

2019 Health Report: Manantenina and Matsobe

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Introduction

Health issues in low- and middle-income countries involve a dual burden of infectious and non-infectious diseases, including malaria and schistosomiasis, along with hypertension, malnutrition and obesity. Access to healthcare is an additional factor that contributes to these diseases.

For the last five years, researchers from Duke University have conducted health and social surveys to identify health challenges. This effort has focused on the village of Mandena (Commune Rural Maroambihy, District of Sambava). We found that hypertension was a major health issue, with nearly half of participants in the study exhibiting hypertension¹. To expand on these results, we conducted health and socioeconomic surveys in the neighboring village of Manantenina and other nearby communities. To gain a comparative perspective, we also conducted additional research in Matsobe (Commune Rural Marovato, District of Andapa).

Data was collected to document general health information, such as body temperature. A household interview was used to collect additional information regarding fever prevalence, vaccination rates, healthcare use and information about sanitation.

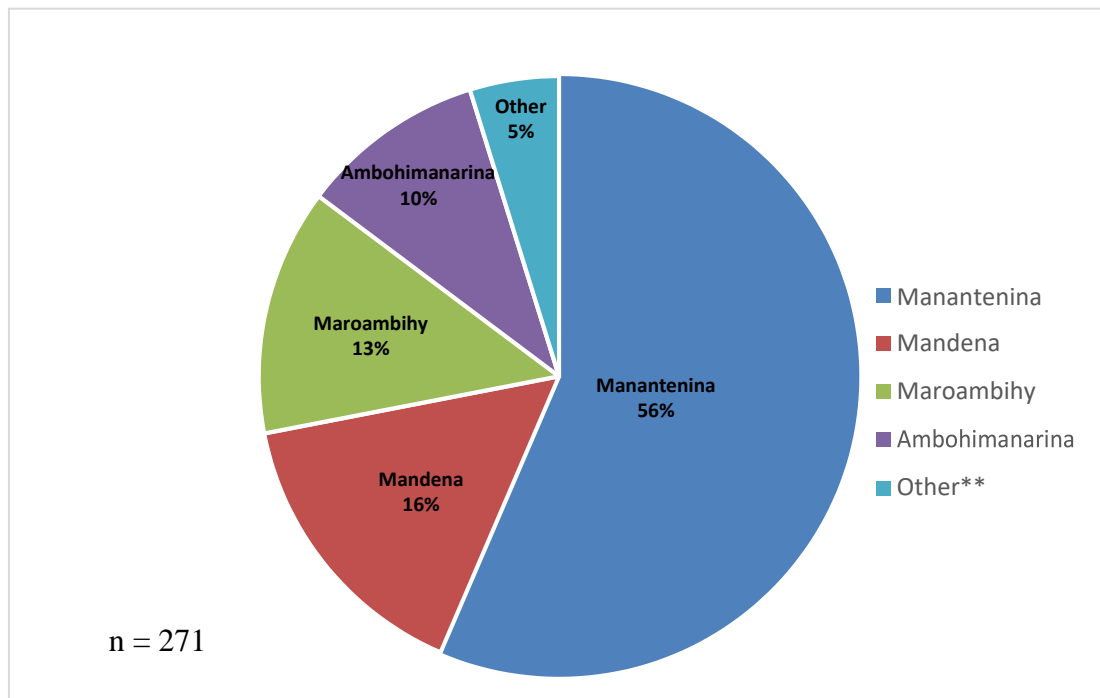
Health Survey

A health survey was conducted in Manantenina with participants from a range of neighboring villages in June and July of 2019. The survey collected information on blood pressure, height and weight (to calculate Body Mass Index), tobacco smoking habits, and other relevant general health information, such as body temperature. In total, we conducted the health survey with 271 participants (100 men and 171 women) ranging in age from 18 to 103 years old. The findings are reported below

I. Village distribution

Out of the 271 participants, the majority of individuals reported they lived in Manantenina, Figure 1 summarizes the home villages of survey participants. The furthest village from Manantenina where participants lived was Maroambihy which is 4.3 kilometers away.

Figure 1. Village Distribution of Participants Villages



** The “other” category includes: Amboangibe (3), Andramonifotitra (2), Belambo (2), Andafsakala (1), Anjangoveratra (1), Ambinanin ‘Antsehabe (1), Ambodiampana (1), Antafiamora (2). Three individuals did not report a village name.

