Internship Training

at

National Health System Resource Centre (NHSRC)

Project title

<u>Maternal Knowledge of Malnutrition and</u>

<u>Healthcare Seeking Attitudes in urban-poor population of Central India</u>

by

Dr Divya Maheshwari

Enroll No.PG/14/20

` **Under the guidance of**

Asso. Prof. Mr. B.S.Singh

Post Graduate Diploma in Hospital and Health Management

2014-16

International Institute of Health Management Research New Delhi

Completion of Dissertation from NHSRC

The certificate is awarded to **Dr Divya Maheshwari**, in recognition of having   successfully completed her Internship from **National Health System Resource Centre** in the department of **Public Health Administration** and has successfully completed her Project on **Maternal Knowledge of Malnutrition and Healthcare Seeking Attitudes in Urban-poor population of Central India**, Dated - 15/2/2016 to 15/5/2016

We wish her all the best for future endeavors.
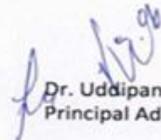
Dr. Uddipan Dutta
Principal Administrative Officer

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr Divya Maheshwari** student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at **National Health System Resource Centre (NHSRC)** from 15/2/2016 to 15/5/2016

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements. I wish him all success in all his future endeavors.

Dr. A.K. Agarwal

Dean, Academics and Student Affairs

IIHMR, New Delhi
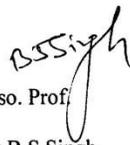
Asso. Prof.

Mr B.S.Singh

IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Maternal Knowledge of Malnutrition and Healthcare Seeking Attitudes in Urban-Poor population of Central India"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name   Signature

1. Dr. S. B. Arora

2. Dr. B. S. Singh

3. Dr. Preetha qs

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Divya Maheshwari,** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. She is submitting this dissertation titled "Maternal Knowledge of Malnutrition and Healthcare Seeking Attitudes in urban-poor population of central India" at "National Health System Resource Centre" in partial fulfillment of the requirements for the award of the **Post-Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Institute Mentor Name,

Mr. Arun Shrivastava

Designation,

Consultant community process

Organization

National Health System Resource Centre

(NHSRC)

Organization Mentor Name,

Mr.B.S.Singh

Designation,

Associate Professor

Organization

IIHMR, Delhi

v

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT

RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "Maternal Knowledge of Malnutrition and Healthcare Seeking Attitudes in urban-poor population of Central India" and submitted by Dr Divya Maheshwari, Enrollment No. PG/14/20 under the supervision of Mr. B.S.Singh for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 15/2/2016 to 15/5/2016 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

DR. DIVYA MAHESHWARI

FEEDBACK FORM

Name of the Student:

Divya Maheswari.

Dissertation Organization:

NHSRC, NHM, MOHFW, GOI.

Area of Dissertation:

Malnutrition and Healthcare Seeking Behaviour in urban Population.

Attendance:

All working days within the Internship period.

Objectives achieved: Study Completed, with full coverage of sample size. Analysis done.

Deliverables: Study completed and a set of recommendations. given.

Strengths: Methodology of sampling and data analysis through S.P.S.S. was followed as planned.

Suggestions for Improvement: Analysis of the trends emerging from data can be further expanded.

Signature of the Officer-in-Charge/ Organization Mentor (Dissertation)

Date: 18/05/2016

Place: N. Delhi.

Arun Srivastava

ABSTRACT

Background:

In India, approximately 20 percent of children under the age of four suffer from severe malnutrition, while half of all the children suffer from under nutrition. Children in rural areas (50%) are somewhat more likely to be undernourished, but even in urban areas, 44 percent of children suffer from chronic under nutrition. The purpose of this study is to explore maternal knowledge of the causes of malnutrition, health-care-seeking attitudes and socioeconomic risk factors in relation to children's nutritional status in Central India focusing on urban poor population.

Materials and Methods:

Community based case-control study was conducted in urban-poor population of Sagar block, Madhya Pradesh, India. 34 Cases were selected from hospital pediatric records between 1st January to 1st March 2016 .These were mothers of children having of grade III or IV malnutrition with z-scores $< -3SD$ from the median of WHO reference . For Controls, records from local Anganwadi Centers were used to identify mothers having children with no malnutrition with z-scores between -2SD and +2SD. Control matched by age and location. Inclusion criteria were residence of Sagar ward and BPL status. A semi structured questionnaire was prepared for data collection. Data on (1)socio demographic information,(2) knowledge on childhood malnutrition causes and (3) health-care-seeking attitudes for common childhood illnesses was collected through door to door survey and analyses using SPSS software with a accuracy level of $P < 0.05$ was done.

Results:

The mean age of well nourished and malnourished children were 15.06(+/-10.10) and 14.68(+/- 9.95) respectively. The socio economic risk factors for severe malnutrition were maternal illiteracy(OR= 4.091, P=.05) ,female gender child(OR= 3.83, CI=95%) , low monthly per capital consumption expenditure(OR= 3.04,CI=95%) ,absence of maternal autonomy over nutrition expenditure (OR = 2.88, CI=95%) and low birth spacing(OR=6.79, CI=95%). Further analysis by logistic regression revealed maternal illiteracy (Aor= 4.53, CI=95%), spacing less than 2 years with previous child (Aor= 3.75, CI=95%) and female gender child (Aor= 3.137, CI=95%) as factors independently and significantly associated with severe malnutrition of under five children.

The two groups showed a significant difference in knowledge related to cause of malnutrition (crude OR= 3.87 CI=95%) . Lack of food or improper food, lack of strength, and mother's negligence were common answer. Causes such as lack of breast milk, lack of food during pregnancy, lack of immunization, born premature were hardly known to both cases and control. No significant difference was apparent in health-care seeking attitudes. Based on their traditional beliefs, the mothers did not believe that medical care was an appropriate intervention for childhood illnesses such as malnutrition or measles

Conclusion:

The results suggested that female gender of the child, low birth interval and maternal illiteracy were more significant risk factors for malnutrition than health-care-seeking attitudes. Considering low level of the mothers' knowledge about children's malnutrition causes and nutritional behavior, there is a need for intensive nutritional programs incorporated with social components targeted for urban poor female children and their mother

ACKNOWLEDGEMENT

Apart from own efforts, the success of any internship depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people who have been instrumental in the successful completion of my internship with dissertation report.

I would like to show my greatest appreciation to Dr. Himashu Bhushan,Advisor and Head, PHA Division, NHSRC for providing me the opportunity to work an intern in **NHSRC** and guiding me throughout the period . Also I would like to thank **Mr Arun Shrivastava, Consultant community process,** under whose mentorship I successfully completed my internship. Without their encouragement and support my efforts would not have materialized.

