

MASTER OF PUBLIC HEALTH
Johns Hopkins Bloomberg School of Public Health & IIHMR University

PRACTICUM REPORT

By
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Cohort-5
2017-19

Under the Guidance of
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TO WHOMSOEVER MAY CONCERN

This is to certify that **Priyanka J Pawar** student of Master of Public Health Program offered by IIHMR University, Jaipur in cooperation with Johns Hopkins Bloomberg School of Public Health, Baltimore has undergone Practicum Training at Indian Institute of Health and Research (IIHMR), Jaipur from date **15/10/2018** to **15/12/2018**. The Candidate has successfully carried out the study designated to her during practicum training and her approach to the study has been sincere, scientific and analytical. The Practicum Training is in fulfillment of the course requirements. I wish her/him success in all his future endeavours.

Dr. Nutan P Jain

Name of the faculty
Practicum Advisor

CERTIFICATE BY SCHOLAR

This is to certify that the Practicum Project titled **Formulation of evidence based and actionable dietary advice for children (6-23months) in Rajasthan** submitted by me (**Priyanka Pawar**) with Enrolment No. IIHMR-U/07/2017-2019/0031 under the supervision of **Dr .Nutan P Jain** for award of **Master of Public Health** carried out during the period **15/10/2018 to 15/12/2018** 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.

Priyanka J Pawar

Student name
MPH Cohort 2017-19

CERTIFICATE OF ORGANIZATION

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH

(WHO Collaborating Centre for District Health System Based on Primary Health Care)



Date: April 17, 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Priyanka J. Pawar** IIHMR-U/07/2017-2019/0031 is a student of Master of Public Health Program offered by IIHMR University, Jaipur in cooperation with the Johns Hopkins Bloomberg School of Public Health, USA. She has undergone practicum training "A study on assessment of nutritional status and formulation of evidence-based and actionable dietary advice for the children (6-23 Months) in Baran, Bhilwara and Udaipur district of Rajasthan" conducted by IIHMR University sponsored by IPE Global. Her assignment in the project was from **15/10/2018 to 15/12/2018**.

Dr. Priyanka has successfully carried out the statistical analysis of the above study designated to her during practicum training under the guidance of Dr. Goutam Sadhu, Professor, SDS, IIHMR University.

Lastly, through her integrity and resilience during the project, she has proven herself as a valuable researcher and public health leader. A person like Dr. Priyanka J. Pawar would be a great asset for any institution she will join in future.

I wish her a prosperous academic and professional journey.

A handwritten signature in blue ink, appearing to read 'G. Sadhu', is written over a circular purple stamp. The stamp contains the text 'The IIHMR University' around the top and 'Jaipur' at the bottom, with a stylized building icon in the center.

Dr. Goutam Sadhu
Professor- School of Developmental Studies

ACKNOWLEDGEMENT

First and foremost, I would like to express my sincere thanks to my practicum advisor Dr. Goutam Sadhu, Professor IIHMR University for giving me an opportunity to join his team as an intern. His continuous support, guidance, patience and motivation helped me in successfully completing my practicum.

My sincere thanks to my faculty advisor Dr. Nutan P Jain for all the support, guidance and suggestions throughout my MPH Program.

I would also like to thank all the research officers and faculty at IIHMR for their support throughout.

I am also grateful to Mr. Gowthamghosh B (Coordinator-MPH program) for his guidance and help throughout my MPH program.

Lastly, I would like to thank my family and friends for their support throughout this period.

Priyanka Pawar

MPH Cohort 5

Practicum learning objectives

Throughout my practicum I intended to achieve three core public health competencies which were **analytical skills** by obtaining and interpreting data to identify public health problem, **public health science skills** by applying methods of social sciences, biostatistics and epidemiology and **program planning skills** by collecting relevant information to support the program and analyzing various aspects of the program to produce recommendations for improvements.

About the organization

IIHMR University established in 1984 is a leading knowledge institution of the country engaged in teaching, research and training in the domains of public health, health and hospital administration, pharmaceutical management and rural development. The genesis of IIHMR owes to the pressing need at that time to improve the health systems in India. For a country as large and complex as India, the bottlenecks impeding effective healthcare delivery were a plenty and the founding idea of IIHMR was thus that better management of health systems could significantly affect the operational efficiency of healthcare delivery in India. It is with this vision that the institute was set up.

