Midline Survey – Methods Report
The Reduction in Anemia through Normative Innovations (RANI) Project

Background

The Reduction in Anemia through Normative Innovations (RANI) project is a norms-based intervention to reduce anemia among women of reproductive age in Odisha, India. The project is being implemented in two blocks (Athamalik and Kishorenagar) in the Angul district of Odisha. We evaluate the RANI Project using a cluster randomized controlled trial (RCT) and longitudinal study design. In this design, villages were randomized on a 1:1 ratio to receive the treatment or continue with usual care (defined as the currently existing and ongoing efforts to reduce anemia in Odisha). Treatment is defined as exposure to one or more components of the RANI project. As this is a community-level intervention, we used a cluster design to prevent contamination across communities. Data collection occurs at three-time points: baseline, midline, and end line. The overall schema of the study design is depicted in Figure 1.

As per the study design, the baseline survey was conducted in 30 out of 89 clusters (i.e. 15 out of 50 intervention clusters and 15 out of 39 control clusters) during the month July to September 2019 (i.e. just before the implementation of the RANI project started). A total of 4,110 women between the ages of 15 and 49 residing in the treatment and control clusters were interviewed in the baseline. Of those who participated in the interview, the hemoglobin test and anthropometry (height and weight) measurements of 4,088 (excluding the refusals) and 3,895 (excluding the refusals and pregnant women) participants were conducted respectively. Besides, the baseline survey also conducted the work capacity assessment (Queens College Step Test); assessment of cognitive functioning (viz. Simon Task, SRT, Corsi Block Tapping test and Word Span test); and physical activity assessment (ActivPAL test) in the sub-cohort of 376 participants.

The implementation of the RANI project interventions was started soon after the baseline survey was over. The 1st follow-up round after the baseline survey also named here as a midline survey, was carried out after 6 months of the project implementation. The midline survey data were collected over six weeks from January to March 2020. Since this is a follow-up survey, we adopted the same methods and processes applied for conducting the baseline survey. This report presents the step by step processes and methods adopted for conducting the midline survey; and also presents the details about the coverage of study participants; and the challenges encountered by the survey team while conducting the midline survey.

Midline Survey: Steps and Procedures

Recruitment of Staff and Training: We engaged a team of 60 female data collectors, 8 female supervisors cum data quality assurance persons, and 8 male support staff for the midline survey. The 60 data collectors comprised 44 interviewers, 8 Lab Technicians, and 8 Physical test members. This entire team of these data collectors, quality assurance persons, and male support staff were divided into 8 sub-teams for the data collection.

Additionally, we engaged 4 Survey Coordinators for day to day monitoring and supervision of the survey. Apart from the above teams, the entire survey was managed and supervised by a core team consisted of 5 persons from DCOR. We also engaged exclusively 3 support staff for managing the field logistics and team movements.

Including the core team members of DCOR, a team of 88 persons was engaged in conducting the midline survey. Out of them, 32 were involved in the baseline. The remaining 56 i.e. 63.6% had to be recruited afresh for the midline survey. Further to mention that, out of the 44 interviewers, 8 Lab Technicians, and 8 Physical test members engaged for the midline data collection, there were 13 interviewers, 2 Lab Technicians, and 4 Physical test members engaged in the same position as they were in the baseline.

The training of the midline survey team was conducted from January 24 to February 09, 2020. We conducted four-day training of the physical & cognitive test team (from January 24 to 27, 2020); six-day classroom training of the interviewers (from January 28 to February 02, 2020); and six-day field testing cum practice and de-briefing (from February 04 to 09, 2019). Since many of them were new to the project, we had to conduct similar rigorous training of the midline survey team like baseline.

Preparation of the List of Study Participants: As per the study design, the same 4,110 households covered in the baseline had to be revisited for their interviews, hemoglobin tests and anthropometric measurements during the midline survey. The physical and cognitive tests conducted in a sub-cohort of 376 women in baseline had to be also re-administered the same during the midline. Hence, prior to the start of the midline data collection, we prepared the list of all the 4,110 participants with their identification information from the baseline database. The list included identification details of the participants viz. names of the participants; head of the household names; cluster codes; village names & codes; hamlet names; and telephone numbers to enable the survey team to correctly locate and identify the same respondents who were interviewed during the baseline. A similar list of 376 women, who participated in the physical and cognitive tests conducted in the baseline, was also prepared.