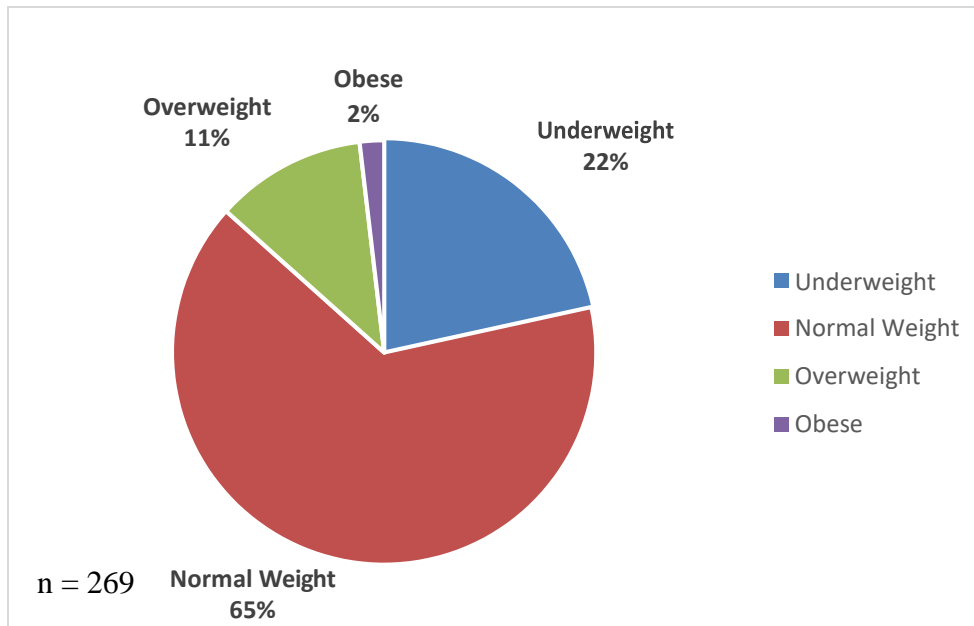
II. Body Mass Index

We calculated body mass index (BMI, kg/m²) based on the measured height and weight of participants and categorized weights into groups based on WHO guidelines² (Table 1). Results are in Figure 2. Most individuals are within the normal weight for body mass index. However, 22% of adults are underweight, indicating issues associated with food security, while 13% of participants are overweight or obese, suggesting that despite food security issues, some individuals have access to foods that may be leading to obesity.

Table 1. Body mass index classification of participants

BMI Classification*	(body mass [kg]/ height squared [m ²])
Underweight	<18.5
Normal Weight	≥18.5 - <25
Overweight	≥25-<30
Obese	≥30

Figure 2. Distribution of BMI classifications



Figures 3 and 4 show BMI amongst female and male participants. The majority of male and female participants are within normal weight. The proportion of females within the underweight and overweight category are similar and relatively low. In contrast to females, 27% of males were underweight. About 9% of female participants reported being pregnant at the time of the survey.

Figure 3. Bar chart distribution of body mass index amongst female participants

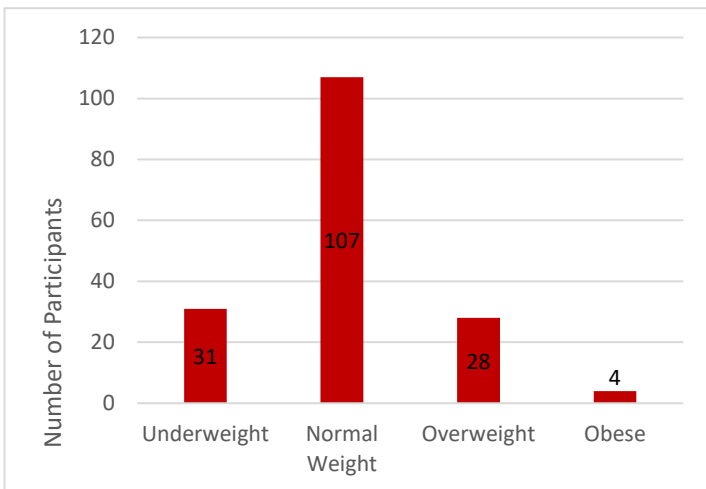
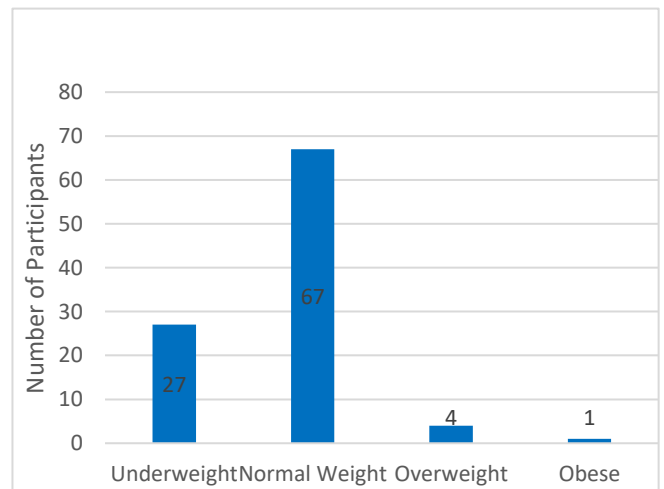


Figure 4. Bar chart distribution of body mass index amongst male participants



III. Blood Pressure

We collected blood pressure data categorized levels of hypertension (Table 2) based on the American College of Cardiology (ACC) and American Heart Association (AHA)^{3,4}.

