COMPARATIVE ANALYSIS OF NUTRITIONAL STATUS OF UNDER-5 CHILDREN OF PURDAH AND NON-PURDAH WOMEN IN NORTH-WEST ZONE OF NIGERIA

BY

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DEDICATION

The thesis is dedicated to my Lord, Allah (swt) who out of His infinity mercies, granted completion of this work; and to the servitude of humanity, most especially, survival of women and children.

ABSTRACT

Socio-economic, religious beliefs, nutritional knowledge, hygiene, health status and maternal demographic characteristics are determinants of malnutrition among under-five children. In Nigeria, higher prevalence of under-nutrition is found in the North-west zone where practice of purdah is predominant. However, the influence of purdah on malnutrition has not been well documented. The objective of this study was to compare the nutritional status of under-5 children of purdah and non-purdah women in North-west zone of Nigeria.

Comparative cross-sectional survey was conducted among purdah and non-purdah women using 5-stage sampling techniques. North-west zone was randomly selected from the two zones in Northern Nigeria where purdah is more common; purposive selection of Kano and Sokoto States; five Local Government Areas were randomly selected through balloting from each state; random selection of 20 communities and 600 participants comprising 293 purdah and 307 non-purdah mother-child pairs were purposively selected. Data were collected using pre-tested semi-structured interviewer-administered questionnaire, containing wealth index parameter to determine the Socio-Economic Status (SES) of the mothers, health service utilisation; nutritional knowledge on a 48-point scale rated as poor (0.0-24.9) or good (25.0-48.0). A 24-hour dietary recall was used to determine the nutrient intakes of the children and compared with Recommended Dietary Intake (RDI). Nutritional status of the children was determined using Anthro-2005. Data were analyzed using descriptive statistics, Chi-square test, binary logistic regression and ANOVA.

Ages of purdah and non-purdah women were 28.9±7.0 and 27.8±6.6 years respectively ($p>0.05$), while their children were 19.8±14.9 and 21.6±14.9 months, respectively ($p>0.05$). The SES was 43.3% in purdah and 29.6% in non-purdah ($p<0.05$). About 56.0% of purdah and 43.0% of non-purdah women had no formal education ($p<0.05$). Similar proportions of the children of purdah (9.9%) and non-purdah women (9.1%) received complete immunization. However, 33.8% of purdah and 21.8% non-purdah were not immunised ($p<0.05$). The proportion with good nutritional knowledge among purdah and non-purdah women were 54.3% and 53.1% respectively ($p>0.05$). Exclusive Breast Feeding (EBF) was

practiced by 17.7% of purdah and 16.6% of non-purdah ($p<0.05$). Mean energy and protein intakes of the children were 870.5kcal (75.7% RDI) and 12.4 g (65.3% RDI) in purdah and 896.1kcal (77.9% RDI) and 14.6g (76.8% RDI) in non-purdah respectively. Underweight in children of purdah and non-purdah women were 43.3% and 33.6% respectively ($p<0.05$). Stunting was 53.9% and 50.5% ($p>0.05$), while wasting was 12.6% and 13.7% ($p>0.05$) in children of purdah and non-purdah women respectively. Odds of being underweight (OR=6.678, 95%,C.I.=3.413-13.060), stunted (OR=5.697, 95% C.I.=2.937-11.051) and wasted (OR=3.211, 95% C.I.=1.250-8.253) were significantly higher among children from low socio-economic households. The EBF conferred protection on underweight (OR=0.298, 95% C.I.=0.112-0.795) and stunting (OR=0.179, 95% C.I.=0.066-0.0485).

Nutritional status of under-5 children of purdah and non-purdah women did not differ significantly. However, women in purdah showed some inadequacies in child-care practices that may affect child nutritional status. Nutrition education intervention is advocated for women in the North-west Nigeria to improve the level of good maternal and child-care practices.

Keywords: Purdah, Nutritional status, Nutritional knowledge, Under-5 children.
Word counts: 483

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CERTIFICATION

I certify that Miss Omolara Adijat Babatunde of the Department of Human Nutrition, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria, carried out this work.

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ACC/SCN Administrative Committee on Coordination/Subcommittee on Nutrition

ANC	Ante Natal Care
EBF	Exclusive Breast Feeding
FAO	Food and Agriculture Organization
FMOH	Federal Ministry of Health
IFPRI	International Food Policy Research Institute
MICS	Multiple Indicator Cluster Survey
ORC	Macros National Demographic and Health Survey
NFCNS	Nigeria Food Consumption and Nutrition Survey
NPC	National Planning Commission
SDA	Skilled Delivery Assistance
SCN	Standing Committee on Nutrition
TBA	Traditional Birth Attendance
UN	United Nations
UNICEF	United Nations Children Fund
USAID	United States Agency for International Development
WHO	World Health Organization
MDGs	Millennium Development Goals
FOS	Federal Office of Statistics
MMR	Maternal Mortality Rate
UAE	United Arab Emirates
UNFPA	United Nations Population Fund
MTCT	Mother to Child Transmission
NPC	National Population Commission
SES	Socio – Economic Status
ICPD	International Conference on Population and Development
MENA	Middle East and North Africa
VVF	Vesico–Vaginal Fistula
IFAD	International Fund for Agriculture Development
WFP	World Food Programme

GNI	Gross National Income
LGAs	Local Government Areas
NBS	Nigeria Bureau of Statistics
EAs	Enumeration Areas
FOMWAN	Federation of Muslim Women Association of Nigeria
RDI	Recommended Dietary Intake
IDI	In-depth interviews
HAZ	Height – for – Age
WAZ	Weight – for – Age
WHZ	Weight – for – Height
BMI	Body Mass Index
SPSS	Statistical Package for Social Sciences
OR	Odd Ratios
CI	Confidence Interval
HNS	Household Nutritional Security
ORT	Oral Rehydration Therapy
RDA	Recommended Dietary Allowance
TBA	Traditional Birth Attendance
ANOVA	ANOVA Analysis
FCT	Federal Capital Territory
MCH	Maternal Child Health

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

Malnutrition is defined as the cellular imbalance between supply of nutrients and energy, and the body's demand for them to ensure growth, maintenance and specific functions (WHO, 2000). This is recognized globally as the most important risk factor for illness and death, contributing to more than half of deaths in children worldwide (Grigsby and Shashidhar, 2006).

The World Health Organization cites malnutrition as the gravest single threat to the world's public health (WHO, 2008). Nearly, 50% of children aged 12 to 15 months are underweight and more than one third of children less than five years are stunted (Black *et al.*, 2008). In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing on a daily basis in the region (FAO, 2008).

The causes of malnutrition are both behavioural and resource related (SCN, 2003) and the adverse effects of malnutrition on the children are not restricted to poor physical health, but extend to cognitive, mental, social and spiritual development. The side effect of malnutrition could be transferred from one generation to another leading to a vicious cycle (Gillespie *et al*., 1993; Behrman *et al*., 2004). Children that are malnourished tend to have increased risk of morbidity and mortality and often suffer delayed mental development, poor school performances and reduced intellectual achievement (Alderman *et al*., 2003). Additionally, being stunted in childhood may be associated with cardiovascular morbidity in adulthood (Stein *et al*., 2005; Yang *et al*., 2008).

Furthermore, the conceptual framework developed by UNICEF (1990) separated food security (availability and access to food) from activities and behaviours related to food utilisation and classified these activities and behaviours under "care". Thus three fundamental pre-conditions for achieving good nutritional outcome were finally generated and these include: Household food security (Akinyele 2009), care and health practices (ACC/SCN, 1991; Engle *et al*., 1997a). It is the prerogative role of the woman to provide care at the household level, and the pattern of care provided determines the biological and developmental stages of the child. Moreover, the nutritional status of the under-five emanated from the inadequate care activities provided during pre and post-natal periods.

Such care includes ante-natal care; breastfeeding processes; complementary feeding; early discovery and treatment of infection and hygiene practices (Timothy *et al*., 2012).

Dissemination and use of new ideas on maternal and infant care depend on the ability of the women to comprehend the medium of communication and most importantly, to accept the value system associated with the new approaches. Kishor (2000), embarked on a study in Egypt where several dimensions of women's status (such as exposure to employment and family structure amenable to employment) was found to be associated with immunisation coverage in 12–23 months old children. The ability of the women to provide care for the well-being of their children rests solely on the quality of care they themselves receive and their own nutritional status.

Nigeria has the largest number of under-five children (20%) and child deaths (about one million yearly) in Africa. It is envisaged that Nigeria's low progress in under-five mortality and morbidity might draw Africa's success backward (FMOH 2007 and MICS, 2007).

Lately, the relationship between purdah and nutritional status of women has become a subject of unveiling study in Asian and Middle East countries. In India, Gosh (2004) conducted a survey among Muslim and Hindu women to determine the impacts of purdah on the status of Muslim women. His findings showed that Muslim women had the lowest per capita income indicators especially in the North than in the South. However, this was ascribed to low educational attainment, which leads to low socio-economic status, rather than religion.

Nigeria is characterized with diversity of culture, religion and environmental differences. Purdah is a significant phenomenon in the northern part of Nigeria and it literally means curtain or veil, which could also be referred to as the various modes of shielding women from the sight, primarily of men (other than their husband or men of their natal family).

The respondents for this study are Muslim women in purdah; those outside purdah (non-purdah) and their under-five children. The study instruments included the questionnaire and in-depth interview.

Consequently, the following variables were assessed in the study:

- Educational status of respondents and spouses

- Types of marriage
- Disposition to income-generating activities
- Constraints to health services utilisation
- Maternal autonomy in obtaining health-care for their children
- Knowledge of Breastfeeding /complementary feeding
- Food preparation, preservation and safety facilities (e.g. storage facilities)
- Assessment of respondent nutritional knowledge
- Cultural barriers against nutrition and health status
- Knowledge of growth monitoring
- Evaluation of male involvement in child-care
- Disposition of respondents to children's immunisation

1.2 Statement of the problem

Nutritional care and status are subsets of the overall health status and it focuses on the kind of food, health, environment and caring capacity of the individual. Invariably, the level of attainment of the nutritional status of an individual will determine the health status and overall well-being of the person.

Globally, women and children are the most vulnerable to socio-economic and cultural hazards. They make up most of the world's poor demographics (Miemie *et al.*, 2007). Some 1.5 million children still die every year because they are inappropriately fed, less than 35% of infants worldwide are exclusively breastfed for the first four months of life, and complementary feeding practices are in adequate and unsafe (WHO, 2000).

In Nigeria, nutritional deficiencies have been found to contribute to the high rate of disability, morbidity, and mortality, especially among infants and young children (NPC and UNICEF, 2001). The results of the national Health survey (ORC Macros, 2008) conducted in Nigeria revealed that 41% of children are stunted, 14% of children are wasted or thin, and 23% of children are under-weight. Both severe and moderate cases of malnutrition have significant impact on the outcomes children face for the remainder of their lives and are also a cause of severe illness leading to growth retardation (both physical and mental) and possibly death.

All available data on maternal and under -five children's health and nutrition show the dire situation in northern Nigeria. Specifically, children from the North-West are particularly disadvantaged, one-third are severely stunted, which reflects extensive long-term malnutrition in the region (NDHS, 2003 and 2008). Furthermore, across all maternal care indicators studied, there were marked regional differences among women. It was observed that both maternal and under–five children's nutritional statuses were significantly poor in the northern part of the country (e.g. North-western zone) compared to other zones of Nigeria (MICS, 1999; NFCNS, 2004; MICs, 2007 and NDHS, 2008).

Furthermore, few studies have been carried out to show the influence of purdah on the nutritional status of both the mother and their under-five children. Even then, most of the studies were conducted in the Middle East and not in Nigeria

Owing to paucity of information on the relationship between purdah and nutritional status of under-five children, this study attempted to address the gap in knowledge in this area. Hence, the study embarked on a comparative analysis of nutritional status of under-five children of purdah and non-purdah women in the north-west zone of Nigeria

1.3 Justification of the study

Nutrition and its association with health are paradoxical, and both over-nutrition and under-nutrition can lead to ill-health. Nutritional status however, is determined by health status, food security, environmental factors and the caring behaviour directed towards the individual (IFPRI, 2003). The global community has set a target of halving the prevalence of underweight children by 2015 as a key indicator of progress towards the Millennium Development Goal (MDG) of eradicating extreme poverty and hunger. It is noteworthy that during 1996-2004, more than 26 per cent of the world's under-five years children were underweight for their age. The proportion ranged from one per cent in developed countries to 27 percent in developing countries (WHO, UNICEF and UNFPA, 2004).

The nutritional situation in northern Nigeria, most especially, North-West followed by North-East were incredibly high compared to other zones in Nigeria. More than half of the children in the North-West are stunted (53%); 20% wasted and 35% are under-weight (ORC Macros 2003 and MICS 2007). Invariably, the achievement of the MDGs in Nigeria depends on the progress in Northern Nigeria. However, one of the ways of meeting the

MDG 4 on reduction of under-five mortality by 2015 is to have an understanding of the causes of malnutrition at the household level as well as providing appropriate recommendation. Previous studies have established significant relationship between maternal status (Ojofeitimi *et al.*, 2003), household food security, maternal educational and empowerment levels (Ajeiroh, 2006) and under-five nutritional status.

Few studies have been carried out to show the influence of purdah on the nutritional status of both the mother and their under-five children. Even then, most of the studies were conducted in the Middle East and not in Nigeria. Gannage–Yared (2000) examined various predictors of vitamin D and calcium deficiencies among men and women in Lebanon. His findings showed that in addition to other variables, veiling was an independent predictor of low vitamin D and calcium status. However, the few studies conducted in Nigeria have not actually addressed the nutritional status of women in Purdah in Nigeria. Lewis (1998) looked at the social context of maternal morbidity and mortality among the Hausa of Northern Nigeria. He was able to establish a significant relationship between the age of marriage and some of the complications encountered during child-birth.

Furthermore, an assessment of growth not only serves as one of the best global indicators of children's nutritional status but also measures quality of life of an entire population (Martorell *et al.*, 1995). Owing to the paucity of information on this group of women, and purdah being a significant phenomenon in Nigeria, especially in the Northern part of the country, it is worthwhile to conduct a comparative analysis of nutritional status of under-five children of purdah and non-purdah women in the north-west zone of Nigeria in order to assess underlying causes of the high prevalence of malnutrition in the study area.

1.4. Objectives of the study

1.4.1 General objective of the study

The general objective of the study was to evaluate the nutritional status of under-five children of purdah and non-purdah women in North–West zone of Nigeria.

1.4.2 The specific objectives were to:

1. Identify socio-demographic characteristics of nursing mothers in purdah and non-purdah.

2 Determine pattern of utilisation of health services among women' in purdah and non-purdah

3 Identify infant and young child feeding practices of the nursing mothers in purdah and non-purdah

4 Access the nutritional knowledge of the nursing mothers in purdah and non-purdah

5 Determine the anthropometric indices of the children

6 Identify hygiene practices of purdah and non-purdah women

1.5. Hypotheses of the study

The hypotheses of the study, stated in null form, are as given below:

$H_0$1: There is no significant difference between socio-economic variables and child nutritional outcomes of purdah and non-purdah women

$H_0$2: There is no significant relationship between hygiene practices and child nutritional outcomes of purdah and non-purdah women

$H_0$3: There is no significant relationship between health service utilisation and child nutritional outcomes of purdah and non-purdah women.

$H_0$4: There is no significant relationship between infant and young child feeding practices and child nutritional outcomes.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1. Socio-demographic indices and child's nutritional status

Adequate nutritional status is an outcome of various factors, and this usually becomes obvious most especially among the vulnerable groups such as women and children. The direct causes of maternal and under-five children's nutritional status are embedded in several numbers of underlying factors at the household, community and district levels that undermine the health and nutrition status as well as survival of these groups. Maternal socio-demographic indices are well documented in the literatures as factors influencing under-five children's nutritional status (Ajeiroh, 2006, Parimita, *et al*., 2010). These conditions have been grouped into lack of education, inadequate maternal and newborn health practices, health service utilisation behaviours, insufficient access to nutritious food and essential micronutrients, poor environmental sanitation and inadequate basic health-care service (UNICEF, 2009).

Universally, maternal education has been recognized as the most important maternal resource for care and hence, is categorised to be a crucial investment in children's growth and development (Engle, *et al.*, 1997, Ruel and Menon, 2003). Education attainment is perhaps the most paramount characteristics of household members (Sethi *et al.,* 2003) and maternal education attainment plays a crucial role in their dispositions to issues relating to health and nutrition of their children. Nigeria has the largest number of children who have dropped out of school in the world. More than seventy percent (70.8%) of young women aged 20-29 in the North-West are unable to read or write compared to 9.7% in the South-East. These figures show wide disparities between States and across communities. Several reasons were associated with this variation and this includes early childbirth and shortage of female teachers (British council 2012).

Low maternal education has been linked to serious development impairment in children and this affects not only the individual concerned, but has a substantial impact on the social and economic levels of the population at large. Grantham-McGregor (2007) found that low maternal education resulted in the highest risk of intellectual disability of offspring, while other factors such as maternal illness, delivery complications, gestational

age at birth, and even very low birth weight were not having similar effects as level of maternal education.

Maternal education has been very crucial in determining the nutritional outcomes of the children. The study conducted in Bangladesh among women of reproductive age discovered an association between maternal education and Body Mass Index (BMI). In this study, socio-economic status and years of schooling were found to be important predictors of women's BMI and this yielded a positive influence on the nutritional status of mothers and their children. Also, a study in Pakistan revealed that the majority of infants with signs of under-nutrition had mothers with virtually No formal education. The study also observed that the introduction of complementary foods for infants at an appropriate age (6 months) improved when mothers were educated (Ojofeitimi 2003, Liaqat, 2007).

Maternal education has also been linked to adequate growth in children and various studies have established that an increase in the level of mother's education showed a decreased incidence of malnutrition among young children (Yimer, 2000; Geneb *et al.*, 1998). An impact of education has been reported on the improvement of nutritional indices of the under-five children. Bound (1995) observed that being literate or having some level of education showed an increment in child's nutritional status by more than one–third of a z-score.

Numerous factors have been attached to low coverage of immunisation for the children. The role of maternal education was reported to have significant link with higher vaccination coverage for the children compared to paternal education (Nandan *et al.*, 1985; Sathar, 1987). Previous studies linked higher maternal education with a higher vaccination coverage for their children owing to their better knowledge and firmer understanding of the benefits and needs of immunisation Angelillo *et al*., 1999; Dabbagh *et al*., 2007; Pande, *et al.*, 2002; Sethi *et al.*, 2003). However, some studies gave totally contrasting results, stating that higher educated mothers were found to be more ignorant of the vaccination details and their children less covered by vaccination (Pristlin *et al.*, 1998; Angelillo *et al.*, 1999). This probably could be as a result of genders roles in different societies.

Kate (2004) conducted a study in the United States on the effect of maternal education on child immunisation status. The study supported a positive correlation between maternal education and child immunisation status. Additionally, a study at the University of

Jos Teaching Hospital in the North-central region of Nigeria showed that nearly three quarters of maternal deaths in 2005 occurred among illiterate women (WHO, 2006).

Generally, educated mothers are more informed about important knowledge that could be useful for their children's health. They are more capable of making a good choice on the appropriate care for their children. Eventually, both the ability to earn income and the ability to appreciate the importance of care-giving are increased (Engle *et al.*, 1999). Women who receive even a minimum education are generally more informed or aware than those who have no education of how to utilise available resources for the improvement of their own nutritional status and that of their families. Uneducated mothers are bound to make incorrect decisions (Filmer *et al.*, 1999)

Additionally, the impact of mother's literacy level on the development of the child had also been recognized more than 3 decades ago in Nigeria, knowing fully well that malnutrition is one of the common causes of death among Nigerian children (Onadeko, 1980, Nnayelugo, 1983). The findings of Onwuzurike (1988) in a survey conducted in Bauchi (Northeast) and Plateau (North-Central) states of Nigeria showed similar effects of women's education on children's health and nutrition. He observed that high illiteracy rate among women has significant repercussion for the welfare of both mothers and under-five. Alebiosun (1991) also examined similar effect of maternal literacy on the nutritional status of under-five children in Ondo state of Nigeria. The results showed that children born to illiterate mothers were malnourished with respect to their anthropometric indices.

Also, the theory presented by Bicego and Boema (1993) is that greater physical access to health services can explain the relationship between maternal education and child survival. Researcher has assumed that when health-care is accessible to both educated and uneducated mothers educated mothers would take advantage of these services more than uneducated mothers. However, the difference can only be unmasked if greater access is made visible to uneducated mothers. Nigeria showed a relationship between maternal education status and rate at which health service utilisation from trained providers is sought. For instance, 31% of mothers without any form of education attainment received Ante-natal (ANC) services from a health professional compared with 97% of mothers with more than a secondary education (NDHS 2003 and 2008).

Furthermore, the issue of less access to health services can also be related to rural and urban residency where greater access to health-care is more available in the urban environment than in the rural. Even though, urban settlement was among other variables that was found to reduce the duration of breastfeeding in a comparative study of Kenya and eight other developing countries in Asia and Latin America (Mott, 1984). Again, low education attainments and rural characteristics of poverty were mirrored in the geographical distribution of poverty. Sangole *et al.*, (2002) concluded a cross-sectional study to reveal the pattern of breastfeeding practices in the urban slum of India. The results showed that 7 out of 600 mothers (1.6%) recruited for the study actually practiced exclusive breastfeeding for their children.

Conversely, some researchers had also observed that breastfeeding practices such as duration, timing and outcome of breastfeeding need to be compromised with increased number of education attainment in breastfeeding mothers. It is worthy to mention that in Nigeria, the reverse was the situation found among educated mothers where exclusive breastfeeding (for the first six months of life) was predominantly common among the educated than the uneducated mothers, even though the rate of EBF is still very low in the country (13%), (ORC Macros, 2008).

A shorter duration of breastfeeding was noted among mothers with high education and prolonged duration than recommended was found among poor and illiterate mothers. However, despite the advantage of this practice, both prolonged breastfeeding and delayed complementary feeding resulted in malnutrition.

In conclusion, the responsibility for sending children to school lies with the parents, and previous study has shown that in a certain region of Nigeria (specifically, in the Northern parts where girls' right to education has been violated) some parents refuse to send their daughters to school rather; they send them into the streets to hawk (British Council, 2012).

There are striking gender disparities in education attainments across both sexes. In almost all the regions in the developing world, fewer girls than boys attend schools. About 62% of women in developing countries are illiterate, while only 38% are literate despite the importance of education. A similar scenario was observed in Nigeria on the attitudes of parents towards female education, most especially in the North-western zone. About 75%

of women in the North-West have no education, whereas in the South- East, the figure is 8%. It is noteworthy that out of the 13 states with gender disparity in primary and secondary education, 11 are in the northern parts of the country (Kole, 2008). A survey in 2006 showed that the North-West and the North-east recorded enrolment rates for females in junior secondary schools to be lower than the Sub-Saharan African average of 26%.

However, studies have shown that nutrition and health education could be considered as potential substitutes, at least in the short term, for maternal schooling (Ruel and Menon, 2003, Sule *et al.*, 2009). It is believed that even in the absence of a schooling opportunity for a mother, the availability and accessibility of certain related knowledge (sources of such knowledge could include ante-natal visit, immunisation visits, peer groups, media resources and even through community dialogues and caregivers' experience) to child-care could still compensate, at least to some level, for the lack of formal education (Engle *et al.*, 1997a). It is expected that the more educated a mother is, the more likely she is to be receptive to developmental initiatives such as the Childhood Survival Strategies. This has the effect of improved family nutrition and less risk of childhood malnutrition (UNICEF 2000).

Glewwe (1999) also carried out a study in Morocco among the women and the results established that knowledge gained outside the classroom (specific nutrition training) had potential benefits on the women. Moreover, formal schooling is often limited among the poor in the study area. However, mother's level of formal education can assist better in facilitating the level of assimilation and acquaintance with such knowledge. Hence, formal education augments any other acquired knowledge.

Furthermore, male involvement in child-care was also found to influence nutritional status of the under-five children. Oyewole (2007) conducted a study among men of reproductive age in Oyo State of Nigeria in order to measure the impact of male involvement. The study was able to establish a positive significant relationship between male involvement in child-care and rate of exclusive breastfeeding for the under-five children.

2.1.2 Women's autonomy and economic determinants of child's nutritional status

The economic status of a household is an indicator of access to adequate food supplies, use of health services, availability of improved water sources, and sanitation facilities, which are prime determinants of child and maternal nutritional status (UNICEF, 1990). However, the relationship between family poverty and children's health is well known (Angelillo *et al.*, 1999 and Montgomery *et al.*, 2000).

Some authors have emphasized that children from poor families may come up with several health problems at once. Wamala *et al.,* (2001) study had shown the link between growth delay among poor children and cognitive function, and cardiovascular disease in adulthood. Hence, prevention of health problems in poor children is critical. Considering how various resources influence children and women's health it can be inferred that with the availability of adequate resources (both human and economic), the nutritional status of both mothers and children can still be improved when these resources are pooled together.

Annual family income has always been used to provide information on resources linked to income. Louise *et al*., (2005) conducted a study among Canadian children, controlling for mother's level of education and neonatal health problems. He was able to establish a significant relationship between the occurrence of health problems in toddlers and children raised in a family with a serious lack of money for basic needs. One explanation of different vaccination coverage in children of different socio-economic status is reported to be the different sources of vaccination. The higher socio-economic status of the parents served as an opportunities for easy access to obtain and consult the private health services, while the lower status are limited to the public health sector only, which is even limited in some areas and, even if available might be difficult for the less privileged in the society to access (Topuzoglu, *et al.*, 2005). A lack of material resources can affect children's health directly through under- nutrition (Rahman *et al*., 2009) as well as through poverty, thereby eliciting long-standing stress for both parents and children.

In Nigeria, the northern states, which are substantially rural and have had less opportunity to education, experience more poverty than the other parts of the country. According to national statistics, a third of Nigerians' poor are concentrated in three northern states– Sokoto, Kaduna and Kano (Federal Office of Statistics, FOS, 1996). The incidence of poverty as measured by income categorised the six zones in Nigeria with North-East

(70.3%) having the highest, followed by North-Central (66.5%), North-West (65.4%), South-South (55.8%), South-West (46.1%) and South-East (39.8%). Unfortunately, Jigawa state (North-west) has the highest incidence of poverty of 90.9% (Kole, 2008).

Women help in food production and their contribution is even greater in some societies. They provide most of the labour needed in agriculture for food production and even help in the sale of this farm produce in the market. Often times, the income generated from agriculture sale by women is dedicated to children's upkeep, however, apparently some situations are impeding these efforts of the women-folk. Attitudes towards women's control over income vary across different regions, and this usually translates to women's autonomy (which also varies by the dimension of the autonomy being considered).

Generally, in traditional societies, women's social autonomy (their rights, power and status) is often defined in the domestic sphere (Bloom *et al*., 2001), while household decision-making and freedom of movement are indicators of the level of autonomy that women enjoy in the domestic sphere. Hence, maternal economic status is influenced by access and control over economic resources (Rahman, 2006). According to Taguri *et al*., (2008) in some Muslim settings, women generally have less freedom of movement or decision-making especially on the treatment of children's illness, than women in Non-Muslim communities, although such differences were not always substantial.

It is noteworthy that available literature documents the near–universal rights and practice of Muslim women's control over their wealth. Despite the practice of seclusion, most of the economic engagements by women in the North take place within the home. Often times, their economic earnings are individually held and spent on what they perceived as their private needs such as engagement in social networking (biki), and buying of "Kayan daki" (room decoration for themselves and their daughters). More importantly, the husband has no control over the labour of his wife, contrary to the practice in many African societies (British Council, 2012). This practice is very common and is mostly one of the remarkable features of Muslim women in the North. Meanwhile previous study in Africa had indicated earlier on that, at similar levels of income, households in which women have greater controls over their income are more likely to be food and nutrition secured (Kennedy and of Haddar 1991). Conversely, this practice is observed to be in decline, probably due to general economic setback, or because of the increase in the

number of women with professional qualifications who are now engaged in the development of the society (British Council, 2012).

2.5 Purdah and gender order

The definition of purdah (literally meaning 'curtain' in Urdu) commonly refers to the practice of gender segregation and the seclusion of women and girls, as well as the use of veiling in public (Balchin 1996).

In Northern Nigeria (mostly dominated by Muslims) women are traditionally expected to live under the practice of purdah. Therefore, the analysis of women's life and status in this society cannot be adequately carried out without taking into consideration the crucial importance of purdah as a constant element in everyday life in northern Muslim culture.

Terms like 'segregation' and 'seclusion', which are usually associated with purdah observance, refer to the limitation of interaction between the women and men outside certain well-defined categories (Papanek, 1971). According to Ibraz (1993)

> "*...one of the most defining features of Muslim purdah is that social intercourse between man and woman is delimited by the criterion of kinship. In this* respect, *social access and interaction between men and women is possible only if they are related…". (Ibraz 1993: page)*

It is, therefore, clear that only those men and women between whom social interactions are permitted and whom marriage is prohibited are said to be 'Mahram' persons.

> "*…Mahram is the legal term denoting a relationship by blood, milk, marriage or sexual union which* makes *marriage between persons so related forbidden. The term is also used in sense that Mahram persons are those with whom one can mix freely and be on informal term. Non-mahram, literally denotes any person of the opposite sex whose kinship does not represent an impediment for marriage…" (Khatib-Chahidi , 1993: page).*

However the practice of veiling in everyday life does not necessarily mean subordination as it is often interpreted in Western discourse (Vagt 1992). For the individual women, veiling can also be used strategically as a means of broadening her space of action, for example, for gaining access to the public sphere that would otherwise be denied to her (Vagt 1992).

Furthermore, in Muslim societies the social order is pervaded by notions that concerns (female) sexuality and by concepts of how sexuality can be best organized and controlled. This world view is simply there, operating between people more or less unconsciously as part of everyday's life (Dhal, 1997, Mernissi, 1987). Hence, the result is gender order whose main characteristic is gender segregation.

2.1.3. Concept of care and malnutrition

Malnutrition is a complex phenomenon that stems from various underlying determinants, including problems of household food insecurity, access to health–care services, presence of an unhealthy environment, and lack of optimal feeding practices for infants and young children, and unavailability of care for the vulnerable household members, particularly women and children. Accordingly, UNICEF's conceptual framework for determinants of nutritional status, maternal and child-care practices have been given due attention. This is in addition to sufficient food supply at the household level and access to health services and a clean environment (UNICEF, 1997). The concept of care has been realized over a decade ago. It directly or indirectly determines the nutrient intake, health, cognitive, and psychosocial status of the child (Engle *et al.*, 1997).

The term "care of children and women" includes not only the care a mother renders to her child but also the care women receive either within the household, by her family members, community supports, or social activities at the health centre or work places (Engle *et al.*, 1997). The care rendered to the mother may have direct effects on her ability to provide responsive and highly qualitative care for her children. Often times, the actual food ingested by a child are closely related to the food security of the household. Nevertheless, it is also highly dependent on the care-related feeding behaviour such as breastfeeding, complementary feeding, and food preparation hygiene status of the child's mother. Some children in low-income countries with high rates of malnutrition grow normally due to better education and household management, or coping skills of their mothers (Pelto, 2000).

Various factors have been linked to childhood malnutrition, disability and death, but most importantly, the synergistic relationship between child malnutrition and care is continuously recognized (UNICEF, 1998). With regard to the concept of care, woman as a

caregiver is pre-eminently recognized as the first-in-line caretakers of children from the beginning of humanity, and their contributions at home and within the community cannot be underestimated. The impact of this has been clearly understood for the well-being of the child among various health-care providers, community development practitioners, and home economists. However, the care initiative stated that for women to render any adequate care, they themselves must have acquired certain care in terms of nourishment right from their intrauterine, through childhood and up to motherhood.

Consequently, attempts to address the predicaments brought about by malnutrition have led to the development of possible potential channels in order to tackle nutritional problems in developing countries, Nigeria inclusive. Actions identified to improve both maternal and child nutrition includes community-based programs to support breastfeeding and national programs to increase childhood immunisation, safe motherhood and family planning services. However, the issue of gender (maternal) impact on nutritional status has not been adequately investigated in Nigeria, whereas it attracts more attention in situation whereby malnutrition brings an avoidable global progress setback especially in the developing countries among children that are less than five years of age.

Again, it has been realized that for care to be efficiently performed, sufficient resources such as time, energy and financial support must be made available at the caregiver's disposal (ACC/SCN, 1999). Availability of these will translate to food security and health-care into a child's well being and adequate nutritional status. The explanation derived from this concept is that, poor care limits the ability of children especially the infants, to consume enough foods (infrequent feedings), diminishes the quality of the sanitary environment, and reduces the psychosocial stimulation the child receives.

Nevertheless, the characteristics of the child also influence the care they receive; the relationship between the cares received by a child however, depends on the age and the developmental stage of the particular child (Aschalew, 2000; Samuel, 2004). Additionally, in the care context, enhanced care-giving practices for instance, inhibit the effect of poverty and low socio-economic status of the households where existing resources are optimized to promote good health and nutrition in women and their children.

The body of evidence suggests that a preventive approach that targets children at the age when they are most vulnerable to growth faltering (i.e. between 6 and 24 months of

age) has recognized care to be the most substantial resource needed to maintain adequate growth at a higher level of development throughout their most vulnerable period (Ogunba, 2007). Meanwhile, the impact will not only manifest in the short-term, but also its long-term benefits on the child's growth (Aschalew, 1995).