Confirmation of the Study Participants: The Supervisor cum Data Quality Assurance persons of the 8 field teams were engaged to correctly locate and identify the participants given in the list. The same list was also provided to all the team members to assist the supervisors for correct identification and confirmation of the participants. The following step by step processes was adopted for doing this.

i) First, we checked and confirmed the names; head of the household names; village names & codes; hamlet names; and telephone numbers given in the list by verifying with the concerned participants.
ii) Aadhaar card[1] of the respondents was verified to know that the person we identified for the interview bears the same name and other identification details given in the list.

[1] Aadhaar is a verifiable 12-digit identification number issued by Unique Identification Authority of India (UIDAI) to the resident of India for free of cost. Aadhaar is for every Resident of India. From a newborn to a senior citizen, everyone is enrolled under Aadhaar. Apart from identification number, Aadhaar card provides photo identity, date of birth and gender of a person.

iii) We also checked with the respondents that they had participated in the interview; hemoglobin tests; height & weight measurements held with them in the baseline (i.e. in the month of last August and September).

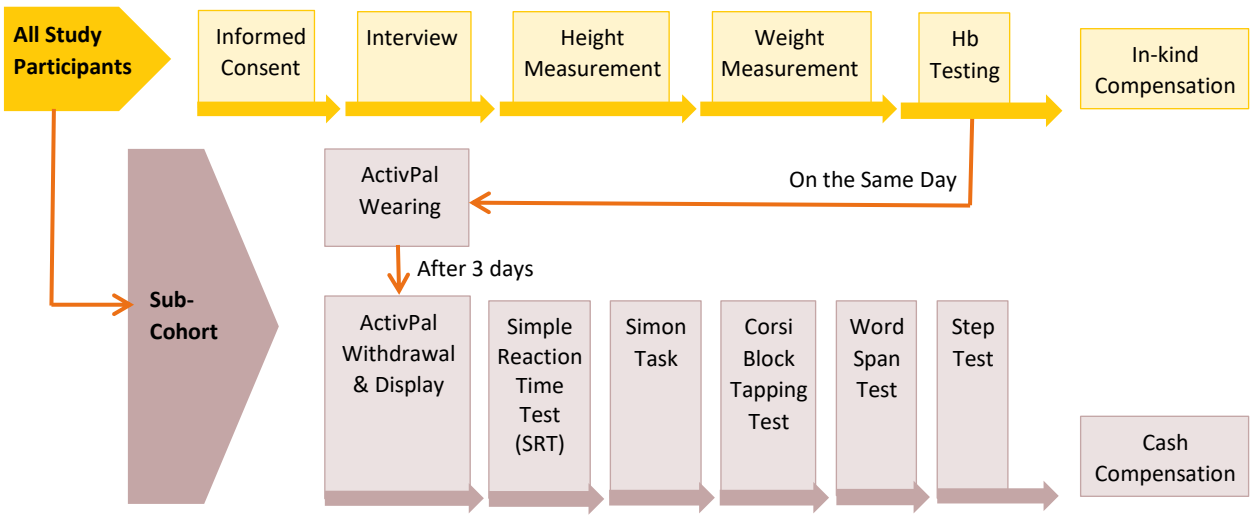
iv) Apart from these steps, we also asked the participants to show the signed consent form provided to them during the baseline, which was also used as another step for the confirmation of the study participants. The survey team found, even after six months of completion of baseline, most of the study participants kept the consent form and could show to the interviewers. Those who could not show, they were confirmed receive of the same during the baseline.

Participant Consent and Confidentiality: Like the baseline, prior informed consent was again obtained in Odia by the data collectors for the midline data collection. In the case of participants under the age of 18 years, written permission of one parent or legal guardian and assent of the participants were obtained. All data from participants were de-identified by the local principal investigator and stored in secure, password-protected computers that only the study team and its affiliates have access to.