I would like to extend my sincere thanks to Asst. Prof. **Mr. B.S.Singh**. at IIHMR, New Delhi who guided me out to make dissertation report a success

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Dr. Divya Maheshwari

Batch 2014-16

IIHMR(DELHI)

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List of Abbreviations

1	CI	Confidence Interval
2	OR	Odds Ratio
3	aOR	Adjusted Odds Ratio
4	WHO	World Health Organization
5	NHSRC	National Health System Resource Centre
6	NFHS	National Family Health Survey

INTRODUCTION:

Nutrition has increasingly been recognized as a basic pillar for social and economic development. It acts as a determining factor in biosocial growth and physical and mental well- being.[1] Malnutrition occurs when nutrients are in excess, lacking or wrong proportion corresponding to unbalanced diet causing stunting, wasting or underweight. Stunting is an indicator of chronic deficiency, wasting is an indicator of acute under nutrition and under weight is a composite measure of both chronic and acute under nutrition (Gillespie and McNeil 1992; Arnold et al. 2003). Malnutrition most often refers to under nutrition resulting from inadequate consumption, poor absorption or excessive loss of nutrients.[2]

In present century, Malnutrition has been one of the world's most serious developmental problems affecting all age group. The issue of child malnutrition is critical because it effects are not limited to the boundary of childhood but rather persist in adulthood impending physical and mental development and silently destroying future productivity and economic growth. [3]

According to WHO (2012 estimate) every third child die due to malnutrition globally. The prevalence of malnutrition is high in developing countries with India ranking highest(42.5%) followed by sub Saharan Africa (21%). [2] In a considerable number of countries, the urban poor children actually have *higher* rates of stunting than their rural counterparts.[4] Child malnutrition is responsible for 22 percent of India's burden of disease. Among Indian states, child malnutrition in Madhya Pradesh is much higher than the national averages for India and MP's urban poor are worst-affected. [5]

Multiple factors like socio-cultural, economic and demographic contribute to child malnutrition Mother's education, standard of living, ethnicity etc. can play major role in determining their children's nutrition status. [6]Strong evidence exists on synergism between under nutrition and child mortality due to common childhood illnesses

including diarrhea, malaria and measles. [5] A report based on the National Family Health Survey (2014-15) in India has concluded that the prevalence of malnutrition can be reduced by improving educational level of mothers. [7]

In this context, the present study tries to explore the determinants of child under nutrition in urban poor population of Madhya Pradesh which is one of the high-child under nutrition states of India.

PROBLEM STATEMENT

Alma Ata Declaration (1978) envisaged "Health for All" goal till 2000. But the year 2000 has passed; still the state of health is not in a good shape. Among various non communicable diseases, under-5 malnutrition stands as one of the enduring enigmas globally. It has been underlying cause of death of 2.6 million children each year – a third of child deaths. According to WHO estimate 2012, it accounts for 11 per cent of the global burden of disease and is considered the number one risk to health worldwide. 1 in 4 of the world's children are stunted, in developing countries this is as high as one in three.[8]

In developing countries, approximately 193 million children less than five years of age suffer from malnutrition. Sixty percent of these children reside in South Asia, nearly double than sub Saharan Africa. (UNICEF et al. 2014b) Amongst South Asian nations, India ranks top with a global hunger index score of 29.0 ("serious situation") followed by Afghanistan and Pakistan [2]

India is one of the highest ranking countries in the world for the number of children suffering from malnutrition with 1/3 of malnourished children living in India(The World Bank estimate). [9] The UN estimates that 13 million children under age 5 years have SAM, and the disorder is associated with 1 million to 2 million preventable child deaths each year- four every minute in India. [1]

A big, nationwide study from 2005 and 2006, the National Family Health Survey (NFHS), found that 45, 23 and 40 percent of children below three years suffer from stunting, wasting and underweight respectively (corresponding figure for NFHS II, 1998-99 were 51, 20 and 43 percent respectively). A comparison between NFHS II and III shows that there has been a minor reduction in proportion of child malnutrition. Even during the first six months of life, when most babies are breastfed, 24 percent of children are stunted, 48 percent are wasted, and 48 percent are underweight. [10]

Among states, there has been large inter-state variation in the patterns and trends in under nutrition. North Indian states show higher prevalence of underweight children under 5. In six states, at least one in two children are under nourished, namely Maharashtra, Orissa, Bihar, Madhya Pradesh, Uttar Pradesh, and Rajasthan. The latter four states account for more than 43 percent of all underweight children in India. Madhya Pradesh ranks highest having 6 million under nourished children including 1 million moderately under nourished and 1.3 million severe under nourished children. [11]

Disaggregation of underweight statistics by demographic characteristics reveals that Children in rural areas (50%) are somewhat more likely to be undernourished, but even in urban areas, 44 percent of children suffer from chronic under nutrition. . [9] One-third of urban poor children in India (33%) suffer from this condition. According to third NFHS (2005-06), Madhya Pradesh is one of the poorest performing states in the country reporting more than 51% urban poor children who are under five years of age as undernourished. [10] Past studies have investigated urbanization and illiteracy as major cause. The lack of livelihood opportunities, especially in sectors like agriculture, coupled with restrictions imposed on the use of forests, has resulted in the migration of the poor from rural areas to cities. However, the people who move in to access these opportunities tend to remain on the socio-economic margins, struggling to meet the

most basic requirements of life and livelihood. One of the most intense struggles is for food. High illiteracy adds to the burden.

In recent times there has been some attempt to highlight the extent of malnutrition among the poor, primarily rural poor. The urban poor situation remains under-explored. The purpose of this study is to explore maternal knowledge of the causes of malnutrition, health-care-seeking attitudes and socioeconomic risk factors in relation to children's nutritional status in central India focusing on urban poor population.

RATIONALE OF THE STUDY

The education of women, especially, can play a central role in improving the health of children. Being the foremost providers of primary care for their children, their understanding of basic nutrition and health measures can strongly influences the care they provide. Household socioeconomic characteristics also determine to a large extent the nutritional status of children, and have a positive relation with the ability of mothers to provide adequate food and health care. Many studies have been conducted to explore factors related to child malnutrition but the focus has largely been on rural poverty.

Hence with an attempt to explore maternal influence on children malnutrition in urban poverty, this study has been conducted in Sagar block of Madhya Pradesh, India to examine the relationship between children's nutritional status and mothers' knowledge of the cause of childhood malnutrition, their attitudes toward resources available to improve their children's condition and their socio-economic backgrounds .

STUDY OBJECTIVES

General objective

The main aim of the study was to assess the relationship between maternal knowledge, health care seeking attitude and socio-economic condition with malnutrition in children below five years age in urban poor population of Sagar, Madhya Pradesh

Specific objectives

The specific objectives of the study were to:

i.   Assess knowledge of mother on causes of malnutrition and their attitude toward resources available to improve children's health condition

ii.   Determine relationship of mothers' knowledge and heath seeking practices with nutritional status of the children

iii.   Determine whether nutritional status of children is dependent on the socioeconomic status of the household in urban poor population

LITERATURE REVIEW

A Shahjada et al in Indore Madhya Pradesh conducted a cross sectional community based study to find out any association between nutritional status of children and birth interval. House to house visit, Clinical examination and Anthropometric measurements of the under five children and interview of the adult care-givers with a pre-designed pre-tested Performa was done. Results showed that majority of the undernourished children were with birth interval less than 24 months. The prevalence of underweight, wasting

and stunting was highest among children with birth interval less than 24 months i.e. 57.21%, 42.78% and 51.03% respectively as compared to children with birth interval more than 48 months where prevalence of underweight, wasting and stunting was found to be lowest i.e. 29.62%, 22.22% and 25.92 respectively.

A case-controlled study was conducted in a rural area in Tamil Nadu, India in 1996 to assess knowledge and heath care seeking behavior among mothers of under 4 children. 34 cases and 34 controls were selected from the population of approximately 97,000 by using the local hospital's list of young children. Analysis using logistic regression model and chi-square test results showed that the gender of the child and socioeconomic factors were stronger risk factors for malnutrition than health-care availability and health-care-seeking attitudes.