Consequently, the factors affecting food utilisation and nutrition have ever since been constructed and organized around six important elements usually observed by the care-givers (ACC/SCN, 1999), and these include the following:

- Care for women,
- Infant and young child feeding practices,
- Food preparation, processing and storage,
- Hygiene practices,
- Home health practice,
- Psychosocial Care.

2.1.4. Care of women and child nutritional status

Care for women requires the same elements as those aimed for other vulnerable and dependent groups; provision of time, attention, support and skills to meet their nutritional needs. This care can be provided by the husband if women are married; and from extended family networks if they are yet to be married, or separated from their husbands. In most societies women are required to provide primary responsibilities for their family. However, this task is an additional duty aside from the biological responsibilities of reproduction. All these are usually carried out before they can think of engaging in any income-earning work. Often times, this situation eventually predisposes women (especially in developing countries) to low paid income-earning which will invariably put them to low socio-economic status (Jayati, 2004).

Hence, actions to protect, support, and promote adequate nutritional status of the under-five children cannot underestimate maternal inputs and this should also include measures to improve the image and attitudes towards mothers of these under-five children (ACC/SCN 2001). The care provided should be extended to post-natal care, physical health, mental health, autonomy and respect within the family (Engle *et al.*, 1997a).

The report of a cross-country survey using data from 63 countries with multiple observations over time discovered that improvement in women's education and life expectancy relative to men's have contributed immensely to reduction in child malnutrition of more than 40% (Smith and Hadad, 2001).

Presently, the relationship between purdah and nutritional status of women is being recognized in some studies carried out in Asian and Middle East countries. In India, Gosh (2004) conducted a survey between Muslim and Hindu women to determine the impacts of purdah on the status of Muslim women. His findings showed that Muslims women have the lowest per capita income indicators especially in the North than in the South. However, this was ascribed to low educational attainment, which leads to low socio-economic status, rather than religion.

Study was also conducted among three regions (South Asia, Sub-Saharan Africa and Latin America, and the Caribbean) showed that women with better status have better nutritional status for themselves, and are more capable of giving their children more qualitative care and attention (IFPRI, 2003). This intergenerational linkage has been well drawn whereby a vicious cycle exists between a malnourished mother and their babies. This process may be continued, thus increasing the (SCN, 2007).

Similarly, Alok *et al.*, (2005) conducted a survey in India involving pregnant woman at term and the cord blood of their newborn. The results showed a significant relationship between maternal hypovitaminosis D status and subsequent problem of malnutrition which may eventually be passed down to future generations (nutritional status of their children. Furthermore, the results also revealed that non-affordability of diet rich in calcium, coupled with social and cultural practices (which precluded adequate exposure to sunshine) were found to be limitating conditions in India.

The implication of these practices becomes very useful in some cultural settings whereby culture has influenced lactating mothers from eating adequately during pregnancy for fear of having "big" baby at birth. The practice has led to many mothers being predisposed to stunting and underweight, and it also increases the chances of developing complications and poor birth outcomes (UNICEF, 2009).

Mostly, the usual practice is for food to be consumed among members of the household without special consideration for pregnant women, even though, public heath

medical specialists understand fairly well the debilitating effects of malnutrition on young children such as stunted growth; impaired cognitive functioning; increased vulnerability to disease and greater risk of death (Nicol,l 2000; Pollitt, 2000).

In Nigeria, this practice has also been reported to have led to high prevalence of anaemia, especially among pregnant women in the North-western zone. This is considered a major cause of maternal mortality among this group of women (UNICEF Nigeria Report, 2006). Consequently, efforts were geared up to ameliorate this unpalatable situation, hence micronutrients supplementation has therefore been recommended in the efforts to combat micronutrient deficiency in the expectant mothers, and alternative drugs were made available in vitamins and iron. Unfortunately, according to ORC Macro (2003) survey, 10 % of pregnant women take iron supplement for at least 90 days during pregnancy in the north-west compared with 63% found in South-west. This situation has not received better improvement according to latest update from the national survey (ORC Macros, 2008).

Again, poor nutritional status has also been realized to be more associated with less child-care than income generation. Income generated by women has been well researched and found to contribute to food security and enhance care-giver resources to survival (IFPRI, 2003). The impact of this condition depends on the robustness of the income, the presence of capable adult care-giver and the age of the child.

However, there are other studies that revealed a negative effect of maternal earnings on child nutritional status. Rahman *et al*. 2009; Brunken *et al.,* 2006 studies showed that higher socio-economic status and maternal employment outside the household were negatively associated with breast-feeding outcomes. For instance, shorter exclusive breastfeeding and earlier bottle feeding were associated with women's income-earning in Thailand, Indonesia, and Colombia, but they had no effect in Kenya (Winikoff, 1988). The authors concluded that there were other determinants to poor child feeding attitudes of mothers than income earnings. Festus (2003) study showed that women's work load has a negative influence on nutritional outcomes in under-five children in Nigeria. The result added that wasting increased among infants when their mothers do not take them to work probably due to recent episodes of diarrhoea, or shorter breastfeeding duration.

Also, Emmanuel, (1986) study in Ondo state could not establish a significant relationship between time spent at work and the effect on the nutritional status of children

with respect to weight-for-height (wasting) among children under-five years of age. However, Jessica (1998) study was able to show that children of employed mothers (56%) fared better in weight-for-height than those whose mothers were not employed by either controlling or not controlling for socio-economic status, maternal education, paternal financial support, child-care adequacy, sex and age of the child. It was also shown that children with inadequate alternative child-care (care by a pre-teen, or care at the work place) had lower height for age, even controlling for the same variables and for maternal employment.

Ogunba (2007) conducted a study in Osun State among women of reproductive age and their under-five children and was able to confirm the positive association between working for earnings alone rather than improved child care.

2.2 Infant and young child feeding practices

Breastfeeding is an important child survival strategy. It provides the required nutrition that caters for growth, cognitive development and immunological components that healthy term infants need (Leon-cava *et al.*, 2002). The situation observed in developing countries revealed that breastfed children are at least six times more likely to survive in the early months than non-breastfed children; in the first six months of life they are 6 times less likely to die from diarrhoea and 2.4 times less likely to die from acute respiratory infection (WHO, 2000).

The option of breastfeeding could also be traced back to a specific religious belief (Islam) where breastfeeding a child for a period of 2 years had been stipulated long before the awareness became advocated by different segments of the society. Subsequently some Islamic countries like the Islamic republic of Iran derived this legislation from Islam.

Moreover, relevant studies have been conducted over time, and many other numerous studies in developing countries have shown that breast milk out-put is sufficient for up to six months of age in infants, even in malnourished mothers (UNICEF, 2002). Early initiation of breastfeeding, within one hour of birth, protects the newborn from acquiring infection and reduces newborn mortality (Edmond, 2006).

Low adherence to established breastfeeding guidelines is a major health concern because it becomes a catalyst for various childhood diseases and increases chances of

childhood morbidity and mortality. Many factors have been identified to influence mothers' decision on when to initiate breastfeeding and these have been found to influence the nutritional status of the under-five children. Certain resources have been identified to influence the nutritional outcomes of both mothers and their under-five children. The literature reveals more and more studies that define social and cultural determinants of breastfeeding. In low-income communities, the factors that generally seem to influence decisions regarding breastfeeding are associated with education, employment, and family (Sasaki, 2010).

2.2.1. Colostrums, pre-lacteal feeding and exclusive breastfeeding

Colostrums is the first breast milk, yellowish in colour and thicker than later milk which comes in small amounts in the first few days after delivery. It is all the food an infant needs for this particular moment even without water (Baker *et al.,* 2006), due to enormous advantages like antibodies, proteins, fat-soluble vitamins, minerals and electrolytes embedded in it. However in practice some mothers refuse to feed their children colostrums because of the belief that it might harm their children. Some studies have shown that different conditions lead to the feeding of colostrums to infants. Among the reasons cited were grandparents' negative attitudes towards colostrums feeding; a belief that it is bad for the child's health; caesarean deliveries; place of birth and absence of colostrums secretion (Ghosh, 1992).

Despite the increase in the dissemination of information and communication about its importance the usual negative attitudes of discarding colostrums is still in practice among some countries. This was revealed in the study conducted in India, where 85.7% of the mothers were discovered to have discarded the colostrums expected for their infants first feeding (Anuradha, 2004). Similarly, in Bangladesh, despite the formation of Baby Friendly Initiative Hospital, the negative impact of delivery at home (87-89%) has precluded its impact on the rate of exclusive breastfeeding, among mothers, whereby only12.8% actually practiced exclusive breastfeeding (Faruque *et al.*, 2008).

Exclusive breastfeeding has also been realized to confer additional benefits in Hiv-1 patients, most especially by lowering the transmission rate when mixed feeding is avoided in such patients. WHO recommends that mothers should exclusively breastfeed their babies

for the "first months of life," and then transition to complementary feeding around six months of age (WHO, 2001), hence, mixed feeding is associated with a higher risk of mother-to-child transmission (MTCT) (Iliff *et al.,* 2005).

Furthermore, opinions differ on the optimal duration of exclusive breastfeeding. Non-exclusive breastfeeding is the norm in many Sub-Saharan countries (Becquet *et al*., 2005; Yeo *et al.*, 2005). Most often, the controversy stemmed from the so-called "weanling's dilemma" in developing countries where the choice between health benefits of exclusive breastfeeding and the (theoretical) insufficiency of breast milk alone to be adequate in energy and micronutrients for infants beyond four months of age. Various factors have been identified to predict whether mothers will actually end up with the practice.

Employment as a barrier to successful breastfeeding has become a recurring theme in breastfeeding literature. Marques *et al.,* 2001 study was able to show that breastfeeding is common in the northeastern region of Brazil, but is often interrupted by early introduction of other sources of nutrition. The negative effects of mother's work on child nutritional status are presumed to occur due to the lack of care-giving (including breastfeeding). Davies-Adetugbo *et al., (*1997) carried out a study between two groups in Ile-Ife, South-west zone of Nigeria (among Yoruba and Hausa populations) on the effects of education on breastfeeding practices. He was able to establish a positive significant relationship between maternal education, ethnicity and other variables as crucial in the outcomes of breastfeeding practices (specifically initiation of breastfeeding) among the mothers.

Conversely, formal education was also found to likely prompt mothers to start feeding human milk substitutes, which encourages mothers to leave their children at home for economic activities. Similarly, Webb *et al.*, 2004 also reported a negative relationship between level of maternal education and breast feeding duration in Malaysia. However, the study carried out by Ukwuani *et al.* (2003) was unable to clearly establish the relationship between maternal work and child malnutrition.

Issues on male involvement have emerged in virtually almost all aspects relating to child survival and development. Male involvement has thus been identified to be another essential factor affecting the outcomes of breastfeeding practices in children under-five

years of age. Oyewole (2007) study was able to identify the influence of paternal involvement on both duration and initiation of breastfeeding; and whether mother would practise exclusive breastfeeding for their infants.

2.2.2 Adequate complementary feeding

Optimal and young child feeding (usually referred to as initiation of breastfeeding within one hour of birth, exclusive breastfeeding for the first six months of the child's life and continued breastfeeding until the child is at least 2 years old, together with age-appropriate, nutritionally adequate and safe complementary foods) can have a major impact on child survival. The practice has the potential to prevent an estimated 19 per cent of all under-five children's deaths in the developing world, more than any other preventive intervention (Jones *et al.,* 2003). Infant-feeding practices constitute a major component of child caring practices apart from socio-cultural, economic and demographic factors. Somehow, these practices constitute one of the most neglected and important roles in the growth pattern of children. Recent studies have recognized the link between malnutrition and child's666 feeding practices (Sethi *et al.*. 2003; Brennan *et al.*, 2004).

Often times, after the age of two or three years, the effects of malnutrition in a baby will be irreversible. Additionally, to break the intergenerational transmission of malnutrition, it is essential that children must be reached during the first two years of life.

As part of the guidelines for infant and young child feeding practices in Nigeria (FMOH, 2010), the following are characteristics of good complementary foods:

- High energy and adequate good-quality protein, vitamins, and minerals,
- Soft consistency to enable the child to swallow easily,
- Low dietary bulk,
- Need for minimal preparation prior to feeding and easy digestibility,
- No anti-nutritional factors and low indigestible fiber content, and
- No artificial colours and flavours.

Appropriate child feeding practices and behaviours of parents have a positive effect on growth of infants and young children (Saha, *et al.,* 2008). For instance, an analysis of

results from several Latin American countries demonstrated that appropriate breastfeeding and complementary feeding practices were positively associated with child height-for-age in most of the countries studied (Ruel *et al.*, 2002).

2.2.3. Formula feeding

Improving infant nutrition has wider implications over a person's lifetime because infancy is when the groundwork for dietary habits and nutritional adequacy is laid (PAHO 2003).

The reason for giving infants formulas has been documented by various researchers and this varied across different socio-economic and cultural groups. The reason could be medical or occasionally due to the death of the mother and also when there is insufficient breast milk secretion from the mothers, the common option is usually formula feeding. However, most mothers offered their children formula foods when it is not required at all for the child and these reasons usually include pregnancy; maternal illness; inflamation of the breast; and societal influence on the part of the mother.

The literature indicates that a mother's decision to breast-feed or formula feed her infant results from a complex interaction of various factors (Anderson *et al.*, 2002, Ceriani *et al.*, 2003, Sarah *et al.*, 2004, Shakaer *et al.*, 2004). Previous studies have shown that mother's current circumstances may therefore result in her opting to rather formula feed her infant, despite the known benefits of breast-feeding. A study conducted in USA (Lawrence *et al.*, 2003) showed that 11% of the mothers made their decision to feed their infants with formula only after the birth of the baby. Conversely, Sowden *et al.*, 2009 in Cape Metro pole finding revealed that majority of the mothers (80%) made their decision to formula feed their infant before the delivery of the infant., This is probably an indication that shows that some mothers did not have the intention of not breastfeeding their infant and were only challenged with breastfeeding difficulties after the birth of the infant.

The duration and commencement of the formula feeding now varies across different cultures in the society. Often times, children are given other feeds apart from breast milk purposely to reduce the thirst in the child, however, some mothers still believed strongly that breast milk alone cannot be provided as an adequate diet for the child, hence formula feed is added as an additional food for the growing child.

2.2.4. Food preparation, processing and storage

Food preparation starts from different stages ranging from procurement down to several other stages before it can be regarded as desirable for consumption by both adult and younger children. Hence adequate skills and efforts are pooled together purposely in order to achieve this, moreover, findings have shown that these activities contributes to child nutritional status (Engle *et al.*, 1997a).

Food preparation requires caregiver's knowledge, skill, energy and time to perform certain aspects of food such as grinding, mashing and adding specific ingredients to food to enhance both their acceptability and nutritional contents. Alternative cooking materials such as stoves and some other less labour intensive techniques reduce the caregivers' effort in food preparation and this also safeguards certain environmental pollution (ACC/SCN, 2001). It was observed that women who have many hours in the field for their economic engagement are often prompted to delegate feeding of younger children to their older children. It was further stated that in a particular situation, a young caregiver, who was also too young to start a fire had to give the baby prepared food kept over a long period of time without warming it.

Furthermore, food contamination is another outcome of poor hygienic practices in food preparation that predisposes children to malnutrition and infection. The sources of such contamination include unclean hands, feaces, polluted water, flies, domestic animals, unclean utensils and unsanitary environment. The most prevalent infections among children are respiratory and diarrhoea infections in which most children become most susceptible to them when complementary foods or liquids complement or replace breast-milk. Diarrhoea is believed to be the most common cause of child morbidity and mortality in developing countries. It is also suspected that almost 70% of these diarrhoeal episodes could be caused by pathogens transmitted through food.

Food storage can be improved by using various materials such as screen or cloth coverings over food, thermos flask, and closed containers for water; rhombus and silos for grains storage. Adequate Storage of food can help reduce the time families spend in procuring and preparing foods and reduce losses. Finally, beliefs and practices, ignorance, taboos, poverty, insufficient food, social infrastructure, and shortage of fuel and time often

make it more difficult to assure food safety, which invariably affects the health and nutritional status of the children.

2.2.5. Psychosocial care

Children's growth and nutritional status are usually determined from the responsiveness of the surrounding environment which is usually accessible depending on such factors, as the cultural phenomenon as well as the understanding given by the caregiver of such child.

Good psychosocial care includes provision of warmth, verbal interaction and condusive environment for learning. This has been found to improve the cognitive development of children and is related to complementary feeding styles (ACN/SCN 2001). Furthermore, other caregiver's clues that have been found to contribute to the child's nutritional status include affection, attention, involvement and encouragement of autonomy, exploration and learning (Engle *et al.*, 1997a). Hence, four major kinds of practices have been defined and discussed in the following stages

2.2.6. Attention, affection, involvement and exploration

Availability of attention, affection and involvement provided for a child such as maintenance of valuable traditional practices, holding, touching and talking to a child depend on the child's age, which obviously influences caregiver's behaviours as well as definitions of appropriate care. Engle, *et al..*, 1997)have documented the role of gender as a determinant of caregiver behaviour in some cultures, with male children receiving more timely medical care, a larger portion of family food, and more breastfeeding In the research context, it is observed that every developmental stage of a child is usually influenced by the child's age, and this usually dictates the caregiver's behaviour as well as the type of attention such a child will receive. Some authors also added that certain conditions such as children endowment healthiness, temperament, social and language development vary significantly in every child. These particular characteristics may influence how the outcome of care, food and attention is pronounced in a child (Piwoz, *et al.*, 1994; Engle, *et al..*, 1997).

In summary, breastfeeding is the only phenomenon where substantial attention, affection and involvement of the caregivers may be derived in the processes of child's nurturing (Engle *et al.*, 1997a).

With regard to children's nutritional and health status, much can be accomplished without the involvement of the health system. Mostly, improved water supplies and sanitation and cleaner sources of energy (to reduce indoor air pollution) could significantly reduce the incidence of some of the more common diseases of childhood. Exclusive breastfeeding for the first six months and appropriate complementary feeding could prevent almost 20% of childhood death in the 42 countries where 90% of those deaths occur (Jones *et al.*, 2003).

The new reference standard confirms that children born anywhere in the world and given the optimum start in life have the potential to develop within the same range of height and weight, i.e. differences in children's growth up to age of five are more influenced by nutrition, feeding practices, environment and health-care than genetics or ethnicity (UNICEF, 2009). However, these processes can only be achieved by the primary providers of care for young children in all cultures. Therefore the quality of the care a child receives is inextricably linked with the situation of the household and women.

Since 1995 Beijing World Conference on Women, the importance of gender has gained prominence in ways to boost good governance and improvement in health and nutrition. Initially the enduring battle of the sexes was likely to be the last thing on the leader's minds. The effects of gender are now being realized both at the grassroots level as well as at the larger society. Their influence can be realized in virtually all spheres of life, most especially in economic development and in an attempt to reduce poverty in the society (Rahman *et al.*, 2009; and World Bank, 2001). Public policies have different effects on men and women and these may lead to unintended outcomes due to the gender differences in behaviour.

2.3 Households Hygiene practices and environmental sanitation

Hygiene practices have been recognized to be paramount and they unequivocally contribute to health and nutrition of the under-five children. Few data are, however, available on this area (Silva *et al*., 2005). Inadequate sanitation of water, poor housing and

deficient health facilities characterized many impoverished communities and these adversely affect the health of the children (Kaufmann *et al.,* 1994).

The setback observed in the higher prevalence of young child malnutrition in South Asia compared to Sub-Saharan Africa were due to inadequate hygiene practices which are menacingly available compared to what is observed in Sub-Saharan Africa (Johnson 1997). In addition, it has been agreed upon by various researchers that there are emerging critical conditions that require being included in the process of measuring hygiene practices, considering their immense effect on positive health and nutrition outcomes. These include disposal of children's faeces; cleaning children after defecation; washing of hands after cleaning the children; before food preparation and during feeding period (Almedon, 1996, Arimond *et al.,* 2002). Subsequently, the practices are now grouped into five clusters which include disposal of human faeces, protection of water sources; water and personal hygiene; food preparation and storage; domestic and environmental hygiene (Boot *et al.,* 1993; Arimond *et al.,* 2002).

Various methods have been adopted in achieving measurement of these practices (i.e individual and environment) and each has been observed with their varying benefits to the outcome measures. The use of mixed methods was agreed to by various researchers to be explored in order to achieve detailed information and to possibly reveal any available cultural context and motivations for prevailing practices in the study areas (Almedon, 1996; Curtis *et al.,* 1997; Yeager *et al.,* 1999). Consequently, hand-washing has been widely used as a signal to poor hygiene practices and, in addition to this approach, spot-check observation of mothers hands and nails (if found dirty) is presumed to provide more robust information on the adequacy and frequency of expected hygiene practices (NPC/ORC Macro, 2004).

The study conducted in Bangladesh explored the usage of hygiene proxy by allocating scores to each practice observed in the households of study. He was able to establish significant relationship between prevalence of diarrhoea and hygiene practices. Similarly, Muoki *et al.,* 2008 carried out a study among under-five children in Nairobi and he brought out a similar outcome between malnutrition, diarrhoea, and poor environmental sanitation and hygiene.

The National Demographic Health Survey (2003), conducted in Nigeria, adopted two indices in measuring household hygiene practices; hand washing and disposal of children's feaces. Oyemade *et al.,* (1998) carried out an investigation among two major markets (Bodija and Gbagi) in Oyo State in order to measure the impact of hand-washing practices of mothers having under-five children and the incidence of diarrhoea. He was able to show that inappropriate disposal of faeces was a fundamental cause of recurrent prevalence of diarrhoea among the under-five children of these market women.

Furthermore, in order to arrive at a more comprehensive information of caregivers attitude in their hand washing practices, microbiological method (a proxy measure of effective hand washing practices was included in some studies which involve sampling bacteria from hands of caregivers. This approach complemented previous methods used in generating data from households (Kaltenthaler and Pinfold, 1995 Pinfold and Thoran, 1996).

Some other studies were able to bring out other variables that might be contributing to households' hygienic status and this explained how a particular household would be related to the environmental condition. Examples include socio-economic variables like maternal education, housing quality, assets possession, availability of waste disposal facilities, and water sanitation. Armer Wemesn *et al.,* (2000) conducted a study in Ghana among different socio-economic (SES) classes, and the study was able to find out that high socio-economic group had good hygiene practices. Also, a recent study in rural Ethiopia population, highlighted the importance of poor household sanitary facility (alongside other factors), and prevalence of childhood under-nutrition in the first year of infancy (Medhin *et al.,* 2010).

Conversely, households' with a good hygiene practices, despite their poor (SES) status, showed very positive results of having a low prevalence of diarrhoea. Invariably, poor environmental and hygiene practices sullied the benefits accrued to high socio-economic status (Paramita *et al.,* 2010).

2.4. Respondents' health service utilisation

Previous studies on the causes of malnutrition have established that food is only an aspect of the concept of malnutrition. Additionally, dietary intake; possible dietary

diversification; health status; treatment of diseases; maternal status and child health–care practices are also important determinants of causes of malnutrition (UNICEF, 2007). Health professionals have long viewed health in terms of the absence of medically defined disease or disability (Osmari, 1997). However, the World Health Organisation (WHO) had earlier recognized that there is a social dimension to health. Previous efforts have been accelerated towards provision of basic health services to different categories of the population, and this can be observed in the 1979 declaration of Alma-Ata. This was ground-breaking, because it linked the rights-based approach to health and transfer of aid and knowledge to reverse the disparities between industrialized and developing countries, to achieve the ambitious but unrealized goals of "Health for all" by 2000. In addition, a common set of indicators was agreed upon to monitor progress on reproductive health during the United Nations International Conference on Population and Development (ICPD) meeting held in Cairo (1994). These include the percentage of women using contraceptives and the maternal mortality ratio (defined as the number of deliveries attended by trained personnel), UNICEF, 2002.

The importance of skilled attendance at delivery has long been recognised (Engle *et al..*, 1997), and ANC visits also serve to encourage women to have skilled attendants at birth at a facility, who can provide life-saving emergency obstetric care interventions to women who develop serious complications. However, distance to health facilities, inadequate transportation, socio-cultural beliefs and the need for immediate and specialized services have hampered women's ability to access these services in many low- and middle-income countries, including Nigeria (Pandey *et al.*, 2002)

Really, nearly all women in industrialized countries receive ante-natal care; however, many pregnant women in the Middle East and North Africa (MENA) countries seek ante-natal care only when they have a complaint. More than half of maternal deaths worldwide occur within 24 hours of delivery, mostly due to postpartum haemorrhage (Shehu 1999). Meanwhile, maternal deaths have been strongly associated with the absence of good medical care before, during and after delivery. Unfortunately, according to one study of maternal health in Morocco, 50% claimed they did not seek medical care because they did not have problems with their pregnancy; another 22% reported unavailability of

such services at their disposal; while another 10% said the services were too expensive (USAID, 2001).

Socio-economic inequalities are similarly marked within countries. State and provincial differences in maternal and child health are also wide. Studies from contexts like India and Morocco have revealed that rather than religion, the demarcation between women's use and non-use of modern health care services is due to more immediate practical matters, such as the availability of transportation to a health facility, cost, and the presence of other relatives to assist with home delivery (Griffiths *et al.*, 2001; Obermeyer, 1993). Variations by socio-economic position, derived from comparing skilled attendance at delivery across different income levels showed unparallel results. Among the poorest 20% of South Asian mothers, fewer than 10% of births are delivered by a skilled attendant, compared to 56% of births for mothers from the richest income quartile in the region (Abou-Zahr *et al.*, 2003). Even in Europe and Central Asia, the proportion of deliveries attended by skilled health personnel is significantly lower for the poorest women than for the most affluent group (Abou-Zahr *et al.*, 2003). Furthermore, one of the biggest challenges for maternal and under-five children's health is the shortage of skilled health personnel. The determinants of social health stemmed from social and personal resources as well as physical capacities of health providers and users, and the contributions of the state and institutions to reduce structural barriers that may preclude adequate utilisation and vulnerability to poor health (Caldwell, 1993; Lucas, 2000).

Generally, in Nigeria, less than half of the births are attended to by skilled health personnel (MICS, 2007). Furthermore, in Nigeria, the ORC Macros 2008 revealed that around 39% of deliveries in Nigeria were attended by skilled birth attendants, which is a decrease from 44% reported in 2007 MICS. However, this varies across different zones in the country.

A 2006 World Health Organization survey reveals that while Africa accounts for more than 24% of the world's health workers. America has only 10% of the global burden of disease, but commands 37% of the world health works. The shortage arises from factors such as including weak incentive for heath workers, low remuneration and high levels of stress. A survey of 10 African countries showed that the number of locally trained doctors

now in eight developed countries was equivalent to 23% of the doctors still domestically employed in these countries (Stilwell *et al.*2003).

Data from several Sub-Saharan African, however revealed that the proportion of mothers and children who received a package of four essential interventions (ante-natal care, skilled attendance at delivery, post-natal care and childhood immunisation) was two to six times higher-depending on the country, mostly among the richest groups than it was in the poorest groups (Kerber, 2007).

The rural-urban gap is particularly large in lower-income countries. In Egypt, for example, only forty-two percent of pregnant women in rural areas received any antenatal check-ups, compared with 70 percent of those living in urban areas; in Morocco, the rates are 56 percent and 88 percent respectively (USAID).

In Nigeria, women in the urban areas and those found in the Southern part are more likely to receive ante-natal care (ANC) than those residing in the rural area and in the northern part of the country. According to the outcome of the national surveys (ORC Macros, 2008), 87 percent of mothers received ante-natal care from a health professional in the South West and South East zones, compared with 31% of mothers in the North West. Further dichotomy of the state showed that 98 percent was found in Anambra compared with a low level of 12% observed in Kebbi state.

According to Rahman *et al.* (2006), three responses can be generated to assess maternal ability to health-care for themselves based on: knowing where to go in the event of sickness, getting permission to go and money for transportation to visit. It was revealed that 58.8% of pregnant women attended one or more ante-natal visits which is obviously lower than 61% reported in MICS 2007. About eighty-two percent and 89% of women in the North East and North West respectively have their deliveries at home in the previous five years, compared with 13 percent from the South East and 21% percent from the South-West (ORC Macros2003). Although, the importance of home care cannot be underrated since various studies across countries showed that 70-80% of health care treatment is performed at home by caregivers, specifically mothers (World Bank, 1994), but this cannot substitute for the need of adequate and accessible health-care obtainable at health facilities.

Distance, cost and competing priorities may determine whether the woman will thus follow medical advice or reject it as the situation might warrants (Haddad *et al*., 2003).

Occasionally, women insist on their husbands bearing the cost of drugs, laboratory investigations, and children's medical and transport fares to the health centre (Mayer, 2003; Siziya 2009). However, the refusal by husbands to give permission to their wives to seek medical help may become more common with the current economy instability, most especially in developing countries. Hence, when husbands refuse to pay the medical bills, wives are left without medical care.

Consequently, delay in seeking hospital care has far-reaching negative impacts on women's and children's health in less developed countries, Nigeria inclusive. This attitude has been implicated as an important cause of high maternal mortality and morbidity rate in the Northern part of Nigeria (Shehu 1992) as well as other gynaecological problems (Myer 2003). Unfortunately, this practice has over a long time predisposed women in the Northern parts of Nigeria to bear the burden of 200,000 sufferers of vesico-vaginal fistula (VVF) where seventy percent of this estimate is found (Khalid *et al.*, 1996).

2.6 Anthropometric characteristics of women and their under-five children

Generally, welfarism improvements at the households are not just to achieve increase in incomes of the households; they are related to who actually accrues the income within the households. Researchers have done some crucial findings in revealing the relationship between income allocation and child's nutritional status. De Onis *et al*., 2000 and Rahman *et al*., 2009 were able to draw a close relationship between increase in income and child nutritional status.

Various factors have been adequately researched to be imperative in influencing the nutritional status of an individual across all age groups. Often times, women and children mostly bear the brunt of the unpleasant burden owing to their higher nutritional requirement and vulnerability (Girma, 2002). Many of the Millennium Development Goals (MDGs) – particularly MDG 1, to eradicate extreme poverty and hunger, and MDG 4, to reduce child mortality rate will not be reached unless the nutrition of women and children is prioritized in national development programmes and strategies.

Emphasis should, therefore, be concentrated on the status of women as it affects the nutritional status of the children. According to findings on the relationship between gross national income (GNI) and childhood nutritional status, India has a higher (GNI) per capita

at $730 than most of Sub-Saharan Africa, but despite the shift from food deficit to food surpluses on the national level, the rate of stunting among their under-five children is still 46%. This observation was further compared with a country like Gambia which has lower GNI. Gambia had just 19% rate of stunting despite their lower GNI per capita (UNICEF 2007). An inference was then drawn on the positive implication of care and attention provided for their women in Gambia compared to India. In summary, meaningful efforts aimed at reducing malnutrition should, therefore, consider the status of women as crucial components in the effort to translate agricultural-led poverty reduction into nutritional improvements. Consequently, factors militating against this essential contribution of women should therefore be considered appropriately.

CHAPTER THREE

3.0. METHODOLOGY

3.1. General study design

The study was a comparative cross-sectional study of nutritional status of under-five children of purdah and non-purdah women in the North-West zone of Nigeria

3.2. Sampling design

A stratified multi-stage (five-stage) random sampling design was used in the study.

3.3. Sampling procedures:

First stage sampling procedure

List of zones in Northern Nigeria where purdah is predominantly practiced was conducted and North-west was randomly selected (by balloting) from the two zones (North-east and North-west).

Second stage of sampling procedure

Kano and Sokoto States were randomly selected among the seven states in the north-west.

Third stage of sampling procedure

Lists of Local Government Areas (LGAs) in the two states and their population were obtained from the National Bureau of Statistics (NBS) office in Kano and Sokoto States. The LGAs were stratified into three types by the Federal Office of Statistics (FOS) as urban, peri-urban and rural communities. The rural and the urban comprising five rural and five urban LGAs categories were consequently used

Fourth Stage of sampling procedure

The local government areas selection was based on rural and urban classification as supplied by the National Bureau of Statistics (NBS) of each state. The selection was further arranged according to senatorial districts of each state. Within each senatorial district at least one LGA was selected using balloting to represent the district. A total of five LGAs was randomly selected in Kano state (2 rural and 3 urban). Similar procedure was adopted in Sokoto and a total of 5 LGAs was finally used in Sokoto state. Both urban and rural communities were represented in the study.

The lists of Enumeration Areas (EAs) in the selected LGAs were obtained from NBS of each state. The list comprises all the communities and the names of their leaders

(called mai-ngwawa) and religious leaders, e.g. Federation of Muslim Women Association of Nigeria (FOMWAN), were also consulted for easy accessibility to the respondents from both Urban and Rural households. A random selection of twenty communities was eventually done. These included a total number of 600 mother-child-pairs comprising 293 purdah and 307 non-purdah women were purposively selected.

Fifth Stage of sampling procedure

The last stage of the selection was done using a sampling method called snowball sampling technique. This method is usually employed when the subject of interest is not easily accessible or identified. Area maps of the selected EAs assisted in locating the twenty communities where the respondents resided. The non-purdah group was selected within the same vicinity and location with the counterpart in purdah. Selection of the index child was also done in every household visited. However, in a situation whereby a respondent has more than one under–five children or, if the household operates a polygamous family, balloting method was introduced to that particular households in selecting the index child.