Data Collection Methods and Coverage of the Study Participants: The methods used for the midline data collection remained the same as the baseline, which are as follows:

i) Structured interview
ii) Hemoglobin test using HemoCue
iii) Anthropometry (height and weight) measurements
iv) Work capacity assessment adapting Queens College Step Test
v) Computerized (viz. Simon Task and SRT) and non-computerized tests for the assessment of cognitive functioning (viz. Corsi Block Tapping test and Word Span test)
vi) Assessment of physical activity using ActivPAL test

The sequential order in which these methods were administered to the study participants is presented below in the flow-chart.



Specific details about the data collection processes and methods adopted in the midline survey are presented hereunder:

Interview: The midline survey team visited all the 4,110 participants for conducting the interviews with them. Out of the 4,110 participants approached, 3,955 participated in the interview. The response rate for participation in the interview was 96.2%. The remaining 155 did not participate, resulted in 3.8% attrition. The majority of these i.e. 131 could not be interviewed as they were absent at the time when the survey team visited their homes in the village. We declared them as non-response after taking three visits to their homes for conducting the interviews. Of those who were absent, we could only contact 37 participants over phone. All of them consented to participate in the telephonic survey and were administered a short survey containing only 7 questions (the questionnaire is annexed). The rest 94 absentees could not be either contacted over phone or their contact numbers could not be traced.

Even though all the 4,110 participants consented to be part of the 3 rounds of the survey during the baseline, 18 of them refused to participate in the midline survey. The various reasons cited by them for not participating in the survey are as follows:

i) Maximum of them denied to participate in the survey because of the restrictions by their family members. They felt that the survey does not carry any value and benefit to them, despite the interviewers repeatedly explained to them the objectives & purpose of the survey; and the in-kind compensation to be provided for sparing their time for the survey.
ii) Because of the busy job schedules, few of them expressed their inability to participate in the survey. They did not even agree to the interviewer's request to visit them at a later date and/or time suitable to participate in the survey.
iii) Some participants did not give time as they had to go to their relative's house to attend the marriage ceremony. Normally, any marriage ceremony in rural Odisha continues for 7 consecutive days.
iv) Few of them mentioned, they need not have to participate in the survey as they are economically and health-wise sound and do not have any problem. They remained quite persistent with such views even after explaining the need of participating in the survey.
v) Two participants refused to participate in the survey due to their feeling of caste discrimination with the survey team.
vi) One participant refused and cited that she is a doctor and she need not require to participate in the survey. Although, after a lot of persuasions, she gave consent to participate during the baseline survey, she refused to participate this time in the midline survey.

Apart from these above reasons of non-participation, 5 participants could not be surveyed due to their deaths and 1 was excluded because of her mental illness.

Unlike the baseline, which randomly divided the study participants into 4 sub-groups and administered 4 smaller sets of questionnaires (one questionnaire to each), the midline survey administered a full-set of the questionnaire to all the 3,955 participants. So, to minimize the participant burden in the midline

survey, the full questionnaire was modified, field-tested, and reduced to take a maximum of 1hr 15 minutes interview time of the participants.

The changes made in the questionnaire were also incorporated in the Computer Assisted Personal Interview (CAPI) application developed (using the android software known as Open Data Kit - ODK) for the data collection, which was thoroughly tested and installed on android operating system-based tablets for conducting the interviews. To make the data collection error-free, we incorporated appropriate consistency checks, and programmed acceptable data value ranges, skips, and error messages into the data collection form. The responses of the short telephonic survey conducted with the 37 participants were also entered in another CAPI application exclusively developed for the same.

The CAPI application used for the data collection was protected using passwords. Interviewers had to log in to the system to access the surveys and to upload the data. All uploaded data were stored under password protection and only authorized team members had access to the password(s). All data were transmitted electronically from the mobile ODK application via a secured SSL connection to the server. The data were extracted in CSV. files for ensuring data quality in real-time and for the data analysis.