Table 2. Blood pressure classification

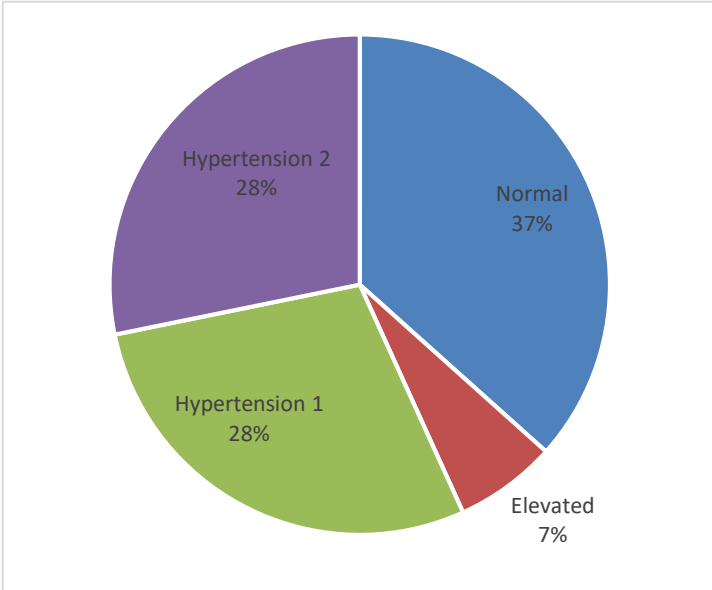
Blood Pressure Classification*	Systolic Blood Pressure (mm Hg)	Diastolic Blood Pressure (mm Hg)
Normal*	<120	<80
Elevated*	120-129	<80
Hypertension Stage 1**	130-139	80-89
Hypertension Stage 2**	≥140	≥90

** Must meet both systolic and diastolic blood pressure*

***Individuals that had a Diastolic and Systolic in two categories were designated to the higher blood pressure category*

The largest proportion of individuals' blood pressure is within the hypertension stage 1 and 2 groups (Figure 5). This supports our findings from earlier data collection in Mandena, reporting 49.1% of hypertension among the community.

Figure 5. Pie chart distribution of participants blood pressure



For both males and females, the majority of blood pressure readings lie within hypertension stage 1 and 2. However, a larger proportion of males have elevated blood pressure compared to female participants (Figure 6). As expected, we also found that blood pressure increases with age (Figure 7).