3.4. A brief description of study sites

Kano state was created in May 27, 1967 from the Northern region. Kano is the capital of Kano state. It borders Katsina State to the North West; Jigawa State to the North East, and Bauchi and Kaduna to the South. It has an area of 20,389 km^2 and rank 20^{th} among the 36 states in Nigeria. The 2006 census ranked it 1^{st} among the 36 states in Nigeria with a population density of 9,401,288 (NPC) 2006. It has 44 local government areas. Kano State is mostly populated by the Hausa.

Historically, Kano state has been a commercial and agriculture state, it is known for the production of groundnuts and solid mineral deposits. It has more than 18,684 square kilometres of cultivable land and is the most extensively irrigated state in the country. It is arguably within the first five states in terms of commercial activity within the country.

3.5 A brief description of Sokoto state

Sokoto is among the seven states in the north-western Nigeria and its capital is Sokoto. It was established in 1967. Kebbi state was carved out from it in 1976 and so was

Zamfara State in 1996. Sokoto state lies to the north-west of Nigeria and shares the borders with Niger Republic to the North, Katsina State to the East, Kwara State to the South, and Benin Republic to the West. Even before the arrival of the Fulani, the state concept had evolved in Hausa land. Sokoto is essentially an agricultural state with the traditional mode of production and more than 90% of the population engaged in subsistence farming. The main crops produced in the state are millet, guinea corn, maize, rice, beans, wheat, cassava, potatoes, groundnuts, cotton, sugar cane and tobacco. The major groups in the state are the Hausa, the Fulani and the Dakarkari. The state ranked 14th in the 2006 census, with a population of 3,702,676 (NPC, 2006). Sokoto State has twenty-three (23) LGAs.

3.6 Study population

The study population was women of reproductive age, operationally defined as women between 15 years to 49 years (with special consideration for women who are in purdah and non-purdah who possess an under–five child). The justification for the choice of these women in this particular zone (North-west) was based on the alarming statistics of nutritional indices reported in the zone for the under-five children (MICS 2007, NDHS 2003 and 2008).

3.7 Sample size determination

Sample size formula for two proportions is calculated thus;

$$n= \frac{(Z_{(1-\alpha/2)}\sqrt{2P_1(1-P_1)} - Z_{(1-\beta)}\sqrt{P_1(1-P_1)+P_2(1-P_2)})^2}{(P_1-P_2)^2}$$

Where

n is the minimum sample size required

α is the type 1 error

β is type 2 error

P_1 is the proportion of Children with malnutrition among women with purdah.

P_2 is the proportion of Children with malnutrition among non- purdah women

If $\alpha= 0.05$, $\beta=0.9$, $P_2= 0.13$, $P_1= 0.23$, $Z_{(1-\alpha/2)} = 1.96$, $Z_{(1-\beta)}= -1.28$, $P_1 – P_2 = 11\%$

The prevalence of under-nutrition in Nigeria is 23% (ORC MACROS 2008), i.e P1.

Therefore the minimum sample size required is 279 women per group. In order to accommodate incompleteness or any attrition that might come up during data collection processes, attrition rate of about 8% was used giving a sample size 300 per group, and a total of 600 mother-child-pair was used. This sample size was divided among the two states using probability to proportion (derived from the data supplied by NPC, 2006).

Table 3.1: Local government areas and number of households used in each senatorial district in sokoto state

Senatorial District	LGAs	LGAs selected	Sample size from selected households		
			Urban	Rural	Total
Sokoto West	Boninga, Dange Shuni Shagari, Yabo, Kebbe, Tambuwal, Tureta	Bodinga Dange Shuni		32 37	69
Sokoto Central	Sokoto South, Sokoto North, Wamakko Kwale, Silame Gwadabawa Binji	Sokoto North, Sokoto South	25 26		51
Sokoto East	Sabon Birni, Gada, Gudu, Isa Goronyo Illela Tangaza Rabah Wurno	Sabon Birni		34	34
Total	**23 LGAs**	**5 LGAs**	**51**	**103**	**154**

Table 3.2: **Local government areas, communities and number of households sampled in each senatorial district in kano state**

Senatorial District	LGAs	LGAs Selected	Sample size from selected households		
			Urban	Rural	Total
Kano Central	dala, gwale, dawakin, gezawa, tarauni, fagge, garum mallam, kano municipal, kumbotso, kura, madobi, minjibir, nassarawa, ungogo, warawa	Kumbotso, Kano municipal Government	89 97	-	186
Kano North	bichi, shanono, bagwai, danbatta, makoda, dawakin, gabasawa, gwarzo, kabo, rimi gado, tofa, tsanyawa, kunchi, karaye	Dawakin Tofa, Gwarzo,	- 100	77	177
Kano South	albasu, bebeji, bunkure, doguwa, gaya, kiru, rano, takai, ajingi, rogo, kibiya, tudun wada, garko, wudil, sumaila	Kibiya	-	83	83
Total	**44**	**5 LGAs**	**286**	**160**	**446**

3.8 A Pretested study

It was carried out on a group of 60 mothers in purdah and non-purdah with their under-five children. Mothers and infants or children included in the pilot study were excluded from the pretested sample size. The purposes of the pretested study were to test the contents and validity of the questionnaire and estimate the length of the time needed to fill the questionnaire.

3.9 Validation and reliability test of research instruments

The questionnaire and the in-depth interview guide were validated by lecturers (from Human Nutrition; EMSEH and Health Promotion departments, University of Ibadan). They were translated into the local language (i.e. Hausa) by two different interpreters who are familiar with the contents. One of them is the State Nutrition Officer (Kano State). Back translation to English language was also done. The two translations were later compared to detect any misinterpretation of the desired messages in the questionnaire. Subsequently, both the English and Hausa copies were administered based on the educational status of the respondents. Reliability test was obtained from the results of the pre-test carried out prior to the study using respondents of similar characteristics. The questionnaires consisted of sixty (60) items giving Cronbach Alpha of **R= 0.73.**

3.10. Data collection and processing

Data were collected using semi-structure questionnaire, in-depth interview, observational method (on child, caregivers and environment) and anthropometric measurements.

Interviews were conducted by trained interviewers who were familiar with the study towns and the districts as a whole. For the benefits of the respondents, interviews were conducted in English or their local dialects (Hausa) based on the participants' language choice. Students from the School of Hygiene (Kano) and Usman Dan Fodio University (Sokoto) were recruited and adequately trained in basic interviewing techniques and how to carry out anthropometric measurements before they were allowed to participate in the survey. The training exercise for the research assistants took about two days. Subsequently, the pre-tested questionnaires after obtaining signed informed consent (Appendix A) from the

respondents were administered. The interview took about 30 to 45 minutes per respondents, while the whole exercise lasted for 30 days.

3.11. Study instruments/ materials and methods

3.11.1. Quantitative data

The following independent variables were included in the household questionnaires which represent the quantitative data:

- Occupation of household head and women,
- Marital status, and decision making on mother's earning,
- Maternal prenatal and delivery care services
- Child health care and immunisation practices,
- Child, maternal and household cleanliness,
- Knowledge and attitudes about nutrition,
- Child feeding practices, while the dependent variables were the three anthropometric measurements namely: height-for-age (Stunting), weight-for-height (Wasting) and weight-for-age (Underweight). Child and Mother anthropometric measurement variables included age, sex, weight, and height.

The household questionnaire was administered to the mother of the index child. Anthropometric measurements (height and weight) were also taken from the respondents and their eligible children in the households (i.e. index child 0–59 months). Mothers were asked to recall the 24-hour dietary intake and whether the child had diarrhoea in the last 2 weeks prior to the study.

Finally, spot-check observation schedules (i.e physical assessment) was used to assess the cleanliness and hygiene practices of the child, mother and the environment.

The questionnaire was able to capture information on household resources, such as household composition, socio-economic status, food security, and caregiver's resources such as education, child-care knowledge and experience, women's empowerment and involvement in decision making. It also gathered data on 5 types of care practices namely:

- Early breastfeeding practices (i.e. around birth);
- Child-feeding practices of 0-59 months old children;
- Current child-feeding practices including meal frequency, dietary diversity, intake of animal sources of food etc;

- Preventive and curative health-care-seeking behaviours (e.g. ante-natal care, childhood immunisation, treatment of diarrhoea), and
- Hygiene practices (e.g. child, maternal and house cleanliness).

3.11.1.2. Household composition and socio-economic status

This section gathered information on the composition of the household, including type of marriage and number of household members. Information on household income and expenditure were not gathered in this study, rather wealth index as contained in the 2003 ORC MACROS data was used as a proxy measure of poverty which is similar to previous authors. For instance, Montgomery *et al.*, (2000), Filmer & Pritchett (1999) considered ownership of assets as proxy to assessing wealth index. Therefore, wealth index is usually used as an indicator in capturing socio-economic status of a household. It serves as a proxy for the households' socio-economic status. Its reliability is dependent on having the appropriate weights for the assets.

Information on household socio-economic status (SES) was determined by using proxy indicators, such as ownership of certain durable goods such as radio, refrigerator, car, television, building, type of roofing materials, flooring and ownership of GSM. Each asset was assigned a score. Furthermore, these assets scores were then summed up and households were finally ranked into three categories (Low, Medium and High).

3.11.1.3. Education and employment status

This section included questions on educational status of the women and their husbands. Two major forms of education attainment (formal and informal) were specifically included. Hence, the respondents were probed further on the level of their education qualification in order to extensively determine their educational status.

Information on the type of employment the mothers and their husbands were engaged was also asked during the interview session in order to have the categorisation of their employment measured accurately.

3.11.1.4. Maternal prenatal and delivery care

The mothers were asked about ante-natal care received during pregnancy. Questions were formulated in order to derive the actual number of health facility visits made during the pregnancy, number of tetanus immunisation taken, number of anti-malaria drugs received, type and place of delivery, etc. The information was developed in order to determine health service utilisation of the respondents to available health care delivery services in the study locations.

3.11.15. Child health care and immunisation.

This section was designed to provide data on the immunisation status of the child as well as symptoms of illness (like diarrhoea) experienced by the child in the last two weeks prior to the survey. Data were gathered on care-seeking pattern of respondents during child's illness and immunisation status as shown on the immunisation cards or from information provided by the mothers, the number of diarrhoea episodes and the treatment adopted during the sickness period. According to the Nigerian Federal Ministry of Health definition, a child is considered fully vaccinated if he or she has received a BCG vaccination against tuberculosis; three doses of DPT to prevent diphtheria, pertussis (whooping cough), and tetanus; at least three doses of polio vaccine; and one dose of measles vaccine. All these vaccinations should be received during the first year of life, over the course of five visits, including the doses delivered at birth. These are the vaccines available for six preventable childhood diseases. The mothers were interviewed to know the number of age-specific immunisations the child has taken and three categories were later developed namely:

- Received all age-specific vaccines
- Received some of the age-specific vaccines
- Received none of the age-specific vaccines.

Furthermore, the respondents were asked if they received assistance from their spouses in child-care. This was measured to determine the extent of male involvement in child care. For instance, adequate male involvement has been reported to be a determinant factor in child immunisation status (Oyewole, 2007).

Subsequently, each type of selected participation of the husbands in child-care was reported and index of husband assistance was later constructed to determine level of male involvements in child care.

3.11.1.6. Child, maternal and household cleanliness

Hygiene practices

Cleanness of the child, mother, and the interior and exterior of the house were assessed using a spot-check observation method. Spot-check methods have been used widely for the assessment of markers/indicators of hygiene practices. This involves cleanliness of different sections of the house or person (Arimond *et al*., 2002). This method consists of observing a list of pre-determined proxies of hygiene practices on a single visit to a household. It is less time-consuming. Hands; face and clothing of mother and children were observed. Based on this information, the hygiene practice of the mothers were pooled together to construct the level of hygiene practices of the respondents and their environments.

The following variables were explored during the process of observation schedule in order to determine the hygiene practices of the respondents, their under-five children and their environment;

- Mothers clean
- Child clean
- Compounds swept
- Presence of stagnant water
- Presence of unwashed utensils
- Domestic animal around
- House swept

The variables above were used as proxies for good or bad hygiene practice. Hence, any positive behaviour received a score of 1 and negative practice received a score of 0. The total score was summed up to seven scores. Subsequently, based on the frequency distribution of the scores, level of cleanliness was generated where scores before the mean were categorised as poor level of cleanliness while scores above the mean were categorised as good, i.e.

- Scores between 0.0–3.7830 = Poor
- Scores between 3.7831–7.0 = Good

3.11.1.7. Child feeding practices

Breastfeeding practices

Data were gathered on child-feeding practices which include initiation of breastfeeding, rate of exclusive breastfeeding and duration of breastfeeding. Some authors have discovered that no single measurement can actually reveal the pattern of breastfeeding and complementary feeding practices among mothers. It is either the practice is under-estimated or over-estimated (Launer *et al.*, 2004) most especially when recall method is adopted to capture breastfeeding and complementary feeding practices. In order to generate adequate information and for easy evaluation of the results, scores were assigned to each practice as reported by the mothers. Practices that fall short of the recommended practices in the current infant feeding practice as stipulated in the guideline received a negative score of -1 (WHO, 2010). Children that were not currently breastfeeding were excluded from this process (Table 3.3).

Table 3.3: Scores for exclusive breastfeeding practice

Indicators	Scoring
Currently breastfeeding	No = -1
	Yes = +1
Initiation of breastfeeding	0-0.9hours=+2
	1-1.9 hours=+1
	2-5.9 hours=0
	6 hours=-1
Uses baby bottles	No=+1
	Yes=-1
In the previous 24 hours gave	No=0
Non-milk liquids	
	Yes=-1
Non-breast milk	No=0
	Yes= -1
Other liquids, semi liquids, solids	Yes=-1
	No=0
Maximum/minimum	+4/ -6

Data were also gathered on the type of complementary foods fed in the previous 24 hours prior to the study period. The number of meals that an infant or young child needs in a day depends on how much energy the child needs, the amount that a child can eat at each meal, and the energy density of the food offered. A 24-hour dietary recall was used to determine the nutrient intakes of the children using Total Dietary Assessment (TDA) version 3.0 and this was compared with Recommended Dietary Intake, RDI (%).

Questions were also asked on the consumption and frequency of various food groups on a daily basis. In addition, consumption of snacks by the child in the previous 24 hours was also inquired from the caregivers.

The assessment of the child's feeding covered both breast-feeding and complementary feeding practices of the index child.

Consequently, responses to questions on breast-feeding included the following:

(1) Current breast-feeding status (breast-feeding or not breast-feeding)

(2) History of pre-lacteals (received pre-lacteals; did not receive pre-lacteals or do not remember what happened).

Furthermore, the quality of complementary feeding was also assessed and these included:

- Kind of complementary food given in the previous 24 hours: 'specially prepared food' or 'adult/family food'; and
- Whether a dairy product (milk), oil/butter or sugar was added to complementary food.
- Complementary feeding frequency in the 24-hours preceding the survey was assessed as a continuous variable.

Food models were presented to the care-givers to assist them in recalling the type, weight or size of the actual foods consumed by the child. During this process, it was observed that ordinary visual aid would not bring out actual amount of food consumed, hence, the mother was asked to "hold and feel" the food models. This enormously assisted the interviewer to record the actual amount fed to the child.

Subsequently, the following were used to construct a score rating for inclusion of food groups in the diets of the children. Inclusion of any of the following into meal is allotted a score and this was finally used to score the mothers on dietary diversification for the under-five children.

The seven food groups used for calculation of this indicator were:

- Grains, roots and tubers,
- Legumes and nuts,
- Dairy products (milk, yogurt, cheese),
- Flesh foods (meat, fish, poultry and liver/organ meats),
- Eggs,
- Vitamin-A rich fruits and vegetables, and
- Other fruits and vegetables.

3.11.1.8 Maternal nutritional knowledge and attitude

Questions relating to knowledge of the women concerning nutrition and health-care practices for their under-five children were gathered. The questions included the following variables:

a. Breastfeeding initiation to a child,
b. Age of introduction of complementary foods,
c. Respondents were asked on their knowledge about duration of breastfeeding,
d. Frequency of complementary foods,
e. Micronutrient supplementation,
f. Psychosocial care during feeding, and
g. Immunisation status.

In order to rank respondents' knowledge and attitudes based on the information above, relevant questions were put under each section and scores were later allocated to each response provided by the mothers.

Various avenues (which include the media, peer groups, ante-natal and post-natal visits, and immunisation visits) were available with which this information could be acquired by the mothers. Subsequently, the mothers were interviewed to provide the

sources available to them. Based on the questions raised above, the nutritional knowledge of the mothers was categorised into 5 grades using the following classifications:

Grade 1: Excellent with a score of 5 points or more if the respondent is able to mention at least 4 indicators under that variable point.

Grade 2: Good with a score of 4 points when the respondent is able to mention 3 indicators under this variable

Grade 3: Fair with a score of 3 points if the respondent is able to mention two indicator under that variable

Grade 4: Poor with a score of 2 points when the respondent is able to mention any one of the indicators under that variable

Grade 5: Very poor with a score of 1point when the respondent is unable to mention any indicator under that variable.

Finally, nutritional knowledge on a 48-point scale was developed where 0.0-24.9 was rated as poor and 25.0-48.0 was rated as good.

3.12 Qualitative data

3.12.1 In-depth interview (IDI)

A total of twenty in-depth interviews were conducted among (urban and rural communities with purdah and non- purdah women). Pre-determined, open-ended questions developed from the study objectives and compiled into a guide which was used to interview the selected respondents. A representative of those in purdah and non-purdah in all the LGAs participated in the interviews. An interviewer (trained and experienced in qualitative study) was employed to moderate the section. The guide was written in English language, but was translated and interpreted to the respondents in the Hausa language. Each of these procedures was tape-recorded and later translated into English by an interpreter (who is very fluent in the Hausa language). The sections were also facilitated by the researcher in order to achieve the set objectives of the study. Consequently, prompt interruption was done when a desired response was not adequately reported by the respondents. Each interview was carried out on one-on-one and an average of one hour and 30 minutes per session was used to derive the desired information. One of the sessions held in the LGAS is presented in appendix 5.

3.12.3 Analysis of qualitative data

Qualitative data (in-depth interview) were collected and analyzed with a modified grounded theory of Glaser and Strauss (1967). The data gathered were audiotape recorded to guarantee that no information is lost. They were subsequently transcribed. This was followed by further reading of the transcripts for accurate translation from the Hausa language to English. The scheduled-structured interview was similar for all respondents. The administration of questionnaires using interviews method was inevitable since the targeted population was majorly educationally disadvantaged (ORC Macros, 2003, 2008; Kole, 2008). The option of self-administration would therefore have been more cost effective. The wordings and sequence of questions asked were similar and uniform, such that differential responses were attributed to the actual differences within and among respondents. Attention was paid to draw out relevant points and opinions related to the subjects of interest from the interview guide (i.e. nutritional status of both mother and their under-five children) were gathered and brought out from the manually transcribed data. The relevant statements were again reviewed to ensure that the IDI interviews eventually covered the study sub-themes which include:

- Disposition to child immunisation,
- Cultural hindrances to nutritional status,
- Knowledge and practice of breastfeeding and complementary feeding for the under-five children,
- Perception towards educational attainment,
- Management of childhood illness, and
- Assessment of health services utilisation.

In order to be able to measures the possible constraints that might be facing the respondents on accessing health-care services, the following questions were generated and included in the questionnaires. It includes the following:

- Knowing where to go for treatment
- Getting permission to go
- Getting money needed for treatment
- The distance to a health facility

- Having to take transport
- Not wanting to go alone
- Concern that there may not be a female health provider
- Knowledge and practice of child-care,

Maternity health-care services utilisation including antenatal care (ANC), skilled delivery assistance (SDA) and use of facility place for child's birth were also included in the questionnaires.

3.12.4 Anthropometric measurements

Anthropometric measurements (height, age and weight) were carried out on the women (between 15 to 49 years of age) and their children (between 0 to 59 months of age) in each household visited. Children less than 85cm in length or, under 24 months or were too weak to stand were measured lying down, i.e., recumbent length, using a length board made of wood, while standing height was used for children above 85cm or more than 24 months of age. The length was taken while the children were undressed (including the diaper). The board has a headboard and sliding foot piece. The height was taken without the child wearing either socks or shoes in order to achieve accurate measurements. The length/ height were measured to the nearest 0.5 cm.

Children's weights were determined by weighing the mother and child together, followed by weighing the mother alone. The mother's weight was then subtracted from the initial weight (mother and child) to obtain the child's weight. For children who were already walking and could stand upright on the scale, their weights were obtained by weighing them with light clothing on them. Digital and bathroom scales were used and set to zero before the respondents were allowed to climb on it and this was read to the nearest 0.01kg (10grm). The anthropometric parameters of every child were recorded to the nearest 0.05kg. Standardization of the tools was done periodically. However, children or mothers with evidences of chronic diseases were excluded from the study.

The ages of the children were ascertained from the mother and through the use of Road to Health Card (health home based record for children from birth up to five years) where the mother is having a copy. The ages of the children were estimated to the nearest whole month.

3.12.5 Z-score analysis.

Children's nutritional status is a reflection of their overall health. Nutritional status in young children is conventionally determined through measurements of height, weight, skin-fold thickness (or subcutaneous fat) and age. The most commonly used indices derived from these measurements are stunting (low height-forage), wasting (low weight-for-height) and underweight (low weight-for- age). The reference standards that were used were those of the National Centre for Health Statistics (NCHS). Each of the three nutritional status indices of the children was expressed in standard deviation units (z-scores) from the reference population (WHO, 2006).

The Z-scores describes how far in units (called standard deviations) a child's weight is from the median weight of a child at the same height-for-age in the reference data. It was calculated based on the median values of the NCHS reference population. In this study, children who had z-scores below –2 standard deviations (SD) of the NCHS reference population median were considered significantly malnourished. These z-scores for weight-for-age, height-for-age and weight-for-height were measured and were converted to standardized values (z-scores); height-for-age (stunting [HAZ]), weight-for-age (underweight [WAZ]) and weight-for-height (wasting [WHZ]) using the World Health Organization Anthro software and macros (World Health Organization, 2006). HAZ, WAZ and WHZ were used in this study in order to evaluate the different spectra of malnutrition among these children according to the WHO recommendations (Dibley *et al.*, 1987; World Health Organization Multicentre Growth Reference Study Group, 2006).

Subsequently, the nutritional status was determined by calculating the Z-scores and it was compared with the international standard Z-score where less than-2 indicate malnutrition in a child. In achieving this processes, the National Centre for Health Statistics/World Health Organization (NCHS/WHO) guidelines and cut-off point were used to determine the degree of stunting, underweight and wasting. The unit of analysis that is, the dependent variables of the present study were based on severe and moderate malnutrition. Hence, U.S. National Center for Health Statistics (NCHS) standard for the classification of malnutrition from the median of the reference population as recommended by WHO, 2006.and this include

- Mild < - 1.00 Z-scores

- Moderate < - 2.00 Z-scores
- Severe < - 3.00 Z-scores

Children were ranked into these three classifications of malnutrition namely;

- Wasting: Low weight for height with z-scores < - 2 and < -3 SD
- Underweight: Low weight for age with z-scores < - 2 and < -3 SD
- Stunting weight: Low height for age with z-scores < - 2 and < -3 SD from the median of the reference population.

3.12.6 Body mass index

Body Mass Index (BMI) is the fourth indicator used to determine nutritional status of an individual, especially adults and it was calculated as weight (in kg)/height (cm) ^{2}. It was used to reflect the nutritional status of mothers. Evidence in developing countries indicated that malnourished women, with a BMI below 18.5, show a progressive increase in mortality rates as well as increased risk of illness (Girma and Genebo 2002).

The following classifications were used to determine chronic energy deficiency and maternal nutritional status:

- BMI <18.5 under-nourished
- BMI 18.5 – 24.99 within normal range
- BMI 25.0 – 29.99 over-weight
- BMI 30 and above obese

3.12.7 Analysis of quantitative data

Copies of the questionnaires were sorted out and incomplete and wrongly filled copies were discarded. Coding guides were prepared to facilitate data entry. A computer analytical software package, Statistical Package for Social Sciences (SPSS) version 17.0 software, was used for analysis. Frequency tables and bar charts were presented for relevant variables'. Descriptive statistics such as means, medians, standard deviations and ranges were used to summarize quantitative variables while qualitative variables were summarized into percentages. Pearson Chi-square test was used to investigate the association between the independent variables and outcome variables (indicators of wasting, stunting and underweight). Fishers exact was reported for tables with low

frequency or zero cells. Binary logistic regression analysis was used to further investigate the relationship between dependent and independent variables. Odd ratios (OR) and 95% confidence intervals (CI) were presented. Statistical significance was set at 5%.

Limitation of the study

Despite the strength of the current study, which includes the fact that the data was collected using a pre-tested and validated questionnaires; the present study has some limitations.

As a cross-sectional study, it was insufficient to assign causation to any of the associated variables. Much of the information obtained was self-reported which is likely to have some inaccuracies during the processing of reporting.

The study was able to explore some aspects of nutritional status assessments using an anthropometric measurement and dietary intake assessment of the children using 24-hours dietary recalls of the mothers. Further analysis such as laboratory assessment is needed to actually assess the overall nutritional status of the subjects.

CHAPTER FOUR

4.0. RESULTS

The results are presented in two parts. The first section is mainly descriptive, with information on household socio-demographic variables, respondents' access to basic facilities in their environments; health services utilisation; feeding and child-care practices. The second part is mainly qualitative data on household nutritional; child-care practices and health-care variables derived from the interviews schedules.

Socio-economic classification was based on a combination of asset index of households and a locally validated socio-economic classification (wealth index) was explored to categorize respondents into various socio-economic statuses (Sirkin 1995). Independent variables were age, gender, urban/rural residency and status of the mother (purdah or non-purdah). The results of the study were reported based on the status of the respondents as contained in the objectives of the study

4.1: Section A: Socio–demographic chacteristics of respondents

4.1.1: Sex and ethnic group of the children

A total of 311(51.8%) of the children were females and 48.2% were males. The study respondents were selected in the North-Western zone of Nigeria. All the respondents studied were Hausa speaking people from all the communities in the two states

4.1.2 Types of community and respondents

These communities included the urban, which made up of 59% of the total communities and remaining 41% were derived from the rural location **(**Table 4.1a). The cases (purdah) were 48.8%, while the controls (non- purdah) were 51.2%, making a gross total of 600 respondents.

4.1.3: Marriage type of the respondents

The result shows that Polygamy type of family prevailed among the respondents (65.5%) compared to Monogamy (34.5%). Further dichotomy into the status of the respondents showed that polygamy was present in (34.1% among purdah and 34.9% among non- purdah) and monogamy in (65.9% purdah and 65.1% non- purdah) ($p>0.05$).

4.1.4: Maternal age

The mean ages of the respondents were 28.9±7.0 years and 27.8±6.6 years in purdah and non-purdah respectively (p>0.05). Table 4.1a shows that majority of the respondents (54.2%) were between the ages of 19 –29 years, this was followed by those between the age brackets of 30-39 years (30.8%), 40 years and above were 10.5% while the least age frequency (4.5%) was found in 15-18 years of age (table 4.1a). Appreciable percentage of the mothers (10.5%) had under-five children at a later age (40 and above) and this was observed to be higher (14.0%) among those in purdah compared to 7.2% found in non-purdah.

4.1.5: Respondents' age at marriage

The mean ages of respondents at marriage were 16.5years±3.2 and 17.6years±3.6 in purdah and non-purdah respectively (p>0.05). Majority of the respondents (57.8%) got married between age brackets of 15-19. Early marriage (10-14 years) was common among women in purdah (25.9%) compared to non-purdah (18.2%), while slightly higher percentage of non-purdah women got married at age bracket 25 years and above (6.2%) compared to women in purdah (2.7%), p<0.05 (Table 4.1a). In summary, early marriage occurred more among women in purdah (25.9%) compared to non-purdah (18.2%), (p<0.05).

4.1.6: Household size

The data in Table 4.1c revealed that the majority (52.3%) of the respondents were found in ≤ 5 members category (i.e members eating from the same pot), while 47.7% had greater or equal to 6 members in their households. Lower household members (≤ 5 members) were found among non-purdah (57.7%) compared to women in purdah (46.6%), while larger household members (≥ 6 members) were common among women in purdah (53.2%) compared to non-purdah (42.3%), (p<0.05).

4.1.7 Educational status of respondents

The overall result showed that almost half of the mothers (47.2%) of the respondents had Arabic education, while 48.6% had western education. This varies across the status of

the respondents. Respondents with Arabic education were more among women in purdah in the rural location (53.2%) compared to non-Purdah from the same location (41.4%). Percentage of the mothers with primary education was found to be 25.2%, while 20.7% had secondary education qualification. However, only few mothers (4.7%) extended their education to the tertiary level, while 2.2% did not have any form of education qualification, $p<0.05$.

4.1.8 Education status of respondents' husbands

Respondents' husband with Arabic education was 27.8%, while those who had more than eighteen years of western education were 15.2%. Among the husbands, 23.2% had primary school education, 31.7% secondary education while 2.1% had none of the various types of education category.

When the result was further dichotomized into status, it was observed that respondents' husbands with Arabic education were higher among mothers in purdah (33.4%) compared to non- purdah (22.5%). Additionally, higher percentage of primary education was reported by non- purdah (25.1%) compared to (21.2%) in purdah. Similarly, tertiary education was found higher among non-purdah (17.9%) compared to purdah (12.3%). Finally, 2.2% of the respondents' husbands had no education, the difference observed in the educational category was statistically significant ($p<0.05$).

4.1.9 Household socio-economic information of respondents

4.1.9.1 Women's occupation

The economic engagement of the household is presented in Table 4.1b. The results show that majority of the respondents (66.0%) were self- employed in petty trading of edible and non-edible commodities within their various households. Slightly higher percentage (69.3%) of respondents in purdah was into self-employment compared to non-purdah (62.9%). However, 23.5% were not employed or engaged in any income-generating activities and only10.5% reported to be in private establishments. Trading was found to be the major occupation across the respondents. A slightly higher percentage (26.6%) of those in purdah was not into any economic engagements compared to non-purdah (20.5%). Furthermore, the results also showed that the respondents in purdah were not adequately

represented in the private establishment (4.1%) compared to their counterpart non-purdah (16.6%), ($p<0.05$).

4.1.10 Economic engagement of respondents' husbands

The results showed a similar phenomenon among the respondents' husbands, where majority of their husbands (69.3%) were reported to be engaged in farming (75.4% in purdah and 63.5% in non-purdah). Almost one- third (28.8%) of the respondents' husband were into civil services (22.5% in purdah and 34.9% in non-purdah). The least percentage (1.8%) of the respondents husbands were found in private establishments, 2.0% in purdah and 1.6% in non-purdah, $p<0.05$.

4.1.11 Decision over income by the respondents

Decision-making over women's income was classified into four categories as being illustrated in Table 4.1c. External influence over women's income was minimal across the status of the respondents, with about 46.2% of the respondents reported as having total autonomy over their income (47.4% in purdah and 45.0% in non-purdah), $p>0.05$. About 25.8% received or sought their husbands' opinion over their income (28.3% in purdah and 23.5% in non-purdah), 25.7% adopted mutual decision (22.2% in purdah and 29.0% in non-purdah), while only 2.3% reported receiving external influence over their income (2.2% in purdah and 2.6% in non-purdah). Eventually, almost similar scenerio was obtained from the women when the results were dichotomised into the two groups of women under study. There was no significance difference in the results.

4.1.12 Provision of food resources

Respondents' husbands (89.0%) provided the resources needed for food as well as other household requirements (89.8% in purdah and 88.3% in non-purdah). Very minimal percentage (7.0%) of the respondents claimed they usually had joint contributions for nutritional and households maintenance (5.8% in purdah and 8.1% in non-purdah). However, only 4.0% of the respondents received food allowances from their husband's parents (4.4% in purdah and 3.6% in non-purdah), ($p>0.05$).

4.1.13 Socio-economic status

The results as presented in table 4.1c showed that more than one-third (36.3%) of the mothers were found in the low socio-economic status (43.3% in purdah and 29.6% in non-purdah), 31.8% were in medium category (29.4% in purdah and 34.2% in non-purdah), while 31.8% of the respondents were in the high socio-economic status (27.3% in purdah and 36.2% in non-purdah), ($p<0.05$).

The specific activities of the women were small scale business, dealing mostly in edible food products. The majority of the households' heads were into farming and some of the women were engaged in processing parts of the farm products (manually) from their husbands' farms; specifically grains (millet) into flour ('Fura'), while few that could afford the expenses used improved methods (grinding machine). Results from the present study showed that most of the women from the study communities were predominantly petty traders; they are available in their homes, working during the daytime (69.3% in purdah and 62.95% in non-purdah). A few percentage of the women work in private establishments, factories or own shops. These types of economic engagements were more common in women in purdah compared to non-purdah. However, an appreciable percentage of the women were not into any economic activity.

The fact that most of the respondents and their husbands are engaged in informal sector implies that their income will be susceptible to the vagaries of economic fluctuation, which will be an important determinant of sustaining their household's food and nutrition security.

