across the regions shows that the only southern region exhibits a slightly lower rate of education. Educational attendance of children aged 3-4 years indicates that on an average 63 percent attend some kind of organized early childhood education (MICS,2001). Attempts to increase this percentage would contribute in the long run to reducing the dropout rates and would enhance the average number of years of schooling .Early childhood attendance in education shows wide variations across regions. Gender difference though not large, exist in this regard; the percentage of children attending some form of educational institution being higher among girls than boys. It was noted the distribution by completed level of

education, it can be seen that high proportion of children dropout during and after secondary level, especially after 15 years of age. . Economic growth has been accompanied by substantial gains in social development with significant increase in the educational levels of the population.

5.3 Implications.

Based on the findings of this study policy development must take into consideration the rural urban divide malnutrition. It is clear that children raised in rural areas are greater risk for under nutrition. This finding supports prior studies the finding of prior studies that have describe the urban and rural differences in nutritional status in the Maldives. People living in urban areas are provided better access to health services, education and other social support system which are either not available or not easily accessible to the residents in rural areas in the islands.

Food insecurity has been a continuous problem in the country specially in the islands due to its geographical locations of the country. During the monsoon the rough weather continues and lasts for weeks which makes transportation in a strand status. Most foods are purchased and imported from other countries and they are delivered to the islands in continuous basis by the traders of the islands. However there has been significant improvement in purchasing and delivering and also consuming food. There is particularly no severe form of malnutrition in

the country. Consequently the rates of stunting and wasting in nutritional status have dropped steadily in the past couple of decades. The problem still exist and significant fraction of the population still continues to experience food scarcity due to mostly to inability to afford food (MPND,2004)

The improved food intake has also been accompanied by a changes in food sources, as well as greater consumption of fruits, vegetables, meat and fish. These food items are also imported and consumption tend to be higher closer to male' and tourist islands.

5.4 Limitations of the study

Disparities in health and nutrition can exist along many social dimensions including age, gender, income or wealth, education, place of residence and many more. This study examines the evidence of differences of nutritional status by wealth quintile, mothers education, and place of residence. The focus mainly on those areas which may not focus on these dimensions previously as such.

Understanding of such perspectives on nutritional status may be important to improve the nutrition and in general health of the children. In undertaking the analysis the emphasis was on using the existing data. The data which was selected from MDHS. Consequently, no new data were collected for this study, and the analysis that conducted was limited. The MDHS data which is used for this study and the findings of MDHS generally shows similar results. By using these data areas such as influence of mother's education and the influence on wealth and

nutritional outcome of under five children and nutritional status in regions including rural, urban status were analyzed.

5.5 Directions for future Research and Recommendations

Programs should be developed to analyses and implement appropriate strategies to address rural and urban malnutrition. It is recommended to study further the relation between mother's education and children's malnutrition status .It is also necessary to know the disparities by wealth quintile and the relationship of nutritional status. A comprehensive information need to be assessed on place of residence or geographical location such as living standards of households and the relationship between nutritional statuses.

- 1 Strengthen female education at schools where dropout rate is higher.
- 2.provide nutrition education and proper child care practices training to mothers.
- 3Promote communication for behavior change using the hearth model.
- 4 Conduct further research in-deapth analysis on wealth.

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