On an average, an interview in the midline took 1hr 11 minutes time ranging from a minimum of 44 minutes to maximum of 1hr 48 minutes. The median time taken for completing an interview was 1hr 10 minutes. Some interviews took more than the expected time as the interviewees were taking shorter breaks during the interviews for taking care of their children, managing domestic chores, etc. But also, there were interviews, which took lesser time than expected as the interviewees were quite prompt in responding to the questions. The average time taken for interviewing in the baseline was 58 minutes 32 seconds (58 minutes 33 seconds for version 1; 58 minutes 32 seconds for version 2 and 3; and 58 minutes 29 seconds for version 4) and median time took was 57 minutes. The interview in the midline took an average of 13 minutes more time than the baseline.

Hemoglobin measurement: We obtained hemoglobin levels from 3,934 out of 3,955 participants, through point-of-care hemoglobin tests, using a HemoCue photometer. Of the remaining 21 participants, 20 refused to participate in the hemoglobin test, though they participated in the interview. The hemoglobin test of the remaining one participant was not taken as she was HIV+. The reasons for refusing to undergo the hemoglobin test are given hereunder.

i) Despite explaining the participants about the hemoglobin test procedures, the instruments used and the safety protocol maintained during the test, maximum did not agree and suspected the intention of conducting the test. Some believed that poison will be injected whereas some others felt that infected blood will be transferred to their bodies through the needle.
ii) Towards the last phase of the survey, two participants from two different clusters suspected that the blood test would spread Corona Virus.
iii) One participant did not consent as her husband denied her to conduct the hemoglobin test, again because of suspicion.

Soon after the hemoglobin test of the participants was conducted, they were verbally communicated their hemoglobin levels. They were also informed about their anemia status:

i) Non-pregnant women: Normal (>=12gdl) or Mild (11-11.9gdl) or Moderate (8-10.9gdl) or Severe Anemia (<8gdl).
ii) Pregnant women: Normal (>=11gdl) or Mild (10-10.9gdl) or Moderate (7-9.9gdl) or Severe Anemia (<7gdl).

Further, all the participants, regardless of their anemia status (including the normal ones), were uniformly communicated and advised verbally to consume iron-rich foods like green leafy vegetables to overcome or avoid becoming anemic. Particularly, the participants identified with Severe Anemia, were provided the referral slip and were advised to visit the nearest health facilities for treatment. A sample copy of the referral slip is given below.

RANI

Midline Survey

Reduction of Anemia through Normative Innovations (RANI) Project:
A Cluster Randomized Controlled Trial in Odisha, India

REFERRAL SLIP

Date:

Age of the Woman	
Name of the Woman	
Result of the Hemoglobin test conducted	. g/dl

Name of Health Facility Referred to (Nearest PHC/CHC): _____

Signature of the Lab Technician

Date:

Signature of the Coordinator

Date:

Note:
i) Refer the Woman to a nearby health facility in case of severe anemia.
ii) Advise the woman to take green leafy vegetables in case of any anemia (mild, moderate and severe).

Hemoglobin levels to diagnose Anemia (g/dl)

Population	Anemia		
	Mild	Moderate	Severe
Non-pregnant women (15 years of age and above)	11–11.9	8–10.9	<8
Pregnant women	10–10.9	7–9.9	<7

Anthropometry measurements: Like the baseline, the anthropometry (height and weight) measurements of only non-pregnant women were taken. So, excluding the 152 pregnant women identified during the survey, we approached the rest 3,803 participants for taking their height and weight measurements. Of them, 11 did not consent for both anthropometry measurements and hemoglobin tests; and one could not participate due to fracture in her leg. The remaining 3,791 were administered anthropometry measurements.

Work capacity, cognitive functioning, and physical activity assessments: The sub-cohort of all the 376 women covered in the baseline were approached for participating in the work capacity, cognitive functioning, and physical activity assessments. Same as the baseline, we used the adapted version of the Queens College Step Test for conducting the work capacity assessment. The assessment of the cognitive functioning was done applying the same 2 computerized tests (viz. Simon Task and Simple Reaction Time - SRT) and 2 non-computerized tests (viz. Corsi Block Tapping test and Word Span test). The physical activity assessment was carried out using the ActivPAL (PAL Technologies, LTD; Glasgow, UK), which the participants wore for three consecutive days to measure their daily reclining, sitting, standing, and walking activities.