Traditionally, the sole responsibilities of child care lies on the mother and this is common in most African countries, Nigeria inclusive, while the husbands take charge of the financial responsibilities. This practice is obviously more pronounced in the study communities and among the two groups of women. The result of this study revealed that about 90.0% of the households' financial responsibilities come from the husbands. However, slight variation exists between purdah (89.8%) and non-purdah (88.3%) women. The finding of this study showed that the husbands provide the household food resources and that substantial proportion of the women makes decision on household nutrition is expected; as this is traditionally their respective areas of prerogative. It therefore implied

that the women can be targeted for effective intervention in nutrition security campaign in the study area.

4.1.14 Respondents' opinion on socio-demographic variables

Subsequently, the perceptions of the respondents obtained during in-depth interviews (ID) schedules were presented below:

"…Traditionally, our people don't like going to school but now, we have started sending the younger ones. It is more of our tradition than being from our religion perspective…"

IDI participant (purdah) from Sokoto Bodinga LGA –Rural

"…My educational attainment (Graduate) has assisted me to know the importance of child-care. At least, I am able to feed my children good food…"

IDI respondent (non- purdah) from Kano Municipal LGA - Urban

Lucid explanations provided by the respondents showed a reflection of the influence the tradition has on their educational attainment; eventually, this was irrefutably accepted as an important factor to child nutritional outcomes across the respondents.

Additionally, qualitative data were generated on the availability of resources for food.

Below are the attitudes and views of the respondents on households' food availability.

"…I manage to ensure we take balance diet in my household, at least twice or thrice per week. Obviously, one cannot afford to take it every day due to occasional scarcity of money in my household…"

IDI, non-purdah, Kano – urban

"… I engage in petty trading in order to assist my husband if income for food is not made available, but my contribution is voluntary since our husbands neither wait nor demand for it…"

IDI, purdah, Sokoto Rural

Generally, most of the responses from the women indicated that households' food provision depends solely on what is made available by the husbands.

Table 4.1a: Distribution of women's socio-demographic characteristics

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**$\chi 2$**	**p-value**
	No (%)	**No (%)**	**No (%)**		
Sex of index children					
Male	289 (48.2)	150 (51.2)	139 (45.3)		
Female	311 (51.8)	143 (48.8)	168 (54.7)	2.10	0.086
Type of family of the women					
Monogamy	207 (34.5)	100 (34.1)	107 (34.9)		
Polygamy	393 (65.5)	193 (65.9)	200 (65.1)	0.035	0.460
Respondent's age (range)					
15-18 years	27 (4.5)	17 (5.8)	10 (3.3)		
19-29 years	325 (54.2)	142 (48.5)	183 (59.6)		
30-39 years	185 (30.8)	93 (31.7)	92 (30.0)	12.40	0.006
40 and above	63 (10.5)	41 (14.0)	22 (7.2)		
Age at marriage (range)					
10-14 years	132 (22.0)	76 (25.9)	56 (18.2)		
15-19 years	347 (57.8)	171 (58.4)	176 (57.3)	10.71	0.013
20-24 years	94 (15.7)	38 (13.0)	56 (18.2)		
25 and above	27 (4.5)	8 (2.7)	19 (6.2)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

Table 4.1b: Distribution of women's socio-demographic characteristics

Variables	Status of the respondents				
	Overall N (%)	**Purdah N (%)**	**Non-purdah N (%)**	χ^2	**p-value**
Maternal educational status					
No formal Education	14 (2.2)	5 (2.3)	9 (1.5)		
Arabic school	283 (47.2)	156 (53.2)	127 (41.4)		
Primary	151 (25.2)	74 (25.3)	77 (25.1)	12.68	0.013
Secondary school	124 (20.7)	46 (15.7)	78 (25.4)		
Tertiary education	28 (4.7)	12 (4.1)	16 (5.2)		
Husbands' educational status					
Arabic school	167 (27.8)	98 (33.4)	69 (22.5)		
Primary	139 (23.2)	62 (21.2)	77 (25.1)		
Secondary school	190 (31.7)	89 (30.4)	101 (32.9)	11.75	0.016
Tertiary education	91 (15.2)	36 (12.3)	55 (17.9)		
No formal Education	13 (2.1)	8 (2.7)	5 (1.6)		
Husbands' occupation					
Farming	416 (69.3)	221 (75.4)	195 (63.5)		
Civil service	173 (28.8)	66 (22.5)	107 (34.9)	11.11	0.004
Private Establishment	11 (1.9)	6 (2.0)	5 (1.6)		
Maternal occupation					
Self- employment	396 (66.0)	203 (69.3)	193 (62.9)		
Civil Service	63 (10.5)	12 (4.1)	51 (16.6)	25.68	0.001
Full Housewife	141 (23.5)	78 (26.2)	63 (20.5)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

Table 4.1c: Distribution of women's socio-demographic characteristics

Variables	Overall N (%)	Purdah N (%)	Non-purdah N (%)	χ^2	p-value
Decision over income					
Respondent	277 (46.2)	139 (47.4)	138 (45.0)		
Husbands	155 (25.8)	83 (28.3)	72 (23.5)		
Couple	154 (25.7)	65 (22.2)	89 (29.0)	4.49	0.214
Relatives	14 (2.3)	6 (2.0)	8 (2.6)		
Provision of food resources					
Husband	534 (89.0)	263 (89.8)	271 (88.3)		
Couple	42 (7.0)	17 (5.8)	25 (8.1)	1.48	0.475
Husbands' parents	24 (4.0)	13 (4.4)	11 (3.6)		
Socio-economic profile					
Low	218 (36.3)	127 (43.3)	91 (29.6)		
Medium	191 (31.8)	86 (29.4)	105 (34.2)	12.55	0.002
High	191 (31.8)	80 (27.3)	111 (36.2)		
Households size					
≤ 5 members	314 (52.3)	137 (46.8)	177 (57.7)		
≥ 6 members	286 (47.7)	156 (53.2)	130 (42.3)	7.14	0.005
Total	**600 (100)**	**293 (100)**	**307 (100)**		

Table 4.1d: Frequency distribution socio-demographic characteristics

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
Autonomy treatment					
Husbands	340 (56.7)	181 (61.8)	159 (51.8)		
Both	40 (6.7)	17 (5.8)	23 (7.5)	6.091	0.048
Self	220 (36.7)	95 (32.4)	125 (40.7)		
8.Level of Constraints					
Low	233 (38.8)	102 (34.8)	131 (42.7)		
High	367 (61.2)	191 (65.2)	176 (57.3)	3.898	0.029
Total	**600 (100)**	**293 (100)**	**307 (100)**		

Figure 5 below shows the percentage distribution of under-five children that was investigated in the study. The majority of the children (over 60%) were under two years. The least percentage (9.3%) appeared in the age range 48 months and above.

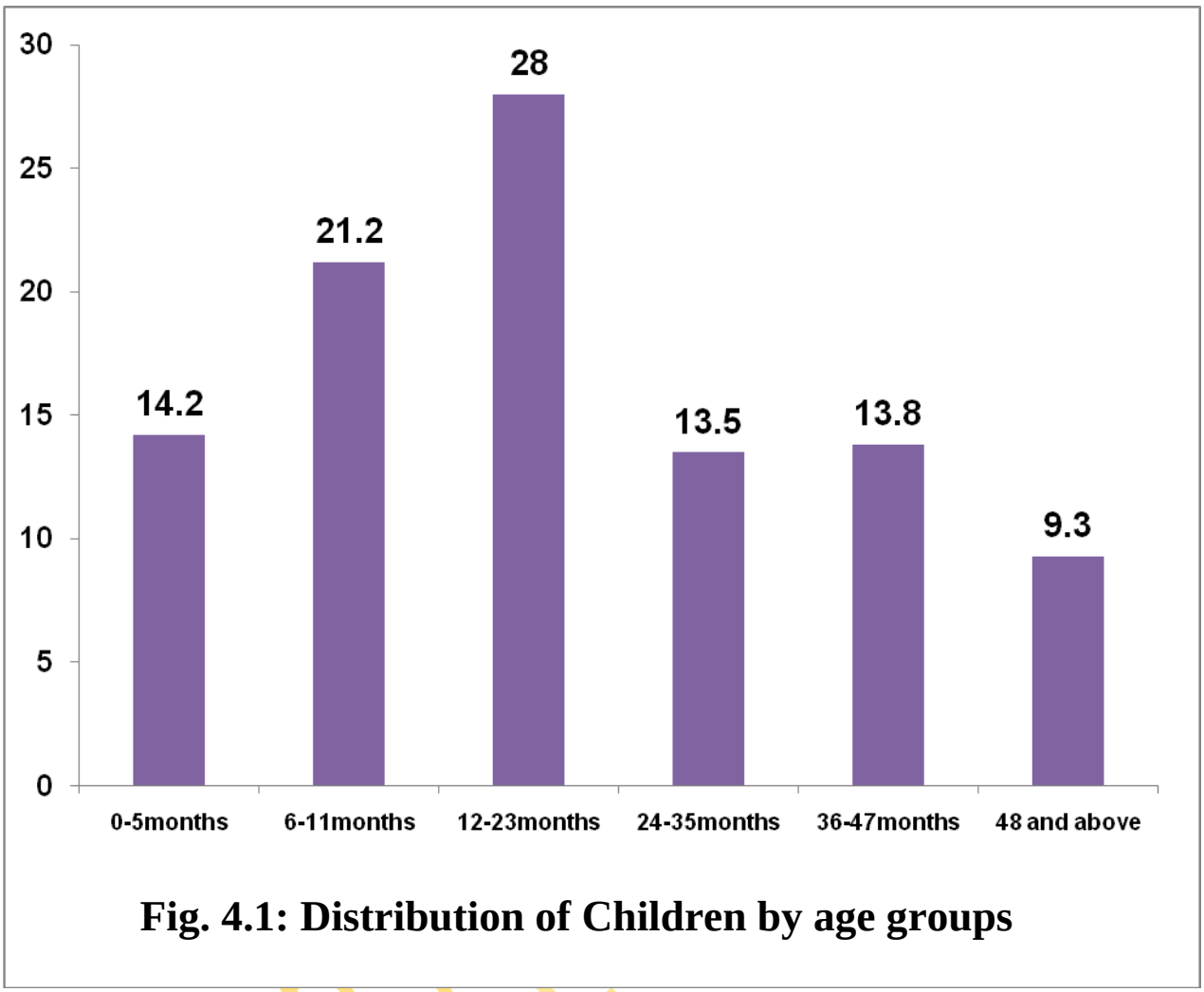

Fig. 4.1: Distribution of Children by age groups

4.2: Household environmental conditions of the respondents

4.2.1 Primary sources of water

Piped-borne water was the predominant source of water in these regions (50.5%). It cuts across the respondents, 45.1% and 55.7% found among women in purdah and non-purdah respectively. Spring water/ river water was the next major source of water (36.2%), (41.6% in purdah and 30.9% in non-purdah). The least source of water was reported to be well water 13.3% (13.3% in purdah and 13.4% in non-purdah), ($p<0.05$), (Table 4.2).

4.2.2. Types of sanitary facilities

The use of latrines or pit appeared to be the most common sanitary facilities reported in this study (78.5%), (81.9% in purdah and 75.2% in non-purdah). The use of flush toilet was generally low among the mothers (18.0%), 14.7% in purdah and 21.5% in non-purdah). A minimal percentage (3.5%) of the respondents reported throwing faeces outside the yards or in the bush (3.4% in purdah and 3.3% in non-purdah), ($p>0.05$), (table 4.2).

4.2.3. Types of refuse disposal

Most of the respondents, (72.0%) across the status reported making use of public or relatively arranged refuse disposal system. This was more common in non-purdah (69.3%) compared to purdah (74.6%) households. Household refuse bin (14.5%) was also used by the mothers (15.7% in purdah and 13.4% in non-purdah). Throwing of refuse in the bush was 5.3% in purdah and 4.9% in non-purdah women, ($p>0.05$), (table 4.2).

4.2.4. Household protective measures against malaria

The measures adopted by respondents in the home environments for prevention of malaria vary across the status of the respondents. The use of coil appeared commonest (53.8%) across the status of the respondents (60.8 in purdah and 47.2% in non-purdah). The use of insecticide was 21.0% across the respondents (18.4% in purdah compared to 23.5% in non-purdah).

The use of bednets to protect the households from mosquito bites was reported by 21% of the respondents. Variation was also observed in the use of bed nets within the status, with higher percentage 24.4% found in non- purdah compared to 17.4% in purdah, while wire gauze had the least percentage (4.2%), 3.4% in purdah and 4.9% in non-purdah, $p <0.05$, (Table 4.2).

Table 4.2: Distribution of household environmental characteristics

Variables	Overall N (%)	Purdah N (%)	Non-purdah N (%)	χ^2	p-value
Household malaria protection					
Net	126 (21.0)	51 (17.4)	75 (24.4)		
Insecticides (Spray)	126 (21.0)	54 (18.4)	72 (23.5)		
Coil	323 (53.8)	178 (60.8)	145 (47.2)	11.19	0.011
Wire-gauze	25 (4.2)	10 (3.4)	15 (4.9)		
Main types of toilets					
Pit latrines	471 (78.5)	240 (81.9)	231 (75.2)		
Water closet system	109 (18.0)	43 (14.7)	66 (21.5)	6.18	0.103
Bush and others	20 (3.5)	10 (3.4)	10 (3.3)		
Primary source of water					
Spring/river water	217 (36.2)	122 (41.6)	95 (30.9)		
Well water	80 (13.3)	39 (13.3)	41 (13.4)	8.11	0.017
Pipe-borne water	303 (50.5)	132 (45.1)	171 (55.7)		
Household refuse disposal					
Burning	49 (8.2)	27 (9.2)	22 (7.2)		
Public refuse bin	432 (72.0)	203 (69.3)	229 (74.6)		
Household refuse bin	87 (14.5)	46 (15.7)	41 (13.4)	2.16	0.539
Bush	32 (5.3)	17 (5.8)	15 (4.9)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

4.3. Observed hygiene practices and hygiene score by status of the respondents

Variations in hygiene practices of respondents were generated by adopting spot checklist as shown in Tables 4.3a and b below. Indicators such as 'mothers' clean and child clean' recorded very high percentages 71.6% and 71.0%, respectively among the respondents in purdah and non- purdah.

Generally, households with presence of animal droppings were about 70 percent (72.9% in Purdah and 66.4% in non-purdah). Unwashed utensils were observed in 34.0% households. This is slightly higher in (30.3%) non-purdah compared to purdah group (37.5%), $p>0.05$.

Stagnant water was found in the majority of the households (69.4%), 74.8% in purdah and 69.4% in non-purdah, ($p<0.05$). Majority of the households (64.4%) were found swept during the observational schedule (64.0% in purdah and 64.8% in non-purdah). Consequently, the results showed that out of every three households, two of them had stagnant water, unwashed utensils and domestic animals droppings in their vicinities.

4.3.1 Levels of hygiene practices among the respondents

The result revealed that more than half of the respondents (63.0%) had high scores in the cleanliness practice (59.7% in purdah and 66.1% in non-purdah), while 37.0% had low cleanliness practice (40.3% in purdah and 33.9% in non-purdah), $p>0.05$.

Table 4.3a: Frequency of respondents' observed hygiene practices of the respondents

Variables	Status of the respondents				
	Overall N (%)	**Purdah N (%)**	**Non-purdah N (%)**	**Chi-square**	**p-value**
Mothers' body clean					
Yes	429 (71.6)	210 (71.9)	219 (71.3)	0.025	0.473
No	170 (28.4)	82 (28.1)	88 (28.7)		
Child's body clean					
Yes	425 (71.0)	200 (68.5)	225 (73.3)	1.671	0.115
No	174 (29.0)	92 (31.5)	82 (26.7)		
Compound swept					
Yes	371 (62.1)	184 (63.4)	187 (60.9)	0.408	0.290
No	226 (37.9)	106 (36.6)	120 (39.1)		
Presence of stagnant water					
Yes	410 (69.4)	214 (74.8)	196 (69.4)	7.751	0.003
No	181 (30.6)	70 (25.2)	111 (30.6)		
Presence of unwashed utensils					
Yes	203 (34.0)	88 (30.3)	115 (37.5)	3.364	0.040
No	394 (66.0)	202 (69.7)	192 (62.5)		
Total	**597 (100)**	**290 (100)**	**307 (100)**		

Table 4.3b: Frequency of respondents' observed hygiene practices by status

Variables	Status of the respondents				
	Overall N (%)	**Purdah N (%)**	**Non-purdah N (%)**	**Chi-square**	**p-value**
Presence of Animals droppings					
Yes	416 (69.6)	212 (72.9)	204 (66.4)	2.893	0.053
No	182 (30.4)	79 (27.1)	103 (33.6)		
House swept					
Yes	386 (64.4)	187 (64.0)	199 (64.8)	0.040	0.455
No	213 (35.6)	105 (63.0)	108 (35.2)		
Total	**599 (100)**	**292 (100)**	**307 (100)**		

Table 4.4: Level of hygiene practices of the women

Variables	Status of the respondents				
	Overall No (%)	**Purdah No (%)**	**Non-purdah No (%)**	**Chi-square**	**p-value**
Level of hygiene practice					
Low	222 (37.0)	118 (40.3)	104 (33.9)	2.632	0.062
High	378 (63.0)	175 (59.7)	203 (66.1)		
Total	**600(100)**	**293 (100)**	**307 (100)**		

4.3. Access to health care delivery services

4.3.1. Ante-natal care

The results showed that 58.8% attended ante-natal clinics (55.3% in purdah and 62.2% in non-purdah), ($p>0.05$). Various sources of ante-natal care were reported by mothers in seeking ante-natal-care during pregnancy. The commonest was obtained from nurse/ midwives (68.3%), 65.2% in purdah and 71.3% in non-purdah. About 21% obtained it from traditional birth attendants (25.9% in purdah and 16.0% in non-purdah), while10.8% obtained it from medical doctors (8.9% in purdah and 12.7% in non-purdah), ($p<0.05$).

4.3.2. Anti-tetanus injections

Generally, 45.2% of the respondents received the recommended dose (two doses) of anti-tetanus injections during pregnancy (42.2% in purdah and 48.2% in non-purdah women), 18.0% received just a dose (16.0% in purdah and 19.9% in non-purdah) while 36.8% did not receive any of the doses during pregnancy (42.0% in purdah and 31.9% in non-purdah), ($p<0.05$), (table 4.5a)

4.3.3. Delivery assistance

More than one-third (36.3%) of the respondents had their delivery assisted by Nurses or Mid-wives (26.6% in purdah and 45.6% in non-purdah), 28.1% had self-delivery (32.1% in purdah and 24.1% in non-purdah), and 27.5% had their babies delivered by Traditional Birth Attendants (33.8% in purdah and 21.5% in non-purdah). Community health personnel assistance was 5.3% (5.1% in purdah and 5.5% in non-purdah), only 2.8% delivery was assisted by medical doctors (2.4% in purdah and 3.3% in non-purdah), $p<0.05$, (table 4.5a)

4.3.4 Health care seeking behaviour and home health practices

The results on maternal health seeking attitudes and home health practices were generated through quantitative and qualitative measurements. The data showed that the majority (90.8%) of all the respondents claimed to seek different kinds of treatments (87.3% in purdah and 94.1% in non-purdah) during child's sickness, while 9.2% of the respondents (12.7% in purdah and 5.9% in non-purdah) reported that nothing was done when their child

was sick, (table 4.5a). Ante-natal care (ANC) attendance is an important element of a comprehensive maternal health strategy. The national coverage of ante-natal care visit by pregnant women was still very low (56.4%) based on the results indicated in MICS4, 2011. Utilisation of ante-natal care services was found to be 3.0% in the North West Zone, much lower than the figure of 87.0% documented in the South West Zone (ORC Macros, 2008). Recently, according to the reports of the national survey conducted in Nigeria, more than 78% of deliveries took place in the home environment in the north-west compared to 12.7% in the south-east (MICS 4, 2011).

4.3.5. Growth monitoring and immunisation status of the children

Growth monitoring practice especially for the under-five children has been realized to be a crucial survival strategy for monitoring the growth and development in the children. However, the majority of the respondents (74.5%) did not monitor the growth of their children, even at birth (68.9% in purdah and 79.8% in non-purdah).

The immunisation status of the children against the six preventable childhood diseases namely measles, whopping cough, oral polio, diphtheria, tuberculosis and tetanus were assessed. The results showed that more than one quarter of the respondents did not receive any of the immunisation. On the overall, about 27.7% of the respondents reported not to have vaccinated their children with the recommended vaccines (33.8% in purdah and 21.8% in non-purdah), 62.8% received some (56.3% in purdah and 69.1% in non-purdah), while only 9.5% (9.9% in purdah and 9.1% in non-purdah) received all the age-specific immunisations for their under-five children, $p<0.05$, (table 4.5a).

4.3.6 Sources of treatments

In all, 68.0% sought for treatment during the child's illness at Government hospitals (64.5% in purdah and 71.3% in non-purdah). The study also revealed that some of the respondents patronized private (13.5% in purdah and 15.6% in non-purdah) as well as patent medicine stores (15.0% in purdah and 6.8% in non-purdah), $p<0.05$, (table 4.5a).

4.3.7. Autonomy over treatment during sickness

Women's autonomy was measured with regard to the ability of the respondents to carry out certain decisions whenever either the respondents or the child is sick for relevant treatment. The autonomy varied across the stratum considered in this study. More than half of the respondents (56.7%) took permission from their husbands before making consultation on medical treatment during child's sickness (61.8% in purdah and 51.8% in non-purdah), 36.6% reported having mutual agreement (32.4% in purdah and 40.7% in non-purdah), while 6.7% claimed self autonomy (5.8% in purdah and 7.5% in non-purdah women) when seeking medical attention, ($p< 0.05$), (table 4.5a).

4.3.8. Level of constraints

The ability of the respondents to access health-care services was further measured. The results were pulled together whereby a constraints index was generated around the mean. Responses below the mean were categorised as low while those above the mean were categorised as high. As presented below in table 4.3, overall results showed that substantial numbers (61.2%) of the respondents appeared in the high level with respect to constraint experienced during health services utilisation (65.2% in purdah and 57.3%), while 38.8% of the women were found in low level of constraints (34.8% in purdah and 42.7% in non-purdah), $p<0.05$, (table 4.5a).

4.3.9. Respondents' opinion on health services utilisation

Qualitative method was also used to augment information provided by the mothers' in order to have a clearer understanding of their disposition towards child immunisation. These are some of their responses:

"…Whenever my child is due for immunisation or the vaccinators don't come, I do take my child to the hospital to obtain the vaccines …"

IDI Respondent (non- purdah) Rural location -Kano.

Some of the respondents reported that after receiving some vaccines, occasionally, they might not deem it fit to complete the remaining vaccines requirement for their children.

"…My children have taken only the first three vaccines (BCG, DPT and OPV) and since then, I have not taken them for the remaining vaccines…"

IDI respondent (purdah) Rural community-Sokoto.

However, a certain level of doubts was still reported by the respondents on their perception towards the vaccines. The following is part of their opinions towards child immunisation:

"…We believe perhaps the vaccine was an attempt to reduce our fertility rate by the people who promote and support the program…"

IDI respondent (non- purdah) Urban location-Sokoto).

However, some of the women were able to receive all the recommended immunisations for their children

"… Since immunisation is good for the children against cough, measles etc, I take them to the hospital for immunisation, hence all my children are immunised*…"*

IDI respondent (non- purdah) Rural location -Kano).

In addition, to the above quantitative results, mothers were interviewed on their disposition, attitudes and perception towards available health-care services. The interview confirmed the patronage was mostly obtained during sickness.

Few of their responses were presented below:

"…Many of us prefer going to the hospital whenever we or our children are sick, but we still prefer home delivery to hospital delivery…"

IDI respondent (non-purdah) Rural-Kano

4.3.10 Attitude of health personnel

Dissatisfaction with the attitude of health care providers towards their patients was widely reported.

"*…The attitude of health workers in our hospitals is generally hostile, unsympathetic, uncaring. Patients and their relatives are often embarrassed by the health workers…"*

IDI respondent(purdah) Rural- Sokoto

'…The private clinic workers are friendlier and more humane, but many of their staff are less qualified than their counterparts in the public hospitals…"

IDI non-purdah, urban, Kano.

Table 4.5a: Frequency distribution of respondents' health services utilisation

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
1.Ante-natal visit					
Yes	353 (58.8)	162 (55.3)	191 (62.2)		
No	247 (41.2)	131 (44.7)	116 (37.8)	2.968	0.050
2.Personnel consulted					
Doctor	65 (10.8)	26 (8.9)	39 (12.7)		
Nurse/Midwife	410 (68.3)	191 (65.2)	219 (71.3)	10.02	0.007
Traditional Birth Attendants	125 (20.8)	76 (25.9)	49 (16.0)		
3.Doses of anti-tetanus taken					
Once	108 (18.0)	47 (16.0)	61 (19.9)		
Twice	271 (45.2)	123 (42.0)	148 (48.2)	6.626	0.036
None	221 (36.8)	123 (42.0)	98 (31.9)		
4.Delivery assistance					
Doctor	17 (2.8)	7 (2.4)	10 (3.3)		
Nurse/Midwife	218 (36.3)	78 (26.6)	140 (45.6)		
Community health personnel	32 (5.3)	15 (5.1)	17 (5.5)	26.956	0.0001
Traditional Birth Attendants	165 (27.5)	99 (33.8)	66 (21.5)		
Self	16 (28.1)	94 (32.1)	74 (24.1)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

Table 4.5b: Frequency distribution of respondents' health services utilisation

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
5. Had Growth monitoring					
Yes	447 (74.5)	202 (68.9)	245 (79.8)		
No	153 (25.5)	91 (31.1)	62 (20.2)	9.312	0.002
6. Had Post-natal check-up					
Yes	364 (60.7)	164 (56.0)	200 (65.1)		
No	236 (39.3)	129 (44.0)	107 (34.9)	5.287	0.013
7. Source of health care					
Government hospital	408 (68.0)	189 (64.5)	219 (71.3)		
Community health facility	46 (7.7)	27 (9.2)	19 (6.2)		
Private clinics	81 (13.5)	33 (11.3)	48 (15.6)	14.194	0.003
Patent medical stores	65 (10.8)	44 (15.0)	21 (6.8)		
8. Immunisation Status					
Received none	166 (27.7)	99 (33.8)	67 (21.8)		
Received some	377 (62.8)	165 (56.3)	212 (69.1)	11.725	0.003
Received all	57 (9.5)	29 (9.9)	28 (9.1)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

4.4. Child-care practices of the respondents

4.4.1. Types of water treatment

The results presented in Table 4.6 below showed that various ways were reported by mothers for the treatment of the water used for their children's foods and drinks. About 21.7% of the respondent reported storing the water in earthware pots (21.5% in purdah and 21.8% in non-purdah), 16.1% of the respondents boiled their water (15.0% in purdah and 16.9% in non-purdah), and 11.3% used local measures to filter their water before usage (11.3% in purdah and 11.4% in non-purdah). However, 15.3% of the respondents used treated water (e.g. table or sachet water for their children (13.3% in purdah compared to 17.3% in non-purdah women), $p>0.05$.

4.4.2. Diarrhoea incidence and treatment

As presented in Table 4.6, overall results showed that more than half of the children (50.8%) had diarrhoea in the last two weeks prior to the study. An incidence of one episode of diarrhoea was reported in 22.7% (28.0% in purdah and 17.6% in non-purdah), 14.7% had three episodes (12.3% in purdah and 16.9% in non-purdah), while 49.1% of the children did not have any incidence of diarrhoea in the last two weeks preceding the study (46.4% in purdah and 51.8% in non-purdah). The overall variation in the incidence of diarrhoea was statistically significant among the under-five children of the women, ($p<0.05$).

The population of the respondents who treated diarrhoea with drugs was 25.7%; 11.8% reported using oral rehydration therapy (ORT), while 13.3% used both drugs and ORT. However, most of the women (49.2%) claimed not to have treated the diarrhoea with any of the aforementioned treatments. Further dichotomy of the results showed that 10.9% of women in purdah and 12.7% of non-purdah used ORT in the treatment of diarrhoea. Surprisingly, 46.4% of purdah and 51.8% of non-purdah women did not provide the children with any treatment during the incidence of diarrhoea, $p>0.05$ (table 4.6).

Table 4.6: Percentage distribution of child care practices among the mothers

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
Water treatment methods					
Boiling	96 (16.0)	44 (15.0)	52 (16.9)		
Filtering	68 (11.3)	33 (11.3)	35 (11.4)		
Store in pots	130 (21.7)	63 (21.5)	67 (21.8)	3.570	0.467
Treated with chemicals	92 (15.3)	39 (13.3)	53 (17.3)		
Not treated	214 (35.7)	114 (38.9)	100 (32.6)		
Diarrhoea incidence					
Once	136 (22.7)	82 (28.0)	54 (17.6)		
Twice	81 (13.5)	39 (13.3)	42 (13.7)		
Thrice	88 (14.7)	36 (12.3)	52 (16.9)	10.257	0.017
None	295 (49.1)	136 (46.4)	159 (51.8)		
Treatment of Diarrhoea					
Use ORT	71 (11.8)	32 (10.9)	39 (12.7)		
Use Drug	154 (25.7)	85 (29.0)	69 (22.5)		
Both ORT and Drug	80 (13.3)	40 (13.6)	40 (13.0)	3.821	0.431
None	295 (49.2)	136 (46.4)	159 (51.8)		
Total	**600 (100)**	**293 (100)**	**307 (100)**		

4.4.3. Frequency of hand washing

The results showed that the majority (72.5%) of the mothers reported practicing hand washing when they had done dirty works (75.4% in purdah and 69.7% in non-purdah), ($p>0.05$). However, getting the hand washed after visiting the toilet was not practiced by more than half (50.7%) of the mothers (53.6% in purdah and 47.9% in non-purdah), $p>0.05$. Hand-washing before food preparation was not practiced by 68.2% of the mothers (70.3%in purdah and 66.1% in non-purdah), $p>0.05$.Similarly, hand-washing before feeding the baby (67.2%) was not practised by the mothers, (68.9% in purdah and 65.5% in non-purdah), $p>0.05$.

Table 4.7: Frequency of hand washing practices of the respondents

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
After using the toilets					
Yes	296 (49.3)	136 (46.4)	160 (52.1)		
No	304 (50.7)	157 (53.6)	147 (47.9)	1.949	0.094
Before food preparations					
Yes	191 (31.8)	87 (29.7)	104 (33.9)		
No	409 (68.2)	206 (70.3)	203 (68.2)	1.209	0.156
Before feeding the child					
Yes	197 (32.8)	91 (31.1)	106 (34.5)		
No	403 (67.2)	202 (68.9)	201 (65.5)	0.818	0.207
After dirty works					
Yes	435 (72.5)	221 (75.4)	214 (69.7)		
No	165 (27.5)	72 (24.6)	93 (30.3)	2.460	0.070
Total	**600 (100)**	**293 (100)**	**307 (100)**		

4.5: Breastfeeding practices of the respondents

Optimal breastfeeding has been recommended for the first six months of life (UNICEF, WHO, 2003). This has been realized to have an impact on child survival, with the potential to prevent an estimated 19% of all under-five children's deaths in the developing world, more than any other preventive intervention (Jones *et al.*, 2003).

4.5.1: Complementary foods before six months

Table 4.8a shows the comparison between the children of purdah and non-purdah with respect to the types of foods used as complementary foods for the under-five children before attaining the age of six months. More than half of the children (59.0%) were offered pap and milk before the age of six months (56.3% in purdah and 61.6% in non-purdah). This is followed by 15.8% of the women feeding their children herbal concoction (13.0% in purdah and 18.6% of non-purdah) as complementary foods before they attain the recommended age (six months). About sixteen percent of the children were offered pap alone (21.5% in purdah and 9.8% in non-purdah). The results also revealed that 5.3% of the children were offered infant formula (4.9% in purdah and 5.8% in non-purdah) as complementary foods. The least percentage of the mothers fed their under-five children water as prelacteal foods (3.4% in purdah and 5.2% in non-purdah), $p<0.05$.

4.5.2. Initiation of breastfeeding

Initiation of breastfeeding has been realized to be possible under various conditions and the timing varies across the status of the respondents under study. The variation is depicted in Table 4.8a. Overall, 38.1% of the respondent initiated breastfeeding immediately (within 0-30 minutes after birth) (39.2% in purdah and 36.8% in non-purdah), 53.7% delayed the initiation until after some hours later (52.9% in purdah and 54.7% in non-purdah), while 8.2% did not initiate it until after a day or more (7.8% in purdah and 8.5% in non-purdah), $p>0.05$.

4.5.3: Frequency of breastfeeding

The result shows that 97.2% of the mothers reported to have ever breastfeed their indexes child (96.9% in purdah and 97.4% in non-purdah), while only 2.8% were unable to

practise breastfeeding (3.1% in purdah and 2.6% in non-purdah), p>0.05. The majority of the women (43.2%) reported to have breastfeed their children 10-12 times per day (50.9% in purdah and 35.8% in non-purdah), while 7.7% extended breastfeeding for their children more than 12 times per day (8.9% in purdah and 6.5% in non-purdah). The difference is statistically significant among the women.

Approximately, 94% of the women breastfeed their children on demand, while only 6% breastfed on fixed time. Breastfeeding on demand was found higher among the women in purdah (94.5%) than among non-purdah (92.8%), p>0.05.

