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Use of Care by Pregnant Women and Children Under Five in Areas Strongly Affected by Climate Hazards

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Résumé

La mortalité maternelle et infantile demeure encore élevée à Madagascar. Dans la région Androy, une zone fortement soumise aux aléas climatiques située dans le sud de Madagascar, les interventions humanitaires sont importantes et récurrentes et certaines ciblent les femmes enceintes et les enfants de moins de 5 ans. Une enquête-ménage a été menée dans cette zone pour étudier les déterminants du recours aux soins et pour déterminer les rôles des interventions humanitaires dans l'amélioration du recours aux soins. Les résultats montrent que les interventions contribuent à augmenter le recours à la consultation prénatale mais des actions supplémentaires sont nécessaires pour favoriser l'accouchement en milieu de santé. Les interventions en faveur des enfants de moins de cinq ans augmente le suivi de la santé des nourrissons par le programme de nutrition, de pesage et de mesure de la taille. Par contre, pour les soins curatifs, la population semble encore attribuer des recours spécifiques selon ses problèmes de santé. Ainsi, des réflexions doivent être portées sur les différentes modalités de collaborations possibles entre les acteurs de santé pour améliorer l'accès aux soins.

Mots-clés : santé maternelle et infantile, impacts des interventions humanitaires, Androy Madagascar.

Summary

Rates of maternal and infant mortality remain high in Madagascar. In Androy, a region located in the south of the island and subject to climate hazards, humanitarian interventions are recurrent and significant. Some interventions especially concern maternal and infant health. A survey was conducted in the region in 2017 to investigate factors influencing the use of maternal and infant services at health facilities, and to determine the roles of humanitarian interventions in improving healthcare. The results showed that interventions contribute to increasing antenatal care, but additional actions are needed to promote delivery in health facilities. Interventions for children under five increase the control of children's health through the nutrition programme, and weighing and measurement services. However, the pattern of healthcare seeking depended on the consideration of the origin of the illness. Thus, there needs to be reflection concerning the different possible methods of collaboration between health actors to improve access to healthcare.

Keywords: maternal and infant healthcare seeking, impacts of humanitarian intervention, Androy Madagascar.

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Introduction

Whilst the mortality rate for children in Madagascar has fallen significantly over the last ten years, the rate of maternal mortality has remained high. In 2015, the rate of maternal mortality was 353 for every 100 000 live births, and in 2016, infant mortality was 46.4% (WHO, 2018).

The rate of use of maternal and infant health services remains low. In 2016, the rate of prenatal consultation[1] (PNC) and the rate of births in basic health centres (BHC) amongst pregnant women was 63.3% and 31.1% respectively (yearbooks on health sector statistics 2017, Ministry of Health). According to UNICEF (2014), 86% of maternal deaths happened outside of the health system. This high mortality rate remains linked to insufficient or late access to care in the event of obstetrical complications (INSTAT, 2010; Pourette et al, 2018), and the absence of postnatal monitoring (Delaunay and Waltisperger, 2010). For children under five, the rate of consultation in BHCs varies according to age. In 2015, the rate was 66% for children between 0 and 11 months and 37% for children between 12 and 59 months (yearbooks on health sector statistics 2017, Ministry of Health, 2013). According to UNICEF (2017a), infant mortality is linked to delays in recourse to care and to chronic malnutrition. Each year, on the national level, malnutrition is at the origin of 34% of deaths amongst children under five.

Structural factors such as distance from health centres, lack of health personnel, lack of health and transport infrastructures, lack of medicine and health equipment partly explain these situations. But other economic factors such as extreme poverty and successive crises, cultural and societal factors including traditions and habits, relationships between carers and patients, and collective indifference also play a role (Pourette et al, 2018). Moreover, alongside the biomedical offer, there are a number of traditional remedies, from domestic care to consultation with traditional healers (Rakotomalala, 2002 ; Pourette, 2014, Pierlovisi , 2014, Quashie et al, 2014), which are not mutually exclusive. Finally, the health and environmental context, which differs from one region to the next, can also influence behaviours in terms of use of care. In the Ambovombe Androy district[2], our study area, droughts create recurrent situations of food insecurity. The region therefore regularly benefits from different humanitarian interventions, including interventions in favour of maternal and infant health.

[1] **Pregnant women who had at least one PNC during their pregnancy**

[2] **Located in the extreme south of the island**

Studies have shown that interventions in maternal and infant health encourage the use of care amongst pregnant women and children under five. Exemptions from health expenses amongst poor populations, for example, lead to an increase in the use of maternal health services (Haddad et al, 2011, Ameur et al, 2012). In the same way, interventions in nutrition and the prevention of malnutrition can significantly reduce maternal and infant mortality and risks of morbidity. Advice on breastfeeding, the distribution of nutritional supplements (vitamin A and zinc), of therapeutic foods and dietary advice can be useful in the fight against malnutrition (Bhutta et al, 2013, UNICEF 2017b).

Humanitarian interventions in Androy in favour of maternal and infant health mainly concern awareness raising, prevention and care for malnourished children under five. Over the past few years, in order to encourage the practice of PNC and medicalised births[3], BHCs distribute donations from NGOs or technical and financial partners (TFP) to pregnant women who come for consultations. Hence, during the PNC, the women receive mosquito nets, water cards[4], nutritional supplements, vaccinations against tetanus and medicines (vermifuge and intermittent malaria treatment). The individual birth kits[5] and water cards are given to women who give birth in the BHCs. Since 2010, the rate of PNCs in the area has almost always been higher than the national average. In 2017, the rate of PNCs in Androy was 82.2%, which is 18.9 percentage points higher than the national average (yearbooks of health sector statistics 2017, Ministry of Health). And yet, the rate of births taking place in BHCs remains low (28.5% in 2017) and has always been lower than the national average (31.1% in 2017) (idem). In order to fight malnutrition amongst children, community nutrition agents (CNAs) carry out cooking demonstrations, weighing and measuring, enabling them to detect cases of malnutrition and either treat them or refer them to the BHCs. In 2017, 37.4% of children under five had been measured and amongst them, 5.4% were underweight and 6.6% were suffering from severe acute malnutrition.

The main goal of this research is to study the factors determining the use of maternal and infant health services in the Ambovombe-Androy district, which regularly benefits from different humanitarian interventions. Does the significant and recurrent presence of humanitarian workers in the district improve the use of care by pregnant women and children under five? Our main hypothesis was that humanitarian actions play a role in improving the offer and use of maternal and infant health services, even though the use of care depends on the interaction of different socioeconomic, geographical, environmental and cultural variables. In terms of maternal health, we will study the factors influencing the use of PNCs and delivery in health centres. In terms of infant health, we will identify the

[3] Delivery assisted by qualified medical personnel

[4] In the region, only 49% of the population has access to drinking water. PTFs supply water cisterns in BHCs, and water cards are distributed to pregnant women during PNCs and delivery, enabling them to access free water every week.

[5] This kit contains an isotonic saline solution, a glucose serum, a catheter and drip, oxytocin, metronizadole, alcohol, cotton, plasters, suture thread and two pairs of gloves. Some kits also contain a clamp for the umbilical cord.

factors influencing the use of preventive care and nutrition advice, and the use of curative care in the case of illness.

