

Baseline Survey
Use of Fortified Atta by Community using Small Chakki
for Flour Fortification in Tribal Blocks of Udaipur
District

Submitted to
GAIN

Submitted by:



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Preface

The study was commissioned by Global Alliance for Improved Nutrition (GAIN) for its project “*Use of Fortified Atta by Community using Small Chakki for Flour Fortification in tribal Blocks of Udaipur District*”. The objective of the study was to assess the present knowledge among rural families (including general population, pregnant women, lactating women and adolescent girls) on food fortification and their attitude and behavior towards regular use of fortified aata; to assess the fortification of atta done at small chakki in the villages of the flour produced from wheat brought by families for grinding; to assess the anemia status among pregnant women, lactating mother, under 5 children, adolescent girls and selected general population and to assess the nutritional status of under 5 year children using age for weight measures, age for height and height for weight.

The survey used structured questionnaires to interview two category of respondents i.e. community (general population, pregnant women, lactating women, adolescent girls) and chakki owner.

We are happy to share the report of three blocks of Udaipur District that is intervention blocks (Salumber and Sarada) and control block (Jhadol) which was covered for the survey. We hope that the report will provide helpful findings regarding awareness among community members about fortification and especially fortified aata and help in designing strategies to create awareness among the community members.

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Acronyms

APL	Above Poverty Line
ASHA	Accredited Social Health Activist
BCC	Behavior Change Communication
BPL	Below Poverty Line
GAIN	Global Alliance for Improved Nutrition
IEC	Information, Education, Communication
IIHMR	Institute of Health Management Research
IRB	Institutional Review Board
KAP	Knowledge, Attitude, Practice
NGO	Non Governmental Organization
PDS	Public Distribution System
PMU	Project Management Unit
PRI	Panchayati Raj Institution
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences

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Executive Summary

Background: The Global Alliance for Improved Nutrition (GAIN) is working to strengthen the nutritional status among the people. GAIN, has proposed an innovative project where flour fortification would be done at small chakki level, it is assumed that most of the above poverty line (APL) and below poverty line (BPL) families grind wheat at small chakki to fulfil their aata requirement. Through this policy everyone could be able to consume fortified aata irrespective of APL or BPL groups. The key stakeholders for this project are: (1). Small chakki owners and (2) Community, the end beneficiary.

Objectives: The present baseline assessment has the following objectives: (1). to assess the present knowledge among rural families on food fortification and their attitude towards regular use of fortified aata; (2). to assess the fortification of atta done at small chakki; (3). to assess the anemia status among pregnant women, lactating mother, under 5 children, adolescent girls and selected general population and (4). to assess the nutritional status of under 5 year children using age for weight measures, age for height and height for weight.

Findings from Community members: Most of the respondents (36.2 percent in intervention area and 37.4 percent in control area) lie in the age group of 20-25 years. Forty eight and 58.0 percent of the respondents in intervention and control block respectively were illiterate. More than half of the respondents (54.4 percent in intervention blocks and 54.6 percent in control block) lived in nuclear family. In intervention blocks, 88.4 percent of the respondents and 87.3 percent respondents in control block had ration card. Most of the respondents (60-70 percent in intervention blocks and 80-90 percent in control block) reported that they get wheat from ration shop and almost all (98-99 percent) purchase it every month. None of them fortify aata at chakki. Only 8.7 percent respondents (i.e. general population, pregnant women and lactating women) in intervention blocks and 24.0 percent respondents in control block purchased aata from ration shop but do not purchase it regularly. They grind wheat to fulfil their requirement as the aata was not sufficient for the family members. Only 19 out of 2856 respondents (i.e. general population, pregnant women and lactating women) reported that have heard about fortified aata. In intervention blocks, newspaper (3) followed by family members/relatives/friends (1) and ration shop (1) whereas in control block ration shop (5) followed by newspaper (1) and flour packet (1) was identified as the source of information about fortified aata. Only 4 respondents out of 9 who have heard about fortified aata in intervention blocks and 7 out of 10 respondents in control block do not know or did not responded on health benefits of fortified aata. Six out of nine respondents who have heard about fortified aata in intervention blocks and 6 out of 10 respondents in control block reported that flour can be fortified. As far as reaction of family members after consuming fortified aata/raj aata/packed aata is concerned, findings depict that in intervention blocks 49 respondents out of 129 who had consumed fortified aata/raj aata/packed aata reported change in

taste followed by similar like other food stuff (42). However in control block 127 respondents out of 329 were overall satisfied with the aata followed by similar like other food stuff (117).

Findings from Chakki Owner: Findings from chakki owner shows that mean age of respondents was 45.1 and 38.5 years in intervention and control blocks respectively. Only 15.4 percent and 2.9 percent of the respondents in intervention and control blocks were illiterate. Eight and six respondents in intervention and control blocks respectively reported that they heard about fortified aata. Mostly get the information from ration shop (six respondents from intervention blocks and 6 respondents from control block). Most of them (62.5 and 66.7 percent of the respondents in intervention and control blocks respectively) do not know the health benefits of fortified aata. Flour was identified as the consumer goods which can be fortified by six and five respondents in intervention and control blocks respectively. Awareness regarding micronutrients mixed during the process of fortification was found to be low as 75.0 and 66.7 percent of the respondents in intervention and control blocks respectively did not responded about the same. None of them fortify aata at chakki in intervention area. One of the chakki owner in control block reported that he got the training from one of the local NGO and got the material for the fortification. He did fortification two year back but not practicing presently as not getting micronutrients from NGO now. Findings on daily average grinding at chakki shows that most of the respondents grind more than 150 kgs wheat in a day (33.3 percent respondents in intervention blocks and 41.2 percent respondents in control block).

Impact Indicators: Prevalence of malnutrition among children was found to be high in both intervention and control blocks. Seventeen and 19.4 percent of the children were severely underweight; 27.5 percent and 37.6 percent were severely stunted and 8.1 percent and 6.7 percent were severely wasted in intervention and control blocks respectively.

Recommendation: Several recommendations have been suggested: (1). IEC activities should be done to enhance the knowledge of community members regarding fortification; (2). BCC activities such as street plays should be done to display the usefulness of fortified aata and its health benefits; (3). chakki owner's should get the training on fortification. So that, community members who grind wheat at the chakki can get fortified aata and (4). ASHA/PRI members should be involved during IEC/BCC.

Chapter 1

Introduction and Methodology of the Study

1.1 Background

The Global Alliance for Improved Nutrition (GAIN) is working to strengthen the nutritional status among the people. GAIN supports public-private partnership to increase access to the missing nutrient in diet necessary for the people. As of now, Government of Rajasthan through public distribution system (PDS) provides fortified aata to APL families and wheat to BPL families but this policy take away BPL families to take benefits of fortified aata. To fill this gaps, the Project Management Unit (PMU) supported by the GAIN, has proposed an innovative project where flour fortification would be done at small chakki level, it is assumed that most of the APL and BPL families grind wheat at small chakki to fulfil their aata requirement. Through this policy everyone could be able to consume fortified aata irrespective of APL or BPL groups. The key stakeholders for this project are:

1. Small chakki owners, who would be directly engaged to fortify wheat grains (by adding wheat flour premix containing Iron, Folic Acid and Vitamin B12).The project would train the Chakki staff, supply premix and any other supply requirement for fortification of wheat flour.
2. Community, the end beneficiary: Efforts will be made through different channels to create awareness and to change practice and behaviour among the population.

The present document is a report on the baseline assessment of the knowledge, attitude and practice of general population, pregnant women, lactating women and adolescent girl (11 to 19 year) regarding food fortification and nutritional status of under 5 year children, as well as the level of awareness of Chakki owners in the block Salumbar and Sarada as a intervention block and Jhadol as a control block in Udaipur district. This assessment was carried out by Institute of Health Management Research (IIHMR), Jaipur during August - September 2012.

1.2 Objective of the Study

This study was aimed to conduct an independent baseline assessment of GAIN's innovative project in intervention and control block of Udaipur district in Rajasthan. The following were the objectives of this study:

- To assess the present knowledge among rural families on micro-nutrient fortification and their attitude and behaviour towards regular use of fortified aata for family members specially pregnant women, lactating women, under 5 year children and adolescent girls

- To assess the fortification of atta done at small chakki in the villages of the flour produced from wheat brought by families for grinding
- To assess the anaemia status among pregnant women, lactating mother, under 5 children, adolescent girls and selected general population
- To assess the nutritional status of under-5-year children using age for weight measures, age for height and height for weight.

1.3 Methodology

1.3.1 Composition of core team

A preliminary meeting of all the team members involved in the study was organized to have a common understanding of the project and methodology and to finalize a plan for conducting the field work for data collection and analyses approaches. The team also drew upon experiences and expertise of other public health experts at IIHMR.

The detailed work plan was shared in a meeting with the representatives from GAIN. This meeting also provided the opportunity to finalize issues related to institutional review board (IRB) approval, mechanism of selection of study sites, sampling and sample size.

1.3.2 Study design

The study design was case control study. The study was conducted in three blocks i.e. Salumber, Sarada (intervention blocks) and Jhadol (control block). Questionnaire was administered to the chakki owner and community i.e. general population, pregnant women, lactating women and adolescent girls.

1.3.3 Sampling

Selection of villages

Cluster sampling technique was used to select the villages among the blocks. All villages under the selected blocks were listed along with their respective populations and cumulative population was worked out.

As shown in Table 1 and Table 2, a total of 30 clusters within each intervention and control areas were identified through determination of the sampling interval.

Table 1: Cluster Sampling of Villages in Sarada and Salumbar (Intervention Block)

S.No	Village Name	Population
1	Deopura	3651
2	Bagruwa	1390
3	Kantora	1211
4	Sarsiya	1993
5	Moondla	566
6	Sekri	154
7	Katanwara	1089
8	Kharbar Chak (B)	1294
9	Mallara	1195
10	Dhan Ka Wara	5185
11	Semari	4683
12	Kunda	2008
13	Bhorai	3605
14	Bhalariya (CT)	6530
15	Newa Talai (CT) - Ward No.1	2836
16	Edana	1601
17	Kharka	2625
18	Gaonra-Pal	1782
19	Baseetar Samchot	1686
20	Baroliya	836
21	Sarwani	708
22	Seriya	2493
23	Ora	563
24	Kheroli	664
25	Kara-Kalan	1011
26	Harmatya Kalan	1142
27	Bhabarana	167
28	Salumbar (M) Ward 3	15878
29	Salumbar (M) - Ward No.10	988
30	Salumbar (M) - Ward No.17	811

*Due to very small population of the village

Table 2: Cluster sampling of villages in Jhadol (Control Block)

S.No	Village Name	Population
1	Dhadhawali	1495
2	Mohammad Phalasiya	2349
3	Bansriya	212
4	Kyariya	438
5	Namli	195
6	Adol	1101
7	Dhudhkiya	366

8	Jhanjhar Ki Pal	1298
9	Biroti	1104
10	Kurawali Khurd	93
11	Damana	1730
12	Sultanji Ka Kherwara	1747
13	Selana	1615
14	Sera	1570
15	Bagpura	2434
16	Adkaliya	1063
17	Kolyari	2569
18	Amiwara	414
19	Turgarh	861
20	Madri	3143
21	Saradeet	1096
22	Khatikamdi	1180
23	Patiya	536
24	Amaliya	3899
25	Amra	1931
26	Bahighatiya	1263
27	Garanwas	1968
28	Karel	2151
29	Kwadar	1231
30	Phutagarh	237

Selection of Aata Chakki

A total 39 chakki owners in intervention blocks and 34 in control block were interviewed in the study. In each cluster, at least one and maximum two small chakki owners were interviewed. In case, chakki was not in selected village, other chakki was selected where selected village people used to go for grinding wheat.

1.4 Tools and Techniques

A comprehensive set of tools were prepared for the following respondents:

- a. Interview schedule for general population, pregnant women and lactating women
- b. Interview schedule for adolescent girls (11 – 19 year)
- c. Anthropometrics for under 5 year children
- d. Interview schedule for chakki owner's

Through these interviews, data was collected on the knowledge, attitude and practices regarding fortified aata among general population, pregnant women, lactating women, adolescent girls and chakki owner's.

The tools were prepared in Hindi. The draft tools were pilot-tested and appropriate modifications were made to ensure that:

- a. The delivery of the questions was acceptable and understood by the respondents;
- b. The questions captured adequately what the study was seeking to find; and
- c. The time duration of administration of the tool was acceptable.

The final modification of the tools was done in consultation with GAIN and given in Annexure 1.

1.5 Sample size

In order to achieve the project objective, data were collected from general population, pregnant women, lactating women, adolescent girl and chakki owner. Cluster sampling technique was used to select the villages among the intervention and control blocks. This method allowed a small number of the target population to be sampled while providing data which are statistically valid. Target was set to cover 12 pregnant women from each cluster, for this each household was touched and questionnaire was administered if any of the category (pregnant women, lactating women, adolescent girl and under-5-children) was present. While administering questionnaire to adolescent and under-5 children, the household head of the family was also interviewed and put under the category of general population.

On reaching the selected cluster, the investigators went to the center of the village and then selected the first house according to random selection procedure. Eligible pregnant women in the household were invited to participate in the interview after obtaining valid consent. After completing the first household, the next household whose front door was nearest to the front door of the previous household was approached. The survey proceeded in the same manner till minimum twelve pregnant women had been interviewed in the cluster. A total of 371 pregnant women in intervention blocks and 374 in control block were interviewed. If investigator did not find 12 pregnant women in a selected village then they covered remaining pregnant women from the nearest village. The survey was completed by using the same process for the remaining 29 clusters.