4.5.4 Practice of exclusive breastfeeding

The result revealed that exclusive breastfeeding was generally low among the respondents, with only 17.2% of the children being exclusively breastfed for the first six months of life (17.7% in purdah and 16.6% in non-purdah), about 76% introduced other non-breast substitutes to their children before the age of six months (72.0% in purdah and 78.8% in non-purdah), while 7.3% of the mothers breastfed their children exclusively for more than six months before introduction of complementary foods (10.2% in purdah and 4.6% in non-purdah), (p<0.05).

4.6 Complementary feeding practices for the under-five children

4.6.1 Children snacks consumption

Table 4.8b shows the comparison between women in purdah and non-purdah as regards the number of times snacks were given to their under-five children. Statistically insignificant difference was observed in purdah and non-purdah regarding number of times snacks were offered to the children asides from their usual dietary intakes. The study showed that 48.7% of the children were offered snacks once (50.6% and 46.9% of the children of women in purdah and non-purdah respectively). Snacks were offered twice to 31.3% of the children (32.2% in purdah and 30.5% in non-purdah), while only 20.0% of the under-five children were offered snacks thrice (17.2% in purdah and 22.6% of non-purdah), p>0.05.

4.6.2: Feeding utensils

Table 4.9b shows the comparison between women in purdah and non-purdah on the feeding utensils used in feeding the under-five children. Majority of the women (67.3%) used cup and spoon in feeding their children (70.7% in purdah and 64.1% in non-purdah). The use of feeding bottles was still practised by 23.6% of the women (19.2% in purdah and 27.9% of non-purdah), while 9.1% (10.1% in purdah and 8.0% in non-purdah) reported using hands to feed their children, $p<0.05$.

Table 4.8a: Distribution of breastfeeding practices of the respondents

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
Ever breastfed					
Yes	583 (97.2)	284 (96.9)	299 (97.4)		
No	17 (2.8)	9 (3.1)	8 (2.6)	0.118	0.461
Initiation of Breastfeeding					
Between 0-30 minutes	228 (38.1)	115 (39.2)	113 (36.8)		
Less than 24 hours	323 (53.7)	155 (52.9)	168 (54.7)	0.398	0.820
Days after delivery	49 (8.2)	23 (7.8)	26 (8.5)		
Exclusive breastfeeding					
For six months	103 (17.2)	52 (17.7)	51 (16.6)		
Less than six months	453 (75.5)	211 (72.1)	242 (78.8)	7.627	0.022
More than six months	44 (7.3)	30 (10.2)	14 (4.6)		
Pattern of breastfeeding					
On demand	562 (93.7)	277 (94.5)	285 (92.8)		
At fixed period	38 (6.3)	16 (5.5)	22 (7.2)	0.735	0.246
Frequency of breastfeeding					
6-8 times	108 (18.0)	31 (10.6)	77 (25.1)		
8-10	187 (31.2)	87 (29.7)	100 (32.6)		
10-12	259 (43.2)	149 (50.9)	110 (35.8)	26.846	0.0001
12 and above	46 (7.7)	26 (8.9)	20 (6.5)		
Total =600	**100**	**100**	**100**		

Table 4.8b: Maternal care practices for the under-five children

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi square**	**P-value**
Number of Snacks /day					
Once	229 (48.7)	115 (50.7)	114 (46.9)		
Twice	147 (31.3)	73 (32.2)	74 (30.5)	2.192	0.334
Thrice	94 (20.0)	39 (17.2)	55 (22.6)		
Foods before Six Months					
Pap and Milk	354 (59.0)	165 (56.3)	189 (61.6)		
Water	26 (4.3)	10 (3.4)	16 (5.2)		
Herbal concoction	95 (15.8)	38 (13.0)	57 (18.6)	18.330	0.001
Infant formula	32 (5.3)	17 (4.9)	15 (5.8)		
Pap alone	93 (15.5)	63 (21.5)	30 (9.8)		
Feeding utensils					
Feeding Bottle	133 (23.6)	53 (19.2)	80 (27.9)		
Cup and spoon	379 (67.3)	195 (70.7)	184 (64.1)	6.078	0.048
Hand	51 (9.1)	28 (10.1)	23 (8.0)		
Total=600	**100**	**100**	**100**		

4.6.3. Male involvement in child-care

Table 4.9a and b show the extent of fathers' involvement in child care across the categories of the women. The highest score of husbands' involvement was found in playing with baby among the two groups of women (154.5 and 152.7 in non-purdah and purdah women respectively). This was followed by carrying baby by the husbands (151.1 in purdah 149.2 in non-purdah). Provision of financial support was found to be higher among respondents in purdah (149.8) compared to their counterpart in non-purdah (135.5). Furthermore, very low levels of male involvement with respect to assisting the mothers to wash baby's wear and bathing the baby were found in respondent in purdah (22.1 and 24.1 respectively) and in non-purdah (27.4and 29.7 respectively).

Table 4.9a: Distribution of male involvement in child-care practices among purdah women

Variable	Always	Occasionally	Never	Weighted Score
Change Diaper	8.5	17.4	74.4	34.4
Feed Baby	16.0	34.5	49.5	66.5
Play with Baby	66.6	19.5	14.0	152.7
Carrying Baby	65.5	20.1	14.3	151.1
Wash Baby's wear	6.1	9.9	84.0	22.1
Bath baby	6.1	11.9	81.9	24.1
Give Financial support	68.6	12.6	18.8	149.8

Table 4.9b: Distribution of male involvement in child-care practices among non-purdah women

Variable	Always	Occasionally	Never	Weighted Score
Change Diaper	9.8	26.1	64.2	45.7
Feed Baby	17.9	35.8	46.3	71.6
Play with Baby	64.2	26.1	9.8	154.5
Carrying Baby	60.6	28.0	11.4	149.2
Wash Baby's wear	6.2	15.0	78.8	27.4
Bath baby	7.2	15.3	77.5	29.7
Give Financial support	58.3	18.9	22.8	135.5

4.6.3: Nutrient Intake from complementary foods by the children

Tables 4.10 and 4.11 showed the nutrient intake from complementary foods among under-five children of women in Purdah and Non-purdah. As seen on the tables, children were not adequately fed with the recommended intakes of micronutrients sources of foods and these cuts across the children from the two groups. Similarly, none of the age-groups was able to meet the RDA for calcium, phosphorus and vitamin C. However, the overall intakes of the children were just slightly above the average in energy, protein, iron and vitamin A. Most of the nutrients intakes in children of non-purdah women were slightly higher compared to those of women in Purdah.

Table 4.10: Mean nutrient intake from complementary foods by the children (Purdah)

Age of children (months)	Energy (Kcal)	Prot .(g)	Fat (g)	Iron (mg)	Calcium (mg)	Phosphorus (mg)	Vitamin (A)	Vitamin C
6-11	753.5	11.9	7.3	5.9	80.6	79.5	219.4	6.9
% RDA met	**58.4**	**67.5**	**24.3**	**85.0**	**16.1**	**17.3**	**73.1**	**46.0**
12-18	861.4	13.9	6.8	4.8	129.3	97.8	201.8	2.5
% RDA met	**46.8**	**63.6**	**27.2**	**68.6**	**25.9**	**20.4**	**67.0**	**16.7**
19-23	911.7	13.2	5.6	5.8	99.8	113.8	291.1	2.6
% RDA met	**46.5**	**53.1**	**22.4**	**57.5**	**12.5**	**22.8**	**72.8**	**19.0**
24-30	955.5	10.4	14.7	5.7	91.4	104.3	232.7	9.3
% RDA met	**54.2**	**51.2**	**58.8**	**57.4**	**11.5**	**20.9**	**58.2**	**37.1**

Table 4.11: Mean nutrient intake from complementary foods the children (Non-purdah)

Age of children	Energy (kcal)	Protein (g)	Fat (g)	Iron (mg)	Calcium (mg)	Phosphorus (mg)	Vitamin A	Vitamin C (mg)
6-11	823.3	13.4	8.9	6.2	90.3	105.6	263.7	2.9
%RDA met	**69.2**	**51.3**	**33.2**	**88.6**	**18.1**	**22.9**	**87.9**	**19.3**
12-18	901.6	14.4	9.1	6.27	120.7	158.7	267.8	3.1
%RDA met	**50.4**	**69.7**	**30.5**	**89.6**	**24.1**	**34.5**	**89.3**	**20.7**
19-23	959.1	14.9	8.4	5.35	99.1	71.4	299.4	1.8
%RDA met	**43.3**	**59.6**	**28.9**	**76.4**	**19.9**	**15.9**	**59.9**	**12.0**
24-30	1000.8	15.6	11.3	7.6	118.8	114.5	305.6	2.06
%RDA met	**52.1**	**68.9**	**45.3**	**76.5**	**23.8**	**22.9**	**61.1**	**13.7**

4.6.4: Dietary diversification in complementary feeding of the children

Consumption of plant and animals foods was very low in this study. None of these foods had 50% intake across the respondents except in bean cakes (Kosein) and it cuts across the children of purdah (51.5%) and non-purdah women (53.1%). This is followed by consumption of milk which was was found to be consumed by 30.3% of the children (28.7% in purdah and 31.7% in non-purdah). Less than one-third of the children did not consume up to 30% of other sources of animal proteins (meat, fish, and egg) across the children of the women. It is noteworthy that more than half of the children (52.3%) consumed bean-cake (‘*Kosein*’).

Fruits and vegetables consumption were incredibly low among the children of both purdah and non-purdah women in the study. The highest percentage was found in orange intake (16.7%), (14.1% in purdah and18.8% in non-purdah). None of the other fruits reported by the women for the children had up to 20% consumption.

The overall vegetable intake was low (18.4%) across the status of the women for their under-five children (20.8% in purdah and 16.5% in non-purdah). However, tea as a form of beverage was mostly offered to the under-five children (47.7%) among the two groups of women (48.8% in purdah and 46.8% in non-purdah).

Table 4.12: Distribution of energy foods consumption of the children

Variables	Overall	Purdah	Non-purdah
Cereals and grains			
Pap	282 (26.5)	148 (27.9)	134 (24.9)
Fortified Pap	53 (5.0)	25 (4.7)	28 (5.5)
Tuwo	244 (22.9)	131 (24.7)	113 (21.0)
Rice	241 (22.6)	120 (22.6)	121 (22.5)
Cerelac	26 (2.4)	6 (1.1)	20 (3.7)
Cornflakes	20 (1.7)	4 (0.7)	16 (2.9)
Bread	201 (18.9)	96 (18.1)	105 (19.5)
Total	**1065**	**530**	**537**
Yams and tubers			
Yam	49 (50.0)	14 (46.7)	35 (51.5)
Potatoes	49 (50.0)	16 (53.3)	33 (48.5)
Total	**98**	**30**	**68**

Table 4.13: Distribution of protein sources of foods among the children (daily)

Variables	Overall	Purdah	Non-purdah
Legumes			
Cheese (soya)	93 (24.7)	49 (24.7)	44 (24.6)
Soya milk	23 (6.1)	12 (6.1)	11 (6.1)
Moin-moin	52 (13.8)	27 (13.6)	25 (13.9)
Bean cake (Kosein)	197 (52.3)	102 (51.5)	95 (53.1)
Beans	12 (3.1)	8 (4.0)	4 (2.2)
Total	**377**	**198**	**179**
Animal proteins			
Meat	148 (29.9)	65 (28.3)	83 (31.3)
Fish	118 (23.9)	59 (25.6)	59 (22.3)
Milk	150 (30.3)	66 (28.7)	84 (31.7)
Egg	79 (15.9)	40 (17.4)	39 (14.7)
Total	**495**	**230**	**265**

Table 4.14: Distribution of fruits and vegetables intakes among the children (daily)

	Overall	Purdah	Non-purdah
Fruits &vegetables			
Orange	67 (16.7)	25 (14.1)	42 (18.8)
Watermelon	22 (5.5)	8 (4.5)	14 (6.3)
Banana	34 (8.5)	16 (9.0)	18 (8.0)
Pawpaw	13 (3.2)	5 (2.8)	8 (3.6)
Vegetables	74 (18.4)	37 (20.8)	37 (16.5)
Tea	192 (47.7)	87 (48.8)	105 (46.8)
Total =	**402**	**178**	**224**

4.7: Assessment of respondents' nutritional knowledge

Adapted 11-item rating scale questionnaire

The adapted 11-item Rating Scale Questionnaire was administered to determine the nutritional knowledge of the women. Table 4.16, represents the percentages of scored obtained by the respondents on their ability to provide information aimed at determining their nutritional knowledge and care practices for their under-five children. Subsequently, the analysis of the variables (using the rating scale) was used to determine the nutritional knowledge of the respondents from the responses obtained. Pattern of breastfeeding recorded an excellent score of 36.6% for women in purdah, while child immunisation status recorded highest poor score (36.9%) among the poor rating category.

Table 4.17, shows the analysis of variables by allocating scores on the rating scale among this particular group of women to determine the nutritional knowledge of the respondents based on the responses obtained from them through the questionnaire interview. Child immunisation status recorded an excellent rating score of 35.6% for women in non-purdah. Similarly, use of pre-lacteal feeds recorded highest poor score (37.7%) among the poor rating category in non-purdah women.

Furthermore, the results showed that substantial numbers of the respondents (26.4%) were unable to put their babies to breast within the first 30 minutes after delivery.

Table 4.15: Rating scale of respondents' nutritional knowledge (purdah)

		Rating (%)				
		5	4	3	2	1
S/N	**Variables**	**Excellent**	**Very good**	**Fair**	**Poor**	**Very poor**
1	Initiation of breastfeeding (0–30 Mins.)	33.9	19.1	16.0	8.5	22.5
2	Use of pre-lacteal feeds	28.3	13.7	12.6	11.3	34.1
3.	Pattern of breastfeeding	36.6	12.3	16.0	16.0	19.1
4.	Exclusive breastfeeding	34.1	12.6	14.7	12.3	26.3
5.	If baby refuses food what do you do	25.6	18.1	16.0	13.0	27.3
6.	Adequate complementary feeding	30.4	22.2	18.4	15.0	14.0
7.	Knowledge on salt iodization	35.5	16.6	13.0	11.3	21.6
8.	Micronutrient/multivitamin supplement	28.7	15.7	13.0	10.6	32.1
9.	Importance of Child nutritional assessment	20.1	21.2	23.9	15.0	19.8
10.	Nutritional care during sickness	22.5	24.9	15.7	12.3	24.6
11.	Child immunisation status	30.3	10.8	12.8	9.2	36.9

Table 4.16: Rating scale of respondents' nutritional knowledge (non-purdah)

		Rating (%)				
		5	4	3	2	1
S/N	Variables	Excellent	Very good	Fair	Poor	Very poor
1	Initiation of breastfeeding (0–30 mins.)	34.2	15.3	13.4	10.7	26.4
2	Use of pre-lacteal feeds	25.7	14.7	13.0	18.9	37.7
3.	Pattern of breastfeeding	29.0	15.3	16.6	16.0	23.1
4.	Exclusive breastfeeding	33.2	11.1	12.4	12.1	31.3
5.	If baby refuses food what do you do	23.8	19.2	16.3	12.7	28.0
6.	Adequate complementary feeding	28.0	23.8	15.0	12.7	20.5
7.	Knowledge on salt iodization	26.7	10.4	9.1	13.0	20.7
8.	Micronutrient/multivitamin supplement	24.1	19.2	12.7	15.3	28.7
9.	Importance of Child nutritional assessment	22.6	23.1	22.5	16.3	19.5
10.	Nutritional care during sickness	25.1	22.8	17.9	10.7	23.5
11.	Child immunisation status	35.6	9.4	9.4	10.1	25.4

4.8: Maternal nutritional knowledge

Maternal nutritional knowledge was later pooled together whereby further analysis was performed on the outcomes to construct the nutritional knowledge index (NKI). Responses to the nutritional knowledge were summed together and the results were grouped into either above the mean or below the mean. Subsequently, nutritional knowledge above the mean (25.0-48.0) was categorised as high, while those below the mean (0.0-24.9) were considered low from the responses provided.

Table 4.18 shows that 53.7% of the women scored above the mean of the nutritional knowledge (i.e. 25.0-48.0) and this was mostly reflected in the scores obtined by the women. Also, 46.3% of the respondents scored below the mean (i.e. 0.0-24.9) using the aforementioned procedure. Furthermore, the results showed that women in purdah had slightly higher nutritional knowledge (54.3%) compared to non-purdah (53.1%). The difference is not statistically significant, $p>0.05$.

Table 4.17: Level of maternal nutritional knowledge

Indicators		**Status of respondents**	
Level of Nutritional Knowledge	**Overall (%)**	**Purdah (%)**	**Non-purdah (%)**
Low (0.0-24.9)	46.3	45.7	46.9
High (25.0-48.0)	53.7	54.3	53.1
Total =600	**100**	**100**	**100**

χ^2=47.793, df =1; p =0.418.

4.9: Nutritional status of the women and their children

4.9.1: Degree of malnutrition among the women.

The results of maternal body mass index (BMI) has indicated in Table 4.19 showed that 27.5% of the women were underweight (31.1% in purdah and 24.1% in non-purdah), 44.0% of the women had normal weight, 20.2% were overweight, while 8.3% were obese (7.8% in purdah compared with 8.8% in non-purdah), However, the difference observed among the respondents was not statistically significant p> 0.05.

Table 4.18: Degree of malnutrition among the Respondents

Variables	Status of the respondents				
	Overall	**Purdah**	**Non-purdah**	**Chi-square**	**P-value**
Maternal Body Mass index					
<18.5	165(27.5)	91(31.1)	74(24.1)		
18.5-24.99	264(44.0)	125(42.7)	139(45.3)		
25.0-29.99	121(20.2)	54(18.4)	67(21.8)	3.886	0.274
30 and above	50 (8.3)	23(7.8)	27(8.8)		
Total	**600(100)**	**293(100)**	**307(100)**		

4.9.2. Prevalence of malnutrition among the children

Overall results as presented in figure 6 shows that more than half of the children under the age of five years were stunted (52.2%), 38.3% were underweight and 13.2% were wasted.

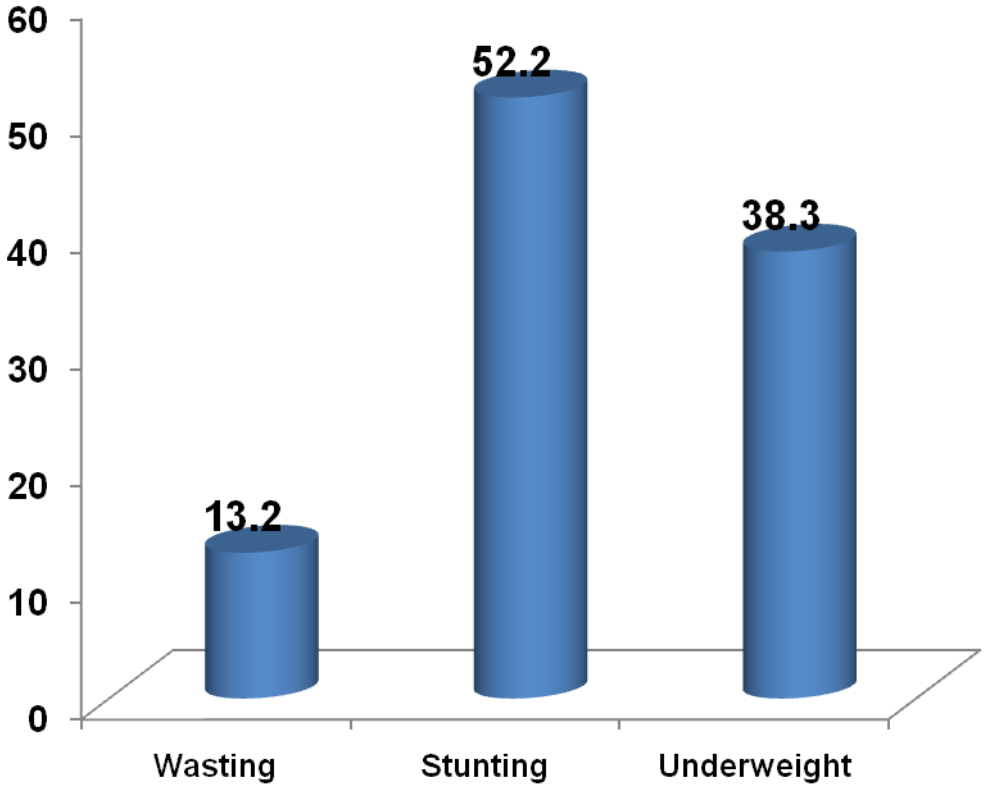

Fig. 4.2: Overall percentage distribution of under nutrition among the under-five children

4.9.3: Percentage prevalence of under nutrition by status

Stunting was found to be 53.9% among children of women in purdah compared to children of non-purdah women (50.5%), p>.05. Underweight was found to be higher in purdah (43.3%) compared to non-purdah (33.6%), p<0.05. Conversely, wasting was found higher among children of non-purdah (13.7%) compared to children of purdah women (12.6%), but the difference was not also statistically significant p>0.05.

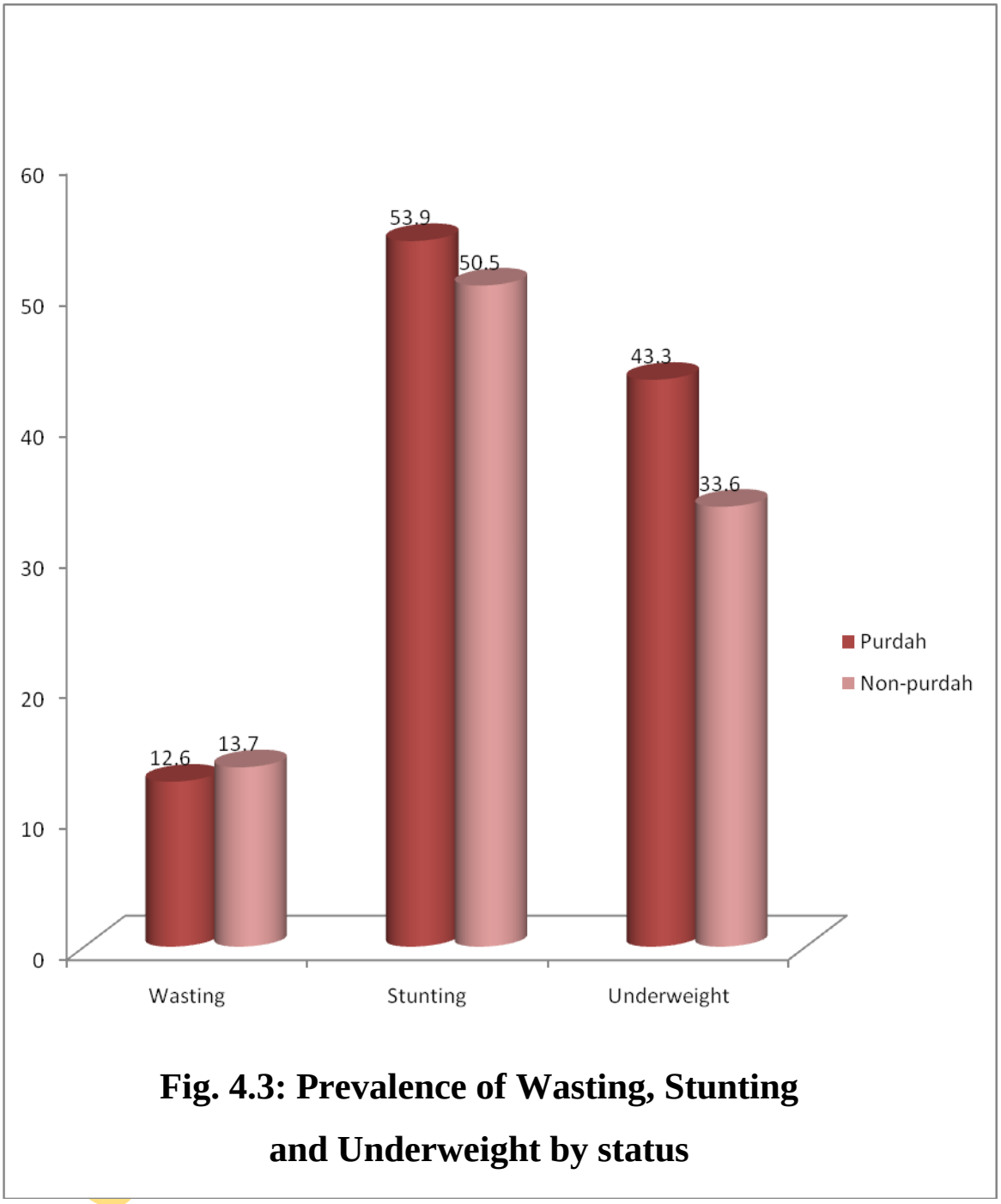

Fig. 4.3: Prevalence of Wasting, Stunting and Underweight by status

4.10: Bivariate analysis of independent and dependent variables

This section presents findings on associations between child nutritional statuses; household socio-demographic variables; households' resources; infant and young child feeding practices and health services utilisation variables achieved through comparison of means. Relationships between dependent and independent variables were categorized significant at $p<0.05$.

4.10 Hypotheses testing

4.10.1: Hypothesis 1

This seeks to test for significant association between selected socio-demographic variables and child nutritional status.

The association between socio-demographic and child nutritional outcomes are presented in Tables 4.21a and b below. Households without any form of economic engagement of the mothers were found with stunting among children of purdah women (mean HAZ = -2.16) and also in non-purdah (mean HAZ=-2.53), $p<0.05$. This was followed by households with self-employment (mean HAZ= -2.01 and mean HAZ =-2.10 in purdah and non-purdah respectively). Also, mean Z-scores, WAZ was found to be highest among household without any primary occupation (mean WAZ = -1.73 and mean WAZ = -1.33 in purdah and non-purdah respectively).

Results from bivariate analysis showed that the primary economic engagement of the household heads and their wives were significantly associated with the three indices of child malnutrition. The impacts on the under-five children was, however, significantly different between purdah and non-purdah women. All indices of malnutrition were significantly different between types of primary occupation of women in purdah and child malnutrition, while significant difference was found in stunting in non-purdah women. The analysis also indicated higher prevalence of underweight, stunting and wasting among the children of mothers that were self-employed or full housewives (i.e. who were not into any economic engagement) compared to children whose mothers works in offices. Similar scenario was found with children whose fathers were either farmers or private establishments.

Level of stunting was found to be high when the mother had Arabic education alone (mean HAZ =-2.41) and also in primary education category (mean HAZ =-2.20) among women in purdah, while children of women with Arabic education in non-purdah also had stunting (mean HAZ =-2.21), $p<0.05$. Educational attainment from secondary school up to tertiary level was found to confer protection against all indices of malnutrition across the two groups of women i.e. the mean Z-scores increased as both maternal and paternal education level increase. Conversely, this pattern (i.e. secondary education attainment) did not follow similar pattern in paternal education with respect to stunting among children of purdah women.

Stunting (HAZ) was found where resource for food was obtainable from the father (mean HAZ= -2.06) and specifically high when it comes from the husbands' parents (mean HA Z= -2.44) among children from women in purdah, $p>0.05$. However, stunting was observed among children from non-purdah when resources were made available by the husbands' parents (mean HAZ= -2.64), $p>0.05$. Conversely, when resources for food were made available by the couple, malnutrition was not found among the children in the study.

The association with stunting was statistically significant when households' sizes was greater or equal to six members (i.e.≥6 members) in purdah women (mean HAZ =-2.11) and non-purdah women (mean HAZ =-2.02) respectively. The result was only statistically significant among children of non-purdah women with respect to stunting, $p<0.05$.

Maternal body mass index was significantly associated with stunting and underweight in purdah and non-purdah women respectively, i.e. mean HAZ and WAZ in children whose mothers were either undernourished or obese across the various dichotomy explored in the study. The difference was statistically significant, $p<0.05$ in stunting and underweight among the children from the two groups of women.

Table 4.19a: Socio-demographic and food resource variables and mean height for age (HAZ), weight for Age (WAZ) and weight for height (WHZ) of respondents

Characteristics	Purdah			Non-purdah		
	WHZ N=600	HAZ N=600	WAZ N=600	WHZ N=600	HAZ N=600	WAZ N=600
1. Maternal occupation						
None	-0.64	-2.16	-1.73	-1.27	-2.53	-1.33
Civil service	- 0.18	-1.00	-1.45	-0.61	-0.66	-0.85
Self-employment	0.60	-2.01	-0.23	-1.02	-2.10	-1.17
P-value	**0.026**	**0.020**	**0.0002**	**0.196**	**<0.0001**	**0.075**
2.Maternal education						
Arabic school	-0.46	-2.41	-1.86	-0.26	-2.21	-1.48
Primary school	-0.32	-2.20	-1.47	-0.23	-1.89	-1.34
Secondary school	0.41	1.12	-0.48	-0.22	-1.04	-0.80
Tertiary education	0.32	-0.44	-0.03	-0.34	-0.40	-0.43
No formal education	-1.24	-1.85	-1.87	-0.99	-1.41	-1.68
P-value	**0.017**	**<0.0001**	**<0.0001**	**0.833**	**<0.0001**	**<0.0001**
3.Paternal occupation						
Private establishment	-0.37	-2.99	-1.68	-0.22	-2.90	-1.31
Civil Service	0.03	-1.88	-0.78	-0.33	-1.75	-1.03
Farming	-0.03	-2.01	-2.11	-0.64	-2.00	-1.98
P-value	**0.243**	**<0.0001**	**0.0001**	**0.799**	**0.006**	**0.112**
4.Paternal education						
Arabic school	-0.44	-2.44	-1.88	-0.25	-2.45	-1.69
Primary school	-0.40	-2.34	-1.77	-0.30	-1.99	-1.36
Secondary school	-0.27	-1.99	-1.37	-0.25	-1.53	-1.12
Tertiary education	0.56	-0.69	0.01	-0.24	-0.80	-0.62
No formal education	-0.86	-2.37	-1.89	-0.06	-1.44	-1.33
P-value	**0.032**	**<0.0001**	**<0.0001**	**0.994**	**<0.0001**	**<0.0001**

Table 4.19b: Socio-demographic variables and mean height for age (HAZ), weight for Age (WAZ) and weight for height (WHZ) of the respondents

Characteristics	Purdah			Non-purdah		
	WHZ	**HAZ**	**WAZ**	**WHZ**	**HAZ**	**WAZ**
5.Decision over income						
Respondent	-0.35	-2.12	-1.58	-0.40	-1.72	-1.32
Husbands	-0.14	-2.05	-1.43	-0.18	-1.82	-1.26
Couple	-0.24	-1.96	-1.30	-0.15	-1.69	-1.08
Others	-0.59	-2.16	-1.58	-0.01	-1.43	-1.84
P-value	**0.803**	**0.906**	**0.571**	**0.732**	**0.892**	**0.528**
6.Sources of food income						
Husbands	-0.32	-2.06	-1.50	-0.25	-1.70	-1.19
Husbands and wife	0.30	-1.83	-1.00	0.64	-1.64	-1.44
Husbands parents	0.04	-2.44	-1.59	0.09	-2.64	-1.52
P-value	**0.281**	**0.481**	**0.333**	**0.485**	**0.142**	**0.504**
7.Households size						
≤5 members	-0.16	-1.98	-1.31	-0.28	-1.51	-1.12
≥6 members	-0.35	-2.11	-1.61	-0.24	-2.02	-1.36
P-value	**0.351**	**0.410**	**0.065**	**0.805**	**0.004**	**0.131**
8.Maternal Body Mass index						
<18.5	-0.43	-2.27	-1.66	-0.63	-2.29	-1.75
18.5-24.99	-0.16	-1.68	-1.17	-0.03	-1.39	-0.93
25.0-29.99	-0.38	-1.74	-1.34	-0.42	-1.62	-1.23
30 and above	-0.23	-2.09	-1.25	-0.09	-2.18	-1.32
P value	**0.293**	**0.0001**	**0.005**	**0.120**	**0.0001**	**0.0001**

4.10.2: Hypothesis 2

This seeks to test for significant association between selected household's environmental characteristics and child nutritional status.

Table 4.22 below shows that child malnutrition was significantly associated with the main types of toilets available in the households. Level of stunting was highest in purdah when pit latrines (mean HAZ= -2.16) and bush or others sources of toilets facilities (mean HAZ= -2.51) were the toilets facilities in the households, $p<0.05$. Prevalence of stunting was also higher when bush/others were used in non-purdah (mean HAZ = -2.96), $p<0.05$. Similarly, use of pit latrines also predisposed children to high incidence of underweight among children from purdah (mean WAZ =-1.56) and non-purdah women (mean WAZ = -1.40) respectively, $p<0.05$.

Child malnutrition was found to be significantly associated with spring /river water in purdah (mean HAZ =-2.83) and non-purdah women (mean HAZ = -2.04) respectively, $p<0.05$. Well water was shown to predispose children of non-purdah women alone to stunting (mean HAZ =-2.03) and this difference observed was statistically significant, $p<0.05$. Furthermore, spring/ river water also increased the chance of being underweight in both purdah (mean WAZ = -1.93) and non-purdah women (mean WAZ = -1.57), $p<0.05$.

Virtually all household refuse disposal methods used by women in purdah was found to be associated with stunting in their under-five children, $p>0.05$. Conversely, only household refuse bin predisposed children of non-purdah women to stunting, $p>0.05$.