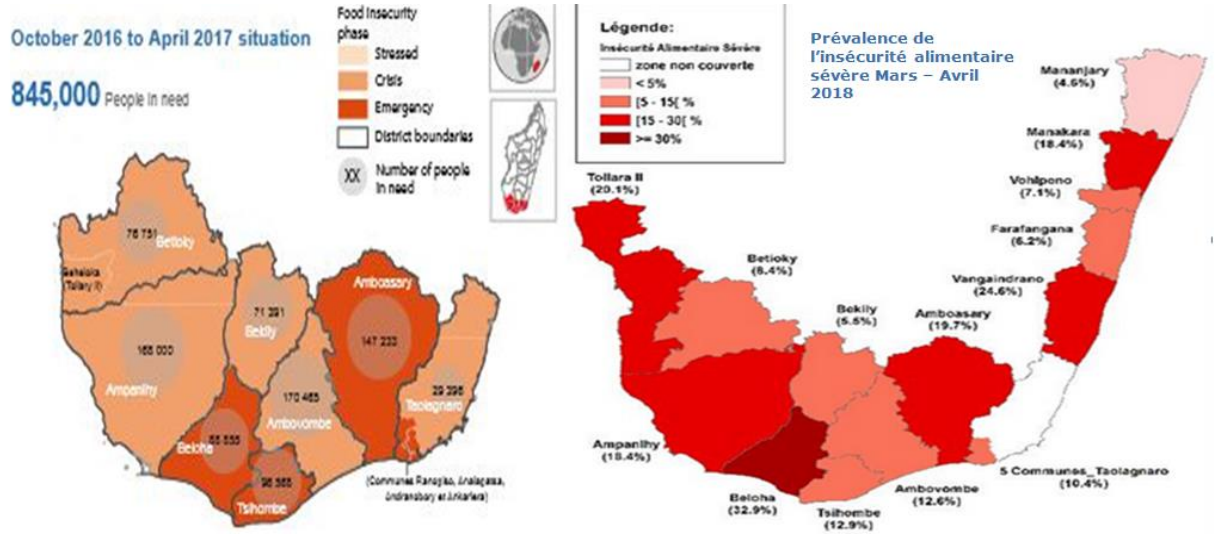
Methodology

This study received authorisation from the Ethics Committee of the Ministry of Health in August 2017 and comprises two related sections: one quantitative and one qualitative. A large part of the study questionnaires and interview grids was taken from the RESOFEN project (Recours aux soins des femmes enceintes et des enfants de moins de cinq ans à Madagascar[6]).

The area of study

Androy has a semi-arid climate with low precipitation, the intensity of which is significantly decreasing every year. The FAO/WFP evaluation mission (2016) noted a significant decrease of 112mm in 2016 compared to the average. Irregularities in rainfall degrade soil and lead to a decrease in production capacity for staple crops of 30 to 80% (BNGRC, 2016). Androy therefore experiences recurrent episodes of food insecurity (map n°1).

Map 1: Prevalence of food insecurity in the south of Madagascar



Source : WFP, 2017,2018

[6] **This project developed from a collaboration between young researchers in maternal and infant health at the Centre for Population and Development (UMR 196-IRD-Université Paris-Descartes), the Research Centre for Development at the Université Catholique de Madagascar and the Institut Pasteur in Madagascar. The project is financed by the IRD, by means of funding for IRD Young Associate Teams (JEAI), and covers the period between 2015 and 2018, and by UNICEF for 2017. The aim of the project is to study the socio-economic, psycho-social and cultural factors influencing recourse to preventive and curative care amongst pregnant women and children under five.**

In Ambovombe-Androy, the rate of food insecurity rose from 27% to 41% between 2014 and 2015 and to 48.6% in 2016 (OCHA, UNICEF and BNGRC, 2015, 2016, 2017b). The survival situation means that fundamental needs of households are often unmet, including food, education and health. Indeed, over the same period, the rate of acute malnutrition went from 6.7% to 8.4% from 2014 to 2015, and to 14.1% in 2016 (idem). In 2016, 37% of households affected by malnutrition withdrew their children from primary school (idem), and amongst the under-fives, the retrospective mortality rate associated with malnutrition is 5.9% (idem). In terms of maternal health, deprivation can be reflected in the absence of PNCs and by births unassisted by qualified medical personnel. Amongst children, deprivation takes the form of absence of use of care in the case of illness and absence of hygiene. Emergency humanitarian interventions generally concern care for malnourished people in specialised centres, the distribution of food and drinking water. Prevention programmes aim to reduce the vulnerability of households by periodic transfers of money to targeted vulnerable households[7], support in the use of improved seeds that are better adapted to the area's climate, support for the school canteen, nutritional advice for pregnant and breastfeeding women, the implementation of community sites to raise awareness and to care for malnourished children, provision of drinking water, etc.

The people of Androy, known as *Antandroy* or *Tandroy*, have a social structure based on the respect of ancestors and notables, especially those from the paternal line. It is a very codified polygamous society, whose socio-economic organisation depends on ancestral rules of clans and lineages. Society is also shaped by many beliefs, taboos and powers, including the power of sorcerers, diviners and spirits. The *Antandroy* are farmers and pastoralists, namely of zebus. The zebu is considered sacred and holds an important place in families' daily and spiritual lives. Having numerous zebu heads is a sign of wealth and confers high rank to families in society. During the different death ceremonies or requests for benediction from ancestors, honour is measured according to the number of sacrificed heads. Hence, households' economic activities often aim towards the acquisition of zebus.

In the daily life of *Antandroy* families, the patriarchal form of society implies distinctive roles for men and women. These roles are often unfavourable to women, who have an inferior status to men. Women are often victims of domestic violence and 78.2% of victims accept this situation (MICS4, INSTAT-UNICEF, 2012). Women do not inherit land and in polygamy, it is the man who attributes a piece of land to each of his wives for them to cultivate. Men decide on the distribution of the harvest and woman have sole responsibility, according to the land attributed to them, for the subsistence, health and education of the **children (Maharetse, 2015). This situation therefore partly explains the precarious health situation of women and malnutrition amongst children.**

[7] **Amongst others, households with children under five.**

Sampling procedure

All of the districts in the *Androy* region benefit from the same humanitarian interventions in the field of maternal and infant health. The Ambovombe district, the capital of the region, was therefore chosen as the site of the study since it allows for representation of both urban (Commune of Ambovombe city) and rural (Ambohimalaza and Ambanisarika communes) areas, and also allowed us to study two rural regions which are the same distance from the district capital[8]. Nevertheless, the households in the rural commune of Ambohimalaza also benefit from another programme of cash transfer; "*le fiavota*"[9]. A fund is paid monthly to vulnerable households with children under five. The project covers the period 2016-2019 and amounts to 30 000[10] Ariary (9.6 $ US) per month, or the equivalent of 16.7kgs of rice[11].

The study population consisted of two groups: pregnant women past the second trimester[12] and women who had given birth less than a year before. Part of the questionnaire was also addressed to two categories of women with children between 12 and 59 months.