Figure 6. Bar chart distribution of participants blood pressure based on sex

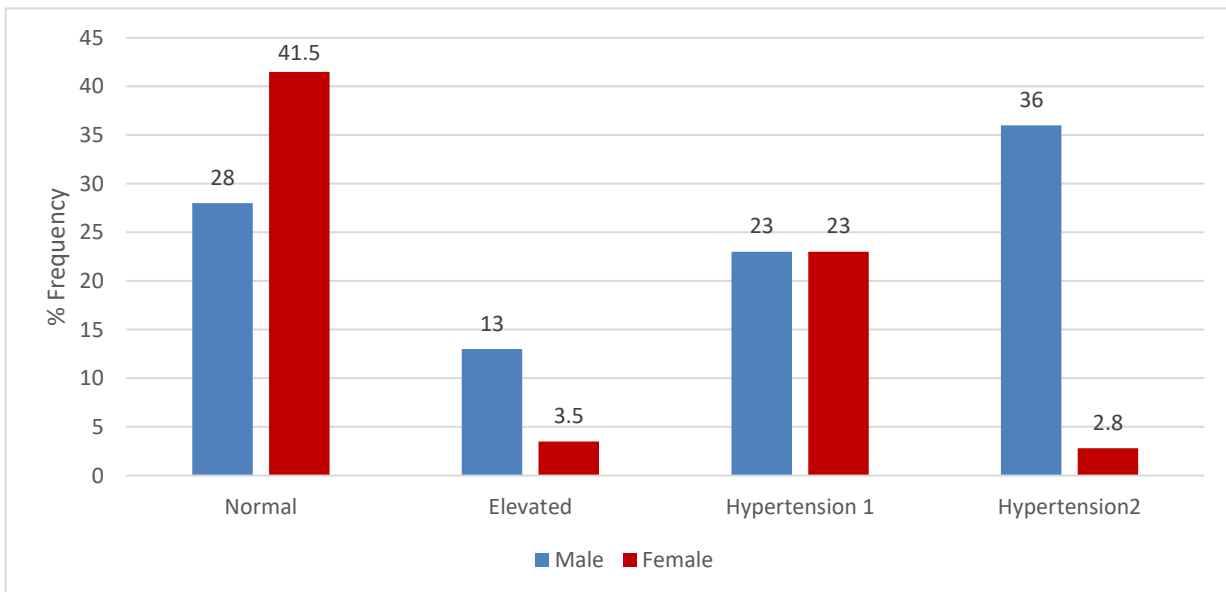
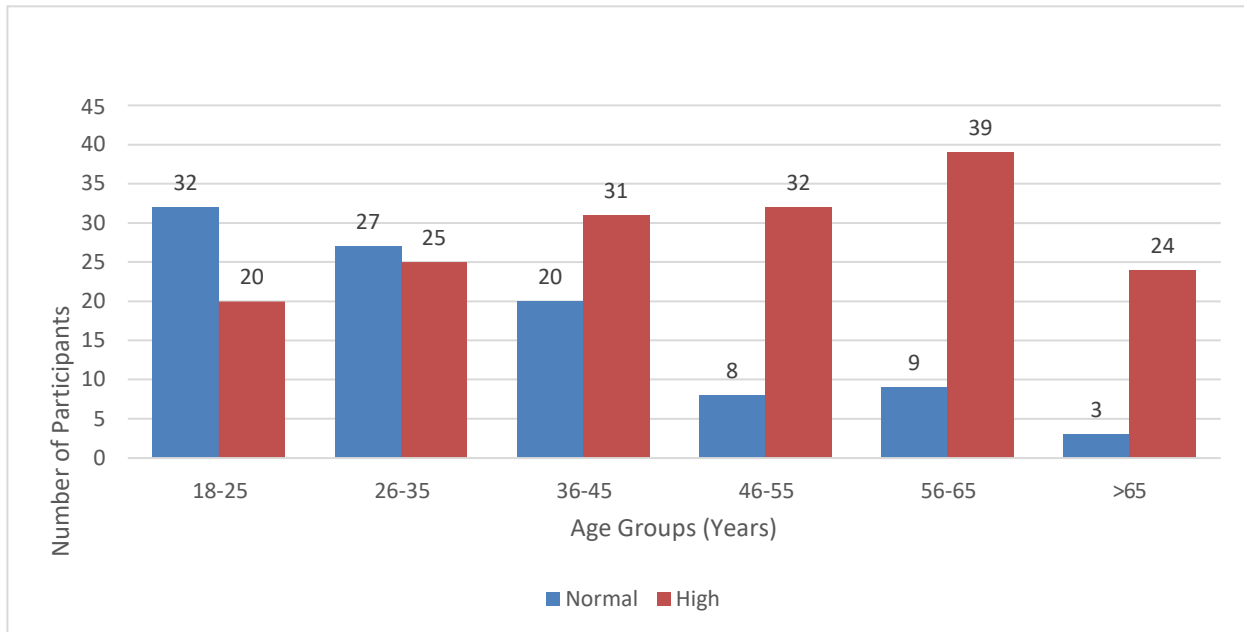


Figure 7. Blood Pressure Distribution by Age Group



“High” includes elevated and hypertension stage 1 and 2

IV. Smoking Habits

The health survey documented smoking habits among participants. The survey inquired about participants’ tobacco smoking status, the frequency they smoked tobacco, and the number of years they smoked. We found that the majority of the participants are non-smokers (92%), and of the participants that reported smoking, the majority were male (75%). The median age of smoking participants was 36 years old. The median quantity of cigarettes that smokers consumed in the week prior to the survey was 28, and the median number of years of tobacco use amongst smoker participants was 10 years. Given the low rate of smoking, this does not appear to be a cause of the hypertension that we documented.

Household Survey

The household survey was largely based on the Demographic Health Survey (DHS) employed by USAID⁵ and modified to be country/regionally specific to the SAVA region of Madagascar. The survey contained health information about sanitation, demographic characteristics, maternal health, vaccination rates, and indicators of access to health care. Household surveys were conducted in 150 households in Manantenina for the months of June-July 2019, and 110 households in Matsobe during the month of August 2019. The findings are reported below.

I. Demographic Information

Table 3. summarizes the basic demographic information collected from the household survey.

Table 3. Demographic information of household survey

	Manantenina	Matsobe
Households Surveyed	150	110
Total number of individuals in the surveyed households	663	467
Mean Household Size	4.4 (range 1-10)	4.2 (range 1-11)
Male/Female (% distribution)	51/49	50/50*
Average age of household	18.4 years old	20.5years old