Table 3: Number of Respondent Interviewed

Type of respondent	Intervention Blocks	Control Block	Total Respondent
General Population	780	630	1410
Pregnant women	371	374	745
Lactating women	337	364	701
Adolescent girl (11-19 yr)	466	436	902
Under 5 year children	1386	1426	2812
Chakki owners	39	34	73

1.6 Composition of Field Teams

Data collection was accomplished by field investigators recruited at IIHMR, Jaipur. These were well educated with experience in field work. There were 12 investigators in the field team, 6 males and 6 females. The team was led by a faculty from IIHMR along with two research officers from IIHMR.

1.7 Recruitment, Training and Data Collection

The recruitment of field staff was done by IIHMR. All efforts were made to recruit the qualified investigators having experience of conducting health surveys. Before initiation of data collection, an intensive two-day training program was conducted. Training course consisted of instructions for interviewing techniques, detailed discussion on schedules, field procedure for conducting survey and quality control. A detailed discussion on each item of schedules was conducted. During the training programme special attention was paid to missing information, skips, filter questions, etc. For quality data collection by field staff, various techniques were used during the training programme. Mock interviews among the participants in the classroom were arranged during the training sessions. Pre-testing was done on 8th August, 2012 at two villages of Chaksu block (Saligrampura and Dadanpura Dungariya) of Jaipur District. GAIN was involved in finalization of questionnaire and training of investigators. Data collection was done during August 17 to September 06, 2012. Emphasis was laid on using objective approach while collecting data so that personal biases may not influence the quality of data collection.



Two day training at IIHMR, Jaipur

Data collection was monitored by research officers and faculty member from IIHMR through random spot-checks and back-checks. GAIN was also involved in monitoring data collection team during the data collection.



Spot Check by GAIN and IIHMR Team

1.8 Data Analysis

All the data were edited, entered and analyzed at IIHMR Jaipur. Software was prepared for data entry using CPro. Information was analyzed using SPSS statistical software package.

1.9 Quality Assurance

- Trained and experience investigators were recruited to ensure data quality
- The field teams were provided with intensive training before sending them for data collection
- All the tools were pretested and refined before being administered in the field
- Experienced faculty and research officers coordinated the study
- Research Officers and faculty checked all the interview schedules for completeness before leaving the PSU
- The data entry package CPro had skips and consistency checks and range checks to reduce the errors at data entry level.

Chapter 2

Socio-Demographic Profile of Respondents and KAP Regarding Food Fortification

This chapter deals with the socio and demographic profile of the respondents in the survey blocks of Udaipur district i.e. intervention blocks (Sarada and Salumber) and control block (Jhadol). This chapter also presents the knowledge among the respondents (i.e. general population, pregnant women, lactating women and adolescent girls) regarding food fortification (especially fortified aata), health benefits of fortified aata and micronutrients mixed during the process of fortification. Study also assessed the reaction of family members about fortified aata who had consumed it. Attempts were also made to assess the attitude of respondents on food fortification at aata chakki.

2.1 Socio-demographic profile of respondents

General socio-demographic profile of respondents is depicted in table 4. Findings depict that most of them (36.2 percent in intervention area and 37.4 percent in control area) lie in the age group of 20-25 years followed by 26-30 years and 31-35 years. As far as education qualification is concerned, data shows that 48.5 and 58.3 percent of the respondents in intervention and control blocks respectively were illiterate. More than half of the respondents (54.4 percent in intervention blocks and 54.6 percent in control block) lived in nuclear family. Availability of ration card was also asked and findings depict that 88.4 percent of the respondents in intervention blocks and 87.3 percent respondents in control block had ration card. In intervention blocks, 62.4 percent had BPL card while 71.2 percent of the respondents had BPL card in control block. Nearly 70 percent (67.8 percent in intervention blocks and 68.4 percent in control block) of the ration cards had 3-6 members registered.

Data were also collected from adolescent girls aged 11-19 years. Educational status of adolescent girls is shown in table 11. Findings depict that 15.7 and 20.0 percent adolescent girls in intervention and control area respectively were illiterate. Thirty six percent were primary passed in both intervention and control area.

2.2 Awareness regarding consumer goods at ration shop

Data were collected from survey respondents on their awareness regarding consumer goods available at ration shop. To reduce the recall bias, probing was done. So, response was taken and analyzed into two categories: one is spontaneous response and response after probing.

Finding from general population is shown in table 5. In intervention area, 87.6 percent of the respondents spontaneously reported that kerosene oil is provided by ration shop followed by wheat (86 percent), sugar (47.9 percent) and tea (12.3 percent) whereas in control block 96 percent identified wheat followed by kerosene oil (95.6 percent) and sugar (67.0 percent). After probing,

salt and packed aata were also named by respondents in both intervention and control areas. Findings from pregnant women are depicted in table 7. In intervention area, 89.2 percent of the respondents spontaneously reported kerosene oil followed by wheat (87.6 percent) while in control block, 98.1 percent of the respondents identified wheat followed by kerosene oil (92.2 percent) and sugar (66.3 percent). After probing, salt, packed aata and tea were also named by the respondents from both the study areas. Table 9 shows the findings from lactating women. Ninety one percent of the respondents spontaneously reported kerosene oil as a consumer good provided by ration shop followed by wheat (89.0 percent) and sugar (50.4 percent) whereas in control block, 94.8 percent identified wheat followed by kerosene oil (88.5 percent) and sugar (65.1 percent). After probing, salt was also named by the lactating women in both intervention and control areas.

2.3 Practice regarding purchase of wheat and flour from ration shop

Data were collected to know the practice regarding purchase of wheat and flour from ration shop and frequency of purchasing.

Finding from general population is depicted in table 5. Sixty three and 81 percent of the respondents in intervention and control blocks respectively reported that they get wheat from ration shop. Almost all (98.4 percent in intervention blocks and 99.6 percent in control block) purchase it every month. Shop do not open every month is the reason identified by the respondents who do not purchase wheat every month from ration shop in control block whereas in intervention area, despite of this reason, other reasons were also reported such as use of other grains and no need to purchase wheat as they produce wheat in agriculture land. Out of those who purchase wheat from ration shop, 67.3 and 52.3 percent respondents from intervention blocks and control block respectively reported that they get 25 kg wheat from the ration shop. None of them fortify aata at chakki in both intervention and control area. Eighty three and 99.3 percent of the respondents who had ration card in intervention and control area respectively reported that they do not purchase packed aata/raj aata/fortified aata every month. Out of these, 80.7 and 99.4 percent from intervention and control area respectively reported that they do not get aata packet from ration shop due to non availability at ration shop. Despite of this, poor quality and poor taste of flour was also identified by the respondents of not purchasing flour every month in intervention blocks and control block respectively. Almost all respondents (96.8 percent in intervention blocks and 99.3 percent in control block) who consumed aata reported that flour was not sufficient for the family members and they grind wheat to fulfil the requirement of the family members and few reported that they grind jawar/bajra and other grains or purchase aata from retail shop.



Respondent showing Ration Card

Table 7 shows the findings from pregnant women. Findings depict that 69.8 and 88.4 percent respondents from intervention blocks and control block respectively reported that they get wheat from ration shop. Almost all (98.7 percent in intervention area and 98.9 percent in control area) purchase it every month. Rest respondents reported that shop do not open every month and due to poor quality of wheat they do not purchase wheat every month from ration shop. Out of those who purchase wheat every month from ration shop, 61 percent in intervention blocks and 56.6 percent in control block respectively reported that they get 25 kgs followed by 35 kgs (19.5 and 21.3 percent in intervention and control blocks respectively). None of them fortify wheat at chakki. Thirty two and 93 respondents from intervention and control blocks respectively reported that they got packed aata/raj aata and out of these, only 3 respondents from intervention blocks reported that they get flour from ration shop every month whereas none of the respondent from control block reported the same. Data shows that 86.2 percent and 96.8 percent of the respondents who do not purchase flour from ration shop every month in intervention and control area respectively reported that they do not get it as it is not available at ration shop. Worse quality of food and poor taste was also identified by the respondents of not purchasing flour every month from ration shop. Almost all respondents (96.9 percent from intervention blocks and 98.9 percent from control block) who consumed aata reported that flour was not sufficient for the family members and they grind wheat to fulfil the requirement of the family members (100 percent respondents from intervention blocks

and 96.8 percent respondents from control block). One and six respondents from intervention area and control area respectively reported that they grind jawar/bajra and other grain to fulfil the requirement of family members and one of the respondent in intervention area also reported that they purchase aata from retail shop.



Interview with lactating women

Findings from lactating women are shown in table 9. Sixty six and 84 percent of the respondents in intervention and control blocks respectively reported that they get wheat from ration shop. Out of these, 99.0 percent of the respondents from intervention blocks and 99.2 percent respondents from control block reported that they purchase it every month. Ration shop do not open every month is the reason identified by the respondents for not purchasing wheat monthly. Out of those, who purchase wheat every month from ration shop, 36 and 51 percent in intervention and control blocks respectively reported that they get 25 kg wheat. None of them fortify aata at chakki. Only 25.8 percent of the respondents who purchased packed aata/fortified aata/raj aata from ration shop in intervention area reported that they get it every month but none of them reported about the same in control block. All respondents from intervention blocks and 98.8 percent of the respondents from control block reported that non availability of flour at ration shop is the major reason of not buying aata from ration shop followed by bad taste of aata. All respondents in both intervention

and control areas who consumed aata reported that flour was not sufficient for the family members and they grind wheat to fulfil the requirement of the family members (all respondents from intervention blocks and 98.8 percent respondents from control block). Despite of that, they purchase aata from retail shop was identified by one of the respondent in intervention block and three respondents from control block reported that they grind other grain.

2.4 Awareness regarding fortified aata and its health benefits, fortified food items and micronutrients

Awareness among the general population regarding fortified aata was found to be poor in both the study areas shown in table 6. Findings depict that only 6 respondents out of 780 in intervention blocks and 8 respondents out of 630 in control block heard about fortified aata. Out of these, three respondents spontaneously reported that they get the information from newspaper in intervention block whereas in control block 5 out of 8 respondents received information from ration shop followed by newspaper (3) and television (2). After probing, two respondents (one from intervention block and one from control block) identified posters/pamphlets/hordings/banner as a source of information about food fortification and one of the respondent in control block also reported television.

Awareness was also assessed regarding the health benefits of fortified aata and responses were taken and analyzed into two categories: one is spontaneous response and response after probing. Findings from general population is depicted in table 6 and data shows that three out of six respondents in intervention blocks and 5 out of 8 respondents in control block did not responded spontaneously about the health benefits. In intervention blocks, respondents spontaneously reported that fortified aata is helpful in mental development (2), reduce anemia (1), reduce fatigue and physical weakness (1) and sharpen the mind of children (1) whereas in control block, two respondents identified that it is helpful in mother and newborn child healthcare (2) followed by reduce anemia (1), reduce fatiguw and physical weakness (1), sharpen mind of children (1) and healthy for eyes (1). Response was quite better after probing in both the study areas. Data depict that 4 respondents out of 6 and 4 respondents out of 8 in intervention and control blocks respectively spontaneously reported that flour is fortified. However, in control block milk (1) and salt (1) were also named among the consumer goods which are fortified. After probing, edible oil (1) was also identified in intervention block. As far as awareness regarding micro nutrient mixed during the process of fortification is concerned, findings depict that most of them (5 out of 6 in intervention blocks and 7 respondents out of 8 in control block) did not respond spontaneously. Iron (1), folic acid (1) and vitamin B12 (1) were identified by the respondents in intervention blocks whereas in control block iron (1) and folic acid (1) was reported. After probing, folic acid (1) and vitamin B12 (1) in intervention and control blocks respectively were also identified by the respondents.



One of the respondent showing packet of fortified aata

Awareness among pregnant women is shown in table 8. Findings depict that 2 respondents out of 371 in intervention blocks and only one respondent out of 374 in control block reported that they have heard about fortified aata. In intervention blocks, ration shop (1) and friends/relatives/family members (1) were reported by the respondents as the source of information regarding food fortification. No response was found after probing. As far as health benefits of fortified aata is concerned, findings depict that fortified aata reduces anemia (1), helpful in maternal and newborn child healthcare (1) and sharpen the mind of children (1). Only one respondent spontaneously reported that flour is fortified but after probing salt (1) was also reported. None of them responded spontaneously about the micronutrients to be mixed during the process of fortification but after probing iron (1) was identified. Findings from control block depict that one respondent who had heard about fortified aata get the information regarding the same from newspaper. She did not respond spontaneously on health benefits of fortified aata but after probing helpful in mother and newborn child health care, reduce fatigue and physical weakness and helpful in mental development was identified. She spontaneously reported that flour can be fortified but do not have the knowledge about the micronutrients to be mixed during the process of fortification.

Awareness among lactating women is also reported quite low and shown in table 10. Only two respondents (one from intervention block and one from control block) heard about fortified aata and reported that they read about it from flour packet. They identified flour as a food item which can be fortified but do not have information about health benefits of fortified aata and micronutrients to be mixed during the process of food fortification.