The quantitative section

The estimate of the sample size was carried out with Epitools (alpha risk==0,05, Beta risk=0,2), and on the basis of health statistics from the Ministry of Health in 2015. The required size of the sample of pregnant women was of 246, or 82 in each commune, and 288 for women having given birth and parents of children under five, or 96 in each commune. At the end of the fieldwork, we were able to question 255 pregnant women and 303 women who had given birth.

Table 1: Distribution of women questioned according to their place of residence

	Pregnant women	Women who gave birth and parents of children under five
Urban environment		
Ambovombe	87	105
Rural environment		
Ambohimalaza	83	98
Ambanisarika	85	100
Total	255	303

Source: Study of maternal and infant health, Androy, 2017

[8] The district capital has a hospital centre where illnesses linked to childbirth, such as fistulae, are treated for free.

[9] A social protection programme based on complementary axes, including food security and nutrition. The project's priority targets are the most vulnerable households with children under five.

[10] The average exchange rate for 1 $ US in 2017 was 3116 Ar

[11] According to Madagascar's Rice Observatory, the average price of one kilo of rice in the first trimester of 2018 was roughly 1800 Ariary. Rice is the staple food for Malagasies. But in Androy, one of the main manioc-producing areas, maize and manioc are the main substitutes for rice.

[12] This period of pregnancy was retained since some pregnant women hesitated to visit for PNCs until the pregnancy was visible.

The qualitative section

We carried out 44 semi-directive interviews. In the households, we spoke with eight pregnant women, seven women who recently gave birth and parents of children under five, and four grandmothers. On the supply side, interviews were carried out with four heads of NGO programmes, four heads of BHCs and four community health agents[13], a diviner-healer and seven matrons on the traditional healer side. The interviews with the households enabled us to understand the processes of use of care and events which may have influenced them, relationships between patients and carers and the roles played by other members of the family, especially the grandmothers, regarding women's and children's health. On the supply side, the aim was to establish whether humanitarian organisations were working alongside the health system or whether their interventions were integrated into the health system.

Data analysis

Factors in the use of maternal health services

To estimate the probability of a pregnant woman having at least one PNC, we used a logistical model. The dependent variable (Y) is a binary variable with a value of 1 in the case of a PNC being carried out, and of 0 otherwise.

$$logit[P(X = x1, \dots xn)] = \beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n$$

The independent variables (Xi) taken into account are the socio-economic and geographical variables and the number of previous pregnancies, and βj indicates the regression coefficient or the net effect of each Xi variable on the probability of a pregnant woman having at least one PNC.

Since births in medical environments are still rare in Androy (13.8 % in 2015 20.8% in 2016, 28.5% in 2017), the analysis of this theme focused more on descriptive statistics and on information gathered from the interviews. The statistics were obtained using Stata software (version 13.0). The comparison tests of proportion (t-test) and the Student tests (ki-2) were used to check the existence or otherwise of a difference in access to care between the three communities. The p-value<=0.05 is considered to be statistically significant.

[13] are people designated by the population to ensure local recourse in the management of simple cases of the three main childhood illnesses: malaria, diarrhoea and pneumonia. Their role consists of managing simple cases, referring serious cases to the nearest BHC, managing a supply of medicine for the treatment of simple cases, leading awareness-raising and community mobilisation sessions in collaboration with heads of BHCs, carrying out house calls, monitoring sick children and reporting these activities to their referent BHC (MINSANP, 2012).

Factors in the use of infant health services

Preventive care for children under 12 months includes the post-natal consultation, weighing and measuring, vitamins, vaccinations and nutrition. The use of curative care concerns children between 0 and 11 months and between 12 and 59 months. We used descriptive statistics and the analyses were completed by thematic analyses from interviews and observation notes. We also carried out comparison tests of proportion (t-test) and Student tests (ki-2) to check the existence or otherwise of differences in access to care between the three communes.

Qualitative analysis

Qualitative analysis took place in two stages. The first aimed to produce a thematic tree with all of the themes and sub-themes used for the treatment of information. The seven following themes emerged from the interviewing process: care during pregnancy, birth, care for children and newborns, the implication of community health and nutrition agents, the impact of NGO interventions, and the collaboration between different actors of maternal and infant health. The second stage consisted in gathering passages from the interviews by theme and sub-theme in order to get a better idea of the supply and demand for care and the place of humanitarian organisations in the supply of maternal and infant health.

The use of maternal health services

On the national scale, major awareness campaigns aimed at pregnant women are developed to encourage them to visit health centres. These campaigns explain the advantages of the medical monitoring of pregnancy and birth. Studies show that these messages are well-perceived by women, but that different factors prevent them from effectively using medical services. On the one hand, there are barriers inherent in the supply: geographical distance and the state of the roads leading to the health centres, the relationships between patients and carers based on nuisance and humiliation for the patients, negotiation for services, etc (Pourette et al, 2015, 2018, Mestre 2014, 2018). On the other hand, individual and household situations can be obstacles to access to health: the domestic and economic activities assigned to women which they cannot renege on, the economic situation of the households which does not often allow for the payment of medical services. These factors contribute to the use of traditional practices during pregnancy and birth, including consultation with matrons or *reninjaza*[14] (Pourette et al op cit).

[14] Term referring to people designated by the community to care for women during the reproductive process. These people become matrons, because they come from families of matrons or because they have received a gift from God. Matrons intervene, sometimes from the point of conception, to help women get pregnant, during pregnancy to ensure a safe pregnancy, at the moment of delivery

The practice of PNC in Androy

Nearly all pregnant women (97%) accept the necessity of PNCs and 84% have had one. In the BHCs, PNCs are carried out by a midwife (in the case of Ambovombe and Ambohimalaza) or a nurse (in the case of Ambanisarika). Women generally choose to go to the BHC in their village. Nevertheless, in order to save time, some women go to the Ambovombe health centre when they go into town to fetch water.

Table 2 : Practice of prenatal consultation amongst pregnant women in 2017

	Total	Ambanisarika	Ambohimalaza	Ambovombe
Need to have PNC				
Yes	248 (97.3%)	84 (98.8%)	81 (97.6 %)	83 (95.4 %)
No	7 (2.7%)	1 (1.2 %)	2 (2.4%)	4 (4.6 %)
Have PNC (Pregnant woman having had at least one PNC)				
Yes	213 (83.5%)	77 (90.6%)	69 (83.1%)	67 (77.0%)
No	42 (16.5%)	8 (9.4%)	14 (16.9%)	20 (23.0%)
Total	255 (100%)	85 (100%)	83 (100%)	87 (100%)
Personne qui suit la grossesse				
Sage-femme	148 (69.5%)	17 (22.1%)	69 (100%)	62 (92.5%)
Infirmière	1 (0.5%)	60 (77.9%)	0 (0%)	1 (1.5%)
Matrone	1 (0.5%)	0 (0%)	0 (0%)	1 (1.5%)
Médecin	63 (29.6%)	0 (0%)	0 (0%)	3 (4.5%)
Total	213 (100%)	77 (100%)	69 (100%)	67 (100%)

Source: Authors, Study on maternal and infant, Androy, 2017

According to the interviews, the simultaneous use of the services of a matron and those of a health practitioner is common during pregnancy. Pregnant women who use the services of both systems recognise their respective benefits and the aim is to ensure a safe pregnancy: medical monitoring through the BHC and protection from harmful influences from the outside or spirit world through the services of a matron. According to the women, the PNC is useful for monitoring the health of the mother and the foetus, getting vaccinations, seeing the position of the foetus, receiving treatment in the case of illness and determining the stage of the pregnancy. The matron, for her part, mainly gives advice for the health of the woman and the foetus (nutrition, prohibitions, rituals, etc), and prepares tinctures from plants to give strength to the mother. The matron also offers services which

and sometimes beyond, to give advice regarding the health of the mother and newborn (Pourette, 2018).

are not offered in the BHCs, such as massages to relieve pain in the back or stomach, or to reposition a foetus which has been diagnosed as being incorrectly positioned[15].