In study on Nutritional problems in urban slum children, Delhi by Ghosh S and Shah D showed High prevalence of malnutrition among young children due to lack of awareness and knowledge regarding their food requirements and absence of a responsible adult care giver.

A case control study was conducted by Islam et al (1994) to examine the relation of maternal and socioeconomic factors with the development of severe malnutrition in young children. 125 cases of severely malnourished children, aged < 36 months, having weight-for-age < 55% and 125 Controls were recruited concurrently matching for gender, disease type (i.e. diarrhea or dysentery) and age.

A case-control study was completed at the Princess Marie Louise Hospital in Accra, Ghana by Rikamaru et al, to identify risk factors for the prevalence of underweight and

severe malnutrition in urban African children. A total of 170 children, aged 8 to 36 mo, with normally nutritional status (> or = 80% W/A of NCHS reference), underweight (moderate malnutrition) (60-80% W/A), or severe malnutrition (< 80% W/A and presence of edema, or < 60% of W/A) were recruited. Anthropometric measurements were done, and the guardians were interviewed about their children's health status, birth weight, child care, and household conditions. On analysis, low birth weight and lack of a mother's education found to be one of the important risk factors for the prevalence of underweight and severe malnutrition Multivariable analysis resulted in the conclusion that the Z-score of weight-for-age, birth weight, and mother's educational level were highly associated with one another.

Cross section study was conducted by Sibabrata Das and Harihar Sahoo in Madhya Pradesh to explore the determinants of child under nutrition .Both bivariate and multivariate analyses have been carried out by using National Family Health Survey III data, 2005-06.Logistic regression models revealed that education of the mother, poverty, social group membership, birth order, nutritional status of mother etc as important factors of child under nutrition.

METHODOLOGY

RESEARCH QUESTIONS

    i.   What is the level of knowledge of causes related to under nutrition among study population?

    ii.   What are the preferences of health resources for common childhood illnesses among study population?

    iii.   Is there a link between mothers' knowledge and heath seeking practices with nutritional status of the children?

    iv.   Does household socioeconomic status influence the nutritional status of children in urban poor population?

RESEARCH DESIGN AND PROCEDURE

Study design – Case control study

Study area – 7 wards of Sagar (Subash Nagar ward, Sant Kawar Ram Ward, Ravidas Ward, Kakaganj Ward, Tili Ward, Baghraj Ward, Tili Ward), District Sagar, Madhya Pradesh, India

Study period – 1/4/2016 to 15/5/2016

Study population –

Mothers of children below 5 years of age residing in the study area belonging to urban poor population.

Inclusion criteria -

Mothers living in temporary shelters, slums and below poverty line.

Exclusion criteria -

Children with mental retardation, physical challenges, serious illnesses, born as preterm babies (less than 37 weeks of gestation) and having single parent.

Recruitment of respondents

From district hospital pediatric record, severely malnourished children (grade III or IV malnutrition with weight for height z-scores $< -3SD$ from the median of WHO reference) less than five years of age and admitted in Nutrition Rehabilitation Centre between 1st January to 31st march 2016 were identified*+. Based on inclusion and exclusion criteria mothers of these children were selected as cases.

For Controls, records from local Anganwadi Centers were used. Children without malnutrition (having weight for height z-scores between -2SD and +2SD ($-2SD \leq z$-scores$\leq +2SD$)) were identified. Mothers of such children were selected as control matched by 2 criteria (1) child born one month prior or following the birth of each case child and (2) living in same locality/ward to the case child.

One control per case was selected (ratio 1:1). If more than 1 match found, control latest visited was selected for the study.

One child corresponded to one household unit

The controls were not matched by gender to determine if gender was an independent predictor of children's nutritional status.

Sampling size –

Total 84 respondents were identified. Considering inclusion exclusion criteria and availability, 68 respondents were included the study (34 cases and 34 controls)

Sampling technique –

Convenient sampling technique was used.

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*Case identification and admission criteria as given in "Operational Guidelines on Facility Based Management of Children with Severe Acute Malnutrition", MoHFW 2011.

+ Admission criteria other than weight for height z score not included as a part of study due to missing data

Study variables -

Dependent variables-

The dependent variables of this study were gender-specific anthropometric z-scores of weight-for-height, age and location of the children .Based on the z-scores, a child was classified into two categories: i) undernourished (case); or ii) well-nourished (control).

Independent variables –

This study identified two domains affecting children's nutritional status. Each domain comprised of several variables as presented below:

a)*Household socio-economic characteristics:* gender of child, mother's age, education and occupation, father's occupation, family size , number of children, birth interval with previous child, mother's 1st child bearing age, household per capital monthly income and expenditure, maternal autonomy over expenditure on nutrition, ownership of land and livestock, religion and caste

b)*Maternal knowledge and healthcare seeking attitude:* knowledge of nutrition related causes, health related causes related to malnutrition, preference of health resources for common childhood illnesses like diarrhea, cold, worms and measles

Data collection method

Technique: Data collected by interviewing of the study sample.

Study tool: semi structured questionnaire and interview schedule

Procedure**:**

   i. Door-to-door household visit of all 68 eligible respondents was done for conducting face-to face interview using questionnaire.(see appendix 2)

   ii. Permission to proceed- After introducing to parents, addressing the objectives of the study and assuring confidentiality ,Informed written consent (see appendix 1) were taken from husband/guardian before collecting data. Participation was voluntary and respondents were free to terminate the interview at any time.

iii. Data collection-

- Knowledge relating to malnutrition was assessed though one –to-one interview schedule using pictures of children with symptoms of: severe marasmus and severe kwashiorkor malnutrition. Mothers were asked about the symptoms in each picture. In case, they could not correctly identify all the essential symptoms (e.g., enlarged stomach, wasting, and swelling), they were then informed verbally. Then, they were asked to explain what they believed caused these symptoms. Their answers were grouped into three categories: nutrition-related, health-related and non-relevant. There after they were asked for their action if their children had each of the following common childhood illnesses: diarrhea, cold, worms and measles. All responses were noted.

- Socio-demographic information of mother and child's attributes such as age, sex, weight, height and nutritional status were recorded.

iv. Interviews were conducted in Hindi, lasting for about 15-20 minutes each

Data analysis

Statistical analyses were performed using the IBM Statistical Program for Social Sciences (SPSS) version 21. The z-score values of weight for height (WHZ) were computed using the WHO Anthro (version 3.2.2, 2011) (see appendix 3) Descriptive analyses were computed to compare the socio-economic characteristics and caregiver variables between cases and controls. Mean and standard deviation were reported for normally distributed continuous variables. Counts and percentages for categorical variables were reported. Univariate and multivariate logistic regression analyses were conducted. Crude odds ratios (OR) and adjusted odds ratios (aOR) with 95% confidence intervals (CI) were calculated. P values less than 0.05 were considered statistically significant.

RESULTS

Anthropometric profile and ages of the sampled children

A total of 64 mothers (34 with severely malnourished children and 34 with well nourished children) were analyzed. Children's age ranged from two to 48 months .The mean age of well nourished and malnourished children were 15.06(+/-10.10) and 14.68(+/- 9.95) respectively. The mean height and weight of the healthy children were 70.94 cm and 7.80 kg respectively, whereas the mean height and weight of severely malnourished children were 70.13 cm and 5.73 kg. The differences in the mean height and weight of healthy and malnourished children were 0.81 cm and 2.07 kg respectively. (Table 1).