Interview with Adolescent Girl

Findings from adolescent girls are shown in table 12. Only nine and four respondents from intervention and control blocks reported that they have heard about fortified aata. As far as source of information is concerned, four respondents in intervention blocks reported that they read about it from flour packet followed by family members/relatives/friends (3) and ration shop (2) whereas in control block flour packet (2) and ration shop (2) were identified by the respondents. After probing, poster/pamphlets/hording/banner (1) was identified by the respondent in intervention area. None of the respondent had the knowledge about health benefits of fortified aata in control area. However, in intervention blocks, fortified aata sharpens the mind of children (1) and helpful in mother and newborn child healthcare (1) were identified spontaneously by the respondents. After probing, fortified aata helps in mental development (1) was reported in intervention blocks. All four respondents from intervention blocks and two respondents from control block reported that flour can be fortified. Salt (1) was also spontaneously identified by the respondent in intervention area and after probing rest five respondents identified flour as consumer good which

can be fortified. None of the respondent has the knowledge about micronutrients added during the process of fortification.

2.5 Attitude and Practice

An attempt has been made to assess the attitude of respondents regarding fortified aata through identifying the reaction of family members after consuming fortified aata/raj aata/packed aata. Practice regarding purchasing fortified aata and fortifying goods at the chakki were also assessed.

Findings from general population (table 6) depict that 3 out of 6 respondents from intervention area and 4 out of 8 respondents from control area reported that fortified aata is available at ration shop in their village. Out of these, only four respondents (two from each survey area) reported that they ask the family members to buy fortified aata and they purchased the same. None of them reported regular purchase of fortified aata. Reaction of the respondents who had consumed fortified aata/raj aata/packed aata were assessed and findings from intervention blocks depict that 47.1 percent of the respondents found change in taste followed by similar like other food stuff (32.9 percent) and do not like aata (15.7 percent). Findings from control block shows that nearly 41.3 percent were overall satisfied with the aata followed by similar like other food stuff (34.8 percent), change in taste (31.0 percent) and do not like it (15.5 percent). Seven and 11 respondents from intervention and control blocks respectively reported that they fed aata to domestic animals. Only one respondent from control block knew that aata can be fortified at chakki.

Findings from pregnant women are shown in table 8. Only one respondent in intervention block reported that fortified aata is available in their village at ration shop but they never purchased. Nearly 41 percent respondents who has consumed fortified aata/raj aata/packed aata (32) reported that aata is similar like other food stuff followed by change in taste (21.9 percent) and 15.6 percent reported that they want to use it again. Findings from control block depict that 38.7 percent of 93 respondents who had consumed fortified aata/raj aata/packed aata reported that fortified aata is similar like other food stuff followed by overall satisfied with aata (32.3 percent), change in taste (20.4 percent) and change in colour (13 percent). None of the respondent had the knowledge about fortification at chakki.

As far as findings from lactating women is concerned, data depicted in table 10 shows that only two respondents (one from intervention area and one from control area) reported that fortified aata is available at ration shop in their village but none of them purchased aata. Thirty one and 81 respondents who had consumed fortified aata/raj aata/packed aata were asked about the reaction after consuming the same. In intervention blocks, 32.3 percent found change in color followed by change in taste (29.0 percent) and similar like other food stuff (19.4 percent). In control block, 40.7 percent respondents were overall satisfied with the aata followed by similar like other food stuff (33.3 percent) and change in taste (22.2 percent). None of them have the knowledge about the flour fortification at chakki.

Table 12 shows findings from adolescent girls. Seven out of 9 in intervention area and 2 out of 4 from control area who have heard about fortified aata reported that fortified aata is available at ration shop in their village. Two and one respondents from intervention and control blocks respectively reported that they asked family members to buy fortified aata and they purchased the same. Only one respondent from control block reported regular purchase of fortified aata. As far as reaction of family members after consuming fortified aata is concerned, data from intervention blocks shows that both two respondents want to use it always followed by similar like other food stuff (1) and change in taste (1). However, in control block, respondent was overall satisfied with the aata.

Chapter 3

Knowledge, Attitude and Practice of Chakki Owner Regarding Food Fortification

The chapter deals with the background characteristics (such as age profile and educational qualification) of chakki owner residing in the study blocks (Salumber, Sarada and Jhadol) of Udaipur district of Rajasthan. Chapter presents the knowledge and awareness of the respondents regarding food fortification especially fortified atta, fortified food items, use of micronutrients and its health benefits etc. This study also addresses the practice regarding food fortification at chakki.



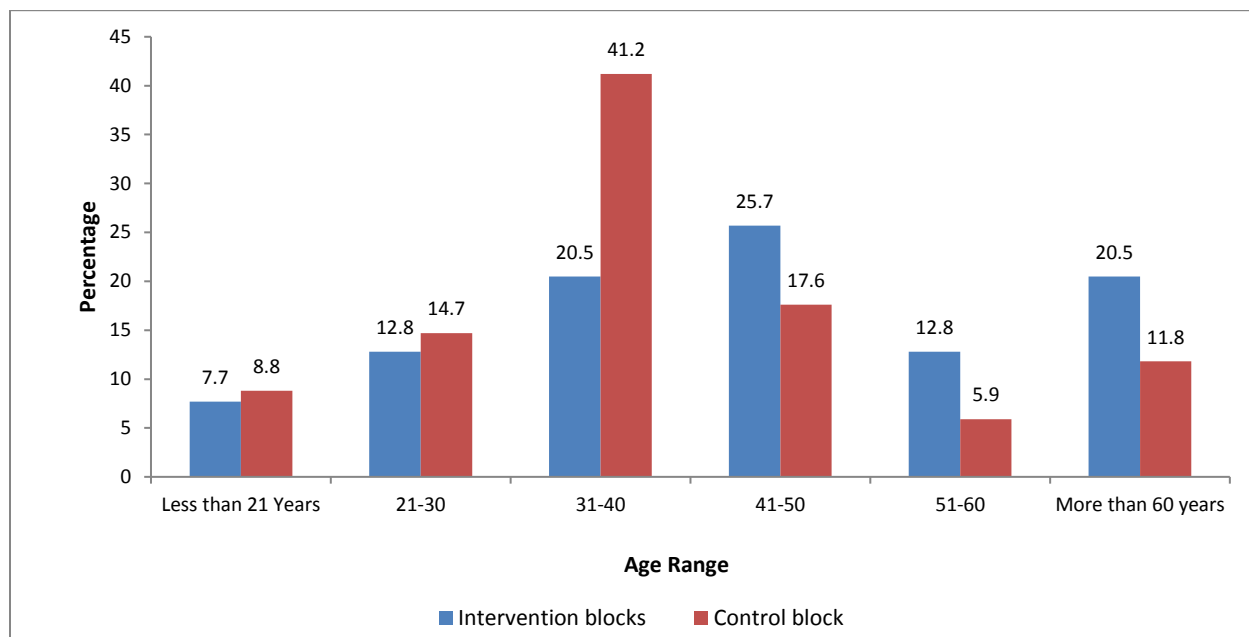
Atta Chakki at Udaipur District

3.1 Socio-demographic profile of Chakki Owners

Socio-demographic profiles of the respondents are depicted in table 13. Mean age of respondents was 45.1 and 38.5 years in intervention and control blocks respectively. In intervention blocks 25.6 percent of the respondents were in the age group of 41-50 years followed by 31-40 years (20.5

percent) whereas in control block 41.2 percent respondents were in the age group of 31-40 years followed by 41-50 years (17.6 percent). It was found that 28.2 percent respondents in intervention blocks were primary passed followed by middle (23.1 percent) whereas in control block 35.3 percent of the chakki owner were middle passed followed by Xth pass (23.5 percent). Data depict that 15.4 percent and 2.9 percent of the respondents in intervention and control blocks respectively were illiterate.

Figure 1: Percentage distribution of age among Chakki Owner



3.2 Awareness regarding fortified aata and its health benefits, fortified food items and micronutrients

Table 14 shows that awareness among the respondents regarding fortified aata was found to be low in both the study areas. Findings from intervention area shows that 8 out of 39 respondents heard about fortified aata. Six respondents out of eight spontaneously reported that they heard about fortified aata from from ration shop followed by newspaper (1) and anganwadi centers (1). However, findings from control area depict that 6 respondents out of 34 heard about fortified aata. Most of them reported that they get the information from ration shop (6) followed by posters/banners/pamphlets/hordings (1), interpersonal communication (1), meetings (1) and anganwadi centers (1). After probing, one respondent in intervention block identified anganwadi center as a source of information. Findings depict that 5 out of 8 respondents in intervention blocks and 4 out of 6 respondents in control block who have heard about fortified aata reported that they do not know the health benefits of fortified aata. In intervention blocks, fortified aata reduces anemia (1), reduce fatigue and physical weakness (1) and helpful in mental development (1) were identified spontaneously by the respondents. After probing, respondents reported that fortified aata

is beneficial for mother and child health (3) followed by reduce anemia (1), sharpen mind of children (1), healthy for eyes (1) and helpful in mental development (1). In control block, one of the respondent spontaneously reported that fortified aata is beneficial for mother and child health followed by reduce anemia (1) and reduce fatigue and physical weakness (1). After probing, one of the respondent also reported that fortified aata sharpens the mind of children.

Data were also collected from respondents (who heard about fortified aata) regarding food materials which are fortified and micro-nutrients mixed during the fortification process. In intervention area six respondents out of 8 spontaneously reported flour followed by pulses (1) and milk (1) and after probing edible oil (1) and salt (1) were also identified by the respondents. However, in control block, flour (5) and pulses (1) were spontaneously reported by the respondents. Salt (4) and milk (1) were also reported by the respondents after probing in control block. Four respondents, two from intervention blocks and two from control block spontaneously reported that iron is mixed during fortification of aata. After probing, folic acid (two from intervention blocks and one from control block) and vitamin B12 (two from intervention blocks and one from control block) were also reported.

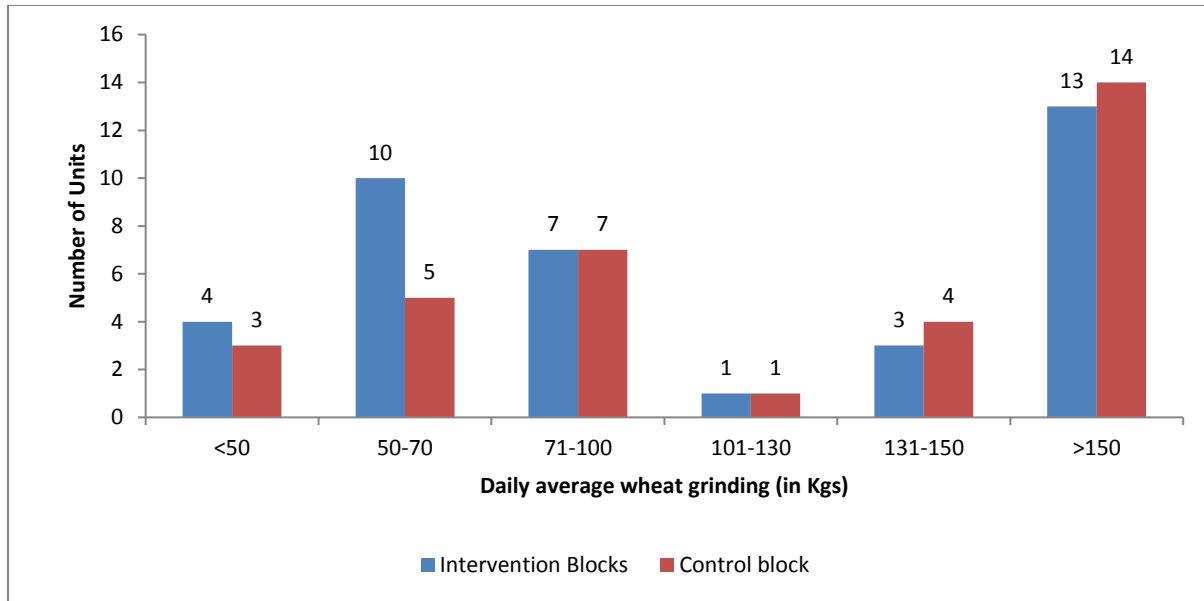
3.3 Practice of Fortification

As far as practicing food fortification at aata chakki is concerned, findings depict that 6 respondents from intervention blocks and 12 respondents from control block knew that wheat can be fortified at chakki but none of them fortify aata at chakki in both the study areas. In control block, one of the chakki owner reported that he got the training on food fortification from one of the local NGOs. He got the material for fortification two years back and did fortification but presently he is not getting the micronutrients from NGO, so not practicing now.

3.4 Work-Load

It was found that wheat and corn are usually consumed by the people in the survey area. Data were collected on daily average grinding at chakki and depicted in table 15.

Figure 2: Daily Average Wheat Grinding (in Kgs)



Findings from intervention area depict that 13 respondents out of 39 reported that they grind more than 150 kgs wheat in a day followed by 50-70 kgs (10) and 71-100 kgs (7). Findings from control area shows that 14 out of 34 respondents reported that on an average they grind wheat more than 150 kgs per day followed by 71-100 kgs (7) and 50-70 kgs (5). As far as grinding of other food material is concerned, data shows that 24 chakki owners grind less than 50 kg followed by 50-70 kgs (6) and more than 150 kgs (4). However, in control block, 11 respondents grind less than 50 kgs followed by more than 150 kgs (9) and 71-100 kgs (7).