Factors in the practice of PNC

We will first look at the costs associated with the practice of PNC, mentioned by some women as factors in the use of care. Indeed, even though BHC services are supposed to be completely free (52.6% of women paid nothing), some services entail expenses which the pregnant woman is not always in a position to meet. For those who did pay medical fees (47.3%), the average cost of the consultation was 4 826 Ariary[16] or 1,5 $ US or the equivalent of 2.7kg of rice. These expenses are significant, even though they cannot be considered to be catastrophic[17] (WHO, 2003). Indeed, they amount to less than 13.5% of the households' ability to pay.

Some women also said that they were accompanied when they had their PNC. The majority of these accompaniers (80%) stopped their economic activities and for half of them, this led to an economic cost. The loss of revenue was estimated at an average of 17 550 Ariary or 5,6 $ US, or the equivalent of roughly 10kg of rice.

Table 3 : Costs linked to PNCs for pregnant women (in Ariary)

	Ambanisarika	Ambohimalaza	Ambovombe
Average direct cost (medical fees)	6 188	2 000	6 954
Average indirect cost (transport and/or meals)	0	18 750	16 350
Total cost	6 188	20 750	23 304
Monthly income	69 760	178355	180 600
Capacity to pay (CTP)	46 042	117 714	119 196
Direct cost/CTP	13,4 %	1,7 %	5,8 %
Total cost/CTP	13,4 %	17,6 %	19,6 %

Source : Authors, Study on maternal and infant health, Androy, 2017

According to the interviews, another factor preventing pregnant women from having PNCs or having them late, around the 6th or 7th month of pregnancy, was the distance to the BHC, generally travelled in a cart or on foot. The women explained that the BHC is several hours' walk away and going there would exhaust them. Moreover, they could not abandon their chores or their daily work. Shame regarding their pregnancies was also highlighted.

[15] When the fœtus is not correctly engaged.

[16] Malagasy unit of currency

[17] Health expenses are considered to be catastrophic when they exceed 40% of households' capacity to pay, which is to say, of the average income once food expenses are subtracted. In Madagascar, food expenses account for an average of 66% of a household's total income (INSTAT, 2010).

To know the weight of these different variables (distance and living conditions) in the practice of PNCs, we resorted to an estimate, specifying the modalities associated with each variable and adding other control variables such as age, level of education, marital status, religion, place of residence and number of previous pregnancies. The results of the model show that amongst the retained variables, only religion and place of residence and the distance to the BHC were significant.

Table 4: Probability of women practicing prenatal consultations according to their characteristics

	OR[18]	p-value	OR	p-value	OR	p-value
Age (reference: 18-25 ans)						
Under 18	0.83	0.75	1.15	0.85	2.74	0.20
25-49 years old	1.12	0.79	0.97	0.94	0.63	0.44
Education (ref: illiterate and primary school)						
School (to 15)	0.89	0.79	0.85	0.71	0.88	0.78
High school	1.43	0.54	1.06	0.92	1.18	0.79
Religion (ref: Christian)	0.22***	0.00	0.22***	0.00	0.21***	0.00
Marital status (ref : partnered)						
Unaccompanied	1.41	0.40	1.64	0.27	1.36	0.53
CAP	1.09	0.49	1.16	0.31	1.16	0.33
Place of residence (ref: urban)						
Rural	2.92***	0.01	2.71**	0.02	2.63**	0.04
Distance (ref: <3km)						
3 to 5 km	-	-	0.53	0.26	0.41	0.14
5 to 10km	-	-	0.30**	0.02	0.28**	0.02
More than 10 km	-	-	0.30	0.11	0.30	0.13
Pregnancy n° (ref: first pregnancy)						
2<pregnancy<4	-	-	-	-	3.30*	0.08
More than 4 pregnancies	-	-	-	-	5.89*	0.07
Constant	2.31	0.62	1.72	0.76	0.68	0.84
Number of observations	236		236		236	

Source: Authors, Study on maternal and infant health, Androy, 2017

The probability of having a PNC is high when the woman is Christian. According to community health agents, the different Christian religions present in the region convey messages for health care (Morrison et al, 2014) and make their awareness raising work effective. Certain religions even offer health services to families in medical centres.

[18] Odd ratio (OR) is the probability ratio of using PNCs. If the OR is superior to 1 and the p-value inferior to 0.05, the probability of having a PNC is high and significant.

In rural areas, contrary to public opinion, the practice of PNC is more widespread. Women in rural areas are aware of medical services and look for care in BHCs. Nevertheless, this use is favoured by the geographical accessibility of the BHCs (in the case of Ambanisarika); free care and/or the distribution of donations. Indeed, according to our interviews, some women have a PNC as early as the second month of pregnancy or return for other PNCs in order to receive donations of water of mosquito nets, which are useful in their daily lives. PNCs are becoming more frequent in BHCs because they respond to basic needs for women. The guarantee of a safe pregnancy thanks to free or low-cost consultations, the distribution of medicines and vaccinations and medical exams for the mother and foetus are seen as more reliable and detailed than those of the matrons (carried out with medical equipment and analysis). The practice of PNCs also enables women to receive a health booklet for follow-up monitoring. Later, if the birth takes place outside of the BHC for various reasons, this booklet guarantees reception in the BHC in the case of complications and care that is not provided to the general community, namely vaccinations for the newborn. Nevertheless, these interventions are not efficient if the health centres are far away from the women's places of residence. Estimations from the models show a decrease in the likelihood of practicing PNCs when the distance is further than 5km.

Delivery

The majority of pregnant women (93%) think that matrons can assist a birth and 62.7% think they will give birth in a health centre. According to the interviews, birth can be assisted by matrons, especially since they have the necessary knowledge to ensure it goes smoothly. This social representation of the role of the matron, together with socio-economic, geographical and climatic circumstances at the time of birth often influence the women's choices regarding the use of the matron's services as a first resort. Moreover, the guarantee that the pregnancy carried no risks during the PNCs tended, depending on the circumstances, to make women choose the services of the matrons. Hence, despite the offer of birth kits in the BHCs, more than 50% of women in Ambanisarika and 65% of women in Ambohimalaza gave birth assisted by a matron. In the urban areas, however, births in health centres account for 51.4%. The Pearson test shows that there is a significant difference in use between the three communes communes (chi2 = 61.2343, Pr = 0.000). The distance of health centres largely explains this situation.