Table 1. Anthropometric profile and ages of the sampled children, Sagar block, Madhya Pradesh, India, 2016.

	Cases (n = 34)	Controls (n = 34)	Difference
Age range	2 to 48 months	2 to 48 months	-
Mean age(months)	14.68	15.06	0.38
Mean height(cm)	70.13	70.94	0.81
Mean weight(kg)	5.73	7.80	2.07

Socio-demographic characteristics

Table 2 shows socio-demographic characteristics of the respondents. Illiteracy rate was higher among cases 12(35.3%) than controls 4 (11.8%) (OR= 4.091, P=.05) (fig 1) .Majority of mother, 26 (76.5) cases and 27 (79.4%) controls were housewives with no

occupation. The main paternal occupation was labor work both in cases 28(82.5%) and control 25(73.5%). All mothers had an average of two children .The mean age at first childbirth was nearly 18 for both cases and controls (range 14-25). Spacing less than 2 years with previous child was higher in cases 26(76.5%) than control 11(32.4%) (OR=6.79, CI=95%) (fig 2) . Female gender child was higher in cases 23(67.6%) than controls 12(35.3%) (OR= 3.83, CI=95%) (fig 3). Majority (85.4%) of mothers were Hindu and belong to backward class

According to planning commission 2014, per capita consumption expenditure less than 1407 rupees/month in urban poor should be treated as below poverty line. This study revealed 27 cases(79.4%) had monthly per capital consumption expenditure even less than 703 rupees compared to 19(55.8%) control (OR= 3.04,CI=95%) (fig 4).

 26(76.5%) cases had no autonomy over expenditure on nutrition compared to 18(52.9%) controls. (OR = 2.88, CI=95%)(fig 5)

Table 2: Demographic profile of 68 mothers interviewed in Sagar block, Madhya Pradesh, India, 2016.

Risk factors	Cases (n = 34)	Controls (n = 34)	Crude OR,CI=95%
Maternal illiteracy			
yes	12(35.3%)	4(11.8%)	4.091
no	22(64.7%)	30(88.2%)	1
Spacing less than 2 years with previous child			
yes	26(76.5%)	11(32.4%)	6.79
no	8(23.5%)	23(67.6%)	1
Female gender child			
yes	23(67.6%)	12(35.3%)	3.83
no	11(32.4%)	22(64.7%)	1

Tables 2 continue…..

**Monthly per capital consumption
expenditure less than 703 rupees**

yes	27(79.4%)	19(55.8%)	3.04
no	7(20.6%)	15(44.2%)	1

**No Maternal autonomy
over expenditure on nutrition**

|			
yes	26(76.5%)	18(52.9%)	2.88
no	8(23.5%)	16(47.1%)	1
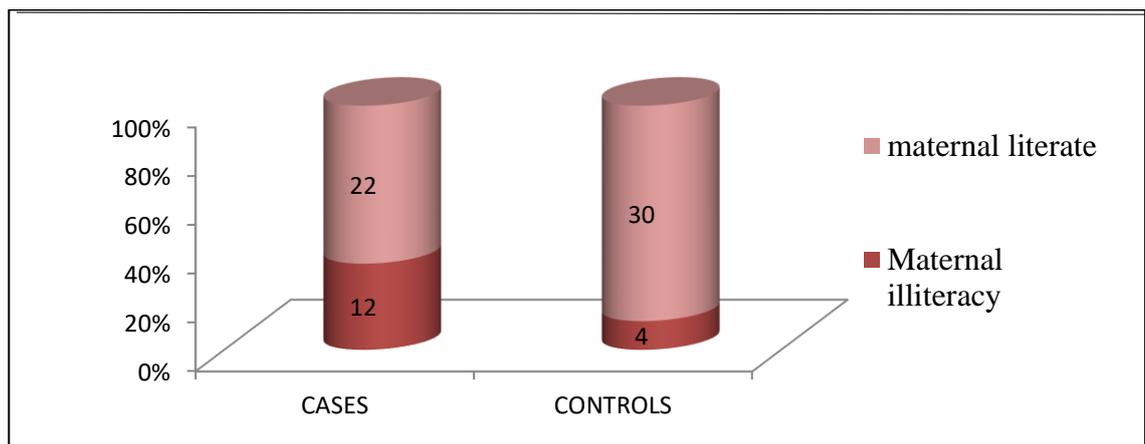
**Fig 1: Maternal illiteracy & childhood malnutrition status**
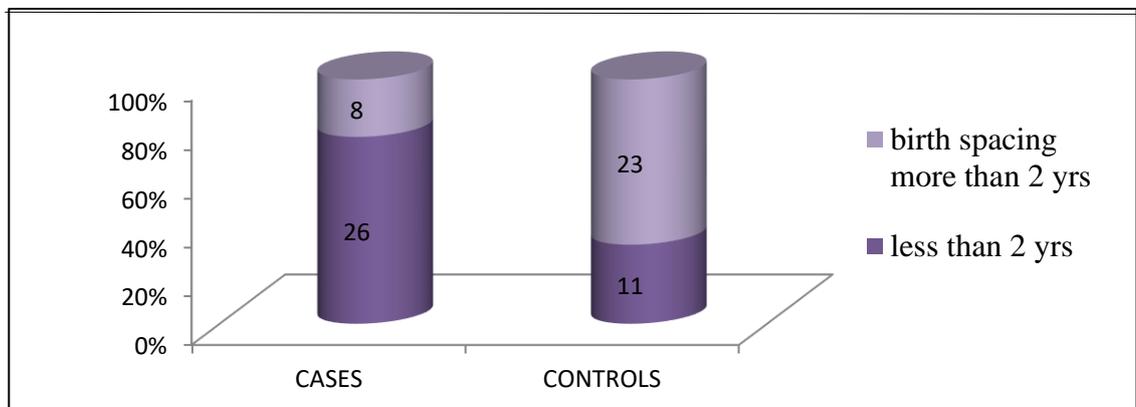
**Fig 2: Birth spacing and childhood malnutrition**
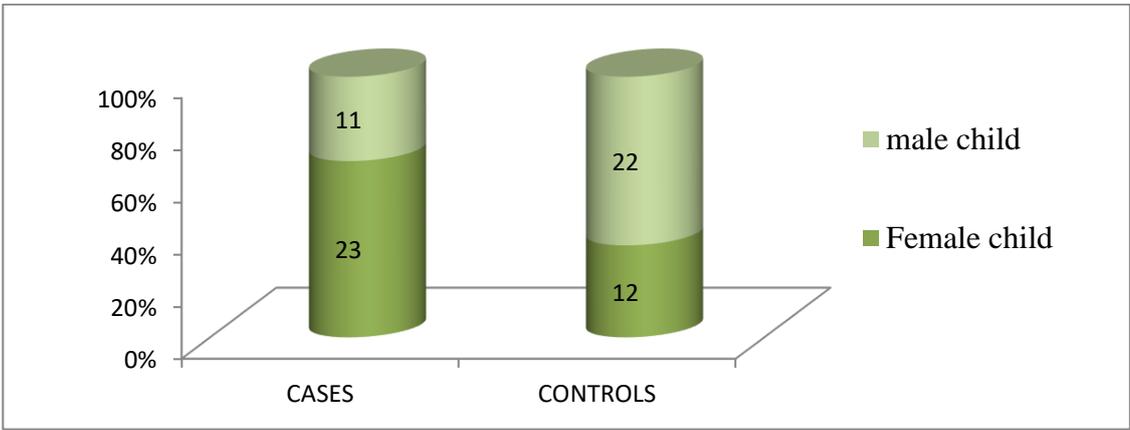
**Fig 3:** Child Gender and Malnutrition Status
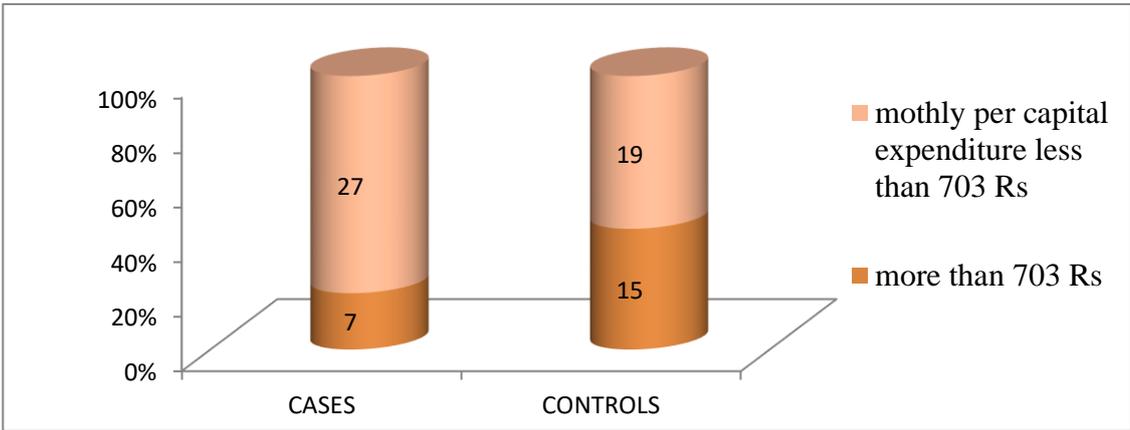
Fig 4 : Monthly per capital Expenditure and childhood malnutrition status
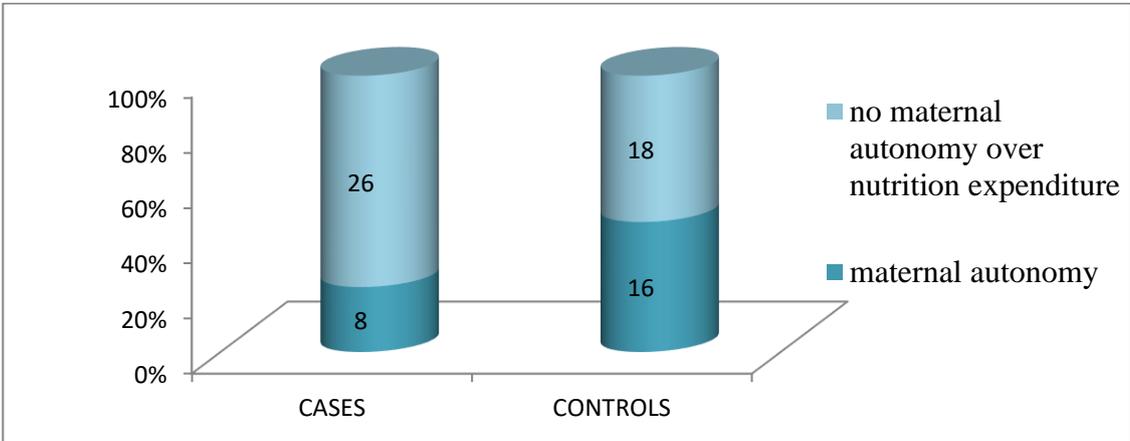
Fig 5: **Maternal Autonomy over nutrition Expenditure and child malnutrition status**