Chapter 4

Anthropometric Indicators

4.1 Impact Indicators: Underweight, stunting and wasting

The nutritional status of children was calculated using age, sex, weight and height. The index was calculated according to the standard deviation classification. Children who are more than 2SD below the reference median are considered to be malnourished (i.e. $<-2SD$) and children who fall more than 3 SD below the reference median are considered to be severely malnourished (i.e. $<-3SD$).

Weight measurement by the investigator



4.1.1 Underweight

Figure 3: Percentage of Underweight Children

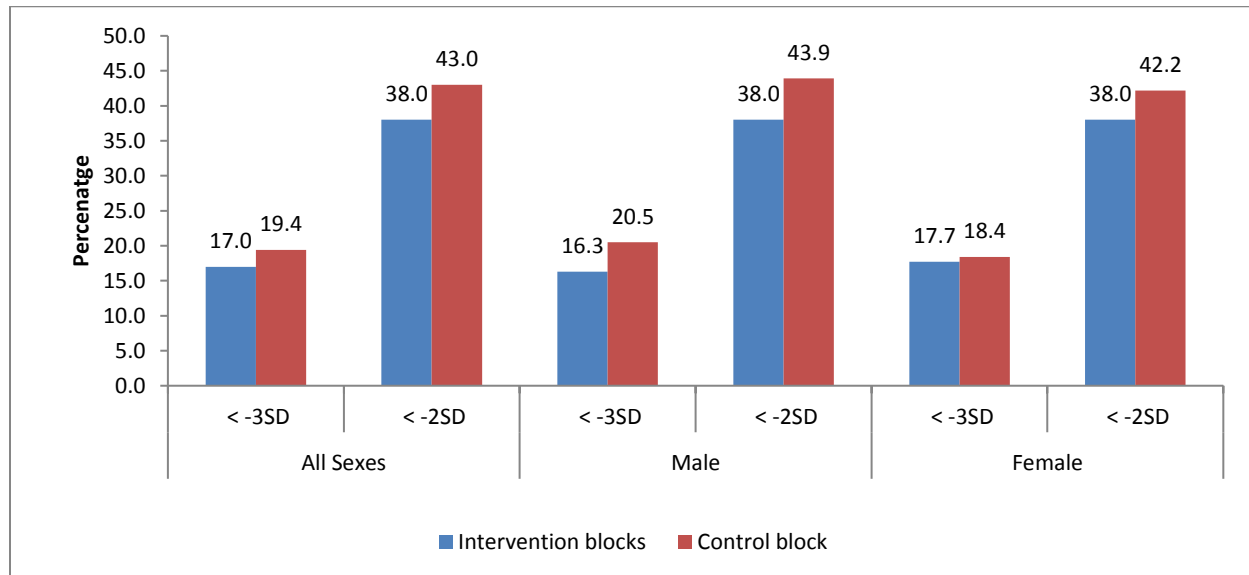


Figure 3 shows that 17.0 and 19.4 percent of the children were severely underweight in intervention and control blocks respectively. Data depict that 17.7 and 18.4 percent females were severely underweight in intervention and control blocks respectively whereas 16.3 percent males in intervention blocks and 20.5 percent males in control block were severely underweight. Age wise distribution of percentage of children is depicted in table 16. Findings depict that percentage of severely underweight children, increases with age and found to be highest among children aged 36-47 months.

4.1.2 Stunting

Figure 4: Percentage of Stunted Children

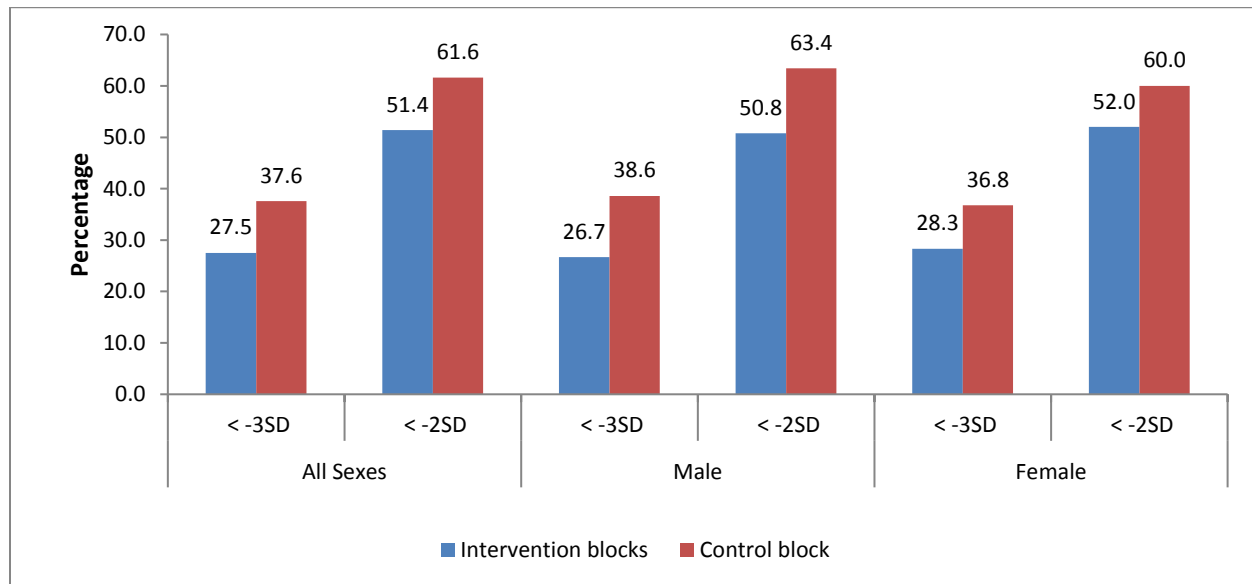


Figure 4 shows the percentage of stunting among children under-five years. Findings depict that 27.5 and 37.6 percent of children are severely stunted in intervention and control blocks respectively. There is a huge variation among the percentage of stunted female and male. It is clear from the table 17 that 26.7 percent males and 28.3 percent females are severely stunted in intervention blocks whereas in control block 38.6 percent males and 36.8 percent females were severely stunted. Highest percentage of stunted children were found in the age group of 24-35 years. Findings also reveal that the percentage of severely stunted children increases with age.

4.1.3 Wasting

Figure 5: Percentage of Wasted Children

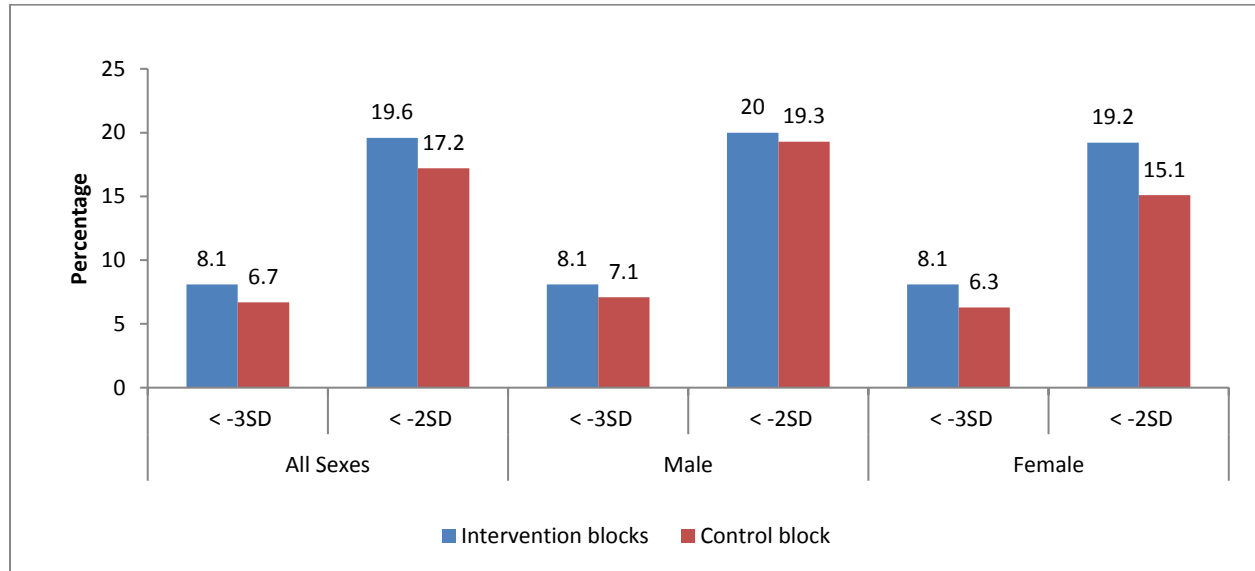


Figure 5 shows the percentage of wasted children in intervention and control areas. Findings shows that 8.1 and 6.7 percent of the children were severely wasted in intervention and control blocks respectively. Data depict that 8.1 percent males and 8.1 percent females in intervention area were severely wasted. However, 7.1 percent males and 6.3 percent females in control block were wasted. Table 18 shows the age wise percentage distribution of wasted children. Finding shows that wasting increases with the age and found to be highest among the children in the age group of 48-60 months.

Chapter 5

Summary, Conclusion and Recommendations

The baseline assessment was done to assess the present knowledge among rural families (including general population, pregnant women, lactating women, under 5 year children and adolescent girls) on food fortification and their attitude and behavior towards regular use of fortified aata for family members; to assess the fortification of atta done at small chakki in the villages of the flour produced from wheat brought by families for grinding; to assess the anemia status among pregnant women, lactating mother, under 5 children, adolescent girls and selected general population and to assess the nutritional status of under 5 year children using age for weight measures, age for height and height for weight.

5.1 Major findings from community

- Most of the respondents (36.2 percent in intervention area and 37.4 percent in control area) lie in the age group of 20-25 years.
- Forty eight and 58 percent of the respondents in intervention and control block respectively were illiterate.
- More than half of the respondents (54.4 percent in intervention blocks and 54.6 percent in control block) lived in nuclear family in both the study areas.
- In intervention blocks, 88.4 percent of the respondents and 87.3 percent respondents in control block had ration card.
- Wheat, kerosene oil and sugar were identified by the respondents as consumer goods available at ration shop in both the survey areas.
- Most of the respondents (60-70 percent in intervention blocks and 80-90 percent in control area) reported that they get wheat from ration shop and almost all (98-99 percent) purchase it every month.
- None of them fortify aata at chakki.
- Only 8.7 percent respondents (i.e. general population, pregnant women and lactating women) in intervention blocks and 24.0 percent respondents in control block purchased aata from ration shop but do not purchase regularly. They grind wheat to fulfil their requirement as the aata was not sufficient for the family members.
- Only 19 out of 2856 respondents (i.e. general population, pregnant women and lactating women) reported that have heard about fortified aata.
- In intervention blocks, newspaper (3) followed by family members/relatives/friends (1) and ration shop (1) whereas in control block ration shop (5) followed by newspaper (1) and flour packet (1) was identified as the source of information regarding fortified aata.

- Only 4 respondents out of 9 who have heard about fortified aata in intervention blocks and 7 out of 10 respondents in control block do not know or did not responded on health benefits of fortified aata.
- Six out of nine respondents who have heard about fortified aata in intervention blocks and 6 out of 10 respondents in control block reported that flour can be fortified.
- As far reaction of family members after consuming fortified aata/raj aata/packed aata is concerned, findings depict that in intervention block 49 respondents out of 129 who had consumed fortified aata/raj aata/packed aata reported change in taste followed by similar like other food stuff (42). However in control block 127 respondents out of 329 were overall satisfied with the aata followed by similar like other food stuff (117).

5.2 Major findings from chakki owner

- Findings from chakki owner shows that mean age of respondents was 45.1 and 38.5 years in intervention and control block respectively.
- Only 15.4 percent and 2.9 percent of the respondents in intervention and control blocks were illiterate.
- Eight and six respondents in intervention and control blocks respectively reported that they heard about fortified aata. Mostly get the information from ration shop (six respondents from intervention blocks and 6 respondents from control block) followed by anganwadi center and newspaper.
- Most of them (62.5 and 66.7 percent of the respondents in intervention and control blocks respectively) do not know the health benefits of fortified aata.
- Flour was identified as the consumer goods which can be fortified by six and five respondents in intervention and control blocks.
- Awareness regarding micronutrients mixed during the process of fortification was found to be low as 75 and 66.7 percent of the respondents in intervention and control blocks did not responded.
- None of them fortify aata at chakki in intervention area. One of the chakki owner in control block reported that he got the training from one of the local NGO and got the material for the fortification. He did fortification two year back but not practicing presently as not getting material now.
- Findings on daily average grinding at chakki shows that most of the respondents grind more than 150 kgs wheat in a day (33.3 percent respondents in intervention blocks and 41.2 percent respondents in control block).

5.3 Anthropometric Indicators

- Prevalence of malnutrition among children was found to be high in both intervention and control block. Seventeen and 19.4 percent of the children were severely underweight; 27.5

percent and 37.6 percent were severely stunted and 8.1 percent and 6.7 percent were severely wasted in intervention and control block respectively.

Overall findings depict that the awareness among the community members regarding fortification (such as fortified food items, health benefits of fortification, micro-nutrients mixed during the process of fortification etc) was found to be low in both the study areas. None of the chakki owner was practicing fortification at chakki.