Table 5 : Women's delivery locations

	Overall	Ambanisarika	Ambohimalaza	Ambovombe
At home with a matron	154 (50.8%)	52 (52.0%)	64 (65.3%)	38 (36.2%)
At a Basic Health Centre	74 (24.4%)	38 (38.0%)	17 (17.4%)	19 (18.1%)
At a maternity or hospital	51 (16.8%)	4 (4.0%)	12 (12.2%)	35 (33.3%)
At home without health personnel	9 (3.0%)	5 (5.0%)	2 (2.0%)	2 (1.9%)
At home with health personnel	6 (2.0%)	0 (0%)	2 (2.0%)	4 (3.8%)
Private clinic or office	1 (0.3%)	0 (0%)	0 (0%)	1 (0.9%)
Other	8 (2.6%)	1 (1.0%)	1 (1.0%)	6 (5.7%)
Total	303 (100%)	100 (100%)	98 (100%)	105 (100%)

Source : Authors, Study on maternal and infant health, Androy, 2017

Women with a preference for the medical milieu explain that they go there for better monitoring. According to the interviews, the BHC is well-equipped and women can get medicine, namely injections against *sovoka*[19], a post-natal disease that can be fatal. Birth in a health centre or at hospital becomes unavoidable when the woman is at risk of complications. These risks are detected by the matron who, lacking equipment, then accompanies the pregnant woman to the BHC.

The main reasons for women to give birth assisted by a matron are the fear of giving birth in transit (21.5%) if they went to a health centre, financial problems (27.3%), practicality (13%) and the belief that childbirth is not difficult (15%). They can therefore neither predict when to go to the BHC to give birth, especially if they live far away, nor prepare financially for the birth given their economic situation. In the three communes, giving birth in the village BHC is 1.5 to 3 times more expensive than giving birth with a matron, or 1.2 to 2.2 times more expensive than giving birth in the public hospital in Ambovombe. Indeed, when women choose to give birth in health centres, they must cover meals, transport fees for people accompanying her and a sum of money which is a kind of recognition of the services rendered during the hospitalisation, on top of their medical fees (Mestre 2014, 2018 ; Bellas-Cabane[20], 2018).

[19] ***Sovoka* is associated with postnatal bloating when a woman who has given birth catches cold, but in modern medicine, the illness stems from a postpartum infection.**

[20] **Prologue to the book, « femme, enfants et santé à Madagascar », Dir Pourette D, Mattern C , Bellas Cabane, Ravololomanga, 2018.**

Table 6 : Average cost of childbirth according to the place of delivery (in Ariary)

Providers	Ambanisarika	Ambohimalaza	Ambovombe
Matron	60 106	40 477	63 202
BHC	181 842	142 353	103 974
Public hospital	156 500	64 250	68 243
Private clinic	-	-	60 000
At home, with a health agent	-	20 000	63 000
At home without assistance	13 360	5 000	15 000
Monthly capacity to pay	46 042	117 714	119 196
Average cost of a matron/ CTP	131 %	34 %	53 %
Average cost of BHC services/ CTP	395 %	121 %	87 %
Average cost of hospital services/ CAP	340 %	55 %	57 %
Loss of revenue for the accompanier	10 800	9 000	23 171
Average cost/income	15,5	5	12,8

Source : Study on maternal and infant health, Androy, 2017

The cost of giving birth in a BHC, especially in rural environments, is well above household's capacity to pay. It is, in Ambanisarika and Ambohimalaza respectively, 181 142 Ariary (58.4 $ US or two 50 kg bags of rice) and 142 353 Ariary (45.7 $ US or the equivalent of 79.1 kg of rice). Expenses linked to childbirth can therefore be considered to be a catastrophic expense. Extreme poverty amongst the households does not allow them to consider saving. Hence, when the moment comes, either the woman sells an animal or borrows enough to pay medical fees, or resorts to the services of a matron whose payment; although also above the capacity to pay in Ambanisarika and Ambovombe, can be deferred, paid in instalments or paid in goods rather than money (rice, chicken, goats, etc).

Women giving birth assisted by a matron must bring alcohol, thread and a knife to cut the umbilical cord. The cost of these items is negligible (3000 to 5000 Ariary, or 0.9 to 1.6 $ US). In relation to the costs incurred by giving birth in a health centre, the offer of a birth kit is therefore not an incentive for women.

Postnatal consultations

Less than a third (30.4%) of women who gave birth had a follow-up health visit after the birth. Most women said that they felt in good health, to explain the lack of consultation. For some, distance, time and financial resources prevented them from going to the BHCs.

According to the interviews, after childbirth, women must observe a confinement period which can last from several weeks to 6 months. During this period, the woman must keep warm and breastfeeding the newborn is a priority. In order to ensure the woman's recovery and encourage milk letdown, the family tries to bring extra food, like rice and meat, which the woman rarely has access to in daily life. Because of her fragile state, the woman's only

duty is to be careful not to catch any diseases, especially *sovoka*. It is therefore the responsibility of the family to bring the woman what she needs for hygiene and to take over her daily tasks. There is no external contact during this period and the midwife is only summoned in the case of illness. In this case, the child's first vaccinations are delayed, or the grandmother brings the child to the BHC on the day of the vaccination. Hence, women do not always receive the messages addressed to them by health personnel, namely those concerning exclusive breastfeeding (Rakotomanana *et al*, 2018).

The use of infant health services

Apart from neonatal consultations, mothers are made aware of prevention behaviours with regard to their newborns. In theory, prevention begins from birth with breastfeeding, followed by vaccinations and vitamins. Vaccinations and the distribution of vitamins can take place in BHCs according to established calendars or during the celebration of the mother and children's health week or SSME[21]. In terms of nutrition and hygiene, mothers are encouraged to go to community sites to get advice, and for weighing and measuring. In case of illness, the messages conveyed stress the importance of immediate consultation with a community health agent or at a health centre and warn against non-treatment or self-treatment (self-medication). Indeed, in Madagascar, there is a multitude of difference uses of care in the case of illness: medical consultation, traditional practices (Blanchy, 2007 ; Lefèvre, 2013), and self-medication via the formal or informal sector (Mattern, 2017, 2018). The choice usually depends on structural variables (distance from health centres, state of the roads), the households' financial situations, the representation of the disease and the member of the family concerned.