Socio- demographic factors such as first child bearing age of the mother, mother's occupation status, number of children, paternal occupation type, ownership of land and livestock, religion and caste did not show significant associations with children's nutritional status

Knowledge regarding malnutrition

Table 3 shows knowledge status regarding causes of malnutrition that varied with cases and control. 21(61.8%) cases and 10(29.4%) control (crude OR= 3.87 CI=95%) had zero knowledge regarding malnutrition causes (fig 6) Those having knowledge, however, gave similar responses. Lack of food or improper food, lack of strength, and mother's negligence were common answers. Few answered chronic illness and lack of sanitation as the cause .Causes such as lack of breast milk, lack of food during pregnancy, lack of immunization, born premature were hardly known to both cases and control

Table 3: Knowledge of causes related to under nutrition among cases and controls, Sagar block, Madhya Pradesh, 2016

Concepts of causes	Cases (n = 34)	Controls (n = 34)
Nutrition-related causes		
Lack of food	8(23.5%)	17(50.0%)
Lack of breast milk	2(5.9%)	4(11.8%)
Lack of strength	5(14.7%)	12(35.3%)
Lack of food during pregnancy	2(5.9%)	8(23.5%)
Improper food	2(5.9%)	13(38.2%)
Health-related causes		
Lack of immunization	0	0

Chronic illness	5(14.7%)	9(26.5%)
Born premature	2(5.9%)	2(5.9%)
Mother negligence	7(20.6%)	11(32.4%)
Sanitation and hygiene	3(9.1%)	7(20.6%)
Have knowledge*		
	13(38.2%)	24(70.6%)
Don't know		
	21(61.8%)	10(29.4%)

*The number of subjects who have knowledge = subjects who had nutrition related concept or subjects who had nutrition related concept or both
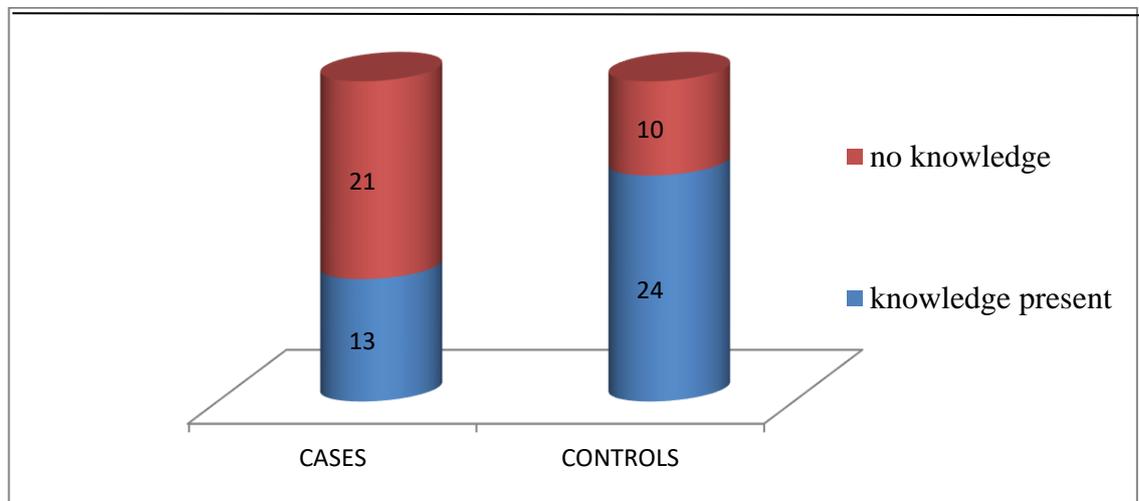
Fig 6: Knowledge prevalence regarding cause of malnutrition among cases and control