Background

Child malnutrition is a public health emergency, more than one third of child deaths are attributed to under nutrition globally (1). Nutrition plays a key role in physical, mental and emotional development of the child. The health of the child and youth is of fundamental importance (1). Around 80% of world's undernourished children live in 20 countries, with India being home to nearly 50 million children who are underweight and 80 million children who are anemic (1). More than half of child deaths below 5 years of age in India are related to malnutrition (1).

In Rajasthan, as per National Family Health Survey 4 conducted in 2015-16, 39 percent of children under age five years were stunted, or too short for their age, which indicates that they have been undernourished. 23 percent were wasted, or too thin for their height, which may result from the inadequate recent food intake or a recent illness causing weight loss, and 9 percent were severely wasted. 37 percent were underweight, which considers both chronic and acute undernutrition (2)

According to UNICEF, nutrient deficiencies in Vitamin A, Iron, Iodine, Zinc are also widespread among children in India. The micronutrient malnutrition is an ignored area as it is not a direct cause of malnutrition but a contributory factor in child deaths (3).

It was observed from the available knowledge and evidence that although nutrition outcomes are affected by range of biomedical and social-cultural factors, feeding and dietary practices and lifestyle factors are also important determinants of nutrition and health. Without ensuring optimal child growth and development efforts to accelerate economic development significantly will be unsuccessful. Good nutrition is a basic requirement for good health (1).

With regards to Rajasthan it is highly affected with under 5 mortality rates of 57 and the prevalence of SAM at 8.6 percent and around 72 percent of children under the age of 3 years

were not breastfed within one hour of birth due to different reasons leaving them under the threat of malnutrition (2) Complementary feeding is recommended from mid-infancy (6 months onward) to two years of age along with breast milk. These dietary practices provide for optimal early child nutrition and development, and deviation from the same causes undernutrition (4) Given the importance of adequate nutrition for the first two years after birth, the effects of poor feeding practices and intake deficiencies are long-lasting, and it is often hard to recover from undernourishment even at the later stages of life.

Age-appropriate diets that provide a right mix of essential macro- and micro-nutrients can lay the early foundation of optimal physical and cognitive development among children, and together with required levels of physical activity, can reduce the risk of several diseases in later stages of life (WHO, 2015).

About the project

The project is a study on “Formulation of evidence based and actionable dietary advice for children (6- 23months) in Rajasthan” conducted by IIHMR University, Jaipur.

It was observed that very little is known about the nature, type and composition of region-specific diets of Indian children. While nationally representative National Family Health Survey (NFHS 4) shows high rates of childhood undernourishment and micronutrient deficiencies, there are no large-scale nationwide surveys that provide information on dietary intake of Indian children (6-23 months)

This study was significant because child malnutrition has huge intergenerational implications for social, economic and health systems, and poses a major challenge to sustainable human development. The region-specific findings of the study for feeding practices of children (6-23 months) can contribute to the base of knowledge that could enhance collaboration among

policy makers, researchers and practitioner towards better implementation of nutrition program, more research, for building onto existing strategies for healthier growth of the child

Hence it was essential to assess the nutritional status of children in age group 6-23 months, determine their dietary practices and identify the nutrient gaps and suggest a realistic and specific dietary advice/recommendation aimed to address the gaps, as early childhood nutrition is core to a healthier childhood.

Methodology

The study focuses on the dietary pattern of children in the age group of 6-23 months. Three stage sampling method was adopted. Three districts (Bhilwara, Udaipur, Baran) were randomly selected from total districts of Rajasthan and from each selected district, four rural blocks/urban slums based on systematic random sampling was enrolled for the study in stage one. For stage two, for each selected block ten villages/urban slums (PSU) were selected. In the third stage, from each PSU 6 children in the age group of 6-11 months and 12 children from the age group of 12-23 months based on systematic random sampling were enrolled for the study. It was done from the list available to ASHA/ Anganwadi workers in the respective PSU.

Regarding the sample size, from every district, a sample of 720 respondents comprising two groups of infants' mothers using 24 hours recall method were interviewed. Hence total sample size for the study was 2160 for all three selected districts.

Anthropometric Measurements:

The Anthropometric data were collected by measuring length/height and weight of all children aged 6 to 23 months. Weight was measured with minimum clothing and using a standard weighing scale. Kilogram had been the unit of measurement and values were considered to the nearest value of 0.1 kg. Firstly, the weight of the mother and the child was collectively

measured on the weighing scale and then for the mother alone. The value of the weight of the child was finally obtained by subtracting the mother's weight from the cumulative weight of the mother and child combined. Length was measured with the child in a recumbent position, from head to toe and using a standard measuring tape. The unit of measurement for height was centimeters and height values were recorded to the nearest 0.1cms.