5.4 Recommendation

Based on the findings, several recommendations has been suggested:

- IEC activities should be done to enhance the knowledge of community members regarding fortification
- BCC activities such as street plays should be organized to display the usefulness of fortified aata and its health benefits
- Chakki owner should get the training on fortification. So that, community members who grind wheat at the chakki can get fortified aata
- ASHA/PRI members should be involved during IEC/BCC.

ANNEXURES

Annexure 1

Study Tools

**Use of Fortified Atta by Community using Small Chakki for Flour
Fortification in Tribal Blocks of Udaipur District**
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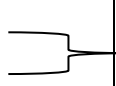
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	funsZ'k & igys mÜkjnrk dks LoSfPNd :i Is crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lquk;sa fQj xksyk djsaA	tPpk cPpk ds LokLFk ds fy, yk"nk;d ----- ----- [kwu dh deh dks nwj djrk gS ----- 'kkjhfd detksjh o Fkdku dks nwj djrk gS ----- ----- cPpkSa dk fnekx rst djrk gS -- ----- vkW[kksa dks LoLFk j[krk gS - ----- ekufld fodkl es lgk;d ----- ---- irk ugha ----- ----- vU; ¼Li"V djsa½ ----- -----	a b c d e f g 99	a b c d e f g 99	

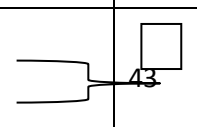
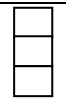
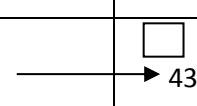
22.	<p>dkSu& dkSu ls [kk inkFkZ QksfVZQkbM gSa\ ¼cgqmÙkj laHko½</p> <p>funsZ'k & igys mÙkjnrkrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lquk;sa fQj xksyk djsaA</p>	<p>vkVk ----- ----- rsy ----- ----- nw/k ----- ----- nky ----- ----- ued ----- ----- irk ughaa ----- ----- vU; ¼Li"V djsa½ ----- -----</p>	<p>LoSPNk ls crk;s gq, ij xksyk djsa</p> <p>a b c d e f 99</p>	<p>iwN dj crk;s x;s ij xksyk djsa</p> <p>a b c d e f 99</p>	
23.	<p>QksfVZQkbM vkVs esa dkSu&dkSu ls iks"kd rRoksa (ekWbØks U;wVªh;sUV) dks feyk;k tkrk gSa\ ¼cgqmÙkj laHko½</p> <p>funsZ'k & igys mÙkjnrkrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lquk;sa fQj xksyk djsaA</p>	<p>vkW;ju ----- ----- QkWfyd ,fIM ----- ----- foVkfue&ch 12 ----- ----- irk ugha ----- ----- vU; ¼Li"V djsa½ ----- -----</p>	<p>LoSPNk ls crk;s gq, ij xksyk djsa</p> <p>a b c d 99</p>	<p>iwN dj crk;s x;s ij xksyk djsa</p> <p>A b c d 99</p>	
24.	<p>D;k QksfVZQkbM vkVk vkids xkWo ;k vklikl esa feyrk gSa\ ----- ----- ----- -----</p>	<p>gkj ----- ----- ----- ----- irk ugh ----- -----</p>		<p>1 2 3</p> 	<p><input type="checkbox"/></p> <p>28</p>

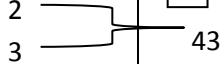
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25.	D;k vkus d" h vius ?kj okyks dks QksfVZQkbM vkVk [kjhnus ds fy, dgk gS\ 	gki ----- ----- ugha ----- -----	1 2 →	<input type="checkbox"/> 28
26.	;fn gki rks D;k QksfVZQkbM vkVk [kjhnk x;k Fkk\ 	gki ----- ----- ugha ----- ----- irk ugh----- -----	1 2 } 3 }	<input type="checkbox"/> 28
27.	;fn gki rks dc&dc QksfVZQkbM vkVk [kjhnrs gS\ 	ges'kk [kjhnrs gSa ----- ----- d" h & d" h [kjhnrs gSa ----- ----- tc miyC/k gksrk gS rc [kjhnrs gSa----- ----- eqf' dy ls [kjhnrs gSa ----- ----- ,d gh ckj [kjhnk gS----- ----- irk ugh----- -----vU; ¼Li"V djsa½ ----- -----	1 2 3 4 5 6 99	<input type="checkbox"/>
28.	QksfVZQkbM vkVs ls cus [kkus dks ysdj vkids @ifjokj ds lnL;ksa dh lkekU;r% D;k izfrfØ;k Fkh\ ¼cgqmÙkj laHko½	vU; [kkus ds leku gh yxk----- ----- [kkus ds jax esa ifjorZu vkuk ----- ----- [kkus ds Lokn esa cnyko ----- ----- [kkus ls larq"V gSa ----- ----- [kkuk ilan ugh vk;k----- -----	a b c d e f g h 99	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

		ges'kk [kkuk ilan djrs gSa ----- ----- nqckjk [kkuk ilan ugh djrs gSa----- ----- v'h rd QksfVZQkbM vkVs dk bLrseky ugh fd;k ----- vU; ¼Li"V djsa½ ----- -----		
29.	D;k vki tkurs gSa vkVs dks pDdh ij QksfVZQkbM fd;k tk ldrk gS\	gki ----- ----- ugha ----- ----- irk ugha ----- -----	1 2 3	<input type="checkbox"/>
30.	D;k d'h pDdh okys us vkils vkVs dks pDdh ij QksfVZQkbM djus ds fy, iwNk\	gki ----- ----- ugha ----- -----	1 2 → 33	<input type="checkbox"/>
31.	D;k vkus xsgwW dks QksfVZQkbM djds filok;k\	gki ----- ----- ugha ----- -----	1 2 → 33	<input type="checkbox"/>
32.	;fn gkW] rks D;k vkidks xsgwW dks QksfVZQkbM dj filokus ds fy, igys ls T;knk filkbZ nsuh iM+hs\	gki ----- ----- ugha ----- ----- irk ugha ----- -----	1 2 3	<input type="checkbox"/>
"kx c% 11 ls 19 o"kZ rd fd fd'kksj ckfydkvksa ds fy,				
vc eSa vkidh ckfydk ls QksfVZQkbM vkVs ds ckjs esa ckr djuk pkgwWxh@pkgwWxkA				

33.	vkidk 'kSdf{kD Lrj D;k gSa\	v'kf{kr ----- ----- f'kf{kr ¼i<+uk@fy[kuk½----- ----- izkFkfed ----- ----- ek/;fed ----- ----- nloha ¼10oha rd½ ----- ----- mPp ek/;fed ¼12oha rd½ ----- ----- Lukrd ----- ----- vU; ¼Li"V djsa½ ----- -----	1 2 3 4 5 6 7 99	<input type="checkbox"/>	
34.	D;k vkus QksfVZQkbM vkVs ds ckjs esa lqk gSa\	gki ----- ----- ugha ----- -----	1 2 → 44	<input type="checkbox"/>	
35.	;fn gki rks ;g tkudkj vkidks dgki ls feyh\ ¼cgqmÙkj laHko½ funsZ'k & igys mÙkjnrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lqk;sa fQj xksyk djsaA	jsfM;ks ----- -----Vsfyotu ls ----- -----lekpkj i=ksa ls----- -----Ldwy ls----- -----LokLFk dk;ZdrkZ----- ----- ,e-lh-,p-,u-fnol----- ----- vkilh okrkyki----- ----- ih vkj vkbZ odZ'kkWi ----- ----- esyk ----- ----- vkWxauokMh -----	LoSfPNd ls crk;s gq, ij xksyk djsa a b c d e f g h i j k l m n 99	iwN dj xksyk djsa a b c d e f g h i j k l m n 99	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

		-----iksLVj ls@iEiysV~l@gksfMZax@csuj -- fj'rsnkj@iM+kslh@fe= ls ----- ----- uqDdM+ ukVd ----- ----- cSBd----- ----- -----vU; ¼Li"V djsa½----- -----			
36.	QksfVZQkbM vkVsds D;k& D;k LokLFk yk" gS\ ¼cgqmÙkj laHko½		LoSfPNd ls crk;s gq, ij xksyk djsa	iwN dj xksyk djsa	
	funsZ'k & igys mÙkjnrkrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lqk;sa fQj xksyk djsaA	tPpk cPpk ds LokLFk esa yk"nk;d -- [kwu dh deh dks nwj djrk gS - ----- 'kkjhfd detksjh o Fkdku dks nwj djrk gS ----- ----- cPpkSa dk fnekx rst djrk gS ---- ----- vkW[kksa dks LoLFk j[krk gS -- ----- ekufld fodkl es lgk;d ----- ---- irk ugha ----- ----- vU; ¼Li"V djsa½ ----- -----	a b c d e f g 99	a b c d e f g 99	
37.	dkSu& dkSu ls [kk] inkFkZ QksfVZQkbM gSa\ ¼cgqmÙkj laHko½		LoSfPNd ls crk;s gq, ij xksyk djsa	iwN dj xksyk djsa	
	funsZ'k & igys mÙkjnrkrk dks LoSfPNd :i ls crkus ns vxj dksbZ	vkVk ----- ----- rsy ----- -----	a b c d e f	a b c d e f	

	fodYi ckfd jgrk gS rks mls fodYi i<dj lquk;sa fQj xksyk djsaA	nw/k----- ----- nky ----- ----- ued ----- ----- irk ugha ----- ----- vU; ¼Li"V djsa½----- -----	99	99	
38.	QksfVZQkbM vkVs esa dkSu & dkSu ls iks"kd rRoksa (ekWbØks U;wVªh;sUV) dks feyk;k tkrk gSa\ ¼cgqmÙkj laHko½		LoSfPNd ls crk;s gq, ij xksyk djsa	iwN dj xksyk djsa	
	funsZ'k & igys mÙkjnrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS rks mls fodYi i<dj lquk;sa fQj xksyk djsaA	vkW;ju ----- ----- QkWfyd ,fIM----- ----- foVkfue&ch 12 ----- ----- irk ugh ----- ----- vU; ¼Li"V djsa½ ----- -----	a b c d 99	a b c d 99	
39.	D;k QksfVZQkbM vkVv vkids xkWo esa ;k vklikl esa feyrk gSa\ ¼cgqmÙkj laHko½	gki ----- ----- ugh ----- -----irk ugh - ----- -----		1 2 3	
39.A	;fn gki rks dgkW feyrk gSa\ ¼cgqmÙkj laHko½	jk'ku dh nqdku esa ----- ----- fdjkus dh nqdku esa ----- ----- vU; ¼Li"V djsa½ ----- -----		a b 99	
40.	D;k vkus d"h vius ?kj okyks dks QksfVZQkbM vkVv [kjhnus ds fy, dgk gS\ ¼cgqmÙkj laHko½	gki ----- ----- ugh ----- -----		1 2	

41.	;fn gki rks D;k QksfVZQkbM vkVk [kjhmk x;k Fkk\	gki ----- ----- ----- ugha ----- ----- ----- irk ugha----- -----	1 2 3	<input type="checkbox"/> 
42.	;fn gki rks dc&dc QksfVZQkbM vkVk [kjhnrS gS\	ges'kk [kjhnrS gSa ----- ----- ----- d'h & d'h [kjhnrS gSa ----- ----- ----- tc miyC/k gksrk gS rc [kjhnrS gSa----- ----- ----- eqf'dy ls [kjhnrS gSa ----- ----- ----- ,d gh ckj [kjhmk gS----- ----- ----- irk ugha----- ----- ----- vU; ¼Li"V djsa½ ----- ----- -----	1 2 3 4 5 6 99	<input type="checkbox"/>
43.	QksfVZQkbM vkVs ls cus[kkus dks [kkus ds i'pkr~ vkidh D;k izfrfØ;k Fkh\ ¼cgqmÙkj laHko½	vU; [kkus ds leku gh yxk----- ----- ----- [kkus ds jax esa ifjorZu vkuk ----- ----- ----- [kkus ds Lokn esa cnyko ----- ----- ----- [kkus ls larq"V gSa ----- ----- ----- [kkuk ilan ugh vk;k----- ----- ----- ges'kk [kkuk ilan djrs gSa ----- ----- ----- nqckjk [kkuk ilan ugh djrs gSa----- ----- ----- v'h rd QksfVZQkbM vkVs dk bLrseky ugh fd;k ----- ----- vU; ¼Li"V djsa½ ----- ----- -----	a b c d e f g h 99	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

"kx l% 5 o"kZ ls de mez dk cPpks ds fy,						
vc eSa 5 o"kZ ls de mez ds cPpksa dk out rFkk yEckbZ ekiuk pkgwWxkA						
44.		1st	2nd	3rd	4th	5th
cPpsa dk uke						
fyax		yM+dk ----- ----- 1 yM+dh ----- ----- 2	yM+dk ----- ----- 1 yM+dh ----- ----- 2	yM+dk ----- ----- 1 yM+dh ----- ----- 2	yM+dk ----- ----- 1 yM+dh ----- ----- 2	yM+dk ----- ----- 1 yM+dh ----- ----- 2
mez (iw.kZ efguksa esa)						
otu (fdyksxzke esa)						
yEckbZ (lsUVhehVj esa)						

mÜkjnrk dks /kU;okn nsA

xksih;
dsoy 'kks/k ds fy,

Use of Fortified Atta by community using Small Chakki for flour fortification in tribal blocks of Udaipur District
mn;iqj ftys ds vkfnoklh CykWdksa esa leqnk; }kjk NksVh pDdh ls rS;kj
QksfVZQkbM vkVs ds mi;ksx ds ckjs esa tkudkj