Healthcare seeking attitude

Health-care seeking attitudes did not differ between cases and controls, but differed

significantly with the type of disease

For worms, 30(44.1%) and 28(41.1%) of all mothers said they would visit Anganwadi

centre and hospital/private clinic respectively for medical service. Similarly For

diarrhea, 25(36.7%) and 27(39.7%) mothers would seek medical care such as

Anganwadi centre and hospitals respectively If the child had a cold, 12 percent would provide home remedy to the child. All others would take the child to either hospital or to private clinic. For measles, however, almost 97% mothers tended not to seek medical care and instead, they preferred to keep their children at home and follow local cultural beliefs. (Table 4 and Table 5)

Table 4:-Preference of health resources/remedy for common childhood illnesses among cases

	cold	measles	worms	Diarrhea/vomit
No treatment	0	8(23.5%)	5(14.7%)	1(2.9%)
Treat at home	2(5.9%)	1(2.9%)	0	2(5.9%)
Follow local beliefs	0	23(27.6%)	0	0
Visit to AWC	2(5.9%)	0	17(50.0%)	12(35.3%)
Visit to hospital/private clinic	30(88.2%)	2(5.9%)	12(25.3%)	9(55.9%)

Table 5: Preference of health resources/remedy for common childhood illnesses among controls

	cold	measles	worms	Diarrhea/vomit
No treatment	0	12(35.3%)	5(14.7%)	1(2.9%)
Treat at home	6(17.6%)	1(2.9%)	0	2(5.9%)
Follow local beliefs	0	21(61.8%)	0	0
Visit to AWC	1(2.9%)	0	13(38.2%)	13(38.2%)
Visit to hospital/private clinic	27(79.4%)	0	16(47.1%)	18(52.9%)

Further analysis by logistic regression revealed that risk of severe malnutrition was independently and significantly associated with following socio demographic factors: maternal illiteracy (Aor= 4.53, CI=95%),spacing less than 2 years with previous child (Aor= 3.75, CI=95%) and female gender child (Aor= 3.137, CI=95%) after the effect of other significant factors were controlled off.

Lack of maternal knowledge on malnutrition was independently associated to risk of severe malnutrition by three folds (Aor= 3.83, CI=95%) (Table 6)

Table 6: Adjusted odd ratio for significant risk factor associated with childhood malnutrition

Risk factors	Adjusted OR ,CI 95%
Maternal illiteracy	
Yes	4.537
No	1
Spacing less than 2 years with previous child	
Yes	3.757
No	1
Female gender child	
Yes	3.137
No	1
Monthly per capital consumption expenditure less than 703 rupees	
Yes	2.428
No	1
No Maternal autonomy over expenditure on nutrition	
Yes	2.146
No	1
Lack of maternal knowledge on malnutrition	
Yes	3.83
No	1

DISCUSSION

This study suggests that socioeconomic factors and knowledge of the cause of malnutrition are stronger risk factors for malnutrition than healthcare-seeking attitudes in urban poor population. Factors such as low monthly per capita expenditure, absence of maternal autonomy over nutrition had affect on malnutrition status, however, Maternal illiteracy (or= 4.53, CI=95%),spacing less than 2 years with previous child (or= 3.75, CI=95%) and female gender child (or= 3.137, CI=95%) (OR = 2.98, p = .05) were independent and significant risk factors for severe malnutrition. Other socioeconomic variables were unrelated to children's nutritional status.

Mothers of the well-nourished children were significantly more aware that malnutrition was caused by lack of food, negligence in mother care and lack of strength. However other related causes were poorly known to all. Health-care-seeking attitudes did not differ between cases and controls, but differed significantly with the type of disease. Except for measles, mothers were fully willing to take the children to various outside health resources for childhood illness such as cold, worm and diarrhea)

Gender and nutritional status

The finding of the present study about gender inequalities in nutritional status is congruent with the existing literature. In present study we found 67.6% of girls were malnourished compared to 32.4% of boys under 5 years age. Similar to our findings, other studies in various parts of India also reported higher proportion of malnutrition among female under five children than males. For example I Dey et al,in Hoogly, west Bengal reported that 55.9% of girls as severely malnourished compared to 46.6% of boys.[12] NFHS 2 also reported a higher percentage of undernourished females (48.9%) than males (45.3%) among under three years' children

In Indian scenario this could be explained due to community gender bias, as a result parents or caregivers do not prefer to seek medical care for the girl Traditionally, Sons are considered pivotal to family welfare, as they are the ones who earn money, continue family lineage, and provide a form of old age security for parents. A daughter, meanwhile, is considered to be a "double loss" as she not only leaves her family when she marries, but she is also a source of marriage expenses, including the payment of dowry to the groom's family. Studies have reported high family and social pressure on Indian mothers to bear sons in order to maintain the economic strength of the family. [13] Annual survey 2011 showed that state like Madhya Pradesh with lowest ever child sex ratio (822)in urban poverty since independence indicates that the son preference, female infanticide, selective abortion and cultural practices for a particular sex has been deeply rooted in the population. [14-15] The urgency to have a son appears with a greater and more universal tone in the urban settings This Social discrimination against female children has been repeatedly documented to have a strong impact on child nutrition. For example, a survey done by Gupta found that Indian mothers selectively fed male children better than female children. More female children suffered from protein energy malnutrition, especially those with mothers in poor communities [16]. A study in Punjab examined milk supply in relation to gender within families and found that little milk was given to female children in families where mothers-in-law control the milk supply [17]. So, gender inequality is evident in almost every part of the country and a potential risk factor for malnutrition.

Birth spacing and childhood malnutrition

Our study reports 76.5% severe malnutrition associated with birth spacing less than two years. Similar association has been reported in Recent   analysis From El Salvador and Yimer G et al, Ethiopia (2000) [18].

This could be explained by the fact that if a pregnancy occurs too soon after the previous birth, the mother may not have recovered her nutritional status, which can contribute to preterm birth and low birth weight. Birth spacing allows women to recover and be healthy for their next pregnancy. Chang Y et al, Beijing (1996) reported high prevalence rate of malnutrition usually in the second year of life of the children due to premature weaning of breastfeeding and inadequate alternative feeding practices, often as a result of a younger sibling's birth in a short period of time. In addition to providing high quality nutrition, breast milk strengthens the immune system against infections and diarrheal diseases, two common contributors to weight loss in children. Mothers who adequately space their pregnancies are able to provide their children with the necessary nutrition for growth development and a strong immune system, thereby reducing the likelihood of childhood under nutrition. [19]

A survey in urban setting of Indore, Madhya Pradesh by Ahmed Shahjada reported that the children with birth interval of less than 24 months suffered more from different grades of malnutrition [20]. Survey by NFHSIII (2006,India) confirmed that 48% children were malnourished when interval between two pregnancies was $\leq$ 24 months [10]. All evidences supports low birth spacing as a risk factor of children malnutrition irrespective of demography of population.

Maternal education and childhood malnutrition

Present study showed that illiteracy status of mother strongly affects the nutritional status of the children by four folds. Mothers are primary care takers and to lack of awareness and knowledge regarding their food requirements affect child nutritional status, a study by Shanti Ghosh on urban slums.[21] In case control study in Bangladesh, maternal illiteracy was associated with fivefold increase in risk of SAM in their children

which is higher than our observation [22]. Rikamaru t et al, found maternal illiteracy and lack of breastfeeding to be associated with approximately fourfold increased risk of severe malnutrition in their unban children of Ghana [23]. Annop et al, in South India reported low maternal intelligence as risk factor for children malnutrition by three folds [24]. Similar observations have been documented in the study done in north Wolli, Ethiopia and in other African and south Asian countries.