Prevention

In the three communes, more than 70% of newborns were taken to a health centre for a neonatal consultation. In rural areas, the good health of the child is the first reason for the absence of a visit. In urban areas, messages regarding the necessity of neonatal consultations seem to be getting through to the population because absences are linked more to financial reasons or to the fact that the visit was carried out by a community health agent. The use of other prevention services seems relatively high: more than 80% of newborns were brought in for weighing and vaccinations and 57.8% of them received vitamin A. The fact that only half the newborns received vitamin A can be explained by the specific periods of its distribution (SSME). Finally, the rate of unvaccinated children, 13.2%, seems high. For a third of cases, the reasons given were the distance and inaccessibility of health centres, for the rest, the parents thought that their children were too little to be vaccinated or that vaccinations would make them sick. Awareness campaigns therefore need to be implemented to inform parents on the aims of vaccinations, especially since the highest proportion of unvaccinated children is in Ambovombe where the health centres are supposedly more accessible (there is a significant difference in vaccination rates, higher in

[21] **The SSME is organised twice a year throughout the country. During this week, BHCs distribute vitamin A to children under five, vermifuges for children under five and for women who are less than four months pregnant, for free. Catch-up vaccination sessions are also held in BHCs or in people's houses by health agents in remote areas.**

Ambanisarika than in Ambovombe, p=0.04), and since campaigns for "catch-up vaccinations" during SSME week are not accepted by mothers who do not understand the relevance of these vaccinations and/or are scared of side effects brought on by recurrent injections (Ramaroson and Pourette, 2018).

Table 7 : Use of prevention services amongst children under five

	Ambanisarika	Ambohimalaza	Ambovombe
Neonatal consultations			
Yes	70 (71.4%)	70 (73.7%)	82 (74.5%)
No	28 (28.6%)	25 (26.3%)	28 (25.5%)
Total	98 (100%)	95 (100%)	110 (100%)
Reason for the lack of neonatal consultation			
The child is in good health	15 (53.6%)	14 (50.0%)	2 (7.1%)
Financial problems	6 (21.4%)	0 (0%)	5 (17.9%)
Access problems	2 (7.1%)	4 (16.0%)	3 (10.7%)
Misunderstanding of the offer	-	2 (8.0%)	5 (17.9%)
Visit with community health agent	2 (7.1%)	0 (0%)	6 (21.4%)
Visit with matron	2 (7.1%)	1 (4.0%)	0 (0%)
Other	1 (3.6%)	4 (16.0%)	7 (25.0%)
Total	28 (100%)	25 (100%)	28 (100%)
Weighing service for 0-11 months			
Yes	79 (80.6%)	80 (84.2%)	93 (84.5%)
No	19 (19.4%)	15 (15.8%)	17 (15.5%)
Vitamins for 0-11 months			
Yes	49 (50.0%)	65 (68.4%)	61 (55.5%)
No	49 (50.0%)	30 (31.6%)	49 (44.5%)
Vaccinations for 0-11 months			
Yes	89 (90.8%)	81 (85.3%)	93 (84.5%)
No	9 (9.2%)	14 (14.7%)	17 (15.5%)
Total	**98 (100%)**	**95 (100%)**	**110 (100%)**

Source : Authors, Study on maternal and infant health, Androy, 2017

Moreover, women also mentioned hygiene as a preventive behaviour. Nevertheless, the recommendations are not often applied due to lack of water or lack of access to water.

Nutritional recommendations for newborns include exclusive breastfeeding for the first six months. The majority of women who gave birth (97.5%) breastfed their children; but only just over half (56%) followed the recommendation. Of the three communes, the mothers from the rural commune of Ambanisarika practice exclusive breastfeeding the most. The difference is significant between the rural and urban communes. The proportion is higher in Ambohimalaza than in Ambovombe (p=0.00) and higher in Ambanisarika than in Ambovombe (p=0.00). Mothers in Ambohimalaza thought that maternal milk was insufficient for their newborns and mothers in Ambovombe introduced other foods out of habit. Habits are formed in the community, with the advice of older women (mothers, grandmothers, matrons). Hence, awareness-raising sessions from pregnancy onwards would shed light on the advantages of exclusive breastfeeding in comparison to non-exclusive breastfeeding. Indeed, whilst the advantages of breastfeeding are known, there are also widespread beliefs about the contribution of other foods to infants' development (Rakotomanana et al, 2018).

In terms of diet, in general, women are encouraged by community health agents to have a varied diet. In this regard, awareness raising sessions and culinary demonstrations by community health agents often suggest varied and multicoloured dishes. Nevertheless, this advice seems difficult to apply given the expenses they would incur, since available food is often limited to manioc and maize, and because in a patriarchal society, women's needs are often relegated to second place.

Table 8 : Breastfeeding of newborns and enrolment of children under five in nutrition programmes

	Overall	Ambanisarika	Ambohimalaza	Ambovombe
Exclusive breastfeeding of newborns				
Yes	170 (56.1%)	76 (77.5%)	36 (37.9%)	58 (52.7%)
No	133 (43.9%)	22 (22.5%)	59 (62.1%)	52 (47.3%)
Total	303 (100%)	98 (100%)	95 (100%)	110 (100%)
Reasons for non-exclusivity				
Insufficient milk	63 (47.4%)	7 (31.8%)	37 (62.7%)	19 (36.5%)
Habit(s)	53 (39.8%)	13 (59.1%)	15 (25.4%)	25 (48.1%)
For the baby's health	13 (9.8%)	1 (4.6%)	6 (10.2%)	6 (11.5%)
Other	4 (3.0%)	1 (4.6%)	1 (1.7%)	2 (3.8%)
Total	133 (100%)	22 (100%)	59 (100%)	52 (100%)
Enrolment in a nutrition programme for 12-59 month olds				
Yes	177 (68.6%)	61 (79.2%)	50 (64.9%)	66 (63.4%)
No	81 (31.4%)	16 (20.8%)	27 (35.1%)	38 (36.5%)
Total	258 (100%)	77 (100%)	77 (100%)	104 (100%)

Source : Study on maternal and infant health, Androy, 2017

Newborns who are brought to community sites for weighing are signed up to the list of children receiving plumpy-nut donations for the fight against malnutrition. For 12-59 month olds, there is a clear increase in the number of children enrolled in infant nutrition programmes. In 2017, overall, the rate is 68.6%, compared to 34.5% in 2015 (Health Statistics Service, *op.cit*). Nevertheless, the difference is significant between the communes: lower in the rural commune of Ambanisarika than in the rural commune of Ambohimalaza (p=0,01), and higher than in the urban commune of Ambovombe (p=0,00).

Curative care for newborns and children under five

Over the course of the last year, 80.1% of newborns and 67% of children between 12 and 59 months were declared to be ill. And yet, around 61% of children under one year and 58.7% of children between 12 and 59 months who were ill were not taken to see a health agent. Hence, the population seems to attribute different recourses according to their health problems. Indeed, community health agents offer local, low-cost health services[22], but they are not often consulted (22%), especially in the rural commune of Ambohimalaza (20.6%). In the urban commune of Ambovombe and the rural commune of'Ambohimalaza, the proportion of sick children brought to traditional healers is rather high (22.3% and 30.9%). However, in the rural commune of Ambanisarika, where there are the highest rates of use of maternity services, the rate of recourse to the medical milieu in the case of childhood illness is also the highest.