Out of the 376 women approached, 330 participated in all the three above-mentioned assessments; and another one person participated only in two out of the three assessments viz. cognitive functioning (viz. Simon Task, SRT, Corsi Block Tapping test and Word Span test); and physical activity (ActivPAL test) assessments. A total of 45 participants did not participate in all three assessments. Of them, 22 refused to participate; 9 did not participate due to their pregnancies; another 9 were absent at their homes when the survey team visited them; 1 each complained of having health issues viz. Asthma problem, Kidney problem, and Family Planning sterilization. There were 2 death cases recorded by the survey team. Apart from these 45 cases, there was one participant who underwent cognitive and physical activity assessment but withdrew from the work capacity assessment (step test) complaining back pain. We recorded around 88% response rate, resulting in about 12% attrition of participants participating in these assessments.

The various reasons for which the 22 participants refused to participate in the physical and cognitive tests are compiled below.

i) Based on the baseline experience, most of these participants refused to wear ActivPal citing the problems of itching and red rashes. One participant even took out after wearing the same for a day. They also denied and refused to give time, when they were requested to participate in the other physical and cognitive tests.
ii) The family members of few participants suspected the intention of wearing the ActivPal. Hence, they stopped the participant to participate not only in the ActivPal test but also in the other physical and cognitive tests.

Except for the one participant, who denied to participate in the step test complaining her back pain, the remaining 330 participated in all the physical and cognitive tests conducted in the survey, whether it was the paper-based or computer-based cognitive tests conducted. Although some participants were

uncomfortable in handling the computer in the baseline, the survey team did not come across with such issue during the midline survey.

Compensation to the participants: Unlike the baseline, each of the 3,955 participants after their participation in the interview, anthropometry measurements and hemoglobin tests in the midline survey were provided in-kind compensation for sparing their valuable time for participating in the same. As a compensation, they were provided a set of steel utensils containing one steel plate, two bowls and one spoon in place of INR 100 paid to them in participating in the baseline survey. Additionally, the sub-cohort of 331 participants were provided the same INR 200 like the baseline for participating in the physical and cognitive tests.

Data entry, storage, and security: Similar to capturing the responses during the interviews, we developed separate CAPI applications for the data entry of the results of the followings:

i) Hemoglobin test and Anthropometry (Height and weight) measurements
ii) Step Test
iii) Corsi Block Tapping test
iv) Word Span test

The results of all the above tests were first entered in paper forms in the field by the survey team. Later after returning from the field, the survey team entered the same from the paper forms into the CAPI applications; and were uploaded in the server daily for real-time access of the data. Since there were errors made by the survey team in the data entry of Corsi Block Tapping test and Word Span test results in the baseline, the IT Expert of DCOR re-entered the same in another application, which was later reconciled to identify the data entry errors and make corrections while cleaning these databases. Our IT Expert also manually matched the paper forms hemoglobin test, anthropometry measurements, and step test results with the databases; and cleaned the same making the necessary corrections.

The results of the remaining tests viz. Simon Task, SRT, and ActivPal were autogenerated by the computer. After returning from the field, all the computer-generated files of these tests were copied from the field laptops and were manually uploaded on the server daily.

Data quality assurance: The following key measures were taken to ensure data quality during the midline survey.

- We used technology-enabled data collection methods, which helped to access and review the quality of data and enable providing feedback in real-time.
- We recruited and engaged the data collection team having experience and record of collecting quality data. After their recruitment, we imparted rigorous training (both classroom and field training) to build their capacity for ensuring quality in data collection.

- During the data collection, we conducted 478 spot-checks for monitoring the data quality. Every day, after returning from the field, the data collectors were provided with feedback and were motivated to ensure quality in data collection.