Monthly per capital expenditure and children's nutritional status

A correlation between monthly per capital income and expenditure and children's nutritional status was found as moderately significant in this study. This finding is contradictory to an existing theory that malnutrition is largely due to poverty .A possible source of this contradiction is an inaccurate assessment of the household income and expenditure. Household earnings reported by the mothers may not have been an accurate assessment of the actual income, income spent on food, or food allocation in the family. For example, even if a husband earned a sufficient income for the family, he may choose to spend it on things other than food for the family. Thus, expenditure on nutrition, rather than overall expenditure, might have measured association more accurately.

Maternal autonomy and childhood malnutrition

In our study, Association between child malnutrition and maternal autonomy over nutrition expenditure was found to be moderate. This may be due to factors such as low income, limited knowledge of nutrition and poor socioeconomic status that could act as confounders

Knowledge of the causes of malnutrition and nutritional status

The knowledge of the nutrition-related cause of malnutrition significantly differed between cases and controls. The mothers who could identify the cause of malnutrition as lack of nutrition, strength, and care were more likely to have well nourished children. This supports the findings from other studies. Other studies that determined relationships between maternal nutrition-related knowledge, attitudes and practices using yes or no answers generally showed an association between the knowledge and children's nutritional status

Preference of health resources for common childhood illnesses

The investigation of maternal health-care-seeking attitudes revealed that mothers change their preference for health care resources depending on their child's disease. For Diarrhea cold and worms, the mothers prefer seeing a health care professional, such as government hospitals, private doctors or rely on Anganwadi centre. This may be due to availability and accessibility of medical center. Secondly practices such as yoga, exercise, use of natural remedy measures are least popular among urban poor population and hence, they are more dependent on hospitals/clinics and Anganwadi centre for healthcare services.

With measles, 97 percent of all the mothers answered that they would not take the child to a doctor. Instead, they preferred to care for their children at home and practice traditional rituals. This came from cultural belief that Goddess enters the body and stays for 7 days and leaves the body and due to the fury of goddess, these infections occur. Medication is treated as severe offense against god. Only treatment is, not to offend god and keep her happy to leave the body. Thus prayers, rituals are considered as sole remedy to treat this disease. Studies in Nigeria,eithopia,Pakistan also reported cultural

beliefs for measles. These results indicate an unfavorable attitude and practice by mothers in relation to measles.

These finding about the health-care-seeking attitudes revealed that the mothers took active roles in finding the best treatment for their children. Except for measles, mothers were fully willing to take the children to various outside health resources. Overall active and positive health-care-seeking attitudes was a plus for improving the health of the family and redeeming to the health of the community.

This study had limitation. Due to time constrain, three month reference period was taken for case selection. This was a considerably small period resulted in small sample size.

CONCLUSION

From the foregoing analysis, it is evident that under nutrition of children shows a gloomy picture in urban poor population of Madhya Pradesh .The results showed that gender of the child, birth interval, maternal literacy and knowledge of nutrition-related cause of malnutrition were more significant risk factors for malnutrition than health-care-seeking attitudes.

The study suggests that it is important for any nutritional intervention programs to incorporate social components. Women need to be empowered in areas of education and their role in childhood health condition .Since girls are much more disadvantaged than boys, emphasis on the health of women and their female children is essential. There is a need to bring girls' health into focus that will help to boost general nutrition, reduce pregnancy complications and boost fetal growth and development. Malnutrition reduction policies should consider programs that address cultural factors that support son preference. Programs to improve nutrition should focus on increasing women's

knowledge about nutrition, risk factors of malnutrition and their decision making power.

Secondly, expanding reach through community health workers to increase already successful nutrition programs' coverage and provide counseling and service to populations who presently lack knowledge and access. Community health workers hold great promise to bring nutrition services to those most vulnerable to malnutrition, and their capacity to carry out this work should therefore be strengthened. There should be Virtual workshop cum counseling session of mothers by AWW along with medical practitioners during VHND. Orientation and monitoring of Outreach workers to ensure spread of formal health knowledge among mothers.

Besides combined food and iron supplementation programmes would help in improving nutrition status of the children. Needless to say, for making a significant dent in child nutrition, holistic programmes need to be designed with special consideration to urban - poor population taking their socio-economic and cultural specificities into account..In this endeavor, co-operation is necessary among the Government, Non-Governmental Organizations, the medical personnel and the local people

APPENDIX A: INFORMED CONSENT FORM (ENGLISH)

MATERNAL KNOWLEDGE ON CHILDHOOD MALNUTRITION INFORMED CONSENT FORM

Purpose and Benefits

Under national health system resource centre a study is being conducted. The purpose of this study to assess maternal knowledge and health care seeking attitude regarding malnutrition in urban poor population. Your participation in the study will help us to asses' level of maternal knowledge about children malnutrition, preference for health care resources for children and impact of socio demographic profile on their children nutritional status.

Safeguarding Privacy

Any information you provide will be maintained in a secure manner. No one but the interviewer will know how you answered the questions. The interviewer has signed a pledge to keep all information about you secure. Your name will be removed from all records involved in the survey. A number will be assigned to the survey questionnaire instead. Only project staff will have access to the study data. We will not use your name when we report results of the survey.

Risks and Benefits

There are no known risks to you as a person taking this survey. There are no known direct benefits to you. However, the overall impact for your community may be great because new data on knowledge among urban poor mother will help to address a crucial health problem related to children malnutrition

Rights as a Volunteer

Your taking part in the study is your choice. If you feel uneasy with any of the questions, you can refuse to answer. You may also skip questions you do not want to answer. You can stop the interview at any time. If you have any questions about this survey, you may call Project Coordinator, [NAME, and TELEPHONE NUMBER]. If you have questions about your rights in taking this survey, you may call [NAME, TELEPHONE NUMBER].

Respondent Agreement

The study has been explained to me. I consent to participate. I have had a chance for my questions to be answered. I know that I may refuse to participate or to stop the interview at any time without any loss of health care benefits that I am otherwise receiving. I

understand that if I have questions about this survey or my rights in taking it, or if I feel I have been injured in this study, I may contact [NAME, TELEPHONE NUMBER]. No funds have been set aside to compensate participants for injuries.

Respondent's signature_____ Date _____

Interviewer signature _____ Date_____

Maternal knowledge of malnutrition and heath care seeking attitude in urban poor population