(pDdhekyd ds fy, lk{kkRdkjvuqlwph)

Øe la[;k		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>							
lk{kkRdkj dk fnukad ¼fnu@ekg@o"kZ½		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px; text-align: center;">d</td> <td style="width: 20px; height: 20px; text-align: center;">d</td> <td style="width: 20px; height: 20px; text-align: center;">m</td> <td style="width: 20px; height: 20px; text-align: center;">m</td> <td style="width: 20px; height: 20px; text-align: center;">y</td> <td style="width: 20px; height: 20px; text-align: center;">y</td> </tr> </table>		d	d	m	m	y	y
d	d	m	m	y	y				
Ø-la-		igpku	dksM						
v-	ftyk	mn;iqj							
c-	CykWd dk uke	1- lywEcj----- ----- 2- ljkM+k----- ----- 3- >kMksy----- -----	1 2 <input style="width: 20px; height: 20px;" type="checkbox"/> 3						
l-	xkao dk uke	uke ----- -----	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						
n-	lk{kkRdkjdrk Zdk uke	uke ----- -----							
j-	mÙkjnrk (pDdhekyd) dk uke	uke ----- -----							
y-	mÙkjnrk (pDdhekyd) ds ifr@firk dk uke	uke ----- -----							

		vkWxauokMh ----- ----- iksLVjls@iEiysV~l@gksfMZax @csuj-- fj'rsnkj@iM+kslh@fe= ls ----- ----- uqDdM+ ukVd ----- -----cSBd----- ----- -----vU; ¼Li"V djsa½----- -----			
49.	;fn lwpuk dk ek;/e ehfVax rFkk uqDdM+ ukVd gks rks iwNs afd ;s xkWo esa fiNys ,d o"kZ esa fdruh ckj vk;kstu gq,s agSa\ (vxLr 2011 ls tqykbZ 2012)	Activity xfrfof/k;kj 1- ehfVax----- ----- 2- uqDdM+ ukVd----- -----		<input type="text"/> <input type="text"/>	
50.	QksfVZQkbM vkVs ds D;k&D;k LokLFk yk" gS\ ¼cgqmÜkj laHko½	tPpkcPpk ds LokLFk ds fy, yk"nk;d----- ----- [kwu dh deh dks nwj djrk gS-- ----- 'kkjhfd detksjh o Fkdku dks nwj djrk gS----- ----- cPpkSa dk fneKx rst djrk gS---- ----- vkW[kksa dks LoLFk j[krk gS-- ----- ekufld fodkl es lgk;d----- ---- irk ugha ----- ----- vU; ¼Li"V djsa½ ----- -----	LoSPNk ls crk;s gq, fodYiksa ij xksyk djsa	iwN dj crk;s x;s fodYiksa ij xksyk djsa	
	funsZ'k& igys mÜkjnrk dks LoSfPNd :i ls crkus ns vxj dksbZ fodYi ckfd jgrk gS] rksmls fodYi i<dj lquk;sa fQj xksyk djsaA		a b c d e f g 99	a b c d e f g 99	

51.	dkSuls [kk] inkFkZ QksVhZQkbM gSa\ ¼cgqmÙkj laHko½	<p>vkVk----- -----</p> <p>rsy----- -----</p> <p>nw/k----- -----</p> <p>nky----- -----</p> <p>ued----- -----</p> <p>irk ugha----- -----</p> <p>vU; ¼Li"V djsa½ ----- -----</p>	LoSPNk ls crk;s gq, fodYiksa ij xksyk djsa	iwN dj crk;s x;s fodYiksa ij xksyk djsa	
52.	QksVhZQkbM vkVs esa dkSu&dkSu ls iks"kdrRoksa (ekWbØksU;wVªh;sUV) dks feyk;k tkrk gSa\ ¼cgqmÙkj laHko½	<p>vkW;ju----- -----</p> <p>QkWfyd ,flM----- -----</p> <p>foVkfue&ch 12 ----- -----</p> <p>irk ugha----- -----</p> <p>vU; ¼Li"V djsa½ ----- -----</p>	LoSPNk ls crk;s gq, fodYiksa ij xksyk djsa	iwN dj crk;s x;s fodYiksa ij xksyk djsa	
53.	D;k vki tkurs gSa vkVs dks pDdh ij QksfVZQkbM fd;k tk ldrk gS\ -----	<p>gki ----- -----</p> <p>ugh----- -----</p> <p>irk ugh----- -----</p>	1 2 3	<input type="checkbox"/> 14	

54.	D;k vki vkVs dks QksfVZQkbM djrs gSa\	gki ----- ----- ----- ugha----- -----	1 2	<input type="checkbox"/> 13→
55.	;fn gkW] D;k vki xkWo okyks dks crkrs gS fd vkVs dks pDdh ij "h QksVhZQkbM fd;k tkrk gS\	gki ----- ----- ----- ugha----- -----	1 2	<input type="checkbox"/>
56.	vki dc & dc vkVs dks QksVhZQkb djrs gSa\	ges'kk djrs gSa ----- ----- d"h&d"h djrs gSa----- ----- eqf' dy ls djrs gSa----- ----- dksbZ tokc ugha----- -----	1 2 3 4	<input type="checkbox"/> 14→
57.	;fn ugh]rks dkj.k crk;sa\ ¼cgqmÜkj laHko½	QksfVZQhds'ku ds fy, lkexzh ugha feyrh gS----- ----- yksx ilUn ugh djrs gSa----- ----- yk"dkjh ugh gS ----- ----- vU; ¼Li"V djsa½----- -----	a b c 99	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
58.	vki ,d fnu esa vkSlru fdruk fdyksxzke xsgwW@vU; [kk]ku filrs gSa\	xsgwW fdyks- ----- ----- vU; [kk]ku fdyks- ----- -----		
59.	;fn pDdh ij xsgwW dks QksfVZQkbM dj ds filok;k tk;s rks D;k ihlkbZ ds igys ls T;knk iSlS nsus gkasxs\	gki ----- ----- ----- ugha ----- -----	1 2	<input type="checkbox"/>

Annexure 2

Study Findings

Table 4: Socio-demographic Profile of Respondents

Parameter	Intervention Blocks		Control Block	
	N=1488	Percentage	N=1368	Percentage
Age				
Less than 20 yrs	77	5.2	78	5.7
20-25	538	36.2	508	37.4
26-30	385	25.9	385	28.4
31-35	201	13.5	162	11.9
36-40	130	8.7	119	8.8
More than 40 yrs	157	10.6	116	8.5
Mean age	29.7		28.9	
Educational Qualification	N=1488	Percentage	N=1368	Percentage
Illiterate	722	48.5	792	58.3
Literate (read/write)	160	10.8	214	15.8
Primary	261	17.6	163	12.0
Matriculation	195	13.1	111	8.2
10th	68	4.6	42	3.1
12th	52	3.5	29	2.1
Graduate	23	1.5	13	1.0
Postgraduate	7	0.5	4	0.3
Type of Family	N=1488	Percentage	N=1368	Percentage
Nuclear Family	809	54.4	741	54.6
Joint Family	649	43.6	627	46.2
Availability of ration card	N=1488	Percentage	N=1368	Percentage
Yes	1315	88.4	1186	87.3
No	172	11.6	182	13.4
Type of ration card	N=1315	Percentage	N=1186	Percentage
APL	437	33.2	196	16.5
BPL	821	62.4	845	71.2
Antoday	37	2.8	130	11.0
State BPL	13	1.0	14	1.2
Don't Know	7	0.5	1	0.1
Number of family members registered in ration card	N=1315	Percentage	N=1186	Percentage
<3	66	5.0	28	2.4
3-6	891	67.8	811	68.4
7-9	304	23.1	296	25.0
10-13	39	3.0	37	3.1
>13	9	0.7	14	1.2

Don't know	6	0.5	0	0.0
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Table 5: Awareness among General Population regarding Consumer Goods provided by Ration Shop

Description	Intervention Blocks		Control Block	
	N=780	Percentage	N=630	Percentage
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Spontaneous)				
Fortified Aata	1	0.1	2	0.3
Wheat	671	86.0	605	96.0
Rice	14	1.8	6	1.0
Edible Oil	11	1.4	3	0.5
Kerosene Oil	683	87.6	602	95.6
Salt	28	3.6	37	5.9
Sugar	374	47.9	422	67.0
Soap	6	0.8	1	0.2
Packed Aata	35	4.5	72	11.4
Raj Aata	7	0.9	0	0.0
Tea	96	12.3	32	5.1
Don't know	10	1.3	3	0.5
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Probed)	N=780		N=630	
Fortified Aata	2	0.2	2	0.3
Wheat	64	8.2	19	3.0
Rice	30	3.8	11	1.7
Pulses	4	0.5	0	0.0
Edible Oil	8	1.0	1	0.2
Kerosene Oil	58	7.4	19	3.0
Salt	184	23.6	242	38.4
Sugar	233	29.9	176	27.9
Soap	39	5.0	25	4.0
Packed Aata	53	6.8	189	30.0
Raj Aata	5	0.6	0	0.0
Tea	54	6.9	72	11.4
Matchbox	2	0.3	0	0.0
Don't know	168	21.5	71	11.3
*Purchase from ration shop	N=693		N=556	
Wheat	440	63.5	449	80.8
Fortified Aata	1	0.1	0	0.0
Packed Aata	65	9.4	154	27.7
Raj Aata	0	0.0	1	0.2
None of the above	245	35.4	102	18.3
Wheat purchasing frequency	N=440		N=449	

Every month	433	98.4	447	99.6
Once in two months	3	0.7	2	0.4
Once in three months	2	0.5	0	0.0
Don't not purchase	1	0.1	0	0.0
Don't know	1	0.1	0	0.0
*If do not purchase wheat every month, reason for it	N=6		N=2	
Shop do not open every month	2	33.3	2	100.0
Use other food grain also	2	33.3	0	0.0
Other (no need & supply problem)	2	33.3	0	0.0
Quantity of wheat received (in kgs)	N=440		N=449	
<25	64	14.5	103	22.9
25	296	67.3	235	52.3
26-34	3	0.7	4	0.9
35	76	17.3	102	22.7
>35	1	0.2	5	1.1
Fortify wheat at chakki	N=440		N=449	
Yes	0	0.0	0	0.0
No	375	85.2	427	95.1
Don't know	65	14.8	22	4.9
Flour purchasing frequency from ration shop	N=66		N=155	
Every month	9	13.6	1	0.6
Once in two months	3	4.5	0	0.0
2 months before	4	6.1	26	16.8
3 months before	8	12.1	16	10.3
4 months before	10	15.2	43	27.7
More than 4 months before	32	48.5	69	44.5
*Reason of non purchasing flour from ration shop every month	N=57		N=154	
Taste is not good	0	0.0	3	1.9
Quickly get worse	2	3.5	0	0.0
Do not get now	46	80.7	153	99.4
Don't know	9	15.8	2	1.3
Flour purchased from ration shop, sufficient for family need for a month	N=66		N=155	
Yes	2	3.2	1	0.6
No	64	96.8	154	99.3
*Alternative to fulfill the requirement of family need	N=64		N=154	
Grind wheat	64	100.0	154	100.0
Grind Jawar/Bajra and other grains	1	1.6	5	3.4
Purchase aata from retail shops	4	6.2	0	0.0

**Multiple Responses*

Table 6: Awareness among General Population regarding Consumer Goods provided by Ration Shop

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
Heard of fortified aata	N=780		N=630	
Yes	6	0.8	8	1.3
No	774	99.2	622	98.7
*Source of information about food fortification (Spontaneous)	N=6		N=8	
Television	1	16.7	2	25.0
News paper	3	50.0	3	37.5
Fair	1	16.7	0	0.0
Family Member/Relative/ Friends	1	16.7	1	12.5
Ration shop	0	0.0	5	62.5
*Source of information about food fortification (Probed)	N=6		N=8	
Television	0	0.0	1	12.5
Poster/ Pamphlets/Hording/Banner	1	16.7	1	12.5
No response	5	83.3	5	62.5
*Health benefits of fortified Aata (Spontaneous)	N=6		N=8	
Helpful in mother and new born child Healthcare	0	0.0	2	25.0
Reduce Anaemia	1	16.7	1	12.5
Reduce fatigue and physical weakness	1	16.7	1	12.5
Sharpen mind of children	1	16.7	1	12.5
Healthy for eyes	0	0.0	1	12.5
Helpful in mental development	2	33.3	0	0.0
Don't know	3	50.0	5	62.5
*Health benefits of fortified Aata (Probed)	N=6		N=8	
Helpful in mother and new born child Healthcare	2	33.3	0	0.0
Reduce Anaemia	1	16.7	2	25.0
Reduce fatigue and physical weakness	1	16.7	2	25.0
Sharpen mind of children	2	33.3	1	12.5
Healthy for eyes	1	16.7	1	12.5
Helpful in mental development	0	0.0	1	12.5
Don't know	1	0.0	1	12.5
*Fortified food items (Spontaneous)	N=6		N=8	
Flour	4	66.7	4	50.0
Milk	0	0.0	1	12.5