II. Fever Prevalence and Diagnosis

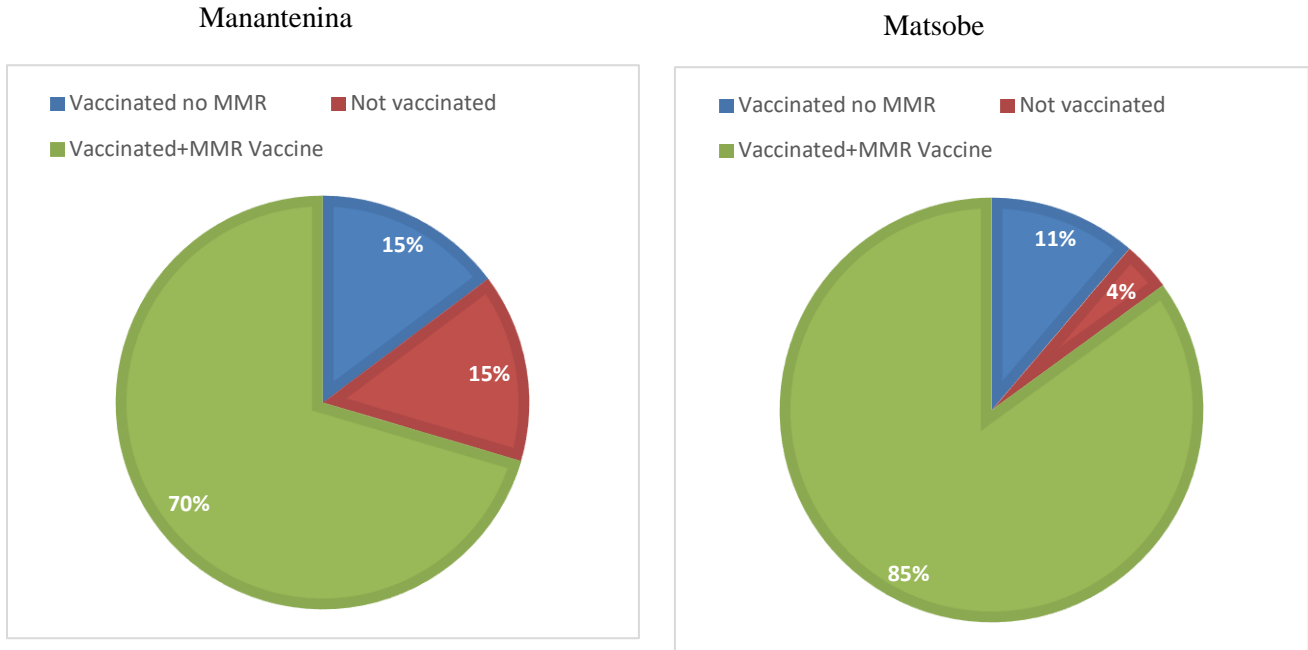
Respondents from the household survey were asked if they or anyone in their household had experienced a fever in the last 3 months. In Manantenina 45% (298/663) of individuals reported having a fever and 43% (203/467) in Matsobe.

In Manantenina, 47% of people who self-reported receiving a diagnosis in the household survey reported not knowing what the diagnosis was (121/227) and 51% (28/55) did not know their diagnosis in Matsobe. The majority of individuals in Manantenina who knew their diagnosis for their fever (40%) reported that fever was their diagnosis creating uncertainty on whether miscommunication occurred between medical provider and patient or if vague diagnostics are commonplace. Of the 27 known diagnosis in Matsobe, 18 were Malaria signifying a higher burden of malaria than reported in Mantanenina (9). Contrarily there were no reports of measles in Matsobe, despite the widespread outbreak in 2018, compared to the 29 reported cases in Manantenina which may be indicative of the village vaccination rates which are reported in the following section.

III. Vaccination Coverage

Respondents were asked questions about vaccinations for children living in their household under the age of 15, the results are in Figure 8.

Figure 8. Vaccination coverage for children under-15



**7 individuals reported not knowing if vaccinations had been received in Manantenina and 6 in Matsobe*

IV. Birthing Practices

Table 4. summarizes the locations women gave birth, and who assisted them during the birth. The survey found that women in Manantenina were significantly more likely to deliver at home or someone else's home than those in Matsobe (44% and 13% respectively). Matsobe has two CSB II's nearby and the majority women deliver at a government facility.