Information to be filled by interviewer

Part A

Nutritional status: ☐ malnourished/case   ☐ non-malnourished/control

1. Name of the child: _____

2. Age/sex   : _____

3. Weight/Height   :_____

4. Mother's name   :_____ 5.Age:_____

6. Mother's education: ☐ yes   ☐ no

7. Mother's Occupation ☐ yes   ☐ no   if yes, mention the occupation_____

8. Fathers name   :_____   9. Occupation _____

10. Total number of children:_____

11. Spacing between last 2 children:

☐ less than 1 yr   ☐ 1-2yr   ☐ 2-3 ☐ more than 3   ☐ NA

12. Mother's age at 1st child birth:_____

13. Family size/number:_____ ___

14. Per capita consumption expenditure/month:_____ _

15. Religion   ☐ Hindu   ☐ Muslim   ☐ Sikh   ☐ Christian ☐   other

16. Caste   ☐ general   ☐ ST   ☐ SC   ☐ OBC

17 .Ownership land/livestock ☐ yes   ☐ no

18. Maternal autonomy over expenditure on nutrition: ☐ yes   ☐ no

19. Address   :_____

20. Contact number : _____

PART B

Knowledge regarding malnutrition

A) Know Nutrition related cause

☐   Lack of food

☐   Lack of breastfeeding

☐   Lack of strength

☐   Lack of food during pregnancy

☐   Improper food/complementary feeding practice

b) Health related causes

☐   Lack of immunization

☐   Chronic illness/diarrhea/vomit

☐   Born premature

☐   By birth/mother negligence

☐   Sanitation and hygiene

c)   Non relevant cause   ☐ if yes, mention the cause_____

d)   Don't know   ☐

2) Response by mother in case of following illness in child

	Cold	measles	worms	diarrhea/vomit
No treatment	☐	☐	☐	☐
Treat at home	☐	☐	☐	☐
Follow local beliefs	☐	☐	☐	☐
Visit to AWC	☐	☐	☐	☐
Visit to hospital/private clinic	☐	☐	☐	☐

APPENDIX C: WHO ANTHROPOMETRIC GUIDE (VERSION 3.2.2, 2011)

Anthropometric Measurement Techniques

Calculating the Weight-for-Height/Length percentage or Standard Deviation score

NCHS normalized reference weight-for-length (49-84 cm) and weight- for-height (85-130 cm) by sex

Boy's Weight (Kg) Malnourishment				Height (cm)	Girls Weight (Kg) Malnourishment			
-4 S.D.	-3 S.D.	-2 S.D.	-1 S.D.		-1 S.D.	-2 S.D.	-3 S.D.	-4 S.D.
60%	70%	80%	85%		85%	80%	70%	60%
1.8	2.1	2.5	2.8	49	2.9	2.6	2.2	1.8
1.8	2.2	2.5	2.9	50	3	2.6	2.3	1.9
1.8	2.2	2.6	3.1	51	3.1	2.7	2.3	1.9
1.9	2.3	2.8	3.2	52	3.3	2.8	2.4	2
1.9	2.4	2.9	3.4	53	3.4	3	2.5	2.1
2	2.6	3.1	3.6	54	3.6	3.1	2.7	2.2
2.2	2.7	3.3	3.8	55	3.8	3.3	2.8	2.3
2.3	2.9	3.5	4	56	4	3.5	3	2.4
2.5	3.1	3.7	4.3	57	4.2	3.7	3.1	2.6
2.7	3.3	3.9	4.5	58	4.4	3.9	3.3	2.7
2.9	3.5	4.1	4.8	59	4.7	4.1	3.5	2.9
3.1	3.7	4.4	5	60	4.9	4.3	3.7	3.1
3.3	4	4.6	5.3	61	5.2	4.6	3.9	3.3
3.5	4.2	4.9	5.6	62	5.4	4.8	4.1	3.5
3.8	4.5	5.2	5.8	63	5.7	5	4.4	3.7
4	4.7	5.4	6.1	64	6	5.3	4.6	3.9
4.3	5	5.7	6.4	65	6.3	5.5	4.8	4.1
4.5	5.3	6	6.7	66	6.5	5.8	5.1	4.3
4.8	5.5	6.2	7	67	6.8	6	5.3	4.5
5.1	5.8	6.5	7.3	68	7.1	6.3	5.5	4.8
5.3	6	6.8	7.5	69	7.3	6.5	5.8	5
5.5	6.3	7	7.8	70	7.6	6.8	6	5.2
5.8	6.5	7.3	8.1	71	7.8	7	6.2	5.4
6	6.8	7.5	8.3	72	8.1	7.2	6.4	5.6
6.2	7	7.8	8.6	73	8.3	7.5	6.6	5.8
6.4	7.2	8	8.8	74	8.5	7.7	6.8	6
6.6	7.4	8.2	9	75	8.7	7.9	7	6.2
6.8	7.6	8.4	9.2	76	8.9	8.1	7.2	6.4
7	7.8	8.6	9.4	77	9.1	8.3	7.4	6.6
7.1	8	8.8	9.7	78	9.3	8.5	7.6	6.7
7.3	8.2	9	9.9	79	9.5	8.7	7.8	6.9

7.5	8.3	9.2	10.1	80	9.7	8.8	8	7.1
7.6	8.5	9.4	10.2	81	9.9	9	8.1	7.2
7.8	8.7	9.6	10.4	82	10.1	9.2	8.3	7.4
7.9	8.8	9.7	10.6	83	10.3	9.4	8.5	7.6
8.1	9	9.9	10.8	84	10.5	9.6	8.7	7.7
7.8	8.9	9.9	11	85	10.6	9.7	8.6	7.6
7.9	9	10.1	11.2	86	11	9.9	8.8	7.7
8.1	9.2	10.3	11.5	87	11.2	10.1	9	7.9
8.3	9.4	10.5	11.7	88	11.4	10.3	9.2	8.1
8.4	9.6	10.7	11.9	89	11.6	10.5	9.3	8.2
8.6	9.8	10.9	12.1	90	11.8	10.7	9.5	8.4
8.8	9.9	11.1	12.3	91	12	10.8	9.7	8.5
8.9	10.1	11.3	12.5	92	12.2	11	9.9	8.7
9.1	10.3	11.5	12.8	93	12.4	11.2	10	8.8
9.2	10.5	11.7	13	94	12.6	11.4	10.2	9
9.4	10.7	11.9	13.2	95	12.9	11.6	10.4	9.1
9.6	10.9	12.1	13.4	96	13.1	11.8	10.6	9.3
9.7	11	12.4	13.7	97	13.3	12	10.7	9.5
9.9	11.2	12.6	13.9	98	13.5	12.2	10.9	9.6
10.1	11.4	12.8	14.1	99	13.8	12.4	11.1	9.8
10.3	11.6	13	14.4	100	14	12.7	11.3	9.9
10.4	11.8	13.2	14.6	101	14.3	12.9	11.5	10.1
10.6	12	13.4	14.9	102	14.5	13.1	11.7	10.3
10.8	12.2	13.7	15.1	103	14.7	13.3	11.9	10.5
11	12.4	13.9	15.4	104	15	13.5	12.1	10.6
11.2	12.7	14.2	15.6	105	15.3	13.8	12.3	10.8
11.4	12.9	14.4	15.9	106	15.5	14	12.5	11
11.6	13.1	14.7	16.2	107	15.8	14.3	12.7	11.2
11.8	13.4	14.9	16.5	108	16.1	14.5	13	11.4
12	13.6	15.2	16.8	109	16.4	14.8	13.2	11.6
12.2	13.8	15.4	17.1	110	16.6	15	13.4	11.9
	12.9	14.9	15.8	110.5	15.8	14.9	12.9	
11.3	13	15	16	111	16	15	13	11.3
	13.1	15.1	16.1	111.5	16.1	15.1	13.1	
11.5	13.3	15.3	16.2	112	16.2	15.3	13.3	11.5
	13.4	15.4	16.4	112.5	16.4	15.4	13.4	
11.6	13.6	15.5	16.5	113	16.5	15.5	13.6	11.6
	13.7	15.7	16.7	113.5	16.7	15.7	13.7	
11.9	13.8	15.8	16.8	114	16.8	15.8	13.8	11.9
	14	16	16.9	114.5	16.9	16	14	
12.1	14.1	16.1	17.1	115	17.1	16.1	14.1	12.1

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