Table 9 : Care for children under five

	Overall	Ambanisarika	Ambohimalaza	Ambovombe
Children between 0 and 12 months ill in the last 12 months				
Yes	243 (80.2%)	80 (81.6%)	74 (77.9%)	89 (80.9%)
No	60 (19.8%)	18 (18.4%)	21 (22.1%)	21 (19.1%)
Total	303 (100%)	98 (100%)	95 (100%)	110 (100%)
Visits to a health centre for 0-12 month olds				
Yes	95 (39.1%)	42 (52.5%)	24 (32.4%)	29 (32.6%)
No	148 (60 .9%)	38 (47.5%)	50 (67.6%)	60 (67.4%)
Total	243 (80.2%)	80 (81.6%)	74 (77.9%)	89 (80.9%)
Children between 12 and 59 months ill in the last 12 months				
Yes	225 (87.2%)	63 (81.8%)	69 (88.3%)	94 (90.4%)
No	33 (12.8%)	14 (18.2%)	9 (11.7%)	10 (9.6%)
Total	258 (100%)	77 (100%)	77 (100%)	104 (100%)
Visits to a health centre for 12-59 month olds				
Never	132 (58.7%)	30 (47.6%)	47 (69.1%)	55 (58.5%)
At least once	93 (41.3%)	33 (52.4%)	21 (30.7%)	39 (41.5%)
Total	225 (100%)	63 (100%)	68 (100%)	94 (100%)

[22] **Community health agents are trained in the management of the three main childhood illnesses: malaria, pneumonia and diarrhoea. They carry out awareness-raising campaigns with households regarding the importance of consulting in the case of illness, and regarding hygiene, etc.**

Visits to community health agents for 12-59 month olds				
Never	151 (67.1%)	34 (54.0%)	54 (79.4%)	63 (67.0%)
At least once	74 (32.9%)	29 (46.0%)	14 (20.6%)	31 (33.0%)
Total	225 (100)	63 (100%)	68 (100%)	94 (100%)
Number of visits to traditional healers for 12-59 month olds				
Never	174 (77.3%)	54 (85.7%)	47 (69.1%)	73 (77.7%)
At least once	51 (22.7%)	9 (14.3%)	21 (30.9%)	21 (22.3%)
Total	225 (100%)	63 (100%)	68 (100%)	94 (100%)
Method of consultation if recourse to traditional healer				
Simultaneous with modern system	28 (54.9%)	6 (66.7%)	10 (47.6%)	12 (57.1%)
Alternating with modern system	18 (35.3%)	3 (33.3%)	8 (38.1%)	7 (33.3%)
Exclusive recourse to traditional system	5 (9.8%)	0 (0%)	3 (14.3%)	2 (9.5%)
Total	51 (100%)	9 (100%)	21 (100%)	21 (100%)

Source: Authors, Study on maternal and infant health, Androy, 2017

The identification of illness or of certain symptoms greatly influences parents' therapeutic decisions. Illnesses are first dealt with in a domestic manner, and remedies are varied and on different levels: self-medication using the traditional pharmacopeia or modern medicine[23], consulting a diviner-healer for illnesses of "spiritual" origin, and medical consultation, if symptoms persist or do not feature in local knowledge. Illnesses are generally classified into three categories: simple or normal illnesses, serious illnesses, and local or traditional illnesses. Simple or normal illnesses include common[24] and recurrent illnesses in children. These illnesses are considered to be easy to manage and they are self-treated. The consumption of pharmaceutical medicines for common illnesses has become a habit amongst Malagasies (Mattern, 2018). The known efficiency of these medicines on symptoms during previous episodes of illness often leads parents to use them. Nevertheless, alongside pharmaceutical products, mothers also prepare tinctures according to advice from neighbours or *ndadybe* (grandmothers). Plant-based remedies are efficient treatments against coughs, diarrhoea and fever and tinctures are used regularly, even in the absence of illness, to keep children in good health. According to the mothers, a child is considered to be ill when he grows idle and seems tired and morose. Fever, coughs and diarrhoea can follow, but these symptoms do not allow for direct identification of the illness. These are common illnesses, the symptoms of which can give rise to different interpretations. Hence, a high fever can be considered to be the beginnings of malaria or a sign of *tambiho* (a convulsion), an illness associated with the traditional. Parents consider an illness to be serious if the child refuses to drink water, is nauseous or will not go out to play. At this stage, parents seek out more specialised care amongst traditional healers or health

[23] The informal sale of medicines in village groceries is very widespread.

[24] Like influenza, colds or malaria.

personnel. Because of the distance and accessibility of health centres, and the costs of its use, parents only go there when the illness seems serious or when treatments used previously have not led to any improvement after a few days (at least three days). The mother takes this decision with her husband, after discussing what needs to be done to cure the child. The interviewees explained, moreover, that injections and medicines from the BHC would necessarily cure the child. They also stated that sick people were given a good reception and that the children would be examined. In some cases, the use of modern care services is also accompanied by consultations with a traditional healer. Simultaneous consultations imply that mothers are pen and receptive to the modern health system, but have not yet renounced the traditional system. For these women, the two systems are complementary. Women who use the services of a traditional healer in alternation with the services of medical personnel are making an informed decision. Women recognise the benefits of each system and choose to get the best of both. Consultation with traditional healers can take place at different stages of the illness, and for different reasons. From the very beginning of the illness, from fear of sprains or *hevo* (hurt fontanel), the child is generally sent to the matron. She is recognised in the village for the efficiency of her treatment in this area. The matron generally carries out massages to relieve sprains and pain. In the case of *hevo*, she may determine and confirm the disease and the prepare infusions for treatment. In the case of a spiritual illness such as *tambiho*, the child is taken to the diviner-healers. A spirit or spell is suspected of being at the root of the illness and the use of injections or pharmaceutical products is considered harmful, if not fatal for the child. Visiting a healer ensures the child's healing and the efficiency constitutes proof of the origin of the illness. Interviewees confirmed that doctors are aware of these cases. Hence, traditional healers, like health personnel, are called upon the event of the failure of the other.

Perception of different health actors, their roles, and the impact of their activities

Generally speaking, the different actors in the field of maternal and infant health already have clearly determined roles. Hence, from the population's point of view, the main role of health centres is to dispense preventive care, especially vaccinations, PNCs and screening for diseases. Depending on the representation of the illness, health personnel can also cure. Community health and nutrition agents, alongside their roles of managing childhood illnesses and monitoring children's nutrition, are generally seen as intermediaries between the population and different aid services for the population. Their main role is to raise awareness and spread information. Finally, the traditional healers, and especially the matrons, are responsible for childbirth, certain treatments for newborns such as massages and curative care for some illnesses. Diviner-healers deal with illnesses of a spiritual nature.

On the actors' side, the roles are also distinguished. Aid organisations (NGOs and TFPs) are in charge of implementing support programmes amongst the population and channelling donations. These organisations work with BHCs and community health agents. NGOs give donations of medicines, mosquito nets and plumpy-nuts to the BHCs. In terms of intervention in maternal health, BHCs care for children affected by severe malnutrition. Community nutrition agents, who are paid by the projects, are in charge of raising

awareness. Weighing and measuring enables them to establish a list of malnourished children. Community health agents, for their part, raise awareness regarding PNCs, vaccinations, family planning, screenings, hygiene and care for children suffering from diarrhoea, malaria, and acute respiratory infections. As for traditional healers, according to the matrons, their intervention in maternal health consists of sending complicated cases or cases they cannot manage to the BHC. Diviner-healers do not deal with maternal and infant health. They take care of specific illnesses such as fractures and illnesses of spiritual origin requiring rites for the treatment to be effective.