Salt	0	0.0	1	12.5
Don't know	2	33.3	2	25.0
*Fortified food items (Probed)	N=6		N=8	
Flour	2	33.3	4	50.0
Edible Oil	1	16.7	0	0.0
Salt	0	0.0	1	12.5
Don't know	4	66.7	6	75.0
*Micro nutrients mixed in fortified aata (Spontaneous)	N=6		N=8	
Iron	1	16.7	1	12.5
Folic acid	1	16.7	1	12.5
Vitamin – B 12	1	16.7	0	0.0
Don't know	5	83.3	7	87.5
*Micro nutrients mixed in fortified aata (Probed)	N=6		N=8	
Iron	0	0.0	0	0.0
Folic acid	1	16.7	0	0.0
Vitamin – B12	0	0.0	1	12.5
Don't know	5	83.3	7	87.5
Availability of fortified aata in the village	N=6		N=8	
Yes	3	50.0	4	50.0
No	3	50.0	2	25.0
Don't know	0	0.0	2	25.0
*Place where fortified aata is available	N=3		N=4	
Ration Shop	3	100.0	4	100.0
Retail shop	0	0.0	0	0.0
Asked family members to buy fortified aata	N=3		N=4	
Yes	2	66.7	2	50.0
No	1	33.3	2	50.0
If yes, fortified aata purchased	N=2		N=2	
Yes	2	100.0	2	100.0
No	0	0.0	0	0.0
Don't know	0	0.0	0	0.0
If yes, frequency of fortified Aata purchase	N=2		N=2	
Sometimes	1	50.0	2	100.0
When available	1	50.0	0	0.0
*Reaction of family members after consuming fortified aata	N=66		N=155	
Similar like other food stuff	23	32.9	54	34.8
Change in color	9	12.9	22	14.2
Change in taste	33	47.1	48	31.0
Overall satisfied	6	8.6	64	41.3
Do not like it	11	15.7	24	15.5
Want to use always	5	7.6	20	12.9
Don't want to use again	6	8.6	9	5.8

Have not used fortified ever	3	4.5	5	3.2
Other	7	10.0	11	7.1
Awareness regarding wheat fortification at chakki	N=6		N=8	
Yes	0	0.0	1	12.5
No	4	66.7	4	50.0
Don't know	2	33.3	3	37.5
Chakki person asked about fortifying your aata at the chakki	N=6		N=8	
Yes	0	0.0	0	0.0
No	6	100.0	8	100.0

**Multiple Responses*

Table 7: Awareness among Pregnant Population regarding Consumer Goods provided by Ration Shop

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Spontaneous)	N=371		N=374	
Fortified Aata	0	0.0	0	0.0
Wheat	325	87.6	367	98.1
Rice	13	3.5	2	0.5
Edible Oil	5	1.3	3	0.8
Kerosene Oil	331	89.2	345	92.2
Salt	14	3.8	12	3.2
Sugar	169	45.6	248	66.3
Soap	3	0.8	1	0.3
Packed Aata	17	4.6	37	9.9
Raj Aata	3	0.8	0	0.0
Tea	50	13.5	15	4.0
Matchbox	1	0.3	0	0.0
Don't know	5	1.3	0	0.0
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Probed)	N=371		N=374	
Fortified Aata	1	0.3	0	0.0
Wheat	26	7.0	6	1.6
Rice	16	4.3	10	2.7
Pulses	4	1.1	0	0.0
Edible Oil	3	0.8	1	0.3
Kerosene Oil	25	6.7	28	7.5
Salt	109	29.4	170	45.5
Sugar	128	34.5	109	29.1
Soap	20	5.4	12	3.2
Packed Aata	30	8.1	107	28.6
Raj Aata	3	0.8	0	0.0
Tea	20	5.4	64	17.1
Matchbox	1	0.3	0	0.0
Don't know	77	20.8	0	0.0
*Purchase from ration shop	N=331		N=318	
Wheat	231	69.8	281	88.4
Fortified Aata	0	0.0	0	0.0
Packed Aata	30	9.1	93	29.2
Raj Aata	2	0.6	0	0.0
None of the above	98	29.6	37	11.6
Wheat purchasing frequency	N=231		N=281	
Every month	228	98.7	278	98.9
Once in two months	2	0.9	3	1.1
Don't not purchase	1	0.4	0	0.0

*If do not purchase wheat every month, reason for it	N=3		N=3	
Shop do not open every month	1	33.3	2	66.7
Quality of wheat is not good	2	66.7	1	33.3
Quantity of wheat received (in kgs)	N=231		N=281	
<25	43	18.6	55	19.6
25	141	61.0	159	56.6
26-34	2	0.9	3	1.1
35	45	19.5	60	21.3
>35	0	0.0	2	0.7
Don't Know	0	0.0	2	0.7
Fortify wheat at chakki	N=231		N=281	
Yes	0	0.0	0	0.0
No	193	83.5	259	92.2
Don't know	38	16.5	22	7.8
Flour purchasing frequency from ration shop	N=32		N=93	
Every month	3	9.4	0	0.0
2 months before	1	3.1	12	12.9
3 months before	3	9.4	10	10.7
4 months before	3	9.4	25	26.9
More than 4 months before	17	53.1	45	48.4
Don't know	5	15.6	0	0.0
*Reason of non purchasing flour from ration shop every month	N=29		N=93	
Taste is not good	2	6.9	3	3.2
Quickly get worse	2	6.9	0	0.0
Do not get now	25	86.2	90	96.8
Flour purchased from ration shop, sufficient for family need for a month	N=32		N=93	
Yes	0	0.0	1	1.1
No	31	96.9	92	98.9
Don't know	1	3.1	0	0.0
*Alternative to fulfill the requirement of family need	N=32		N=93	
Grind wheat	31	100.0	90	96.8
Grind Jawar/Bajra and other grains	1	3.2	6	6.4
Purchase at retail shops	1	3.2	0	0.0

**Multiple Responses*

Table 8: Knowledge regarding Fortified Aata among Pregnant Women

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
Have you heard of fortified Aata	N=371		N=374	
Yes	2	0.5	1	0.3
No	369	99.5	373	99.7
*Source of Information about Food fortification (Spontaneous)	N=2		N=1	
News paper	0	0.0	1	100.0
Family Member/Relative/ Friends	1	50.0	0	0.0
Ration shop	1	50.0	0	0.0
*Source of Information about Food fortification (Probed)	N=2		N=1	
No response	2	100.0	1	100.0
*Health benefits of fortified Aata (Spontaneous)	N=2		N=1	
Helpful in mother and new born child healthcare	1	50.0	0	0.0
Reduce Anaemia	1	50.0	0	0.0
Sharpen mind of children	1	50.0	0	0.0
Don't know	0	0.0	1	100.0
*Health benefits of fortified Aata (Probed)	N=2		N=1	
Helpful in mother and new born child healthcare	0	0.0	1	100.0
Reduce fatigue and physical weakness	0	0.0	1	100.0
Helpful in mental development	0	0.0	1	100.0
Don't know	2	100.0	0	0.0
*Fortified food items (Spontaneous)	N=2		N=1	
Flour	1	50.0	1	100.0
Don't know	1	50.0	0	0.0
*Fortified food items (Probed)	N=2		N=1	
Flour	1	50.0	0	0.0
Salt	1	50.0	1	100.0
*Micro nutrients mixed in fortified Aata (Spontaneous)	N=2		N=1	
Iron	0	0.0	0	0.0
Folic Acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0
Don't know	2	100.0	1	100.0
*Micro nutrients mixed in fortified Aata (Probed)	N=2		N=1	
Iron	1	50.0	0	0.0
Folic Acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0

Don't know	1	50.0	1	100.0
Availability of fortified aata in the village	N=2		N=1	
Yes	1	50.0	0	0.0
No	1	50.0	0	0.0
Don't know	0	0.0	1	100.0
*Place where fortified aata is available	N=1		N=0	
Ration Shop	1	100.0		
Asked family members to buy fortified aata	N=1		N=0	
Yes	1	100.0		
No	0	0.0		
If yes, fortified aata purchased	N=1		N=0	
Yes	0	0.0		
No	1	100.0		
Don't know	0	0.0		
*Reaction of family members after consuming fortified Aata	N=32		N=93	
Similar like other food stuff	13	40.6	36	38.7
Change in color	2	6.3	12	12.9
Change in taste	7	21.9	19	20.4
Overall satisfied	4	12.5	30	32.3
Do not like it	3	9.4	11	11.8
Want to use always	5	15.6	7	7.5
Don't want to use again	4	12.5	3	3.2
Have not used fortified ever	0	0.0	3	3.2
Other	7	21.9	4	4.3
Awareness regarding wheat fortification at chakki	N=2		N=1	
Yes	0	0.0	0	0.0
No	0	0.0	0	0.0
Don't know	2	100.0	1	100.0
Chakki person asked about fortifying your aata at the chakki	N=2		N=1	
Yes	0	0.0	0	0.0
No	2	100.0	1	100.0

**Multiple Responses*

Table 9: Awareness among Lactating Women regarding Consumer Goods provided by Ration Shop

Description	Intervention Blocks		Control block	
	Number	Percentage	Number	Percentage
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Spontaneous)	N=337		N=364	
Fortified Aata	0	0.0	0	0.0
Wheat	300	89.0	345	94.8
Rice	4	1.2	1	0.3
Edible Oil	2	0.6	1	0.3
Kerosene Oil	307	91.1	322	88.5
Salt	12	3.6	10	2.7
Sugar	170	50.4	237	65.1
Soap	5	1.5	1	0.3
Packed Aata	13	3.9	33	9.1
Raj Aata	4	1.2	0	0.0
Tea	49	14.5	23	6.3
Matchbox	1	0.3	0	0.0
Don't know	4	1.2	0	0.0
*Knowledge of the respondent regarding consumer goods provided by the Ration shop (Probed)	N=337		N=364	
Fortified Aata	2	0.6	1	0.3
Wheat	25	7.4	17	4.7
Rice	9	2.7	4	1.1
Pulses	2	0.6	0	0.0
Edible Oil	2	0.6	0	0.0
Kerosene Oil	23	6.8	37	10.2
Salt	95	28.2	155	42.6
Sugar	98	29.1	115	31.6
Soap	14	4.2	10	2.7
Packed Aata	28	8.3	105	28.8
Raj Aata	3	0.9	1	0.3
Tea	19	5.6	81	22.2
Matchbox	0	0.0	0	0.0
Don't know	85	25.2	40	11.0
*Purchase from ration shop	N=291		N=312	
Wheat	191	65.6	262	84.0
Fortified Aata	0	0.0	0	0.0
Packed Aata	28	9.6	78	25.0
Raj Aata	3	1.0	3	1.0
None of the above	98	33.7	49	15.7
Wheat purchasing frequency	N=191		N=262	
Every month	189	99.0	260	99.2
Once in two months	2	1.0	1	0.4
Don't not purchase	0	0.0	1	0.4

*If do not purchase wheat every month, reason for it	N=2		N=2	
Ration shop does not open every month	2	100.0	2	100.0
Quantity of wheat received (in kgs)	N=191		N=262	
<25	38	11.3	72	27.5
25	120	35.6	134	51.1
26-34	3	0.9	2	0.8
35	30	8.9	54	20.6
Fortify wheat at chakki	N=191		N=262	
Yes	0	0.0	0	0.0
No	157	82.2	245	93.5
Don't know	34	17.8	17	6.5
Flour purchasing frequency from ration shop	N=31		N=81	
Every month	8	25.8	0	0.0
Once in two months	0	0.0	0	0.0
Once in three months	0	0.0	0	0.0
2 months before	0	0.0	10	12.3
3 months before	2	6.5	5	6.2
4 months before	2	6.5	22	27.2
More than 4 months before	19	61.3	44	54.3
*Reason of non purchasing flour from ration shop every month	N=23		N=81	
Taste is not good	0	0.0	2	2.5
Do not get now	23	100.0	80	98.8
Flour purchased from ration shop, sufficient for family need for a month	N=31		N=81	
Yes	0	0.0	0	0.0
No	31	100.0	81	100.0
Don't know	0	0.0	0	0.0
*Alternative to fulfill the requirement of family need	N=31		N=81	
Grind wheat	31	100.0	80	98.8
Grind Jawar/Bajra and other grains	0	0.0	3	3.7
Purchase Aata from retail shops	1	3.2	0	0.0

**Multiple Responses*

Table 10: Knowledge regarding Fortified Aata among Lactating Women

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
Have you heard of fortified Aata	N=337		N=364	
Yes	1	0.3	1	0.3
No	336	99.7	363	99.7
*Source of Information about Food fortification (Spontaneous)	N=1		N=1	
From flour packet	1	100.0	1	100.0
*Source of Information about Food fortification (Probed)	N=1		N=1	
No response	1	100.0	1	100.0
*Health benefits of fortified Aata (Spontaneous)	N=1		N=1	
Don't know	0	0.0	1	100.0
No response	1	100.0	0	0.0
*Health benefits of fortified Aata (Probed)	N=1		N=1	
Don't know	1	100.0	1	100.0
*Fortified food items (Spontaneous)	N=1		N=1	
Flour	1	100.0	1	100.0
*Fortified food items (Probed)	N=1		N=1	
Don't know	1	100.0	1	100.0
*Micro nutrients mixed in fortified Aata (Spontaneous)	N=1		N=1	
Iron	0	0.0	0	0.0
Folic acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0
Don't know	1	100.0	1	100.0
*Micro nutrients mixed in fortified Aata (Probed)	N=1		N=1	
Iron	0	0.0	0	0.0
Folic acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0
Don't know	1	100.0	1	100.0
Availability of fortified aata in the village	N=1		N=1	
Yes	1	100.0	1	100.0
*Place where fortified aata is available	N=1		N=1	
Ration Shop	1	100.0	1	100.0
Asked family members to buy fortified aata	N=1		N=1	
Yes	0	0.0	0	0.0
No	1	100.0	1	100.0