Level of malnutrition (stunting) was observed among the children when maternal and households cleanliness index fell under the low category among children of purdah (mean HAZ= -2.47) and non-purdah women (mean HAZ= -2.09), $p<0.05$. Similarly, the incidence of underweight was also shown to be associated with low level of maternal cleanliness among the two groups of women (mean WAZ =-1.89 in purdah ($p<0.05$) and mean WAZ =-1.42 in non-purdah ($p>0.05$).

Table 4.20: Association between household's characteristics and mean height for age (HAZ), weight for age (WAZ) and weight for height (WHZ)

Characteristics	Purdah			Non-purdah		
	WHZ	**HAZ**	**WAZ**	**WHZ**	**HAZ**	**WAZ**
1.Main types of Toilet						
Pit Latrines	-0.31	-2.16	-1.56	-0.39	-1.89	-1.40
Water closet system	-0.06	-1.45	-0.92	-0.05	-0.92	-0.64
Bush and others	-0.23	-2.51	-2.02	1.09	-2.96	-0.86
P- value	**0.868**	**0.004**	**0.016**	**0.024**	**<0.0001**	**<0.0001**
2.Primary source of water						
Spring /River water	-0.53	-2.83	-1.93	0.53	-2.04	-1.57
Well-water	-0.36	-1.63	-1.26	0.03	-2.03	-1.24
Piped-borne water	-0.01	-1.95	-1.13	-0.19	-1.48	-1.03
P-value	**0.048**	**0.012**	**<0.0001**	**0.197**	**0.006**	**0.009**
3.Household refuse disposal						
Burning	-0.53	-2.26	-1.72	-0.30	-1.29	-1.06
Public refuse bin	-0.30	-2.02	-1.45	-0.21	-1.74	-1.19
Household refuse bin	-0.09	-2.12	-1.49	-0.44	-2.06	-1.50
Bush	0.01	-2.11	-1.73	-0.61	-1.23	-1.17
P-value	**0.658**	**0.814**	**0.793**	**0.776**	**0.163**	**0.553**
4.Levels of cleanliness						
Low	-0.45	-2.47	-1.89	-0.25	-2.09	-1.42
High	-0.15	-1.79	-1.19	-0.28	-1.52	-1.12
P-value	**0.134**	**<0.0001**	**<0.0001**	**0.907**	**0.002**	**0.078**

4.10.3: Hypothesis 3:

This seeks to test for significant association between health service utilisation and child nutritional status.

Table 4.23a, b and c elucidates failure of mothers to obtain ante-natal care resulted in a significant level of stunting, (lower mean Z-scores) among children of purdah and non-purdah women compared to children whose mothers received ante-natal care. Receiving ante-natal care from skilled personnel (doctor) reduced malnutrition in the children across the status of the respondents. However, when ante-natal service or care was obtained from unskilled health care provider (e.g. Traditional Birth Attendants [TBA]), all indices of malnutrition were negatively increased across the two groups, $p<0.05$. Similar patterns were observed in the associations between mothers having their delivery assisted by Community Health Workers (CHW) or by TBA and all indices of malnutrition (mean WAZ, HAZ and WAZ), $p<0.05$. Children from mothers who had reported having post-natal check-up had lower mean z-scores in their children nutrition outcomes (specifically underweight) compared to children whose mothers did not receive any post-natal check-up, $p<0.05$.

The table also shows that the level of malnutrition was high when mothers did not seek treatment during child's sickness. Similar pattern was observed for all the indices of malnutrition across the women. However, significant difference was observed among children of women in purdah with respect to stunting, $p<0.05$, while other indices of malnutrition were not statistically significant, $p>0.05$.

The source of medical care available to the mothers also revealed that children whose mothers obtained treatment from patent medicine stores had highest level of stunting in children among purdah (mean HAZ= -2.66, $p<0.05$) and non-purdah women (mean HAZ= -2.44, $p>0.05$).

Child malnutrition was also significantly high when mothers were not aware of growth monitoring for their under-five children compared to children whose mothers were aware of growth monitoring. Level of stunting was high (mean HAZ =-2.33) in children of purdah and non-purdah (mean HAZ =-1.99) women respectively. Similarly, underweight and wasting were also high across the status of the mothers when mothers were not aware of growth monitoring. The associations with stunting and underweight were statistically

significant in children of purdah women alone, $p<0.05$ and no significant difference was observed in non-purdah with respect to growth monitoring, $p>0.05$.

The presence of malnutrition was found to be low when children received all the recommended age-specific immunisations across the status of the respondents. The results showed that having the children immunised conferred some protection on the children against wasting across the status of the respondents. However, when children did not receive any of the recommended immunisation for various ages, all indices of malnutrition were found to be high in the children. Level of stunting, wasting and underweight were high in children from purdah (mean HAZ = - 2.29, mean WHZ = - 0.58 and mean WAZ = -1.85) and non-purdah women (mean HAZ =-2.380, mean WHZ = - 0.76 and mean WAZ = -1.98) respectively.

The presence of malnutrition (stunting) was observed in children when mothers did not take any of the anti-tetanus injection or where only one anti-tetanus injection was taken during pregnancy, compared to children whose mothers took anti-tetanus injections during pregnancy. The level of stunting was high in children of purdah (mean HAZ =- 2.36) and non-purdah women (mean HAZ = -1.78) when mothers' took only one dose of anti-tetanus injection during pregnancy. When none of the anti-tetanus injection was obtained by mothers, stunting level was high in children of both purdah (-2.34) and non-purdah women (-2.14), $p<0.05$. Similar pattern was observed in underweight and wasting when mothers did not take or took only one anti-tetanus injection compared to children whose mothers took the recommended (two) doses of anti-tetanus injections during pregnancy. Statistically significant differences were however observed in stunting and underweight ($p<0.05$) while no significant difference was found in wasting across the two groups of women.

Furthermore, the frequency of having diarrhoea among the children in the past two weeks preceding the survey showed that as episodes of diarrhoea increased, the prevalence of malnutrition also increased (i.e lower z-score). The level of stunting was higher when children suffered from one episode of diarrhoea in purdah (mean HAZ = -2.14) and in non-purdah women (mean HAZ = -2.04) compared to children who did not have any episode of diarrhoea, $p< 0.05$. Malnutrition was specifically higher among children who had up to three episodes of diarrhoea. Additionally, the type of treatment provided for children during incidence of diarrhoea has implications on the child's nutritional outcomes.

Children who did not receive any treatment during diarrhoea incidence had lower Z-scores for all the indices of malnutrition across the status of the respondents compared to children who received any of the treatments during an incidence of diarrhoea.

The severity of constraints the women passed through in their effort to seek health service deliveries showed that high constraints predisposed the children more to malnutrition (stunting) compared to children whose mothers had low constraints**.** However, none of the indices of malnutrition in the under-five children was significant across the women in purdah and non-purdah ($p>0.05$) in relation to level of constraints encountered in health service utilisation.

Table 4.21a: Association between maternal health services utilisation and means height for age (HAZ), weight for age (WAZ) and weight for height (WHZ).

Characteristics	Purdah			Non-purdah		
	WHZ	**HAZ**	**WAZ**	**WHZ**	**HAZ**	**WAZ**
1.Seek antenatal care						
Yes	-0.19	-1.97	-1.33	-0.27	-1.60	-1.17
No	-0.57	-2.46	-1.98	-0.24	-2.53	-1.62
P-value	**0.124**	**0.019**	**<0.0001**	**-0.917**	**<0.0001**	**0.061**
2.Personnel consulted						
Doctor	0.73	-1.37	-0.32	-0.40	-1.03	-0.99
Nurse/Midwife	-0.33	-2.04	-1.45	-0.18	-1.68	-1.14
TBA	-0.46	-2.38	-1.93	-0.54	-2.43	-1.77
P-value	**0.007**	**0.004**	**<0.0001**	**0.421**	**<0.0001**	**0.008**
3.Delivery assistance						
Doctor	0.61	-1.88	-0.56	-0.22	-0.83	-0.70
Nurse/Midwife	-0.12	-1.49	-0.98	-0.11	-1.32	-0.89
Community Health worker	-0.56	-2.51	-2.03	-1.17	-1.92	-1.81
TBA	-0.42	-2.37	-1.73	-0.49	-2.19	-1.64
Self	-0.26	-2.16	-1.61	-0.18	-2.12	-1.41
P-value	**0.469**	**<0.0001**	**<0.0001**	**0.177**	**<0.0001**	**<0.0001**
4.Post-natal check-up						
Yes	-0.19	-2.33	-1.27	-0.08	-1.62	-1.04
No	-0.38	-2.19	-1.73	-0.62	-1.90	-1.57
P-value	**0.358**	**0.769**	**0.004**	**0.015**	**0.126**	**<0.0001**
5.Treatment of illness						
Yes	-0.25	-2.00	-1.43	-0.24	-1.73	-1.20
No	-0.33	-2.50	-1.75	-0.70	-1.65	-1.45
P-value	**0.817**	**0.039**	**0.184**	**0.307**	**0.818**	**0.472**

Table 4.21b: Association between maternal health services utilisation and means height for age (HAZ), weight for age (WAZ) and weight for height (WHZ).

Characteristics	Purdah			Non-purdah		
	WHZ	HAZ	WAZ	WHZ	HAZ	WAZ
6.Source of medical care						
Government Hospital	-0.20	-2.02	-1.41	-0.22	-1.74	-1.19
Community Health Facility	-0.26	-2.14	-1.63	-0.56	-1.76	-1.42
Private Medical sector	-0.31	-1.50	-1.14	-0.38	-1.37	-1.11
Patent Medicine stores	-0.52	-2.66	-1.19	-0.27	-2.41	-1.63
P-value	**0.762**	**0.002**	**0.067**	**0.845**	**0.083**	**0.440**
7.Autonomy on treatment						
Husband	-0.26	-2.11	-1.48	-0.26	-1.80	-1.25
Self	-0.85	-2.75	-2.22	-.055	-1.89	-1.54
Both	-0.18	-1.86	-1.34	-0.23	-1.60	-1.13
P-value	**0.331**	**0.034**	**0.048**	**0.748**	**0.491**	**0.381**
8.Had Growth monitoring						
Aware	-0.24	-1.94	-1.34	-0.23	-1.66	-1.17
Not aware	-0.34	-2.33	-1.79	-0.42	-1.99	-1.46
P value	**0.667**	**0.022**	**0.009**	**0.447**	**0.132**	**0.137**
9.Anti-tetanus injection						
Once	-0.27	-2.36	-1.57	-0.22	-1.78	-1.28
Twice	-0.19	-1.68	-1.16	-0.19	-1.41	-.098
None	-0.35	-2.34	-1.76	-0.42	-2.14	-1.55
P-value	**0.752**	**<0.0001**	**0.002**	**0.626**	**<0.0001**	**0.006**

Table 4.21c: Association between maternal health services utilisation and mean height for age (HAZ), weight for age (WAZ) and weight for height (WHZ)

Characteristics	Purdah			Non-purdah		
	WHZ	HAZ	WAZ	WHZ	HAZ	WAZ
Immunisation status						
Received none	-0.58	-2.29	-1.85	-0.76	-2.38	-1.98
Received some	-0.15	-1.98	-1.33	-0.18	-1.51	-1.05
Received all	0.56	-1.68	-1.00	0.24	-1.80	-0.79
P-value	**0.082**	**0.054**	**0.001**	**0.025**	**0.0001**	**0.0001**
Incidence of diarrhoea						
Once	-0.41	-2.14	-1.71	-0.15	-2.04	-1.47
Twice	-0.65	-2.21	-1.74	-0.38	-2.23	-1.52
Thrice	-0.29	-2.56	-1.79	-0.82	-2.43	-1.62
None	-0.07	-1.87	-1.17	-0.08	-1.37	-0.93
P-value	**0.051**	**0.006**	**0.232**	**0.0001**	**0.002**	**0.124**
Treatment of diarrhoea						
Using ORT	0.04	-2.01	-1.29	-0.79	-1.91	-1.65
Using Drug	-0.62	-2.32	-1.94	-0.34	-2.26	-1.53
Both ORT & Drug	-0.19	-2.07	-1.43	-0.06	-1.85	-1.08
None	-0.71	-2.37	-2.19	-1.03	-2.49	-2.23
P-value	**0.068**	**0.157**	**0.0001**	**0.110**	**0.0001**	**0.0001**
Constraint level						
Low	-0.19	-2.05	-1.42	-0.31	-1.69	-1.22
High	-0.32	-2.06	-1.51	-0.24	-1.75	-1.23
P-value	**0.542**	**0.959**	**0.585**	**0.744**	**0.738**	**0.924**

4.10.4: Hypothesis 4:

This seeks to test for significant association between infant and young child feeding practices and child nutritional status

Table 4.24 a and b shows that failure of mothers to initiate breastfeeding within 0-30 minutes after birth resulted in a significant level of stunting and underweight (lower mean Z-scores) among children of purdah and non-purdah women. Level of malnutrition was more obvious when breastfeeding initiation was delayed (less than 24 hours and days after delivery) among children of purdah and non-purdah women. However, significant difference was observed only in stunting among children of purdah and non-purdah women.

Similar scenario was found when children were not breastfed exclusively up to six months. High significant levels were found in stunting and underweight among children of purdah and non-purdah women who breastfed their children for less than six months and also when children were breastfed exclusively for more than six months. However, prevalence of malnutrition was higher where breastfeeding exceeded or not up to recommended age (six months) among the under-five children, $p<0.05$. Again, wasting was also increased when children were either breastfed exclusively for six months or more than six months, however, the difference was not significant among the status of the respondents, $p>0.05$.

Level of malnutrition was available (underweight) when children were offered complementary foods before the children reached the age of six months in both children of purdah and none purdah women, $p<0.05$. When children were offered water alongside with breastmilk, prevalence of wasting, stunting and underweight in children of purdah (mean Z-scores -0.75, -2.52 and -2.44 respectively) and non-purdah (mean Z-scores -0.87, -2.56 and -2.26 respectively) were observed. The differences observed was however statistically significant in underweight across the children in the study groups, $p<0.05$.

Child malnutrition was also significantly associated with feeding utensils used by the mothers for the under-five children. Level of stunting (HAZ = -2.36) and (HAZ =-1.94) in children of purdah and non-purdah women respectively was increased when children were fed with feeding bottles, however, the association was not significant among the dichotomy explored in the study. Similarly, prevalence of underweight was increased when

feeding bottles was used in feeding the children. None of the child nutrition indices was significant in purdah, $p>0.05$, while only underweight alone was found to be significant in non-purdah, $p<0.05$.

Furthermore, level of stunting was increased significantly when children were offered snacks once across the status of the respondents (mean HAZ= -2.53 in purdah and mean HAZ =-2.17 in children of non-purdah). However, underweight was also increased when snack was offered once and the difference observed was only statistically significant in non-purdah, $p>0.05$.

Impact of Male involvement was also found to have effect on under-five malnutrition in the present study. The effect was more pronounced when the father's involvement falls under low and medium category, while high category of father's involvement was found to confer protection on the child across the status of the respondents. The difference observed was found to be significant in wasting and underweight among children of non-purdah alone women alone, $p<0.05$, however, the difference in the variables was not found to be significant in children of purdah women, $p>0.05$.

Table 4.22a: Association between maternal infant feeding practices and mean height for age (HAZ), weight for age (WAZ) and weight for height (WHZ)

Variables	Purdah			Non-purdah		
	WHZ	**HAZ**	**WAZ**	**WHZ**	**HAZ**	**WAZ**
Initiation of breastfeeding						
Between 0-30 minutes	-0.36	-1.77	-1.23	-0.15	-1.49	-0.96
Less than 24 hours	-0.22	-2.31	-1.63	-0.27	-1.84	-1.30
Days after delivery	-0.06	-1.81	-1.27	0.74	-2.00	-1.81
P-value	**0.675**	**0.003**	**0.116**	**0.336**	**0.117**	**0.009**
Exclusive breastfeeding						
At six months	-0.16	-1.11	-0.79	-0.44	-0.48	-0.57
Less than six months	-0.24	-2.22	-1.57	-0.24	-1.99	-1.35
More than six months	-0.60	-2.53	-1.94	-0.02	-2.36	-1.44
P-value	**0.516**	**0.0001**	**0.0001**	**0.674**	**0.000**	**0.001**
Complementary foods before six months						
Pap and Milk	-0.19	-1.99	-1.33	-0.17	-1.64	-1.09
Water	-0.75	-2.52	-2.44	-0.87	-2.56	-2.26
Herbal concoction	0.19	-2.03	-0.99	-0.02	-1.66	-1.01
Infant formula	-0.64	-2.25	-1.62	-0.53	-2.14	-1.63
Pap alone	-0.58	-1.75	-1.94	-0.88	-1.69	-1.71
P-val P-value	**0.158**	**0.441**	**0.001**	**0.153**	**0.001**	**0.180**
Number of snacks /day						
Once	-0.17	-2.53	-1.63	-0.06	-2.17	-1.29
Twice	-0.35	-1.65	-1.17	-0.53	-1.45	-1.19
Thrice	-0.01	-1.48	-0.95	-0.12	-1.12	-0.74
P-value	**0.563**	**0.0001**	**0.002**	**0.208**	**0.0001**	**0.053**

Table 4.22b: Association between maternal infant feeding practices and mean height for age (HAZ), weight for age (WAZ) and weight for height (WHZ)

Variables	Purdah			Non-purdah		
	WHZ	**HAZ**	**WAZ**	**WHZ**	**HAZ**	**WAZ**
Feeding utensils						
Feeding Bottle	-0.32	-2.36	-1.69	-0.59	-1.94	-1.77
Cup and spoon	-0.25	-1.97	-1.36	-0.11	-1.63	-1.03
Hand	-0.17	-2.02	-1.62	-0.14	-1.86	-1.16
P-value	**0.942**	**0.187**	**0.233**	**0.141**	**0.432**	**0.015**
Male involvement						
Low	-0.24	-2.43	-1.76	-1.10	-1.58	-1.64
Medium	-0.30	-2.02	-1.46	-0.22	-1.82	-1.25
High	-0.10	-1.84	-1.19	0.08	-1.32	-0.76
P-value	**0.807**	**0.126**	**0.182**	**0.020**	**0.148**	**0.020**

4.11: Determinants of nutritional status of under-5 children

4.11.1: Association of independent variables and stunting among under-five children based on logistic regression analysis

The multivariate regression analyses for the study are presented in tables 4.25a and 4.25b below. The variables were subjected to binary logistic regression.

The likelihood of being stunted was about 6 times higher among children from low households' socio-economic status compared to children from high socio-economic status. (OR =5.697, 95% CI=2.924-11.029, p=0.000). The odds of being stunted was also significantly increased when the household socio-economic status falls under medium socio-economic status (OR =2.723, 95% CI=1.569-4.723, p=0.000). Furthermore, the present study shows a highly significant association between low socioeconomic status of the households and the indices of malnutrition among children of purdah and non-purdah women. The present study revealed that, after controlling for other variables in the study, children of respondents in low and medium socioeconomic categories are stunted. Additionally, this study was able to show that malnutrition exists among children from the medium category in the socioeconomic stratum; even though, there were no significant incidences of underweight and wasting, it was only stunting that was shown to be significantly associated with the medium socio-economic category.

The probability of children being stunted was about 6 times reduced in children whose mothers had secondary education attainment (OR=0.175, 95%CI=0.128-1.919, p=0.291) compared to children whose mother had no educational attainment. Conversely, both Arabic and primary education qualification increases the odds of children been stunted (OR=2.264, 95% C.I=0.688-7.577, p=0.181 and OR=1.790, 95% C.I=0.513-6.484, p=0.367 respectively). Conversely, tertiary education did not confer as much protection (2.1 times) on children against stunting compared to the trend observed with secondary education (5.7 times) among the children (OR=0.484, 95% C.I=0.016-1.981, p=0.155).

The odds of being stunted was 3.3 times less likely in the maternal age group 15-18 years compared to age group 40 and above years (OR=0.299, 95% CI=0.104-0.854, p=0.023).

Exclusive breastfeeding for the first six months of life confers about 6 times protection against stunting compared to children who were breastfeed exclusively for more

than six months before introduction of complementary feeding (OR=0.179, 95%CI=0.066-0.485, p=0.001).

The odds of being stunted was 1.6 times less likely in children whose mothers received two doses of anti-tetanus injection during pregnancy compared to children whose mothers did not receive any anti-tetanus injection during pregnancy (OR=0.644, 95%CI=0.397-1.046, P=0.075). Children who had no diarrhoea in the previous two weeks preceding the survey were 2.1 times less likely to be stunted compared to children who had diarrhoea (OR=0.480, 95%CI=0.318-0.724, p=0.000).

Table 4.23a: Logistic regression analysis of factors associated with stunting among under-five children of purdah and non-purdah women

Variables	OR	95% C.I		P-value
Status of the women	0.777	0.510	1.184	0.240
Purdah vs non-purdah				
Maternal education	2.264	0.688	7.577	0.181
Arabic vs No formal education				
Maternal education	1.790	0.513	6.484	0.367
Primary vs No formal education				
Maternal education	0.175	0.128	1.919	0.291
Secondary vs No formal education				
Maternal education	0.484	0.016	1.981	0.155
Tertiary vs No formal education				
Primary source of water	1.395	0.511	1.459	0.574
Spring vs pipep-borne water				
Primary source of water	0.861	0.740	2.690	0.312
Well water vs pipe-borne water				
Socio-economic status	5.697	2.924	11.029	0.000
Low vs high				
Socio-economic status	2.723	1.569	4.723	0.000
Medium vs high				
Maternal age	0.299	0.104	0.854	0.023
15-18 years vs 40 years and above				
Maternal age	0.803	0.411	1.561	0.517
19-29 years vs 40 years and above				
Maternal age	0.960	0.474	1.959	0.909
30-39 years vs 40 years and above				

Table 4.23b: Logistic regression analysis of factors associated with stunting among under-five children of purdah and non-purdah women continued

Variables	OR	95% C.I		P-value
Immunisation status	0.564	0.236	1.346	0.197
None vs complete immunisation				
Immunisation status	0.596	0.273	1.303	0.195
Incomplete vs complete immunisation				
Exclusive breastfeeding	1.036	0.496	2.162	0.925
< six months vs > than six months				
Exclusive breastfeeding	0.179	0.066	0.485	0.001
At six months vs > than six months				
Number of anti-tetanus	0.953	0.526	1.725	0.873
One vs none				
Number of anti-tetanus	0.644	0.397	1.046	0.075
Two vs none				
Incidence of diarrhoea	0.480	0.318	0.724	0.000
Absence vs presence				

4.11.2: Association of independent variables and wasting among under-five children based on logistic regression analysis

The multivariate regression analyses for the study are presented in tables 4.26a and 4.26b below. The variables were subjected to binary logistic regression.

The likelihood of being wasted was more than 3 times higher among children from low households' socio-economic status compared to children from high socio-economic status. (OR =3.211, 95% CI=1.250-8.253, p=0.015).

The odds of being wasted was about 5 times higher in the maternal age group 15-18 years compared to children whose mothers age group were between 40 and above years (OR=4.652, 95% CI=1.363-15.869, p=0.014).

The probability of children being wasted was about 5 times reduced in children whose mothers had tertiary education attainment (OR=0.213, 95%CI=0.153-0.953, p=0.998) compared to children whose mother had no educational attainment.

The odds of being wasted was I.2 times increased in children who were not exclusively breastfed for the first six months of life (OR=1.186, 95%CI=0.453-3.104, p=0.728) compared to children who were breastfed for more than six months before introduction of complementary feeding.

The odds of being wasted was more than 6 times higher in children who did not received any of the recommended age specific vaccines (OR=6.258, 95%CI=0.774-50.618,p=0.086) compared to children who had their immunisation regimes completed. Similarly, children who did not complete their immunisation also had more than 5 times odds of being wasted compared to children who completed their immunisation regime (OR=5.024, 95%CI=0.645-39.136, P=0.123).

Children who had no diarrhoea in the previous two weeks preceding the survey were 1.5 times less likely to be wasted compared to children who had diarrhoea in two weeks preceeding the study (OR=0.661, 95%CI=0.384-1.137, p=0.135).

Table 4.24a: Logistic regression analysis of factors associated with wasting among under-five children of purdah and non-purdah women

Variables	OR	95% C.I		P-value
Status of the women	0.648	0.380	1.106	0.111
Purdah vs non-purdah				
Maternal education	1.036	0.261	4.114	0.960
Arabic vs No formal education				
Maternal education	0.759	0.168	3.436	0.721
Primary vs No formal education				
Maternal education	0.204	0.031	1.359	0.100
Secondary vs No formal education				
Maternal education	0.213	0.153	0.953	0.998
Tertiary vs No formal education				
Primary source of water	1.531	0.281	1.003	0.051
Spring vs pipe-borne water				
Primary source of water	0.404	0.152	1.079	0.071
Well water vs pipe-borne water				
Socio-economic status	3.211	1.250	8.253	0.015
Low vs high				
Socio-economic status	0.998	0.397	2.512	0.997
Medium vs high				
Maternal age	4.652	1.363	15.869	0.014
15-18 years vs 40 years and above				
Maternal age	1.741	0.710	4.268	0.226
19-29 years vs 40 years and above				
Maternal age	1.057	0.401	2.788	0.910
30-39 years vs 40 years and above				

Table 4.24b: Logistic regression analysis of factors associated with wasting among under-five children of purdah and non-purdah women continued

Variables	OR	95% C.I		P-value
Immunisation status	6.258	0.774	50.618	0.086
None vs complete immunisation				
Immunisation status	5.024	0.645	39.136	0.123
Incomplete vs complete immunisation				
Exclusive breastfeeding	1.186	0.453	3.104	0.728
< six months vs > than six months				
Exclusive breastfeeding	1.050	0.268	4.106	0.944
At six months vs > than six months				
Number anti-tetanus	1.004	0.492	2.050	0.991
One vs none				
Number of anti-tetanus	0.827	0.431	1.587	0.568
Two versus none				
Incidence of diarrhoea	0.661	0.384	1.137	0.135
Absence versus presence				

4.11.3: Association of independent variables and underweight among under-five children based on logistic regression analysis

The multivariate regression analyses for the study are presented in tables 4.27a and 4.27b below. The variables were subjected to binary logistic regression.

The likelihood of being underweight was about 7 times higher among children from low households' socio-economic status (OR=6.676, 95%CI=3.413-13.060, p=0.000) compared to children from high socio-economic households.

The odds of being underweight was more than 2 times higher in maternal age group 15-18 years compared to children whose mothers age group were between 40 and above years (OR=2.122, 95% CI=0.718-6.274, p=0.174).

The probability of children being underweight was more than 8 times reduced in children whose mothers had tertiary education attainment (OR=0.119, 95%CI=0.0.000-0.121, p=0.458) compared to children whose mother had no educational attainment.

The odds of being underweight was more than 3 times reduced in children who were exclusively breastfed for the first six months of life (OR=0.298, 95%CI=0.112-0795, p=0.016) compared to children who were breastfed for more than six months before introduction of complementary feeding.

The odds of being underweight was about 3 times higher in children who did not received any of the recommended age specific vaccines (OR=2.805, 95%CI=1.080-7.287,p=0.034) compared to children who had their immunisation regimes completed.

Children who had no diarrhoea in the previous two weeks preceding the survey were 2.1 times less likely to be underweight compared to children who had diarrhoea two weeks preceding the study (OR=0.478, 95%CI=0.318-0.717, p=0.000).

Table 4.25a: Logistic regression analysis of factors associated with underweight among under-five children of purdah and non-purdah women

Variables	OR	95% C.I		P-value
Status of the women	1.054	0.699	1.591	0.802
Purdah vs non-purdah				
Maternal education	1.208	0.371	3.935	0.753
Arabic vs No formal education				
Maternal education	1.164	0.334	4.058	0.812
Primary vs No formal education				
Maternal education	0.576	0.148	2.248	0.427
Secondary vs No formal education				
Maternal education	0.119	0.000	0.121	0.458
Tertiary vs No formal education				
Primary source of water	1.091	0.664	1.791	0.731
Spring vs pipe-borne water				
Primary source of water	1.431	0.771	2.656	0.255
Well water vs pipe-borne water				
Socio-economic status	6.676	3.413	13.060	0.000
Low vs high				
Socio-economic status	1.698	0.926	3.115	0.087
Medium vs high				
Maternal age	2.122	0.718	6.274	0.174
15-18 years vs 40 years and above				
Maternal age	1.248	0.647	2.407	0.509
19-29 years vs 40 years and above				
Maternal age	1.329	0.665	2.653	0.421
30-39 years vs 40 years and above				

Table 4.25b: Logistic regression analysis of factors associated with underweight among under-five children of purdah and non-purdah women continued

Variables	OR	95% C.I		P-value
Immunisation status	2.805	1.080	7.287	0.034
None vs complete immunisation				
Immunisation status	1.775	0.720	4.375	0.212
Incomplete vs complete immunisation				
Exclusive breastfeeding	0.519	0.248	1.085	0.081
< six months vs > than six months				
Exclusive breastfeeding	0.298	0.112	0.795	0.016
At six months vs > than six months				
Number of anti-tetanus	1.017	0.575	1.798	0.953
One vs none				
Number of anti-tetanus	0.886	0.546	1.437	0.623
Two vs none				
Incidence of diarrhoea	0.478	0.318	0.717	0.000
Absence vs presence				

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Socio-demographic characteristics of the respondents

The fact that polygyny is the prevalent family type among the respondents is expected because the respondents are of Hausa tribe, where such marriage type is prevalent (MICS 4, 2011). The survey showed that polygamy was more practiced in the north-western zone of Nigeria (47.4%) compared to other zone of the country. Moreover, being the prevalent family type among the family of the women in purdah is instructive; this is basically because the Muslim faith that encouraged the practice of purdah also encouraged polygynous marriages. Polygyny as a family type is expected to increase family size, which might adversely affect family resources needed to fulfill basic needs including food and nutrition security of family members (Ifeanyi *et al.*, 2009). A similar finding was reported earlier by Sanginga *et al.*, (1999) in the Southern guinea savannah.

The result revealed that almost half of the respondents were found in household size greater than six members category (i.e. >6 members). The results of bivariate analysis corroborate findings from previous studies on the relationship between higher household's size and child's nutritional status. The study finds a negative and significant association between stunting and household size greater than six members in children of -purdah. However, stunting was also found to be higher (lower Z-score) among children of non-purdah but this particular association was not found to be significant in children of purdah women. These findings make sense considering that increases in the number of dependants usually lead to reduction in both the quantity and quality of food available for the members of the households.

The result showing that most of the respondents are within the ages of 19 and 29 years is expected, given the fact that early marriage is encouraged among people of Hausa tribal affiliation. This is further entrenched by the fact that the age at marriage of most of the respondents fall between 15 and 19 years. Further analysis of the results using logistic regression analysis showed a negative and significant association with the children's mother's age which implies that the higher the age of the mother the lesser the nutritional status of the child under her care. In other words, children living with older mothers had higher prevalence of stunting across the status of the respondents. Although unexpected,

this probably could be inferred down to the fact that higher percentage of the respondents in this study practiced polygyny and this could be linked to better attention and support for younger women and their children, which had been a common typical attitude among typical African polygamous households. This finding conforms to findings of Ifeanyi *et al.*, (2009) among pre-school children in Kano and Kaduna States of Nigeria.

The implication of these findings is that since most of the respondents are still young individuals, and are expected to still be amenable to learning and flexible lifestyle, which will facilitate effective interventions to entrench better child-care practices among the respondents when such is found necessary. Furthermore, a contrary trend was however observed with underweight in the present study with respect to mothers' age. The result showed that younger maternal age (15-19 years) increases level of malnutrition (underweight and wasting) among the children across the status of the women. Specifically, this outcome agreed with previous study of Mittal *et al.*, (2007) that the younger the mother's age the higher the prevalence of malnutrition among the children.

The study also identified maternal education as a significant determinant of the three indices of malnutrition across the status of the respondents. Findings from various studies have shown mixed results about the effect of maternal education on children's nutritional status depending on the unit of analysis; the socioeconomic status of the family or the cultural context. Some studies established that maternal education has impact on the nutritional status of the children (Gwatkin *et al.*, 2007; Ruel and Menon, 2003; NPC/ORC Macros, 2004; Paramita, 2010).

Generally, low educational level of the mothers was considered a risk factor for malnutrition. This has been established by previous studies where better perception and estimation of malnutrition were found in children whose mothers had higher educational level (Youssef *et al.*, 2000). Odunayo *et al.*, (2006) also reported that poor maternal education alongside other variables constituted risk factors to malnutrition among rural children in Nigeria. They suggested that improving the educational level of the mother would be of public heath importance in that regard. The lowest height-for-age, weight-for-age and weight-for-height (Z-scores) were found among under-five children whose mothers had no formal education. Specifically, stunting and underweight were highly significantly associated with lack of maternal education across the status of the respondents. Selestine *et*

al., (2011) in Zambia reported significant relationships between maternal education and all the three indices of malnutrition in the under-five children. Extensive research from developing countries on the role of maternal education showed that it influenced child growth and health through better feeding practices, better health promoting behaviours, lower fertility and more child-centred caring practices, all of which are associated with better child health and nutrition (Shah *et al.*, 2003, Semba *et al.*, 2008, Shaili *et al.*, 2011).