According to BHC officials, different interventions in favour of maternal and infant health contribute to the increase in the attendance rate of BHCs by pregnant women, especially for PNCs and by mothers for vaccinations and care for malnourished children. According to doctors, these interventions also contribute to lowering infant mortality rates in the region and to the general improvement of children's health. Nevertheless, in spite of the different collaborations which already exist, difficulties remain in order to make interventions more efficient.

Collaborations and difficulties as seen by different actors

Attention must be given to the ends sought by different actors in collaborations and to different methods of collaboration to implement (Pourette 2018, Olivier de Sardan 2018). Which forms of collaboration would allow each actor to be recognised? How can the distinction of roles be "exploited" to improve access to care? Indeed, medicalised births and the rate of recourse to medical care in the case of childhood illnesses remain low. In terms of maternal health, it is tolerated that matrons assist births when the health centre is more than 5km away (Quashie et al, 2014). In the Ambovombe-Androy district, matrons were trained by BHC staff for births in the event of the woman preferring to give birth outside of the medical milieu. Matrons were then encouraged to send all of their patients to the BHC for PNCs and delivery. Whilst matrons consider this training to be a kind of collaboration with the doctors, the latter do not feel that there is any cooperation with the matrons because of their lack of qualifications and the cases which they refer to the BHC which are all complicated cases. In terms of infant health, the Integrated Childhood Disease Management Program has been implemented, but the rate of use remains low, especially due to the family management of illnesses.

In order to increase attendance rates at the BHCs, especially for births and consultations in the event of illnesses, awareness and information campaigns regarding the advantages of modern care must continue and awareness campaigns regarding the severity of symptoms must be carried out. There is, however, a real need for cooperation between NGOs, BHCs, community health agents and traditional healers to convey the same message to the population. During the awareness campaigns or during field visits by NGOs, matrons can be mobilised together to raise awareness amongst NGOs of the roles they play in the fight against maternal and infant mortality, and the importance of referring women to BHCs. Community health agents already intervene in order to inform people of the available services in the BHCs and matrons could raise awareness about the fact that BHCs have effective equipment and medicines to prevent diseases. In the same way, awareness-raising

based on the fact that the birth kit contains a medicine against *sovoka* could be more of an incentive for giving birth in health centres, inasmuch as this illness is known to be dangerous and fatal and there is no treatment for it in the community. Moreover, for BHCs, different forms of recognition by heads of health centres could motivate matrons to accompany women to the BHCs during childbirth. The midwives, for example, could entrust the matrons with tasks appropriate for their skills, such as support for the labouring mother or the cleaning of equipment (Pourette, 2018). For maternal and infant health, the interventions of traditional healers, who are already known for their healing role amongst the population, could be focused on raising awareness.

In terms of aid, difficulties also emerge with regards to the collaboration between NGOs BHCs and community agents. On the one hand, there are the NGOs, whose practices must respond to the financial constraints of their sponsors (Olivier de Sardan, 2017, 2018) and to their priorities (Lavigne Delville, 2013). On the other hand, there are the local actors whose behaviours are influenced by different aims: obtaining aid, personal gain (Olivier de Sardan, 2007, Ridde, 2010), or a real desire to improve the situation (Olivier de Sardan, 2018). In Ambovombe-Androy, aid is first channelled through the NGOs, then distributed to BHCs or to villages during the campaigns. BHCs then establish lists of pregnant women receiving donations (all women who visit the BHC are included on this list), and community nutrition agents establish a list of malnourished children. Disputes often emerge when the community nutrition agents have to validate the lists and distribute the donations. Indeed, community nutrition agents include all children, including non-malnourished ones, on the list, in order to encourage attendance at the community sites and BHCs. A reduction of this list by heads of BHCs is therefore seen as proof of bad faith. At another level, the lists are also refused by some heads of *fokontany*[25], who have to sign off on them because they receive part of the donations. Finally, the actions of NGOs depend on the funds provided. Answers to calls for donations often fall short of the necessary amounts and interventions do not target everyone concerned. Given this situation, pregnant women, following the recommendation of community nutrition agents, visit BHCs to be put on the list and in the hope of benefiting from donations at the next distribution. What forms of collaboration can be implemented in order to enable proper identification of targets without reducing attendance of sites and BHCs?

[25] The main administrative head of the village

Conclusion

In areas strongly affected by climate hazards, issues surrounding humanitarian health are complex because they go beyond one-off health aid following the advent of a hazard. The main aim of this study was to identify the factors influencing different uses of care amongst pregnant women and children under five in one of these areas, and the reasons behind them. Beyond the traditional analysis of the situation of the supply (availability of the offer, geographical accessibility, etc) and the demand (individual situations, socio-economic variables, etc), we investigated the role of humanitarian interventions in the improvement of the health of women and children. Generally, awareness campaigns lead to an increase in visits to health centres, since they inform the population of the distribution of donations for those who go there. They also improve understanding amongst the population with regard to modern care and health in general (hygiene, nutrition, and vaccinations). Moreover, direct health interventions can have better results in rural areas (in the case of Ambanisarika) than in urban areas (in the case of 'Ambovombe), and in communes which do not receive financial aid (in the case of Ambanisarika) compared with communes where households do receive it (in the case of Ambohimalaza).

The distribution of donations as an incentive to use health services can work or not, depending on the needs of the population concerned. Hence, the rate of PNCs went up because women were seeking a guarantee of a safe pregnancy and because water donations are vital in this area which is prone to long periods of drought. The results also reinforce the conclusions of recent studies (Andrianantoandro et al 2018, Pourette et al 2018) on maternal and infant health. Obstacles to access to care remain distance from health centres and different costs incurred by the recourse to modern care (transport costs, medicine prices and potentially fees for medical procedures). The cultural variable can reinforce these two factors if, in common knowledge, there are efficient traditional practices and/ or if distinctions are made between the roles of different health actors. In this case, donations are not an incentive (the case of childbirth), and the improvement of access to care for the population must necessarily involve an improvement of the offer and the collaboration of all of the actors concerned (traditional healers and health personnel).

In 2017, the Ministry of Health launched universal healthcare coverage in two pilot areas. Universal health coverage includes consultations, medicines, surgical interventions, hospital rooms and transport from BHCs to hospital. People can sign up for universal healthcare coverage with the *fokontany* for an annual fee of 9000 Ariary (or 2.9 $ US) per person, and each individual can benefit from care in the BHCs and Regional Hospital Centres. Universal healthcare coverage resolves the issue of cost but the main challenge for the Ministry of Health remains the scaling up of the programme. Geographical accessibility remains a significant obstacle in use of care. In terms of maternal health, giving BHCs equipment and machines that would be able to specify more precise dates for births would enable women and their families to decide when to leave their homes to give birth. Finally, awareness campaigns amongst the general population must continue in order to improve the use of curative care, especially amongst children. Nevertheless, a real collaboration between traditional healers and health personnel is necessary for a change in behaviour: carrying out

awareness campaigns together in order to convey the same message and reinforcing this message by accompanying women to health centres. This mutual assistance, however, should be rewarding for both parties.

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