*Reaction of family members after consuming fortified Aata	N=31		N=81	
Same as other food stuff	6	19.4	27	33.3
Change in color	10	32.3	12	14.8
Change in taste	9	29.0	18	22.2
Overall satisfied	3	9.7	33	40.7
Do not like it	4	12.9	8	9.9
Want to use always	2	6.5	15	18.5
Don't want to use again	0	0.0	7	8.6
Have not used fortified ever	1	3.2	0	0.0
Other	6	19.4	6	7.4
Awareness regarding wheat fortification at chakki	N=1		N=1	
Yes	0	0.0	0	0.0
No	1	100.0	0	0.0
Don't know	0	0.0	1	100.0
Chakki person asked about fortifying your aata at the chakki	N=1		N=1	
Yes	0	0.0	0	0.0
No	1	100.0	1	100.0

**Multiple Responses*

Table 11: Educational Status of Adolescent Girls

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
Educational Qualification of the Respondent	N=466		N=436	
Illiterate	73	15.7	87	20.0
Literate (read/write)	16	3.4	27	6.2
Primary	170	36.5	159	36.5
Middle	144	30.9	114	26.1
Xth Standard	39	8.4	28	6.4
XIIth Standard	23	4.9	19	4.4
Graduate	1	0.2	2	0.5

Table 12: Knowledge regarding Fortified Aata among Adolescent Girls

Description	Intervention Blocks		Control Block	
	Number	Percentage	Number	Percentage
Heard of fortified Aata	N=466		N=436	
Yes	9	1.9	4	0.9
No	457	98.1	432	99.1
*Source of information about fortified aata (Spontaneous)	N=9		N=4	
Family Member/Relative/ Friends	3	33.3	0	0.0
From flour packet	4	44.4	2	50.0
Ration shop	2	22.2	2	50.0
*Source of information about fortified aata (Probed)	N=9		N=4	
Poster/ Pamphlets/Hording/Banner	1	11.1	0	0.0
No response	8	88.9	4	100.0
*Health benefits of fortified aata (Spontaneous)	N=9		N=4	
Helpful in mother and new born child healthcare	1	11.1	0	0.0
Sharpen mind of children	1	11.1	0	0.0
Don't know	7	77.8	4	100.0
*Health benefits of fortified aata (Probed)	N=9		N=4	
Helpful in mental development	1	11.1	0	0.0
Don't know	8	88.9	4	100.0
*Fortified food items (Spontaneous)	N=9		N=4	
Flour	4	44.4	2	50.0
Salt	1	11.1	0	0.0
Don't know	4	44.4	2	50.0
*Fortified food items (Probed)	N=9		N=4	
Flour	5	55.5	0	0.0
Don't know	8	88.9	4	100.0
*Micro nutrients mixed in fortified aata (Spontaneous)	N=9		N=4	
Iron	0	0.0	0	0.0
Folic acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0
Don't know	8	88.9	4	100.0
*Micro nutrients mixed in fortified aata (Probed)	N=9		N=4	
Iron	0	0.0	0	0.0
Folic acid	0	0.0	0	0.0
Vitamin B 12	0	0.0	0	0.0
Don't know	9	100.0	4	100.0
Availability of fortified aata in the village	N=9		N=4	
Yes	7	77.8	2	50.0

No	0	0.0	0	0.0
Don't know	2	22.2	2	50.0
*Place where fortified aata is available	N=7		N=2	
Ration Shop	7	100.0	2	100.0
Asked family members to buy fortified aata	N=7		N=2	
Yes	2	28.6	1	50.0
No	5	71.4	1	50.0
If yes, fortified aata purchased	N=2		N=1	
Yes	2	100.0	1	100.0
No	0	0.0	0	0.0
Don't know	0	0.0	0	0.0
If yes, frequency of fortified Aata purchase	N=2		N=1	
Always	0	0.0	1	100.0
When available	1	50.0	0	0.0
Once only	1	50.0	0	0.0
*Reaction of family members after consuming fortified Aata	N=2		N=1	
Same as other food stuff	1	11.1	0	0.0
Change in taste	1	11.1	0	0.0
Overall satisfied	0	0.0	1	25.0
Want to use always	2	22.2	0	0.0

**Multiple Responses*

Table 13: Background Characteristics of Chakki Owner

Description	Intervention Blocks		Control Block	
	N=39	Percentage	N=34	Percentage
Age (in years)				
Less than 21 Years	3	7.7	3	8.8
21-30	5	12.8	5	14.7
31-40	8	20.5	14	41.2
41-50	10	25.7	6	17.6
51-60	5	12.8	2	5.9
More than 60 years	8	20.5	4	11.8
Mean age	45.1		38.5	
Educational Qualification	N=39	Percentage	N=34	Percentage
Illiterate	6	15.4	1	2.9
Literate (read/write)	5	12.8	3	8.8
Primary	11	28.2	6	17.6
Middle	9	23.1	12	35.3
Matriculation (Xth Standard)	3	7.7	8	23.5
Senior Secondary (XIIth Standard)	4	10.3	3	8.8
Graduate	1	2.6	1	2.9

Table 144: Knowledge regarding Fortified Aata among Chakki Owner

Description	Intervention Blocks		Control Block	
	N=39	Percentage	N=34	Percentage
Heard of fortified atta				
Yes	8	20.5	6	17.6
No	31	79.5	28	82.4
*Source of information about food fortification (Spontaneous)	N=8	Percentage	N=6	Percentage
News paper	1	12.5	0	0.0
Interpersonal communication	0	0.0	1	16.7
Anganwadi center	1	12.5	1	16.7
Poster/ Pamphlets/ Hording/ Banner	0	0.0	1	16.7
Meeting	0	0.0	1	16.7
Ration Shop	6	75.0	6	100.0
*Source of information about food fortification (Probed)	N=8	Percentage	N=6	Percentage
Anganwadi	1	12.5	0	0.0
*Health benefits of fortified atta (Spontaneous)	N=8	Percentage	N=6	Percentage
Beneficial for mother and child health	0	0.0	1	16.7
Reduce Anaemia	1	12.5	1	16.7
Reduce fatigue and physical weakness	1	12.5	1	16.7
Helpful in mental development	1	12.5	0	0.0
Don't know	5	62.5	4	66.7
*Health benefits of fortified atta (Probed)	N=8	Percentage	N=6	Percentage
Beneficial for mother and child health	3	37.5	1	16.7
Reduce Anaemia	1	12.5	1	16.7
Reduce fatigue and physical weakness	0	0.0	1	16.7
Sharpen mind of children	1	12.5	1	16.7
Healthy for eyes	1	12.5	0	0.0
Helpful in mental development	1	12.5	3	50.0
Don't know	2	25.0	1	16.7
*Fortified food items (Spontaneous)	N=8	Percentage	N=6	Percentage
Flour	6	75.0	5	83.3
Edible Oil	0	0.0	0	0.0
Milk	1	12.5	0	0.0
Pulses	1	12.5	1	16.7
Salt	0	0.0	0	0.0
Don't know	2	25.0	1	16.7
*Fortified food items (Probed)	N=8	Percentage	N=6	Percentage
Flour	2	25.0	1	16.7

Edible Oil	1	12.5	0	0.0
Milk	1	12.5	1	16.7
Pulses	0	0.0	0	0.0
Salt	1	12.5	4	66.7
Don't know	1	12.5	1	16.7
*Micro nutrients mixed in fortified Atta (Spontaneous)	N=8	Percentage	N=6	Percentage
Iron	2	25.0	2	33.3
Folic acid	0	0.0	0	0.0
Vitamin B12	0	0.0	0	0.0
Don't know	6	75.0	4	66.7
*Micro nutrients mixed in fortified Atta (Probed)	N=8	Percentage	N=6	Percentage
Iron	2	25.0	1	16.7
Folic acid	2	25.0	1	16.7
Vitamin – B12	2	25.0	1	16.7
Don't know	1	12.5	3	50.0
Awareness regarding wheat fortification at chakki	N=39	Percentage	N=34	Percentage
Yes	6	15.4	12	35.3
No	21	53.8	11	32.4
Don't know	12	30.8	11	32.4
Fortify flour at chakki	N=6	Percentage	N=12	Percentage
Yes	0	0.0	0	0.0
No	6	100.0	12	100.0

**Multiple Responses*

Table 15: Percentage grinding of materials at Chakki

Daily average material grind	Intervention Blocks		Control Block	
	N=39	Percentage	N=34	Percentage
Wheat (in kg)				
<50	4	10.3	3	8.8
50-70	10	25.6	5	14.7
71-100	7	17.9	7	20.6
101-130	1	2.6	1	2.9
131-150	3	7.7	4	11.8
>150	13	33.3	14	41.2
Other food material (in kg)	N=39	Percentage	N=34	Percentage
<50	24	61.5	11	32.4
50-70	6	15.4	6	17.6
71-100	2	5.1	7	20.6
101-130	1	2.6	0	0.0
131-150	2	5.1	1	2.9
>150	4	10.3	9	26.5

Table 16: Percentage of Underweight Children aged 0-60 months

Age groups (in Months)	Underweight (Weight-for-age)					
	% < -3SD	% < -2SD	% < -3SD	% < -2SD	% < -3SD	% < -2SD
Intervention Blocks	All Sexes		Male		Female	
Total (0-60)	17.0	38.0	16.3	38.0	17.7	38.0
(0-5)	3.2	6.1	2.4	5.6	4.1	6.6
(6-11)	11.0	26.0	8.3	23.8	14.5	29.0
(12-23)	15.8	32.9	17.2	31.9	14.5	33.9
(24-35)	21.1	42.9	20.1	45.6	22.1	40.0
(36-47)	24.8	54.6	28.3	59.2	21.8	50.7
(48-60)	24.6	67.8	19.6	63.0	30.4	73.4
Control Block	All Sexes		Male		Female	
Total (0-60)	19.4	43.0	20.5	43.9	18.4	42.2
(0-5)	2.1	6.5	3.2	7.7	0.7	5.2
(6-11)	10.8	31.8	9.4	32.9	12.5	30.6
(12-23)	21.2	47.3	21.8	48.4	20.7	46.4
(24-35)	26.5	50.9	25.2	51.2	27.6	50.7
(36-47)	29.0	59.8	36.2	65.7	22.7	54.6
(48-60)	28.6	69.8	33.3	72.7	24.0	67.0

Table 17: Percentage of Stunting Children aged 0-60 months

Age groups (in Months)	Stunting (height-for-age)					
	% < -3SD	% < -2SD	% < -3SD	% < -2SD	% < -3SD	% < -2SD
Intervention Blocks	All Sexes		Male		Female	
Total (0-60)	27.5	51.4	26.7	50.8	28.3	52.0
(0-5)	18.6	34.7	19.2	35.0	18.1	34.5
(6-11)	27.0	46.7	29.1	45.6	24.1	48.3
(12-23)	32.8	57.2	28.6	58.0	36.8	56.4
(24-35)	29.1	55.7	27.9	55.7	30.3	55.6
(36-47)	29.1	57.5	29.9	58.1	28.5	56.9
(48-60)	28.1	54.5	26.4	50.5	30.3	59.2
Control Block	All Sexes		Male		Female	
Total (0-60)	37.6	61.6	38.6	63.4	36.8	60.0
(0-5)	23.2	43.8	22.8	49.7	23.7	37.4
(6-11)	34.2	54.6	39.8	54.2	27.5	55.1
(12-23)	41.6	65.2	50.4	70.4	34.1	60.7
(24-35)	47.2	68.5	45.8	68.6	48.3	68.5
(36-47)	44.0	71.1	45.0	74.0	43.2	68.6
(48-60)	35.5	67.5	32.0	66.0	39.0	69.0

Table 18: Percentage of Wasting Children aged 0-60 months

Age groups (in Months)	Wasting (Weight-for-height)					
	% < -3SD	% < -2SD	% < -3SD	% < -2SD	% < -3SD	% < -2SD
Intervention Blocks	All Sexes		Male		Female	
Total (0-60)	8.1	19.6	8.1	20	8.1	19.2
(0-5)	2.3	5.1	2.8	7.5	1.8	2.8
(6-11)	0.7	6.4	1.3	3.8	0.0	9.8
(12-23)	8.2	14.4	8.5	12.8	7.9	15.9
(24-35)	11.7	25.9	10.6	27	12.8	24.8
(36-47)	9.6	25	11.9	26.3	7.7	23.9
(48-60)	12.9	37.6	10.9	39.1	15.4	35.9
Control Block	All Sexes		Male		Female	
Total (0-60)	6.7	17.2	7.1	19.3	6.3	15.1
(0-5)	2.3	5.3	2.8	5.6	1.7	5.0
(6-11)	3.2	7.7	4.7	10.6	1.4	4.3
(12-23)	6.8	19.2	5.6	20.8	7.9	17.9
(24-35)	5.9	14.7	7.4	18.9	4.7	11.3
(36-47)	10.4	24.3	7.8	23.5	12.5	25.0
(48-60)	12.1	32.8	16.3	40.8	8.0	25.0