According to findings from the present study, there is an inverse relationship between maternal educational attainment and child malnutrition. It was revealed that higher maternal education reduced the odds of malnutrition in under-five children of both purdah and non-purdah women. Primary school attendance was the only education category found to be associated with stunting and underweight compared to children whose mothers did not attend any formal school. This may be because most mothers who only completed primary school or who do not have the opportunity to go to other higher schools were not employed and were found in low income economic activities within their households. The results therefore implied that maternal educational qualification is an important determinant of childhood malnutrition. This was confirmed in the results particularly important among children whose mothers have less than secondary education and those who did not acquire tertiary education.

Furthermore, the result of the present study showed that more than half of the respondents' husbands have formal education. Previous studies had however established the impacts of paternal education on child's nutritional status. A study that considered nutritional status of the pre-schooler in Bangladeshi also found a stronger and significant relationship between paternal educational qualification and stunting compared with maternal education (Rahman & Chowdhury, 2006, Semba *et al.*, 2008, Mostafa 2011).

Conversely, the pathways through which paternal and maternal education may influence malnutrition have been frequently investigated by previous studies (Oyewole, 2006 and Ogunba, 2007). Meanwhile, present study also confirmed the trend of association of both paternal and maternal education on nutritional status (stunting) of the under-five children as indicated in the results of test of difference using ANOVA. However, results of binary regression in this study showed that maternal educational level had more influence on nutritional status of the under-five children compared to paternal educational status.

5.2 Socio-economic factors on under-five nutritional status

Findings on the relative socioeconomic profile of the households showed that more than one-third of the households are in the low category meaning that more of the households will not be reasonably able to fulfil their household's needs. The finding that almost half of the respondents has a larger household sizes which seems to corroborate the foregoing. This is because household size has been established as an important variable affecting availability of resources to households (Ifeanyi *et al*., 2009). This is in agreement with Wong *et al.,* (2007) that reported malnutrition to be more common among children of households with low socioeconomic status. Debra, *et al.*, (2008) also stated that poor economic status and social structure are the important factors for the development of malnutrition in the under-five children. Additionally, the trends of the outcome are in consistent with other studies in other developing countries on the relationship between socioeconomic status of the households and childhood under-nutrition in developing countries (Ajeiroh, 2006; Ogunba, 2007; Nguyen *et al.*, 2008; Kamal *et al.*, 2010).

Limited information was gathered in an attempt to determine annual income of the respondents. Consequently, household economic status was determined based on possession of assets using wealth index (Sirkin, 1995). Previous studies have shown relationship between socioeconomic variables and childhood malnutrition in Sub-Saharan Africa (Van de Poel *et al.*, 2008). The finding from this study showed an association between household possession (a proxy for socio-economic status) and under-five malnutrition. Various findings have revealed that property owned by the family, as well as resources available to them could influence the household's nutritional status. This finding can be attributed to limited economic resources to fulfill the household's needs for food and nutrition security. Similar association was also observed in other studies (Nguyen *et al.*, 2008, Alex Kojo *et al.*, 2010).

Furthermore, the number of hours spent with children has an effect on the nutritional status of the under-five children (Ogunba, 2007, Shaili *et al*., 2011). Mothers that spend lesser time in child-care have been shown to spend more time outside the home due to their job; this invariably has negative implications on the children's nutritional status as established in literature (Sule *et al.*, 2009).

5.3 Health services utilisation of the mothers

The information derived from the Maternal Child Health (MCH) indicators provides opportunity to assess the extent to which women visit health facilities to enable them get proper maternal care and the possibilities of ensuring that they understand the need for having access to skilled personnel at birth. Around 39% of deliveries in Nigeria were attended to by skilled birth attendants in 2008 (ORC Macros), decreasing from 44% reported in 2007 MICS. This varies across different zones in the country, meanwhile, access to proper medical attention and hygienic conditions during delivery had been found to be very important in the reduction of complications and infections that may lead to death or serious illness for the mother and/or baby (WHO, 2006).

The results showed that more than half of the women visited the health facility for ante-natal care which implies that they mostly had good attitude to the use of health-care services. Conversely, the findings still revealed that more than in-half of the deliveries were not attended by skilled health-care providers. The reasons that were provided by women who delivered at home were that it is more convenient and sometimes cost-effective to deliver at home than going to a facility.

It is noteworthy that, similar scenario was revealed in a localised study in Sokoto state; only 2.3% of the deliveries were attended to in the home by unskilled Traditional Birth Attendants (TBA) or friends and relatives. Women of child-bearing age in Sokoto state have a 1-in-17 lifetime risk of dying during pregnancy or childbirth, and 60% of the maternal deaths occur at home, 7% on the way to the health facility (Shehu, 1999).

A child is considered fully vaccinated if he or she has received a BCG vaccination against tuberculosis; three doses of DPT to prevent diphtheria, pertussis (whooping cough) and tetanus; at least three doses of polio vaccine; and one dose of measles vaccine. All these vaccinations should be received during the first year of life, over the course of five visits, including the doses delivered at birth. According to this schedule, children aged between 12 and 23 months will have completed their immunisations and be fully immunised. Immunisation of the children is part of the essential indicators that shows the extent of health service utilisation for the under-five children (Engle *et al.*, 1997a).

It is noteworthy that even though a higher percentage of the children that were not immunised at all were mostly from women in purdah, however, the results showed that slightly higher percentage of children of women in purdah received all age specific immunisation compared to children of non-purdah women. This particular finding is in line with inverse association between children's immunisation care and regular employment of mothers, which implied that full housewives are linked to better immunised children. The possible explanation given for this is that of time availability, required to ensure their children's vaccination (Nandan *et al.,* 1997).

Furthermore, this study established that the probability of children getting wasted and underweight was higher in un-immunised children and among those who did not complete their immunisation schedules compared to children who completed their age-specific immunisation schedules. The present study showed that immunisation schedules are poorly observed among the women for their under-five children.

5.4 Feeding practices and nutritional knowledge of the mothers

Under-nutrition among children under the ages of five years has been widely attributed to inappropriate feeding practices regarding breastfeeding and complementary feeding practices. The infant feeding practices is expected to have significant influence on the children's health status. Numerous studies conducted worldwide indicated that there is a myriad of benefits associated with breastfeeding (Araujo *et al.*, 2006; Carvalhaes *et al.*, 2007; Brunken, 2006); while incidences of Kwashiorkor have been associated with child feeding practices (Jegede *et al.*, 2006). The use of infant formula was found to be a risk factor for malnutrition among children in rural Nigeria (Odunayo *et al.*, 2006).

While lactation is a naturally occurring phenomena following child birth, initiation of breastfeeding for the infants has been complicated by numerous factors which include educational level, age, socioeconomic status and ethnicity (Shaker *et al.*, 2004; Lauer *et al.*, 2004). The time of initiation of breastfeeding has been shown to have significant influence on sustainability and the subsequent breastfeeding practices for the under-five children (Baker *et al.*, 2006). In the present study, there was no significant difference between purdah and non-purdah women with respect to initiation of breastfeeding. More than half of the mothers did not initiate breastfeeding within half an hour after birth. The delay in

breastfeeding initiation could be due to low level of attendance of health facilities for delivery. Even though, more than half of the women visited the health facility for ante-natal care, but majority of the deliveries were not attended by skilled health care providers. Most of the deliveries took place outside the hospital environment and therefore an opportunity to educate the mothers on the practice was abortive. The findings is in conjunction with the outcome of study carried out by Atinmo *et al.*, (1993) which found out that women gave water to the newborn before initiation of breastfeeding.

Furthermore, the only feeding practice variable that was related or associated with child malnutrition was exclusive breastfeeding among purdah and non-purdah women. The practice of exclusive breastfeeding had an inverse relationship with stunting and underweight among the two groups of women, while such relationship was not found with wasting. Rates of exclusive breastfeeding (EBF) and frequency of breastfeeding the children within the 24-hours in a day were significantly different between the two groups in bivariate analysis.

Exclusive breastfeeding (feeding an infant immediately after birth up to six months of age with only breast milk without adding any other substance) is a recommendation of Food and Agriculture Organization (2004), where breast milk was considered as sufficient and adequate food for full-term babies for the first months of life. According to ORC Macros survey in 2008, 13.0% of children under-six months of age were exclusively breastfed. This shows a decreasing trend in the national rate of breastfeeding.

Meanwhile, a higher percentage of women in purdah practiced exclusive breastfeeding for more than six months for their under-five children. The explanation provided by women in purdah who practiced EBF for more than six months noted that the reason for this was basically due to closer (mother and child) bond, which became a hindrance towards early acceptance of other foods by their children at six months. Eventually, most of the children usually graduated to adult foods around 7 or 8 months of age. However, studies have frowned at this practice because of the negative implication on childhood malnutrition (Brunken *et al.*, 2006, Carvahaes *et al.*, 2007).

Previous studies have shown that various factors predict practice of exclusive breastfeeding among mothers. Sasaki *et al.*, (2010) indicated that lack of maternal ante-natal EBF plan, working mothers and lack of paternal attendance at breastfeeding classes have

positive associations with cessation of EBF. Similarly, other negative factors that were found as barriers towards successful practice of EBF included insufficient breast milk production, need to allow mothers resume work and efforts to improve the nutritional status of the infant (Cherop *et al.*, 2009). Very little variation was observed among purdah and non-purdah women regarding EBF practice. Additionally, information derived from the in-depth-interview showed that mothers' fear of thirst for their young children, coupled with their ignorance on the importance of EBF precluded them from successful practice of EBF for the under-children.

In the present study, the reasons adduced by women in purdah for not practicing EBF are fear of thirst, insufficient breast milk output and the enthusiasm displayed by children towards adult foods. The reason reported by non-purdah women for not practicing EBF was due to work-related issues. Employment has been noted as a barrier to successful breastfeeding and this has become a recurring theme in breastfeeding literature. Many of the working class reported leaving their children at home. This practice usually occurred due to inadequate knowledge of the mothers on the possibility of expressing breast milk for caregivers at home or crèches for the infants.

Generally, the impact of familial support was a common predisposing factor crucial for discussion when considering influences surrounding a woman's breastfeeding behaviour. Impoverished working women have the added stress of striving to make enough money to support their families and this often times conflicts with duration of breastfeeding or rate of its exclusiveness. The result did not imply male involvement in the interruption of breastfeeding. Similar observation was also reported by the study of Falceto *et al.*, (2004) where the strength of a couple's relationship seems not to have a significant impact on the interruption of breastfeeding. In conclusion, the result of the present study showed a similar level of male involvement among purdah and non-purdah women.

5.4.1 Anthropometric indices of the child nutritional status

Malnutrition is responsible either directly or indirectly for about half of all deaths of children up to the age of five years in developing countries (Bacqui *et al.*, 2006; Atinmo *et al.*, 2008). Nutritional status is the best indicator of the global well-being of children (Onis Mde *et al.*, 2000) and remains a major public health concern (Hien and Kam, 2008).

In Nigeria, as in other developing countries, nutritional status of children is a major public health concern that requires urgent attention (Hien and Kam, 2008). The study showed a very high level of malnutrition in the North-west zone of Nigeria with about 52.2% of the children stunted, 38.3% underweight and 13.2% wasted. Also, previous national surveys conducted in the country which include; Nigeria Food and Nutrition Surveys (Maziya-Dixon *et al.*, 2004), Maternal, MICS, 2007 and National Demographic and Health surveys (ORC Macros 2008) had lesser figures for all the indices of malnutrition compared to the results of this study. The ORC Macros (2008) results indicated stunting rate in Nigeria to be 41 percent, wasting 14% and underweight 23%. Only wasting prevalence in this study was found slightly lesser than the national figures; the other two indices showed a higher prevalence of malnutrition in the study areas. Conversely, it is noteworthy that there is slight improvement in the nutritional status of the children based on the outcomes of the recent National survey conducted in Nigeria (MICS 4, 2011) where Stunting was put at 34.8%, Underweight was 24.2%, while wasting was found to be 10.2%.

Even though, there is a slight improvement in the prevalence of stunting in the north-west region (ORC Macros 2008 compared to MICS 4, 2011). The national survey (ORC Macros, 2008) was able to show that one third of the children in the north-west are severely stunted (33.5%) which, according to WHO classification of malnutrition by prevalence range, falls under the high range (WHO, 1995). Unfortunately, stunting rate in the North-west (53.8%) according to recent national survey (MICS 4, 2011) is apt to draw the country backward in meeting the targets of the MDGs in 2015. This observation cuts across the type of feeding received during the first 6 months after delivery, as well as the age of the child (Samuel, 2004).

Stunting was slightly higher in children of purdah women (53.9%) compared to non-purdah women (50.5%). These figures were higher compared to other studies conducted on Nigerian children in other regions of the country. For instance, Abidoye *et al.* (2001) reported 34.5% stunting among children between 1 and 4 years old in urban ghetto of Lagos state. Relative to other studies carried out in Nigeria, there are unacceptably high indices of malnutrition in the under-five children in the North-west zone of Nigeria.

Underweight (weight-for-age) is a reflection of an overall nutritional status of a population which may be due to the combination of stunting and underweight co-existing in

a population. Underweight is used as a composite indicator to reflect both acute and chronic under nutrition, although it cannot actually distinguish between them (Bose *et al.*, 2008). Result from this study indicated prevalence rate of underweight to be 38.3%. Underweight was found to be higher in purdah (43.3%) compared to non-purdah (33.6%). These results were higher than what was found in other studies conducted among under-five children in different parts of the country (Abidoye, 2000; Ajeiroh, 2006; Ogunba, 2007 and Ekpo *et al.*, 2008).

Furthermore, according to ORC Macros, 2008, underweight was found to be 35.1% in the north-west. Additionally, MICS 4, 2011 results showed that prevalence of underweight (38.4%) in the north-west was unparallel compared to other zones in Nigeria. Consequently, it is worth mentioning that these national figures and the results derived from this study are almost similar, which qualifies the north-west zone to be categorized as one of the hunger spots in Africa (i.e. a zone where the prevalence of underweight is above 20.0), Hunger Task Force, 2003.

The prevalence of wasting as revealed in this study indicated overall percentage of wasting to be 13.2%. The result of ORC Macros (2008) put wasting rate in Nigeria to be 14 percent, 17.1 percent in Kano and 17.5% in Sokoto. Unfortunately, much progress has not been recorded in the prevalence of malnutrition with respect to some of the nutritional indices as reported in the previous national surveys. However, it is noteworthy that slight improvement was observed in the findings of recent survey (MICS 4, 2011) conducted in Nigeria with respect to wasting among the children. Unfortunately, north-west persistently ranked highest in the prevalence of malnutrition compared to other zones (appendix 4). The present study showed wasting to be slightly higher among children of non-purdah women (13.7%) compared to those in purdah (12.6%) but this difference was not found to be significant among the groups, $p>0.05$.

Again, the pattern of stunting and underweight in this study were almost similar to what was found in the national survey (ORC Macros, 2008 and MICS 4, 2011) conducted shortly after the study was carried out. However similar trend was not observed with wasting. Wasting was rather higher in the ORC Macro reports (19.9%) in the north-west compared to 13.2% found in the present study.

Significant differences were observed in the nutrition indices across the two locations explored in the study (i.e. rural and urban communities) with respect to wasting and underweight, but no significant variation was found with stunting.

Furthermore, the three indices of malnutrition in under-five children appeared higher in boys compared to girls in the present study and the difference was found to be statistically significant. Similar outcomes were observed in studies conducted within the country (Ogunba, 2007; Fetuga, 2011) and outside the country (Berner, 2006). Conversely, a study carried in Ldhiana among under-five children discovered higher prevalence of underweight in girls compared to boys (Paramita *et al.*, 2010). It is highly challenging to provide possible causes for this variations between boys and girls as this information was not obtainable during the course of this present study.

It is also noteworthy that wasting and underweight decreases as age the of the children advances. Conversely, stunting increased as age progresses in children from both purdah and non-purdah women in the study.

5.4.2 Maternal body mass index (BMI) and child nutrition

Under-nutrition remains an unbearable nutrition condition in developing countries (Tabak *et al.*, 2000). Previous studies have found factors affecting the nutritional status of the women to include socioeconomic variables like occupation, educational qualification and household resources (Ogunba, 2007; Rayhan *et al.*, 2006). Some other studies were able to draw relationship between maternal nutritional status and some demographic variables like age, marital status, religion and environmental condition and cultural factors (Tabak *et al.*, 2000; Griffths and Barley, 2001; Shetty *et al.*, 2002; Bhatia *et al.*, 2007). The Body Mass Index (BMI) has been widely used to determine the nutritional status of an individual. It has been a very useful tool in both clinical and public health practice for defining chronic energy deficiency/underweight and overweight/obesity. It is noteworthy that under-nutrition has become a common scenario found in developing countries; however overweight and obesity now co-exist with under-nutrition (ORS Macro, 2000). Maternal BMI often times influences the quality of care rendered by the mother to their children. Despite this, much improvement has not been recorded from the previous reports compared to what is available in the present study.

The relationship between maternal nutritional status and under-five children's malnutrition has been well established in the literature and similarly in the present study. The prevalence of stunting and underweight was increased in children whose mothers were undernourished or obese. Similar association was revealed in Bangladesh where maternal body mass index was found to be one of the most important determinants of stunting among under-five children. Interestingly, traditional foods meant for improving nutritional status of children, pregnant and lactating mothers are being forgotten and biscuits, bread, noodles, instant infant foods of very high cost are getting more popular which is apt to predispose the consumer to future malnutrition.

5.5 Hygiene practices and environmental sanitation of the respondents

A wide range of hygiene variables were included in the questionnaires in order to adequately capture level of hygiene practices of the women. Quantitative data were used to cover indices of environmental hygiene, the household studies explored the use of spot-check to obtain indices of personal hygiene. Presence of animal droppings and stagnant water were the principal variables observed among the households visited during the survey. Subsequently, results from bivariate analysis revealed that level of stunting and underweight were higher (lower Z-scores) among children of women in purdah who had low level of hygiene practices. However, there is a consistent trend with stunting and low level of maternal hygiene practice. Low level of maternal hygiene practices also increases the prevalence of stunting in children of non-purdah women while similar trend was not observed with underweight.

The results of the present study are similar to what was found in other previous studies on the association between hygiene practices of the households and nutritional status of the under-five children (Ajeiroh, 2006, Ogunba, 2007 and Mostafa, 2011).

The results was able to show that all the households had one strategy or the other used in order to protect themselves against malaria attack which is an important indication showing the respondents' level of awareness on the need to prevent malaria incidence in their households. Nevertheless, most of the mothers adopted the cheapest option (that is using of coil) for the prevention of mosquitoes bite.

Also, the finding that pit latrine is the toilet facility available to most of the respondents' in their households is clearly an indication of the low socioeconomic status of the people in the study area. It is also noteworthy that access to hygienic sanitation is an indicator of socioeconomic status. This trend is further corroborated by the fact that substantial proportion of the respondents used spring/river as their sources of water. The hygiene status of the households has been extensively researched to have a crucial association with nutritional status of the children. The assumption is that the nutritional statuses of children from households that have access to a hygienic sanitation are better than those who do not have such facilities. The findings of the present study revealed that children that had access to portable water supply (pipe-borne water) were not stunted and underweight compared to children whose source of water for household's domestic use is from spring water source. The result is similar to what was observed in Brazil where socio-economic inequalities resulted in child stunting (Monterio *et al.*, 2010) and likewise in Nigeria (Ajeiroh, 2006).

5.6 Complementary feeding practices and child nutritional status

Infant feeding practices constitutes a major pathway to nutritional status of the under-five children in any communities apart from other socio-cultural, economic and demographic factors. Complementary foods were introduced to majority of the children much earlier than six month which is contrary to the recommendation of World Health Organization, that complementary feeding should be initiated on the sixth month (WHO, 1995).

Similarly, delay in introducing complementary foods predisposes the children to faltered growth, increased susceptibility to infection and compromised growth and development which is apt to be manifested during adulthood. Delayed complementary feeding as it affects the nutritional status of the children and this has been widely documented in literature (Ogunba, 2007, Daelmans *et al.*, 2003). Many variables were usually considered in selecting the choice of foods for the infant and children in almost every community. Some mothers believed that children are not to be given solids with the understanding that their stomach are too tender to accommodate adults foods, hence

introduction of complementary foods are thereby unnecessarily delayed than recommended age.

Regional variation often determines duration of introduction of complementary foods to the children. Early introduction of complementary foods is usually reported among the rural women and within the illiterate mothers. Conversely, according to the ORC MACROS report (2008), early introduction of complementary foods was found among the uneducated mother. Presently, based on the national survey conducted in Nigeria (MICS 4, 2011), showed that only 32.2% of under-five children were introduced to complementary foods in accordance with the recommended age as stipulated in the infant and Young child feeding guideline (FMOH, 2010).

Despite the simplicity of this recommendation, the limitations of available resources in the household like distance from the source of water supply, refrigeration and sufficient fuel for cooking often makes this guideline impracticable to many mothers (Black *et al.*, 1989). This was what obtained in the present study as caregivers occasionally boiled drinking water for their children (Table 4.6). Predominant source of energy and drinking water were wood and spring water; unprotected well, while most caregivers did not even have means of storing household foods. Even though, the best and appropriate method to ensure that food and water are free from contamination is to heat them to a sufficiently high temperature (> 70°C), however, this was not a common practice by the women in the present study.

The quantity, frequency and variety of complementary foods are expected to be improved as the ages of the children advances. Even though, this usually depends on the skill and financial ability of the caregivers. Lack of required skill and knowledge of the caregivers has been established from previous studies as a crucial determinant to the nutritional status as well as well being of the children (Ajeiroh, 2006; Ogunba, 2007).

The present study showed that the recommended number of feeding for the under-five children was not followed by the respondents. Similarly the children were offered foods only when adults' members of the households are eating which is an attitude that is detrimental to child growth and development. According to IYCF guidelines, children are to be offered frequent meal than adults since they have smaller space in the stomach and they usually achieve their satiety with a small meal.

Also, the results showed that snacks were offered to the children but often times, not according to WHO recommendation where children are to be offered 3-5 snacks per day depending on the age-group of the children. Some of the snacks offered to the children were not adequate enough to provide the children with the essential nutrients, while the frequency is slightly below recommendation. However, it is worthy to mention that leguminous foods (‘*Awara and Kosein’)* consumption obtained during the 24-hours and food frequency interviews conducted with the women revealed that these foods were being taking as complementary foods to the protein intake of the children.

5.6.1 Dietary diversification in complementary feeding

Nigeria is among the ten countries in the world with the largest population of underweight. However, the signs of malnutrition could be non-specific, since they could be caused by multiple nutrient deficiencies or by non-nutritional factors.

The relevance of leguminous products in promoting household food and nutrition security had been well researched in previous studies. Sanginga *et al., (*1999) study had earlier revealed that the average per capita consumption of soybean products is positively and significantly related to both long-term nutritional status of children and household food security.

Apparently, the present study was able to observe a significant and positive relationship between bean cake (‘*Kosein*’) and soybean (‘*Awara*’) consumptions among the children across the group of the respondents. Previous study corroborates the findings in the present study with respect to the pattern of food intake among the children in the north-west zone of Nigeria, which found out that soybean accounts for about 34.4 percent of children’s protein intake (Owolabi *et al.*, 1996). The significance of this variable is of interest because soybean has been variously adopted by women for making different types of local food recipes, especially ‘*awara’,* a form of cheese spiced with pepper that had become a good source of food and income for women in the area (Ojiako, 2006).

Nevertheless, the present study was able to show that most of the children were not provided with sufficient nutrients and components needed to be included in their complementary foods for growth and development. Many factors which include paternal involvement, socio-cultural, socioeconomic and educational status have been associated

with such practice in the previous study (Oyewole, 2006, Brunken *et al*., 2006). The finding in the present study revealed that food prejudice, ignorance and prohibitions are strongly implicated in the dietary diversification for the under-five children in the north-west zone of Nigeria. Similarly, the study of Ifeanyi *et al*., (2009) in two States in the north-west zone of Nigeria also corroborates the findings in the present study.

5.8. Hypotheses discussion

5.8.1 Hypothesis 1 discussion

There is no significant relationship between socioeconomic characteristics and child nutritional outcomes.

Socioeconomic characteristics and child nutritional status

The result of the analysis shows that socio-economic status of the households had positive relationship with the nutritional status of the children as indicated in the weight-for-height, height -for-age and weight-for-age in the results. This cuts across the statuses of the respondents in the study.

Logistic analysis results of the study shows a negative association between maternal lack of educational qualification and child's nutritional status.

5.8.2 Hypothesis 2 discussion

There is no significant relationship between household's hygiene practices and child nutritional outcomes.

Households' hygiene practices and child nutritional status

The result of the analysis shows that hygiene practices of the households had positive relationship with the nutritional status of the children as indicated in the height -for-age and weight-for-age in the results among respondent in purdah. However, the association was found with height-for-age among children of non-purdah. Good hygiene practices are not the only essential factor for the nutritional status of the children but, are also required for the optimal growth and development of the household members as well.

The results of the analysis (ANOVA and logistic regression) revealed a negative association between children's nutritional status and household source of water. When household water was obtained from spring water a negative relationship was observed among the children from these particular households in the study areas.

5.8.3 Hypothesis 3 discussion

There is no significant relationship between health service utilisation and child nutritional outcomes

Health service utilisation and child nutritional status

The results show a negative association between immunisation and nutritional status of the children. The finding of this study shows a negative association in all the indices of malnutrition across the status of the respondents when children were not immunised at all or had incomplete immunisation.

Again, a positive and significant association was found with absence of diarrhoea and nutritional status of the children.

Similarly, logistic analysis results also revealed a positive association between mothers getting anti-tetanus vaccine during pregnancy and under-five nutritional status across the status of the respondents.

5.8.4 Hypothesis 4 discussion

There is no significant relationship between infant and young child feeding practices and child nutritional outcomes.

Feeding practices and child nutritional status

The quality and quantity of foods consumed by the children have significant effect on their nutritional status. When infant are breastfed exclusively for the first six mobths of life, the nutritional status of the child is optimal. The result of the logistic regression shows that there is positive and significant association between exclusive breastfeeding and the child's nutritional status. This observation cuts across the status of the respondents.

5.9 Contributions to knowledge

The following were the additional information derived from the study area:

1. The study has provided a clearer understanding of various predisposing factors to childhood malnutrition among children of purdah and non-purdah women. Findings from the study will eventually assist policy makers, Non-governmental

Organizations (NGO) and future researchers to focus on specific interventions for the women and children in the study area.

2. The results revealed a significant difference between children of purdah and non-purdah women with respect to underweight (weight-for-age) however, further analysis using multivariate regression model, showed no significant difference in all the indices of malnutrition irrespective of being in purdah or non-purdah.
3. More than one-third of the households were found in the low socioeconomic profile. Slightly higher percentage of the women in purdah appeared in the low socioeconomic status.
4. Again, it is noteworthy that a household socioeconomic condition as indicated by the occupation of the household heads is significantly associated with child nutrition irrespective of being in purdah or not.
5. While the fundamental importance of early initiation of breastfeeding, access to adequate complementary foods and appropriate sanitation are crucial for optimum nutrition, in the context of the states studied, maternal resources for care (such as maternal education and practice of exclusive breastfeeding) are important determinants for nutritional well being of the children than maternal hygiene practices and initiation of breastfeeding.
6. It was observed that fruits and vegetables; animal and plant proteins were not frequently consumed by the children while yam and tubers were mostly eaten across the study groups.
7. Similarly, majority of the children in the study area were unable to meet the RDA for almost all the nutrients, most especially with respect to vitamins and minerals intakes.
8. The study showed that despite the low educational attainments of the women, half of the mothers had knowledge on key nutrition and care practices. However, the results do not correlate the knowledge possessed by the mothers with respect to identified inadequacies in child nutritional and care practices across the groups of women studied.
9. Qualitative analysis of the study further highlights an ample opportunity for achieving a positive change towards women's orientation with respect to health

service utilisation and infant and young child feeding practices through adoption of nutrition education intervention.

10. The study showed high incidence of diarrhoea among the under-five children. Moreover, almost half of the diarrhoea incidence was not treated based on WHO/UNICEF recommendation and guidelines on management of diarrhoea.

CHAPTER SIX

6.0: CONCLUSIONS AND RECOMMENDATIONS

6.1: Conclusions

The study sought to compare nutritional status of under-five children of purdah and non-purdah women and concluded that:

1. High prevalence of stunting, wasting and underweight was found among the children in the study area. Significant variation exists with the age of the women and educational status. Early marriage is higher in purdah than in non-purdah, while lower percentage of those in purdah possessed higher educational qualification. Meanwhile, higher maternal's education was shown to be inversely related to the prevalence of all indices of malnutrition
2. The study has provided evidence on how inadequate nutrition for the under-five stemmed from women's reliance on the resources provided by their husbands; especially as more than one-third of the households' socio-economic profile appeared in the low category (slightly higher in purdah than non-purdah households). However, it is noteworthy that highest odds of malnutrition, most especially underweight were associated with low socioeconomic status of the households irrespective of being in purdah or non-purdah.
3. The study's findings showed that quite a number of the women did not complete the recommended immunization schedules for their children (significantly higher in purdah than non-purdah). Similarly, slightly higher number of the women in purdah did not complete or take any of the immunization schedules (anti-tetanus vaccine) during their pregnancy. Consequently, the study was able to show a link between uptake of immunization and child growth.
4. Household's level of hygiene practices showed that most of the households were surrounded with stagnant water .The fact that almost half of the children had incidence of diarrhoea is thereby understandable. Consequently, it is not logical to expect good nutrional status where households' hygiene practices of the mothers are not adequate.
5. Most of the women did not report early initiation of breastfeeding coupled with the fact that exclusive breastfeeding was still very low across the women. Significant

difference was observed with slightly higher prevalence of exclusive breastfeeding found in purdah compared to non-purdah. It is noteworthy that practice of exclusive breastfeeding alone was associated with lower odds for all indices of malnutrition than early initiation of breastfeeding.

6. Quite a large number of the children were fed more of cereals and grains than other foods, especially less of protein foods sources (for instance, meat and fish consumption) as a result of strong cultural influence than low socio-economic status of the family.

7. The study confirmed that the prevalence of malnutrition is highest for all the three indices of malnutrition among the children in their second year. Significant variation was observed with children of purdah having higher prevalence of underweight than non-purdah. Current study found that malnutrition is present in almost all age groups. The inference could be deduced from the general inadequate dietary diversification of the mothers for their under-five children.

8. Appreciable percentage of the children in the study area had slightly above 50% of their RDA in energy, protein and vitamin A, while RDA for other macro-and micro-nutrients were not met by the children.

6.2: Recommendations

1. Better nutritional profile of under-five children of educated mothers indicates that right to have education and to achieve optimum literacy will help in improving the nutritional status of children since educated mothers are more aware of the health services available and also the readiness to utilise the same is better among them.

2. Effect of mother's age on prevalence of undernutrition clearly favours the promotion of delaying marriage of females, most especially when they are not empowered to look after their nutrition and health well being. Efforts should be geared towards increasing women's awareness through advocacy and sensitization on the importance of women empowerement in the study area.

3. Inadequate nutrition and the resulting prevalence of malnutrition (most especially in the first two years of life) require both short and long-term nutrition intervention on

appropriate infant and young child feeding practices for the under-five children in the study area.

4. Poor maternal awareness of exclusive breastfeeding practice of children of working mothers suggests that working places should be provided with crèches/play ways where children can be taken care of while the mother is at work.
5. Furthermore, timely, safe and adequate complementary feeding, with continued breastfeeding need to be given a high priority and included in any policy designed among this group of women.
6. Similarly, efforts should be specially focused on the improvement in their nutritional knowledge on related risk factors associated with malnutrition and how various infections can be managed within the home environments.
7. There is also an urgent need for strong advocacy to all stakeholders corncerning negative side effects of mothers' refusal towards obtainining recommended vaccination for the under-five children at the appropriate times and age.
8. Nutrition and health education should be refocused and re-structured to ensure wider coverage so as to achieve positive behavioural change among the women in the study area. Possible opportunities (such as attendance at health facilities during ante-natal visits) should be adequately explored in order to disseminate key messages on health and nutrition most especially among mothers in purdah due to their special pecularities.
9. Since Islam has its views positions and fatwas (legal opinions) on health services utilisations, the issues should be more widely discussed and debated among the *Ulama* (Islamic scholars). They should be made to appreciate the negative implications of reproductive health problems in their communities and make it an issue in their sermons, open air preaching and media discussions.
10. Given that the nature of the determinants of child nutritional status is largely the same across purdah and non-purdah, similar program and policy framework can be used to stem malnutrition among this group of women.

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APPENDIX

ETHICAL APPROVAL

INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IMRAT)
COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN, IBADAN, NIGERIA.
E-Mail - imratcomui@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Nutritional Status of Women in Purdah and their under-five Children in North-Western Zone of Nigeria

UI/UCH Ethics Committee assigned number: UI/EC/10/0122

Name of Principal Investigator: **Omolara A. Babatunde**

Address of Principal Investigator: Department of Human Nutrition,
College of Medicine,
University of Ibadan, Ibadan

Date of receipt of valid application: 19/07/2010

Date of meeting when final determination on ethical approval was made: **21/04/2011**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from 21/04/2011 to 20/04/2012. If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC early in order to obtain renewal of your approval to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. *No changes are permitted in the research without prior approval by the* UI/UCH EC *except in circumstances outlined in the Code. The* UI/UCH EC *reserves the right to conduct compliance visit to your research site without previous notification.*

UI/UCH EC
21 APR 2011
COLLEGE OF MEDICINE U.I.