Data collection challenges:

- Due to the lean season, the study participants in most villages had left their villages for working in brick kilns and other economic ventures. Hence, the data collectors, in most of the cases, had to take 2 to 3 visits to conduct the interviews with them.
- Some participants were found to be staying outside of the village due to their jobs and their husband's jobs.
- Some participants got married and went to stay in their in-law's house.
- Due to caste discrimination with the interviewers, two participants refused to give consent for the interview and denied for the hemoglobin test and anthropometry measurements.
- Some participants refused to participate in the interview as they had to go to their relative's house to attend the marriage ceremony. Traditionally, the rituals during a marriage ceremony in rural Odisha are performed consecutively for 7 days.
- In fear of the spread of COVID-19, two participants from two different clusters, towards the last part of the survey, refused to participate in the Hemoglobin test.
- Lack of concrete or plain surface in some villages created difficulty for the Lab Technicians to administer the height and weight measurements.
- Due to a lack of proper space or public infrastructures, setting-up work stations to conduct the physical and cognitive tests was difficult in some of the villages. Hence, the participants from one village had to be taken to the other village in the cluster for conducting such tests.
- Some participants complained of red rashes on their bodies because of wearing the ActivPal consecutively for 3 days.
- Some participants had removed the ActivPal before the due date, hence the test had to be discarded. In some cases, the survey team had to again visit and administer the ActivPal to the participant.
- Some participants refused to participate in physical and cognitive assessments due to suspecting the intention of data collection, though they participated in the same during the baseline. They were worried suspecting misuse of that against them.

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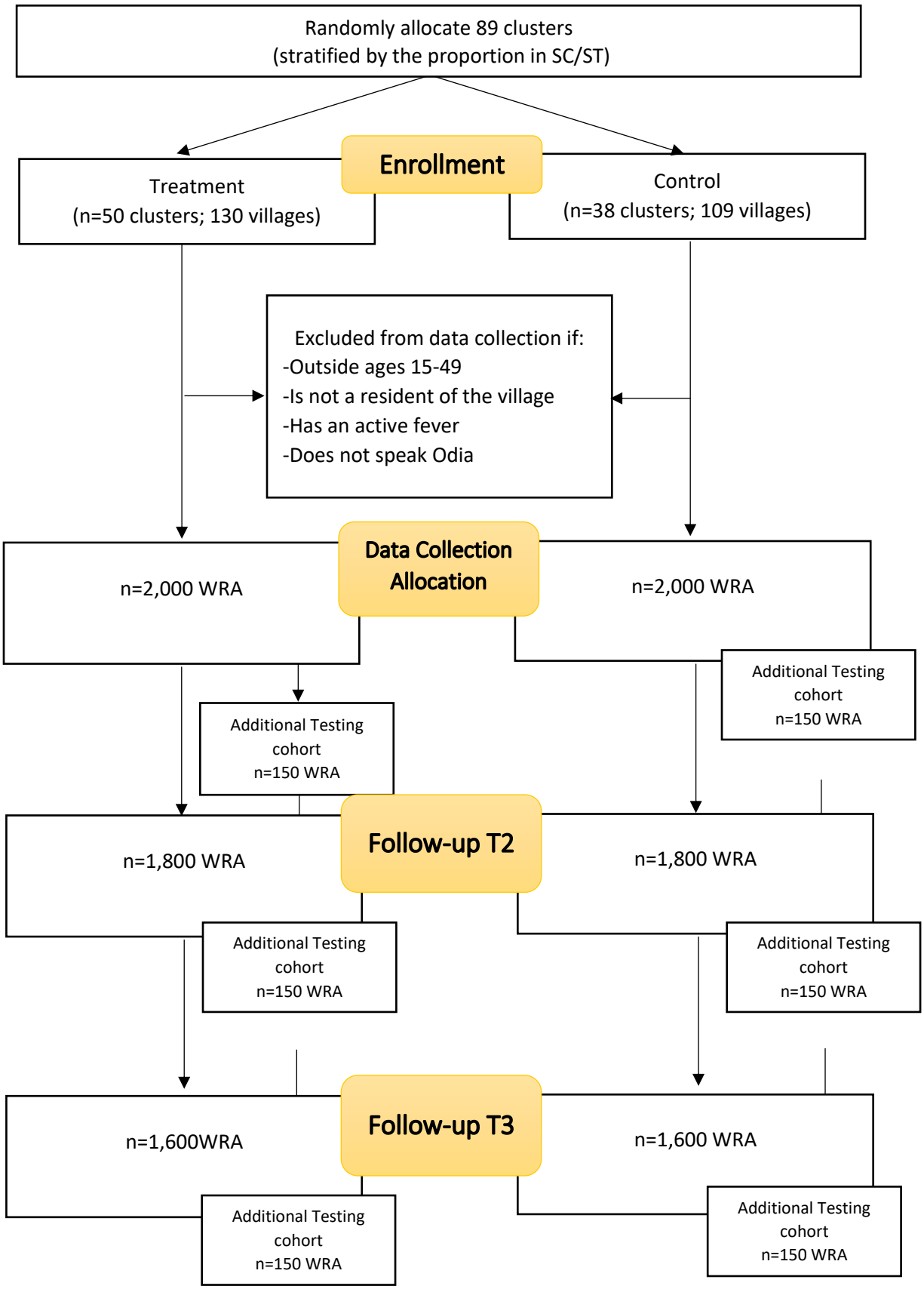
Figure 1. Cluster Randomized Control Trial Schema