Dietary Data Assessment:

Dietary data were collected using an interviewer-administered food frequency questionnaire (FFQ) and a multiplier (i.e. two) pass 24-hour recall. The list of foods in the FFQ included all foods reported in the 24-hour recalls. For the FFQ, interviewers asked mothers about the number of times per day each food was consumed by their infant during the previous day. The dietary practice of all groups of infants was covered in this part using 24-hour recall method

Tasks/Assignments

1. To access the anthropometry based nutritional status of the children aged 6-23 months in the three selected districts using WHO Anthro software.
2. To identify nutrient gaps from 24 hour, recall dietary data of children in the three selected districts.
3. To determine significantly associated factors (socio-economic, demographic, WASH practices, feeding practices and immunization) with the findings of nutritional status and nutrient gap of the children, using SPSS software

Practicum Project Training

- 1. To access the anthropometry based nutritional status of the children aged 6-23 months in the three selected districts using WHO Anthro software.**

To access the nutritional status of children in anthropometry data analysis was carried out. Since the children considered were from 6-23 months of age, 6 different age categories were created. Category 1 included children belonging to the age group of 6-8 months, Category C2 comprised children of 9-11 months, C3 comprised children aged 12-14 months, C4 contained those aged 15-17 months, C5 comprised children of 18-20 months age and C6 involved of children 21-23 months.

To carry out anthropometric analysis WHO Anthro version 3.2.2 software was used. Inputs were made in the software for the parameters of Survey Date, Cluster, ID number (assigned to every child), Household, Sex, Date of Birth, and anthropometric measures- weight (in Kg), height/length (in cm) and age (in months). The WHO Child Growth Standards (2006) were considered as a reference. The anthropometric index of wasting was defined as per the tool as a low weight-for-height Z-score (WHZ), with WHZ values below -2SD of the reference population indicating wasting, while below -3SD meaning severe wasting. Stunting was defined as a low height-for-age Z-score (HAZ), with values below -2SD, indicating stunting while those falling below -3SD indicating severe stunting. Similarly, underweight was defined as having weight-for-age Z-score (WAZ) value below -2SD as underweight and the values below or -3SD as severely underweight.

The analysis using WHO Anthro software was performed on the entire population of 2160 children first followed by district-wise analysis of the children belonging to each of the three districts (720 sample size per district) to obtain the prevalence of wasting, stunting and undernutrition.

Results

The prevalence of wasting, stunting and underweight in all the three districts were obtained from the analysis using WHO Anthro software. The overall prevalence of wasting, stunting and underweight was 16.9 percent, 58.1 percent and 34.2 percent respectively. In case of severe wasting, stunting and underweight among the children, it was 6.4 percent, 36.7 percent and 12.9 percent respectively.

Results obtained in gender wise and district wise form revealed that wasting, stunting and underweight in all the three districts was higher in males as compared to females which concludes that male children are at higher risk of developing under nutrition.

2. To identify nutrient gaps from 24 hour, recall dietary data of children in the three selected districts

In the study 13 nutrients were assessed namely food energy, protein, fat, calcium, iron, zinc, vitamin C, thiamin, riboflavin, vitamin B6, folate, vitamin B12, and vitamin A RAE. The average of these thirteen nutrients were computed using IBM SPSS 20.0 version and compared with corresponding RDAs recommended by ICMR (2011 guidelines). The descriptive analysis incorporated proportions (age, gender, and district wise), mean values, and standard deviations for each of the nutrients. Further, one- way analysis of variance (ANOVA) test was performed to assess age group wise variation in the average intake of each of the nutrients separately. Fisher's least significant difference post- hoc test was considered for the multi-group comparison in the ANOVA test, and the significance level was set at 0.05

Results

It was found that prevalence of insufficient nutrient intake was greater than 60 percent in all the three districts. Out of all the 13 nutrients, 7 nutrients namely **Food energy, Calcium, Iron, Zinc, Thiamin, Riboflavin, and Vitamin B6** were identified as Problem nutrients (insufficient intake prevalence greater than 70 percent)

Considering all the three districts together (n=2160), the highest levels of insufficient nutrient intake were presented for Iron at 99.9 percent and Zinc at 99.7 percent followed by Thiamin at 98.3 percent, Vitamin B6 at 96.7 percent and Calcium at 93.4 percent.

The average daily intakes were significantly low for Iron, Vitamin B6 and Zinc compared to estimated RDA levels for each.