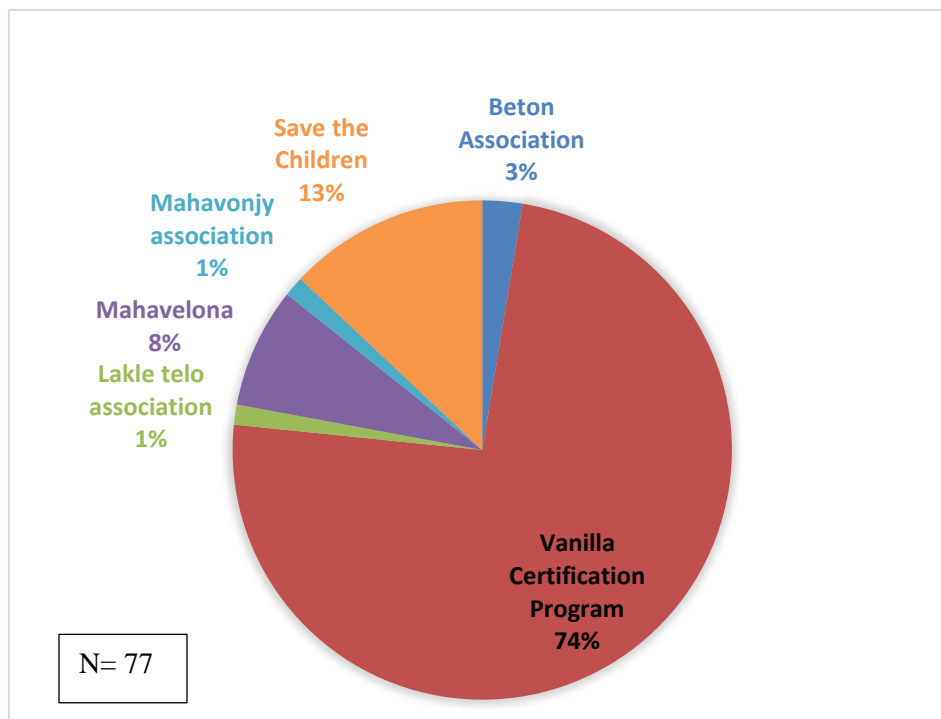
Table 4. Birthing Practices

	Manantenina	Matsobe
Number of Women Who Reported Giving Birth in the Last 3 Years	54	24
Birth at Home or Another's Home	~ 44%	~ 13%
Birth at Private Hospital	~ 41%	~ 4%
Birth at Government Hospital	~ 13%	~ 83%
Birth at Other	~ 2%	0%
Traditional Birth Attendant	~ 13%	~ 4%
Doctor Assisted the Birth	~ 80%	~ 83%
Registered Midwife Assisted the Birth	~ 2%	~ 13%
Other attended birth	~ 6%	0

V. Health Insurance

There were survey questions about health insurance coverage (see Figure 9). 51% of Households in Manantenina reported having health insurance. Matsobe reported 0% health insurance coverage.

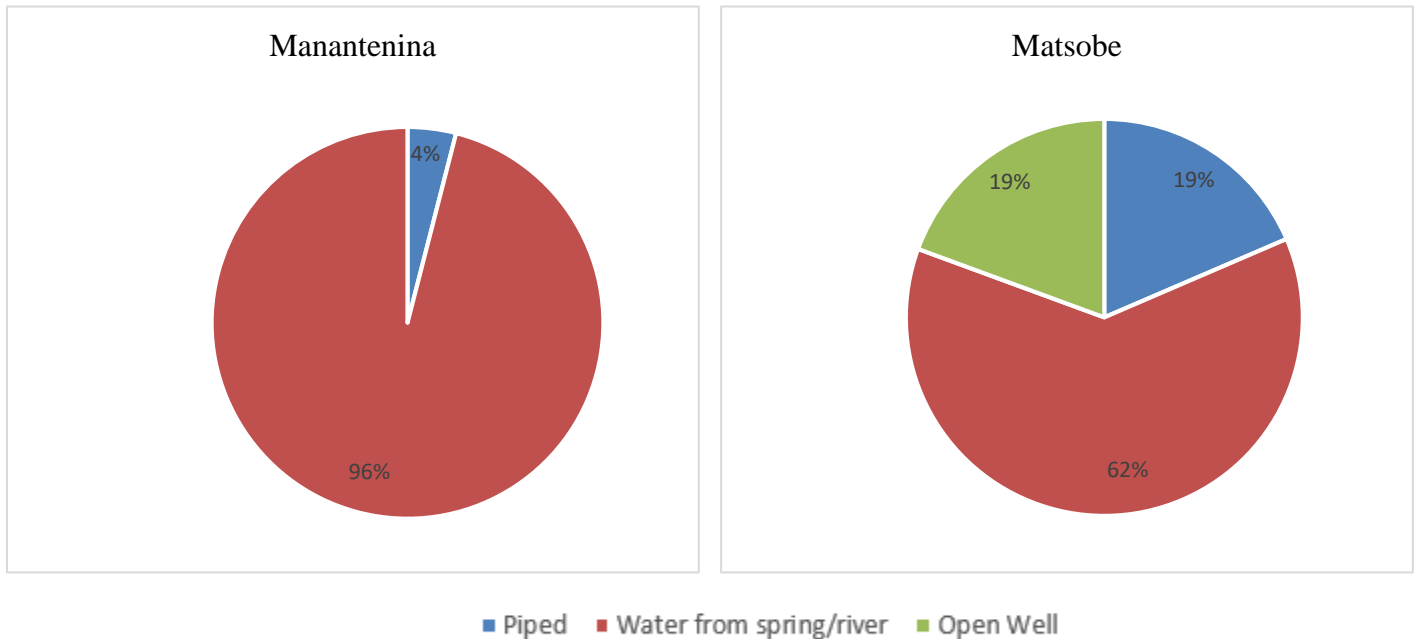
Figure 9. Health Insurance Distribution



VI. Water Sanitation

The surveyed households were asked a series of questions about water supply and sanitation (Figure 10).