Dr. J. A. Otegbayo,
Chairman, Medical Advisory Committee,
University College Hospital, Ibadan, Nigeria
- Vice- Chairman, UI/UCH Ethics Committee
E-mail:uiuchirc@yahoo.com

Research Units: ▪Genetics & Bioethics ▪Malaria ▪Environmental Sciences ▪Epidemiology Research & Service ▪Behavioural & Social Sciences ▪Pharmaceutical Sciences ▪Cancer Research & Services ▪HIV/AIDS

INFORMED CONSENT FORM

Good day ma,

Title of the research:

Nutritional and health status of women in purdah and their under-five children in North-western zone of Nigeria.

This study is being conducted by Miss Babatunde Omolara Adijat of the University of Ibadan, Ibadan, Nigeria.

Purpose of research:

The purpose of this research is to study whether practice of purdah has influence on the nutritional and health status of Muslim women and under-five children in purdah (cases) and those outside purdah (control).

Procedure of research:

We are going to explore your personnel characteristics in order to generate information on you and your children nutritional and health variables. Only a mother and, one under-5 child (Index child) will be interviewed, and balloting will be used to select an under-five child where the number exceeds one in a household. Also, some personal and environmental observations; anthropometric measurements will be carried out during the cause of this survey. Food models will be presented to you in order to determine your index child 24hrs nutrient intake.

Expected duration of research and of participant's involvement:

We expect you to be involved in this study by taking not more than 30 minutes of your time for the interview schedule.

Risk(s):

The procedure of the interview is not expected to confer any risks throughout the cause of obtaining the information.

Benefit(s):

The purpose of this research is to find ways of improving the nutritional and health status of both mothers and under-five children. This will ultimately reduce both morbidity and mortality of our people in the North-western, and Nigeria at large.

Confidentiality:

All the information gathered during the survey will be treated with utmost confidentiality and coding will be used, making it difficult for your names to be traced down with the information. The results will be made available in publications without referring to your names.

Voluntarism:

Your participation in this study is completely voluntary and you will not be mandated to go against your wish as regards your participation in this study.

Statement of person obtaining informed consent:

I ----------of ---------- hereby consent to be involved in the above named study, the nature and purpose of which has been fully explained to me in a language in which I fully understand by Miss Babatunde Adijat Omolara.

Date---------- Signature / Thumb print of participant----------

Signature ----------

Interviewer

For investigator, Babatunde Omolara Adijat,

Postgraduate student,

Department of Human Nutrition,

Faculty of Public Health

University of Ibadan, Ibadan, Nigeria

TRANSLATED VERSION OF CONSENT FORM

MATSAYIN LAFIYAR MATA IYAYEN YARA YAN KASA DA SHEKARU BIYAR DANGANE DA ABINCI

GABATARWA DA SAMUN AMINCEWA

Suna na Adija Babatunde, ina yin bincike ne akan harkan lafiya da dangantar tad a abinci na mata da yara don cika wani bangare na bukar makaranta don samu shaidar babban digiri na na DOCTOR OF PHILOSOPHY daga sashen kimiyar mutane da abinci na jamiar Badun. Sabo da haka zan yi miki tambayoyi agame da lafiyar kid a na yaran ki.

Bazan bayyana amsoshin ki ga kowa ba. Ina fata za ki bani hadin kai kon ra'ayoyin kid a amsoshin na da mahimmanci kwarai a wanna binciken.

Kin amminc/yarda za ki amsa mun tambayoyi na? E ( ) A'A ( )

Za'a kiyaye sirin bayanai.

Da fatan za ki bada hadin kai don mahimmancin gudun mawar ki.

Kin yadda za ki amsa mun tambayoyi E ( ) A'A ( )

Na gode da ammincewar ki.

Interviewer

For investigator, Babatunde Omolara Adijat,

Postgraduate student,

Department of Human Nutrition,

Faculty of Public Health

University of Ibadan

QUESTIONNAIRE

ON

COMPARATIVE ANALYSIS OF NUTRITIONAL STATUS OF UNDER-5 CHILDREN OF PURDAH AND NON-PURDAH WOMEN IN NORTH- WEST ZONE OF NIGERIA

Identification

Serial No: ----------

State----------

(1) L.G.A ----------

(2) Ward ----------

(3) Rural □ urban□----------

(4) Status of respondent: (a) Purdah (b) Not in purdah

Section A: Socio-demographic characteristics of respondents

(5) Age of respondent? ----------

(6) Age at marriage? ----------

(7) Type of marriage (a) Monogamy (b) Polygamy (c) Others specify----------

(8) Educational status of respondent (a) Arabic school (b) Primary (c) Secondary (d) Tertiary (e) No School

(9) No of years of formal education----------

(10) Educational status of respondent husband (a) Arabic school (b) Primary (c) Secondary (d) Tertiary (e) No formal education (f) Others specify----------

(11) Household size (a) ≤ 5 (b) ≥ 6

(12) Which of these economic engagement activities is your husband doing? (a) None (b) Self-employed (c) Civil servant (d) Working in Private establishment

(13) Are you also into any of the following?
(a) Private establishment (b) Self-employed (c) Civil servant (d) None

(14) Who decides how your income is spent? (a) Respondent (b) Husband (c) Couple (d) Others specify--------

(15) Which type of roofing material is used in building your house? (a) Mud (b) Thatch roof (c) Iron roofing sheet (d) Bamboo (e) Asbestos (f) others specify----------

(16) Which type of flooring is used in building your house? (a) Earth (b) Cement (c) Wood (d) Others---------

(17) Which of the following do you possess? Tick as many as applicable (a) Car (b) Radio (c) Television (d) Refrigerator of (e) Building (f) GSM

(18) Who provides incomes for food? (a) Husband (b) Self (c) Both (d) Husband parents (e) Others…….....

Section B: Environmental Conditions

(19) What is your main source of water?(a) Spring/River water (b) Well water (c) pipe- borne water

(20) Which of these sanitary facilities do you have? (a) Latrine/pit (b) Flush toilet (c) Bush and Other

(21) Do you share these facilities with other households? (a) Yes (b) No

(22) How do you dispose your household waste? (a) Bush (b) Burn (c) public dumping bin (d) Household collection

(23) Does your household use anything to protect against mosquito? (a) Yes (b) No What type of protections do you use? (a) Net (b) spray (insecticide) (c) coil (d) wire gauze

Section C: Respondents' access to health care services

(24) Did you seek for antenatal care for this pregnancy? (a) Yes (b) No

(25) Who did you consult? (a)Doctor (b) Nurse or midwife (c) Traditional Birth attendant

(26) Were you weighed during this pregnancy? (a) Yes (b) No

(27) During this pregnancy how many times did you get anti-tetanus injection in the arm to prevent the baby from getting tetanus? (a) Once (b) Twice (c) None

(28) During this pregnancy, were you given or did you buy any iron tablets or iron syrups? (a)Yes (b) No

(29) During this pregnancy, did you take any drugs to prevent you from getting malaria? (a) Yes (b) No (d) Don't know

(30) Who assisted with his/her delivery? (a) Doctor (b) Nurse/midwife (c) Community Health personnel (d) Traditional Birth Attendant (e) self

(31) How much did (name) weighed?(a) less than 2.5kg (b) 2.5-3.5kg (c) 3.6kg and above (d) Not weighed

(32) Did a health professional or traditional birth attendant check on your health after delivery? (a) Yes (b) No

(33) Do you seek advice/treatment when (Name) has illness? (a) Yes (b) No

(34) Where do you seek advice or treatment? (a)Government Hospital (b) Community Health Worker (e) Private Medical sector (e) Patient Medicine store(f)Other specify -----

(35) Who takes the decision of whom to consult medically, when you or your child is sick? (a) Husband (b) Self (c) Both

(36) Which of these constitute a problem and of which magnitude when seeking for medical advice?

Variables	**Serious constraint**	**Mild constraint**	**Not a constraint**
Knowing where to go for treatment			
Getting permission to go			
Getting money needed for the treatment			
The distance to a health facility			
Having to take transport			
Not wanting to go alone			
Concern that there may not be a female health provider			

Section D: Feeding practices for under – 5 Children

Breastfeeding Practices

(37) Did you ever breastfeed your child? (Name) (a) Yes (b) No

(38) How long after birth did you first put him/her to the breast? (a) within0– 30 minutes (b) < 24 hours (c) Days after delivery

(39) How many times do you breastfeed in a day? (a) 6-8 (c) 8-10 (d) 10-12 (e) 12 and above

(40) How do you breast feed? (a) On demand (b) Fixed time

(41) Are you sill breastfeeding? (a) Yes (b) No

Complementary feeding practices

(42) At what age did you introduce other food items to your baby apart from breast milk Age? (a) At six months (b) Less than six months (c) More than six months

(43) What is the first food given to your baby apart from breast milk?(a) Glucose (b) Pap and Milk (c) Herbal Concoction (d) Infant formula (e)Solids foods (f) water (g) fruit juice/drink (h) others specify ----------

(44) What utensils do you usually use to feed your baby? (a) Feeding bottle (b) cup and spoon (c) Hand

Frequency of feeding

(45) How often have you given the following foods to your child in the last seven days?

Food Items	Food availability Times/Day
Pap/Custard	
Fortified Pap	
Tuwo (Masara/Shinkafa)	
Rice	
Cerelac etc	
Cornflakes	
Bread	
Yams and Tubers	
Yam	
Potatoes	

Animal Proteins	
Meat	
Fish	
Milk	
Egg	
Soyamilk	
Legumes	
Cheese	
Moinmoin	
Kosein	
Beans	
Fruits and Vegetables	
Orange	
Watermelon	
Banana	
Pawpaw	
Vegetable	
Tea	

24 hour recall

(46) Which of the following did you give your child in the last 24 hours? (a) Fluids (b) Solid foods (c) Semi –solids foods

(47) What are the foods given to your baby in the last 24-hours?

Menu structure	**Food**	**Quantity**
Breakfast		
Midmorning snack		
Lunch		
Mid afternoon snack		
Dinner		
Midnight feeding		

(48) How many times did you feed the child with snacks? (a)Once (b) twice (c) Thrice

(49) Do you give you child homemade complementary foods? (a) Yes (b) No

Section E: Child care practices

(50) What are the preventive health care services you have used? (a) DPT Immunisation (b) Measles (c) Immunisation (d) Yellow fever (e) Poliomyelitis (f) HBV

(51) Does your child have his/her own bowl for eating? (a)Yes (b) No

(52) How often do you wash bowls and utensils and feed child? (a) Every meal (b) once/day (c) others ----------

(53) Where do you store leftovers? (a) Refrigerator (b) pot (c) Flask (d) Eating bowl (e) other specify ----------

(54) Do you re-warm stored food? (a) Yes (b) No

(55) Do you usually treat the water you use to prepare drinks/food for your child? (a) Yes (b) No

(56) How do you treat it? (a) Boil (b) (c)Filter (d) Store in pot (e)Treat with chemicals

(57) Who generally feeds your child? (a) Respondent (b) husband (c) home help (d) Feed himself/herself

(58) When do you usually wash your hands?

(a) After the use of toilet (a) Yes (b) No

(b) Before feeding baby (a) Yes (b) No

(c) Before food preparation (a) Yes (b) No

(d) After dirty work (a) Yes (b) No

(59) How many times has your baby had diarrhoea in the last 2 weeks prior to this survey? (a) Once (b) Twice (c) Thrice

(60) Does your husband give helping hand in child care? (a) Yes (b) No

If yes, how often (tick the right one)

Variables	Always	Frequently	Occasionally
(a) Change diaper			
(b) Feed baby			
(c) Play with baby			
(d) Carrying baby			
(e) Wash baby's wear			
(f) Bath baby			
(g) Give financial support (h)Other(specify)----------			

Section F: Anthropometric Indices of respondents

Women 15 – 49			**Weight and Height Measurement**		
Respondent's Name	Age	What is your date of birth (Mother)	Weight (kilograms)	Height (centimeters)	

Children under age 5		**Weight and Height Measurement**			
Respondent's name (Child)	Age	What is (Name's) date of birth (Child)	Weight (kilograms)	Height/length (centimeters)	Sex
	Birth-6mths 6-8mths( ) 9-11mths( ) 12-23mths( ) 24-59mths( )	DAY MONTH YEAR ☐ ☐ ☐☐☐☐			

Observational Schedule

Variables	**Positive=1**	**Negative=0**
Mothers clean		
Child clean		
Compounds swept		
Present of stagnant water		
Present of unwashed utensils		
Domestic animal around		
House swept		

TRANSLATED VERSION OF QUESTIONNAIRE

MATSAYIN LAFIYAR MATA IYAYEN YARA YAN KASA DA SHEKARU BIYAR DANGANE DA ABINCI

GABATARWA DA SAMUN AMINCEWA

Suna na Adija Babatunde, ina yin bincike ne akan harkan lafiya da dangantar tad a abinci na mata da yara don cika wani bangare na bukar makaranta don samu shaidar babban digiri na na DOCTOR OF PHILOSOPHY daga sashen kimiyar mutane da abinci na jamiar Badun. Sabo da haka zan yi miki tambayoyi agame da lafiyar kid a na yaran ki.

Bazan bayyana amsoshin ki ga kowa ba. Ina fata za ki bani hadin kai kon ra'ayoyin kid a amsoshin na da mahimmanci kwarai a wanna binciken.

Kin ammince/yarda za ki amsa mun tambayoyi na? E ( ) A'A ( )

Za'a kiyaye sirin bayanai.

Da fatan za ki bada hadin kai don mahimmancin gudun mawar ki.

Kin yadda za ki amsa mun tambayoyi E ( ) A'A ( )

Na gode da ammincewar ki.

Miss. A.O Babatunde

TSARIN TAMBAYOYI

LAKANI: MATSAYIN LAFIYAR YARA DANGANE DA ABINCI NA YARA YAN KASA DA SHEKARU BIYAR WA'ANDA IYAYEN SU KE KULLE A JIHOHIN AREWA MASO YAMMA NA NIJERIYA.

Alamomin Shaidarwa

Lamba: ……..

Jiha----------

(1) Karamar Hukuma ----------

(2) Gunduma----------

(3) Kauye…… Birni----------

(4) Matsayin mai amsa tambaya: (a) Mai Kulle (b) Mara Kulle

Bangare na A: Bayanai kan mai amsa tambayoyi

(5) Shekarun mai amsa tambayoyi ----------

(6) Shekaru a lokacin da ta yi aure ----------

Wane irin aure ne (a) Mace daya ne (b) Da kishyoyi (c) Ko da wani matsayi, to ayi bayani--

(7) Yaro/Yarinyar da ake tambayoyi a game da shi/ita, shine/itace haihuwa na nawa? ----

(8) Matsayin ilimin mai amsa tambaya (a) Makarantar allo/islamiyya (b) Firamare (c) Sakandare (d) Gaba da Sakandare (e) Ba je ko wane irin makaranta ba (f) Ko wasu ne daban, ayi bayanin irin su----------

(9) Matsayin ilimin mijin mai amsa tambayoyi(a) Makarantar allo/islamiyya (b) Firamare (c) Sakandare (d) Gaba da Sakandare (e) Ba je ko wane irin makaranta ba (f) Ko wasu ne daban, ayi bayanin irin su----------

(10) Mutanen nawa ne a gidan? (a) ≤ 5 (b) ≥6

(11) Menene sana'ar mijin ki? (a) Ba sana'a (b) Sana'ar kansa yak le yi (c) Ma'aikacin gwannati ne(d) Ma'aikacin Kanpani ne (e) Wani aiki ne daban, ayi bayani----------

(12) Menene sana'ar ki ke ma? (a) Aiki a kanfani (b) Sana'ar kanki kike yi (c) Aiki da gwamnati (d) Ba sana'a.

(13) Wake yanke shawarar yanda zaki kasha albashinki/kudin ki? (a) Ni kai na (b) Miji na (c) Ni da miji na tare (d) Ko da wani/wasu, ayi bayani----------

(14) Wani irin rufi akayi a gidan ku (a) Rufin kasa (b) Rufin ciyawa (c) Rufin kwano (d) Rufin gwangwala (e) Rufin kwanon Asbestos

(f) Ko wani iri ne, ayi bayani----------

(15) Wani irin dabe ne a gidan? (a) Daben kasa (b) Daben siminti (c) Daben itace (d) ko da wani, ayi bayani----------

(16) Cikin wa'annan abubuwan wane kuka mallaka? Sa alama a duk wanda kuka mallaka (a) Mota (b) Radiyo (c) talabijin (d) Firinji (e) Gida (f) Wayar hannu

(17) Wa ke bada kudin abinci? (a) Miji (b) Ni kai na (c) Ni da miji (d) Iyayen miji (e) Ko das u, a bada bayani……

Bangare na B: Bayaniai akan yanayin muhalli

(18) Daga ina ake samo ruwa? (a) A kududdufi, rafi ko kogi (b) Rijiya/burtsatse (c) Famfo (d) Budadden rijiyal (e) Ko da wta hanyar, ayi bayani ----------

(19) Wane irin ba haya kuke dashi a gidan nan (a) Babu ba haya (b) Masai (c) Ba haya na jan ruwa (d) Tsuguno a koina a cikin gida (e) A daji (f) Ko da wani gurin, ayi bayani---------

(20) Ba hayan ku kadai ke anfani da shi ko tare da wasu gidajen? (a) E (b) A'a

(21) Yaya kuke yi da sharer ku? (a) Binnewa (b) Konawa (c) Zubarwa a matarar shara (d) Tarawa a cikin gida (e) A kwai wani hanyar, ayi bayani ----------

(22) A gidan nan kuna anfani da wani abu ko magani don kariya daga cizon sauro? (a) E (b) A'a

(23) In e, to wane iri? (a) Gidan sauro (b) Feshi (c) Igiyar leco (d) Raga aKofofi da tagogi (e) Ko da wani hanyar, ayi bayani----------

Bangare na C: Hanyoyin da mai amsa tanbayoyi ke samun kiyon lafiya

(24) Kin je awon ciki da kike da wannan cikin? (a) Daya (b) Biu (b) A'a

(25) In e, wa kika gani a asibitin? (a)Likita (b) Nas ko unguwar zoma (c) Unguwar zoman gargajiya

(26) An auna nauyin ki yayin da kike da wannan cikin? (a) E (b) A'a

(27) Yayin da kike da cikin nan so nawa aka yi miki allurar kariyar cutar sarke hakora hannu don kare yaron ki daga cutar sarke hakora? (a)1 (b) 2

(28) Yayin wannan cikin, a ba ki ko kin sayi kwayoyi/maganin ruwa na kara jini? (a)E (b) A'a

(29) Yayin wannan cikin kin sha magani don kariya daga zazzabin cizon sauro? (a) E (b) A'a (d) Ban sani ba

(30) Way a/ta taimaka miki a lokacin haihuwar wannan yaron/yarinya?(a) Likita (b) Nas ko Unguwar zoman asibiti (c) karamar Unguwar zoman asibiti (e) Ma'ikaci/maaikaciyar lafiya na kauye (f) Unguwar zoman gargajiya (g) Ni ka dai (h) ko da wani/wata, yi bayani ----------

(31) Menene nauyin (sunan yaro/yarinya) a lokacin da aka haife ta/shi?(a) Kasa da awo 2.5kg (b) Awo 2.5-3.5kg (c)Awo 3.6kg Ko kuma sama da haka (d) Ba a auna shi/ta ba

(32) Wani maaikacin asibiti ko unguwar zoman gargajiya ta binciki lafiyar ki bayan da kika haihu? (a) E (b)A'a

(33) Kina neman shawara ko magani idan (suna) bashi da lafiya? (a) E (b) a'a

(34) A ina kike neman shawara ko magani? (a) Asibitin Gwamnati (b) Asibitin tafi da gidan ka (c) Maaikacin lafiya na karkara (d) Asibitin kudi (e) Chemist (f) A kwai wani gurin – yi bayani----------

(35) Wa ke yanke shawara kan inda za'a nemi magani in ke ko yaro ba lafiya? (a) Miji (b) Ke kanki (c) Ku biyu

(36) Wannene a cikin wa'annan ya kasnce matsala wajen neman magani ko shawara kuma yaya girman sa?

Matsaloli	**Matsanaici**	**Matsakaici**	**Ba matsala ba**
Sanin gurin da za a nemi magani			
Samun izini zuwa			
Samun kudin maganin			
Nisan asibitin			
Bukatar abun hawa			
Rashin son zuwa ke kadai			
Tunanin ko ba maaikaciya mace			

Bangaren D: Hanyoyin Ciyar da yara yan kasa da shekaru biyar Shayar da nonon uwa

(37) Kin taba shayar da (suna) nonon ki (a) E (b) a'a

(38) Yaushe kika fara bas hi/ta nono da kika haihu? (a) kafin awa daya (b) kafin awa ashirin da hud (c) bayan kwanaki

(39) So nawa kika dinga bada nono a rana? (a) 4-6 (b) 6-8 (c) 8-10 (d) 10-12 (e)

(40) Yaya kike bada nonon? (a) duk lokacin da yaro ya bukata (b) A tsararen lokuta

(41) Har yan zu kina shayarwa? (a) E (b) a'a

(42) In kin yaye, yaushe kika yaye shi/ta? (a)da watanni---------- (b) ban sani ba

Hanyoyin bada abinci daga wata shida tare da nonon uwa

(43) Yana da watanni nawa kika fara bashi wani abinci ban da nonon ki? – Da watanni ---

(44) Me kika fara ba shi/ta bayan nonon ki? (a) Gulucodi (b) kunu da madara (c) dauri

(d) abincingwangwan (e) abincin manya (f) ruwa (g) ruwan yayan itatuwank

(45) Da me kike ba yaro abinci? (a) Feeding bottle (b) kofi da cokali (c) da hannu

Lokutan bada abinci

(42) So nawa kika ba yaro/yarinya wadan nan abincin acikin makon day a wuce?

Nau'in abinci	So nawa a rana	O nawa a mako	
Kunu/Custard			
Ingantaccen kunu			
Tuwo(Masara/Shinkafa)			
Shinkafa Doya			
Golden morn			
Cerelac etc			
Dankali			
Cornflakes			
Burodi			
Nama			
Kifi			
Madara			
Kwai			
Madarar waken soya			
Cukwi			
Alala			
Kosai			
Wake			
Lemu Kankana Ayaba			
Gwanda			

Ganyayyaki			
Shayi			

Tarinhin awa ashirin da hudu

(46) Wadanna abincin na kasa kika bad a/yar ki a awa ashirin da hudu da suka wuce?

(a) Ruwa ruwa (b) maso matsakaicin tauri (c) masu tauri

(47) Wadanne abincin aka ba yaro a cikin awa ashirin da hudu das u ka wuce?

Lokacin abincin	Abinci	Yawan abincin
Karin kumallo		
Taba ka lashen hantsi		
Abincin rana		
Taba ka lashen laasariya		
Abincin dare		
Taba ka lashen tsakar dare		

(48) So nawa kika ba yaro taba ka lashe? (a) So daya (b) So biyu (c) So uku

(49) Abincin da kike ba yaron ki hadin gida ne? (a) E (b) A'a

Bangaren E: Hanyoyin kula da yara

(50) Wadanne hanyoyin rigakai kika taba yin anfani da shi? (a) Allurar riga kafin tarin shika,makarau da sarke hakora (b) Allurar riga kafin kyanda (c) Alluran riga kafi (d) Allurar riga kafin cutar shawara (e) Allurar riga kafin shan inna (f) Allurar riga kafin cutar hanta.

(51) Yaron kin a da kwanon cinsa na daban? (a) E (b) A'a

(52) Da wane lokaci kike wanke kwanukan cin da kayan cin abinci kuma kike ciyar da yaro? (a) Ko wane lokacin cin abinci (b) So daya a rana

(53) A ina kike ajiye sauran tuwo ko abincin? (a) A firinji (b) a tukunya (c) a fulas (d) a kwanon ci

(54) Kina dumama sauran abinci (a) E (b) A'a

(55) Kina tsabtace rowan da kike hada abincin yaro? (a) E (b) A'a

(56) In e ta yaya?(a) Ta tafasawa (b) (c) a tacewa (d) Ta ajiyewa a tukunya (e) Ta hanyar zuba magani

(57) Wa ye ke ba dan nan abinciko yaushe? (a) Ni da kai na (b) Miji na (c) Mai aikin gida (d) Da kanshi.

(58) Yaushe kike wanke hannun ki? (a) In kin fito daga ban daki (b) Kafin ki ba yaro abinci (c) Kafin ki hada abinci (d) Duk lokacin da kika yi aikin kazanta

(59) Mai gidan ki yana taimakawa wajen kula da yaro? (a) E (b) A'a

(60) In e So nawa (sa alama a wanda ya fi daidai)

	Kodayaushe	Akaiakai	In bukata ya taso
(a) Sauya kunzugu			
(b) Ba yaro Abinci			
(c) Yin wasa da yaro			
(d) Daukar yaro			
(e) Wanke kayan yaro			
(f) Yi wa yaro wanka			
(g) Bada taimakon kudi			

Bangaren F: Gwajin nauyi da tsahon mai bada amsa

Mata yan shekaru goma sha biyar zuwa arba'in da tara				
Sunan mai bada da amsa	Sheka run ta	Kwana da wata da shekarar haihuwa	Nauyi (kilograms)	Tsaho (centimenters)

Yara yan kasa da shekaru biyar			**Gwajin nauyi da tsaho**		
Sunan mai bada amsa	Shekarun ta	Kwana da wata da shekarar haihuwar (sunan yaro)	Weight (kilograms)	Height/length (centimenters)	Sex
	Haihuwa zuwa watani shida(Wata shida zuwa takwas (Wata tara zuwa sha daya( ) Wata goma sha biyu zuwa ishirin da uku ( ) Wata ishirin da hudu zuwa hamsin da tara ( )	Rana Wata Shekara			

Abubuwan da za'a kula a gani da ido ba tambaya ba

Abubuwan	**Da kyau shine =1**	**Ba kyau shine =0**
Tsabtar uwa		
Tsabtar yaro/yarinya		
Sharar tsakar gida		
Taruwar ruwa a tsakar gida		
Kazantattun kwanuka da kaya		
A kwai dabbobi a cikin gida		

Appendix 4: Justification for selection of North-west states – Trend of malnutrition among under-five children in Nigeria (<-2 SD)

National surveys	Zones	% of Underweight	% of Stunting	% of Wasting
MICS 2007	• North-east • North-west • South-east • South-west	**24.3** **41.2** 16.7 20.3	**31.4** **56.6** 22.9 28.5	**11.9** **15.5** 7.2 7.5
TOTAL		**25.3**	**34.3**	**10.5**
ORC Macros 2008	• North-east • North-west • South-east • South-west	**34.5** **35.1** 10.0 13.3	**48.6** **52.6** 21.7 31.2	**22.2** **19.9** 8.6 9.3
TOTAL		**23**	**41**	**14**
MICS 2011	• North-east • North-west • South-east • South-west	**34.6** **38.1** 10.1 13.5	**52.5** **53.8** 14.1 20.3	**11.5** **13.9** 6.8 9.4
TOTAL		**24.2**	**35.8**	**10.2**

WORKSHEET FOR NUTRITIONAL KNOWLEDGE SCORES

Grade 1: Excellent with a score of 5 points or more if the respondent is able to mention at least 4 indicators under that variable point.

Grade 2: Good with a score of 4 points when the respondent is able to mention 3 indicators under this variable.

Grade 3: Fair with a score of 3 points if the respondent is able to mention one indicator under that variable

Grade 4: Poor with a score of 2 points when the respondent is able to mention any one of the indicators under that variable.

Grade 5: Very poor with a score of 1point when the respondent is unable to mention any indicator under that variable.

INDICATORS OF MATERNAL NUTRITIONAL KNOWLEDGE

S/N	Variables
1.	Initiation of Breastfeeding
2.	Use of Prelacteal feeds
3.	Pattern of breastfeeding
5.	Adequate complementary feeding
6.	Knowledge on Salt Iodization
7.	Micronutrient supplementation
8.	Psychosocial care during feeding
9.	Assessment of child nutritional status
10.	Child-care during sickness

-PICTURE SHOWING ONE OF THE IDI SESSIONS

PICTURE SHOWING PRESENCE OF STAGNANT WATER

PICTURE SHOWING PRESENCE OF STAGNANT WATER

VARIABLES AND SCORING SYSTEM USED TO CREATE THE CHILD FEEDING INDEX FOR INFANTS 0-6 MONTHS OLD (DEMOGRAPHIC AND HEALTH SURVEYS)

VARIABLE	CODING
Currently breastfeeding	No = -1; Yes = +1
Timing of breastfeeding initiation	0-0.9 h = +2 1-1.9 h = +1 3-5.9 h = 0 > 6 h = -1
Uses baby bottles	No = +1 Yes = -1
In the past 24 hour gave: - Non-milk liquids	No = 0 Yes = -1
- Non-breast milk	No = 0 Yes = -1
- Other liquids, semi-liquids, solids	No = 0 Yes = -1
Maximum/minimum	+ 4 / -6

GLOSSARY OF TERMS

Adequate Diet: Food consumed habitually containing all the nutrients (calories, protein, fats, vitamins and minerals) in the right amounts and proportions to promote growth and good health.

At-Risk Groups: Persons or segments of the population most likely to suffer from nutritional deprivation.

Baby-Friendly Hospital Initiative: A hospital-based programme that seeks to promote good breastfeeding practices by mothers (i.e., exclusive breastfeeding for the first six months of life).

Complementary Foods: foods, in addition to breast milk, given to infants after six months of age.

Corneal Ulceration: A consequence of vitamin A deficiency in which the surface of the eye becomes rough and dry and, if left untreated, leads to perforation and blindness.

Food: A composite of nutrients (protein, fat, carbohydrates, vitamins and minerals) consumed, digested and ultimately utilised to meet the body's needs.

Functional Impairment: Reduction in the level of performance of any body system due to malnutrition or other causes. This may be preceded by slow rate of weight gain in children and often exists in combination with infection.

Growth Monitoring and Promotion: A process which involves regular weighing of a child, plotting the weight on a growth chart, using the information obtained to assess how the child is growing, and then taking appropriate actions to improve or promote the health and growth of the child.

Household Food Security: The ability of a household to gain access to adequate food (both in quantity and quality) to meet their nutritional requirements for an active life throughout the year.

Intra-Uterine Growth Retardation: Gradual arrest in the development of a fetus due to maternal factors, such as illness or malnutrition.

Iodine Deficiency Disorders: The spectrum of disorders resulting from inadequate iodine intake, including mental retardation, reduced growth, spontaneous abortions, still-births, and physical disabilities.

Iron Deficiency Anaemia: Reduce haemoglobin and oxygen carrying capacity of the blood due to inadequate iron intake and /or high iron losses (e.g., blood loss), characterized by fatigue, decreased capacity to work, learning disorders, and increased complications of pregnancy.

Macronutrients: These are carbohydrates, fats and proteins the major components of most foods that supply energy and amino acids for proper growth and development.

Malnutrition: All forms of illness resulting from a shortage or excess of nutrients in the body. The major types of malnutrition in Nigeria result from inadequate food consumption (both in quantity and quality) to meet physical requirements. Malnutrition in children may result in reduced rates of growth in weight and height, functional impairments, and an increased risk of morbidity and mortality. Problems of over-nutrition also exist in Nigeria, particularly obesity, and mainly in the more affluent groups in Nigerian society.

Micronutrients: These are the vitamins and minerals present in foods and required by the body in very small quantities, but which are vital for proper functioning of the body.

Night Blindness: An inability to see in the dark, due to a deficiency of vitamin A in the diet.

Nutrition: The end result of various processes in society (e.g., social, economic, cultural, agricultural, and health) which culminate in food being eaten by an individual and, subsequently, absorbed and utilised by the body for physiological processes.

Nutritional Surveillance: The process of keeping watch over the nutritional situation of a community or a population, and the factors that affect it, in order to take appropriate actions that will forestall problems or lead to improvements in nutrition.

Nutritive Value: The amounts of given nutrient in a food item that will be potentially available for use by the body.

Over-Nutrition: A state of nutritional imbalance brought about by consuming more food than the body requires for normal functioning.

Prenatal Mortality: Death of babies before birth.

Prevalence Rate: The percentage of individuals in a sample or population who are affected by a certain disorder or condition.

Provitamin A: A substance (beta-carotene) found in plants that can be converted by the body to vitamin A.

Stunting: Low height – for – age, resulting from chronic inadequacy of food intake during the first two years of life: often exists in combination with infection.

Synergestic Relationship: The enhancing effect of two or more conditions (e.g malnutrition and infection) on each other, such that the outcome exceeds the sum of the individual effects

Underweight: Low weight-for-age, which is the end result of either previous or recent inadequate food intake; often exists in combination with infection.

Vitamin A Deficiency: Inadequate intake of vitamin A, leading to a reduced ability to resist infection, deteriorating eye changes that may lead to blindness, poor growth, and increased risk of morbidity and mortality.

Vulnerable Groups: Segments of the population which, for reasons of age or physiological status, are most prone to nutritional problems. These groups include infants and young children, adolescent females, pregnant women, nursing mothers, and the elderly.

Wasting: Low weight-for-height in an individual, especially children is usually the end result of recent inadequate food intake, often existing in combination with infection.

Complementary Food Period: The time when milk alone (either mother's milk or a formula) is inadequate to sustain the growth of an infant, and other, complementary, foods must be introduced.