Midline Phone Call Survey Questionnaire

1.	What is your age?□□□□□□□ □□□ □□□□ ?	
2.	What is the name of the village where you were living last July or August? □□ □□□□□ □□□ □□□□□ □□□□□ □□□ □□□□□□□ □□□□□ □□□ □□ □□□ ?	
3.	When did you move to where you are currently living? □□□ □□□□□□□□□ □□□□□□□ □□□□□□□ □□□□ □□□□□ □□□□□ □□□□□□□ ?	Month …. Year….
4.	MXTS1. In the past six months, have you been tested for anemia? This is done by pricking your finger to measure your hemoglobin. Have you been tested in this way? □□ □□ □□□ □□□□□□, □□ □□□□□□□ □□□□□□□□□ □□□□□ □□□□ □□□□□□□ □□□□□□□□ □□? □□□ □□□□□□□ □□□□ □□ □□□□□□□□□□□ □□□□□□ □□□□□ □□□□, □□□□□□□□ □□□□□□ □□□□□□□ □□□□□ □□□	0. No□□□□□ 1. Yes□□

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5.	MIFA1. Have you ever eaten/taken an iron batika (tablet)? □□□ □□□□□□ □□□□ □□□□□ □□□□□□□□ □□ ?	Yes, I am currently taking it/ □□,□□□□□□□□□□□□□□□□□□.....1→ **#7** Yes, I took in the past, but not currently/ □□, □□□□□□□□□□□□□□□□, □□□□□□□□□□□□□□□□□□□□□□□□□□□.....2 No, I have never taken it…... → **#7.**
6	When was the last time you took it? □□□ □□□□□ □□□□ □□□□ □□□□ □□□□□ □□□□□□□ ?	Last month□□ □□□□□……..1 2-3 months ago2-3 □□□ □□□□□□□ …….2 4-5 months ago4-5 □□□ □□□□□□□……..3 More than 6 months ago6 □□□□□ □□□□ □□□ □□□□……..0
7	MSN5: How many of the women in the community (hamlet or village) where you recently moved from think you should take IRON BATIKA tablets, even when you are not pregnant?□□□ □□□□□□□□□ □□□ □□□□□□□ □□□□□□□ (□□□□ □□□□□□ □□□□□□□) □□□□□□ □□□□□ □□□□□□□ □□, □□□ □□□□□□□ □□□□□ □□□□ □□□ □□□□ □□□□□ □□□□□ □□□□	None / □□□□□□□□□...0 Some / □□□□□□□……..1 About half / □□□□□□□□□□□□□□□…….....2 Most / □□□□□□□□□□…….…....3 All / □□□□□□……4