The age-wise multi-comparison ANOVA test results of nutrient intakes revealed that the average food energy, fat, calcium, iron and zinc intake decreased significantly ($p < 0.005$) as the age of the child progressed from 6-8 months to 9-11 followed by progression to age group of 12-14 months.

3. To determine significantly associated factors (socio-demographic, WASH practices, feeding practices and immunization) with the findings of nutritional status and nutrient gap of the children, using SPSS software

Using SPSS software, statistical analysis was performed to determine significant association between anthropometric outcomes (wasting, stunting and underweight) and 34 independent variables. Using descriptive statistics frequencies and proportions were determined for each of the dependent variable (wasting, stunting and underweight). Binary logistic regression analysis was performed and independent variables with a p-value less than 0.25 were selected as a candidate for the multivariable binary logistic

regression model. The backward stepwise elimination method was used to identify the determinants of wasting, stunting and underweight separately. The statistical association was declared significant if the p-value was less than 0.05. The same analysis was carried out to determine the variables significantly associated with insufficient nutrient intake.

Results

The statistical analysis revealed wasting, stunting and underweight were significantly associated with male children.

The analysis also revealed a significant association between stunting and household sanitation and personal hygiene practices (stool disposal method), mother's education and delayed initiation in complementary feeding. In case of nutrient insufficiency, most notable finding was significant association between child's immunization (partial, continuing and not done at all) with nutrient insufficiency. The study also revealed significant association of nutrient insufficiency with deprivation from colostrum, breast-fed after a gap of more than 6 hours, mother's knowledge of nutrition, extended joint family and WASH practices.

Discussion

The discussion is for taking insight about the problem considering the key findings of the study with other similar studies. The results of the study indicate suboptimal feeding practices during infancy are one of the important reasons for higher rates of undernutrition among infants. The feeding practices were majorly associated with community, type of family and education of the mother. The feeding practices in infants and young children are also influenced by elderly females majorly or other elders in the family (e.g., grandmothers) (5,6). Elderly females who

had no formal education, perceived colostrum as indigestible and not suitable for infant's health, and they were also not aware of the health hazards of prelacteal feeds (6). Institution delivery was positively related to better feeding practices (7). Literacy positively affected proper feeding practices (5,6,7).

Competencies Developed

Interpretation/ Analysis of Data

I gained knowledge in analyzing the data using WHO Anthro software and successfully carried out anthropometric analysis and interpreted the data for prevalence of wasting, stunting and underweight. Also, learnt to use Opti food software to identify the nutrients consumed by the child from the food, collected from the 24 hr recall dietary data. I also prepared relevant tables based on the findings of the analysis for the result section of the report and drawn quality interpretations for the analysis. The tables include results from anthropometric analysis which gave district wise, age wise and gender wise prevalence of wasting, stunting and underweight and result of analysis of 24 hr recall dietary data giving proportions of food consumed by children in age wise method. This helped me in defining significance, implications and conclusion of the findings.

Public health science skills

I honed my public health science skills by applying methods of biostatistics, assessing the association of socio-economic, demographic, WASH practices, feeding practices, immunization and other factors with undernutrition and nutrient insufficiency which assisted in defining the implication and conclusion. I also learnt the framework for literature review and conducted literature review for the study after familiarizing with the study details and its significance in Rajasthan's context. The literature review helped me in understanding the nature of the study, provided relevant information and support of similar studies for comparison with study findings and created a theoretical base for further progress in the analysis.

Program Planning skills

This practicum helped me in planning out my work by prioritizing and systematically carrying out the assigned tasks to achieve the study results, starting from reviewing the literature, analyzing the data and interpreting it, gathering credible evidence to support the findings ,communicating the findings in proper tabulated formats, justifying the conclusion and to finally aiding in formulating the dietary recommendations based on the results.

Practicum Experience

My practicum at IIHMR University, Jaipur provided me with much needed exposure to develop appropriate analytical thinking and systematic understanding of the program to carry out the assigned tasks. I was a part of competent and hardworking team under the guidance of Dr. Goutam Sadhu. During my practicum period my ideas and suggestions were encouraged and supported by my supervisor. I learnt to analyze and interpret the data and prepare data-based reports and had an opportunity to improve my skills with advance software for data analysis. All the tasks assigned to me helped me get a better insight of child malnutrition problem in Rajasthan.

I would like to thank my preceptor Dr. Goutam Sadhu for giving me this opportunity and for his guidance and patience throughout. I would like to thank my faculty advisor Dr. Nutan Jain for her valuable suggestions, time and support. I would also like to thank all the research officers, faculty and everyone at IIHMR for this wonderful experience.

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