Figure 10. Main Source of Water

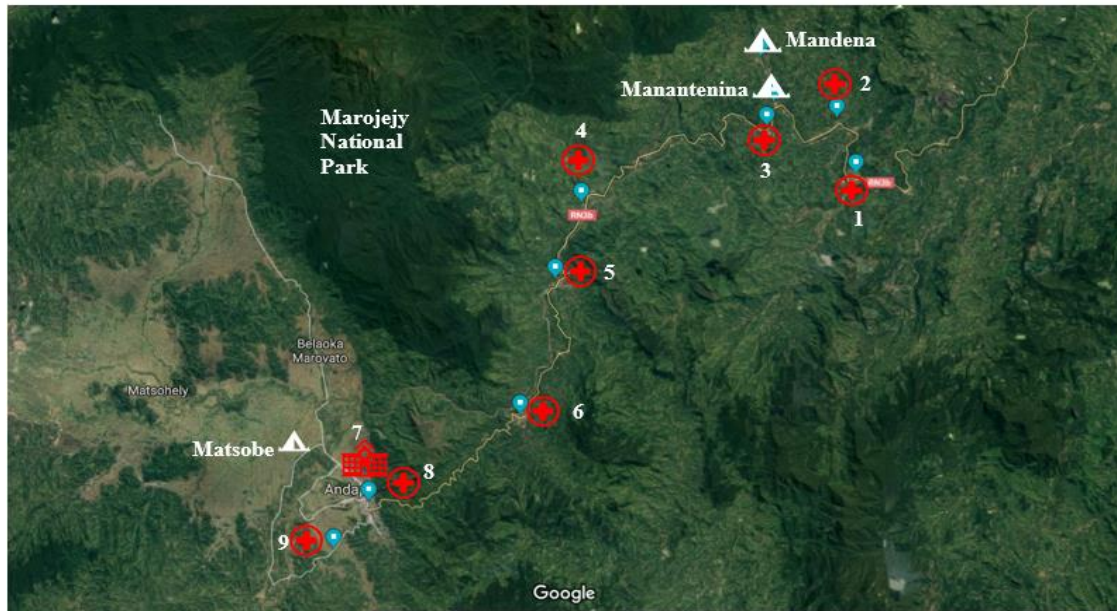


Based on self-report, most participants get their water from springs or rivers, 94% and 95% of respondents in Manantenina and Matsobe, respectively, do not treat their water to make it safe for drinking or cooking. The majority of households reported having pit latrines, 99.3% of 150 households in Manantenina and 94% of 110 households in Matsobe. In Manantenina 9 of the pit latrines were improved pit latrines and 7 were improved pit latrines in Matsobe.

VII. Service Availability and Readiness Assessment

The WHO Service Availability and Readiness survey Assessment (SARA) is a tool used to assess the quality of a health facility by measuring its capacity or “readiness” to treat the communities it serves. These measurements comprise the inventory of country-specific essential medicines and consumables. This assessment tool was applied based on data collected at 9 clinics shown in the map below (Figure 11).

Figure 11. Map of CSBs surveyed for SARA



- 1) Ambodiampana Lokoho
- 2) Maroambihy
- 3) Adventiste Ambohimaraina
- 4) Belambo lokoho
- 5) Belaoko Lokoho
- 6) Andrakata Andapa
- 7) Andapa CSB II
- 8) Tanandava Andapa
- 9) Marovato-Andapa

The assessment found that essential medicine stock ranged from 51% of the total stock to 81% (Figure 12). CSB II Andapa and CSB II Ambodiampana Lokoho were the facilities that had most of the essential inventory medicine list in stock 81% and 80%, respectively. The Private health facility, Adventist Ambohimaraina had the least with only 51% in stock at the time of the interview. A full list of the essential medicines for Madagascar can be found in Table 5.

Figure 12. Essential Medicines Availability

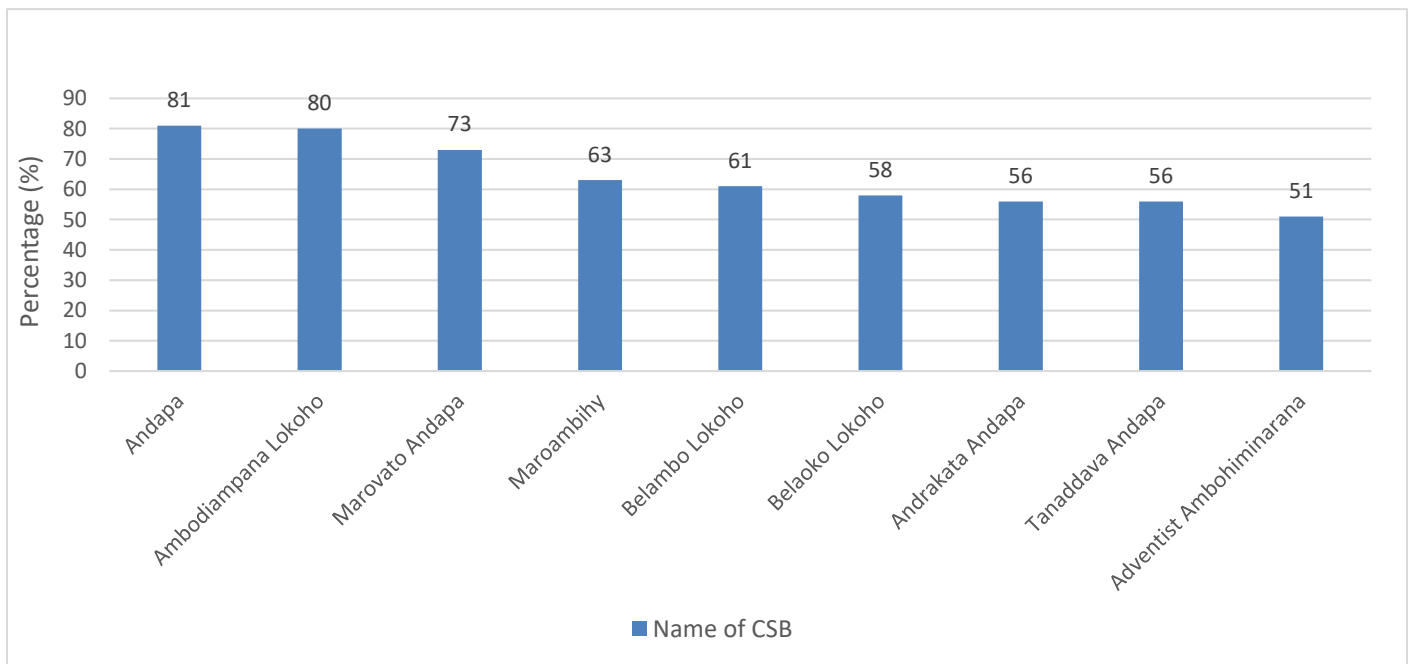


Table 5. Madagascar specific essential medicines

Medications (Oral)	Injectables/Solutions
Albendazole	Lactate de sodium compose ringer inj
Aminophylline	Aminophylline (100 mg)
Amoxicilline 250 mg gel	Ampicilline (500 mg)
Amoxicilline 500 mg gel	Ampicilline (1 g inj)
Amoxicilline 250 mg/ 5 ml	Artesunate
Amoxicilline/ Acide Clavulanique	Atropine Sulfate (0.25 mg/ml)
Ampicilline	Atropine Sulfate (1 mg/ml)
Captopril	Benzathine Benzylpenicillin
Chlorpheniramine	Benzylpenicillin Procaine
Ciprofloxacine	Ceftriaxone
Cotrimoxazole (120 mg)	Diazepam
Cotrimoxazole (400-80 MG)	EAU PPI (5 mL)
Cotrimoxazole (200-40 mg/5 ml)	EAU PPI (10 mL)
Erythromycine (250 mg cp)	Furosemide
Erythromycine (125 mg poudre)	Gentamicine (40 mg/ml inj)
Fer Acide Folique	Hydrocortisone
Furosemide	Lidocaine HCL
Hydrochlorothiazide	Metoclopramide
Ibuprofene	Metronidazole
Metoclopramide	Phenobarbital
Metronidazole	Quinine
Nifedipine	Salbutamol
Nystatine (100,000 UI cp)	Nystatine
Nystatine (30 mL)	Paracetamol
Paracetamol (500 mg cp)	Salbutamol aerosol
Phenobarbital (50 mg cp)	Alcool Ethylique
Praziquantel (600 mg cp)	Gel Hydroalcoolique disinfectant
Quinine	Polyvidone iodee (10%)
Sal de rehydratation Oral	Gentamicine 0.3% collyre
	Tetracycline 1%

VIII. Summary

- There is evidence of under nutrition in Manantenina and Matsobe due to food insecurity, but there are also some who suffer from over nutrition
- Hypertension is a common health problem in both villages
- The prevalence of fever is comparable in the villages, but many more seek treatment in Manantenina.
- For medications, residents of Matsobe are more likely to rely on government facilities.
- The unvaccinated rate is more than 3 times higher in Manantenina than in Matsobe.

- Home births are much more prevalent in Manantenina than in Matsobe.
- Half of those surveyed in Manantenina reported some type of health insurance, when no respondents in Matsobe had insurance.
- Water sources vary considerably across the two villages
- All health facilities were missing some essential medicines; with some only have half of the listed drugs available.

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