Healthcare Behaviour During a Health Crisis: The Case of Covid-19 in Madagascar

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HCD-CCS-008

AFRICAN ECONOMIC RESEARCH CONSORTIUM
CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

Bringing Rigour and Evidence to Economic Policy Making in Africa

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AERC Working Paper HCD-CCS-008
African Economic Research Consortium, Nairobi
July 2024

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are, however, those of the author and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

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List of abbreviations

CHWs	Community Health Workers
ERISC	“Enquête Rapide sur l'Impact Socio-Economique du Covid-19 à Madagascar” or Rapid Survey on the Socio-Economic Impact of Covid-19 in Madagascar
HC	Health Centre
INSTAT	National Institute of Statistics
MICS	Multiple Indicator Cluster Survey
SDG	Sustainable Development Goal

Abstract

A health crisis can affect the attitude towards healthcare seeking of the population. During the COVID-19 pandemic, two situations arose: people either sought care out of caution and vigilance, or because of the fear of contracting the virus and the health restrictions, they did not consult the healthcare facilities. This paper aims to analyze the effects of a health crisis such as that of COVID-19 on the use of healthcare in Madagascar. Two diseases, diarrhoea and fever, are considered. Fever is a common symptom of COVID-19, and diarrhoea is one of the causes of morbidity in Madagascar and a less common symptom of the pandemic. Using data from the Multiple Indicator Cluster Survey in 2018 and the Rapid Survey on the Socio-Economic Impact of COVID-19 in Madagascar in 2020 and considering the same individuals surveyed in 2018 and 2020, after verification of the endogeneity, the absence of it was raised. Probit models without instrumental variables are used. During the pandemic, in the case of diarrhoea, faced with the fear of a pandemic, people have sought other alternatives, such as Community Health Workers (CHWs), which is considered less risky than health centres (0.33; p-value=0.05). In the case of fever, people out of caution, prefer to consult health centres rather than self-medicate (-1.86; p-value=0.00). People's behaviour differs according to the symptoms of their illness, diarrhoea being less well-known and less frequent as a symptom of Covid-19 than fever.

Key words: *Madagascar, COVID-19, Access to Healthcare, Diarrhoea, Fever, Health Centre*

Acknowledgements

We thank the African Economic Research Consortium for the support to this study.

1. Background

Healthcare use refers to the use of healthcare services to prevent and cure health problems and promote health and well-being. Promoting the use of healthcare will thus help to achieve Sustainable Development Goal (SDG) 3, which calls for "Ensuring healthy lives and promoting well-being for all at all ages". However, a health crisis can hamper the achievement of this goal. A health crisis is characterised by a deterioration in health status, limitation of daily activities and sudden disruption of health services. It may be an epidemic or a pandemic, such as COVID-19, which has been on the rise since 2020. Numerous cases have been detected around the world, and the availability of human resources and healthcare services has been severely affected, as COVID-19 cases have overloaded the healthcare system.

Symptoms of COVID-19 vary from individual to individual, ranging from an asymptomatic infection to a severe form of it. In the case of COVID-19, fever is a common symptom of the pandemic, with more than half of sufferers experiencing it; diarrhoea is less common, with 4 to 5% of cases suffering from it. In addition, fever is a symptom of other illnesses, such as malaria and dengue fever. Although fever is a defence mechanism in the event of infection, not always requiring treatment except in the event of aggravation, during the pandemic period, the WHO recommended that people in areas where malaria or dengue fever is rare should consult a professional immediately in the event of fever[1]. In fact, the aim is to detect whether the fever is a sign of COVID-19, requiring screening in order to isolate the sick person to prevent the disease spreading, or if it is a sign of another disease requiring treatment of the disease in question.

In Madagascar, for the year 2020, the country recorded 17,714 cases of COVID-19 and 261 deaths (WHO and Ministry of Health data, 2021). As a result, containment measures have been put in place to limit the spread of the virus. For other illnesses, such as diarrhoea and fever, although these symptoms may appear in the context of COVID-19[2], a drop in prevalence compared with 2018 was observed in 2020. For diarrhoea, the proportion of individuals presenting with this illness two weeks prior to the surveys fell from 13.8% in 2018 to 6.8% in 2020. For cases of fever, it fell from 17% in 2018 to 5.7% in 2020. Furthermore, it has been noted that healthcare-seeking behaviour differs from one individual to another and according to disease. In fact, the percentage of individuals suffering from diarrhoea who consulted a health centre

(public or private) fell slightly from 62% in 2018 to 59% in 2020. However, for fever, this rate increased from 66% in 2018 to 86% in 2020. Therefore, the question that arises is "to what extent can a health crisis affect the use of healthcare?". Specifically, the objectives are to:

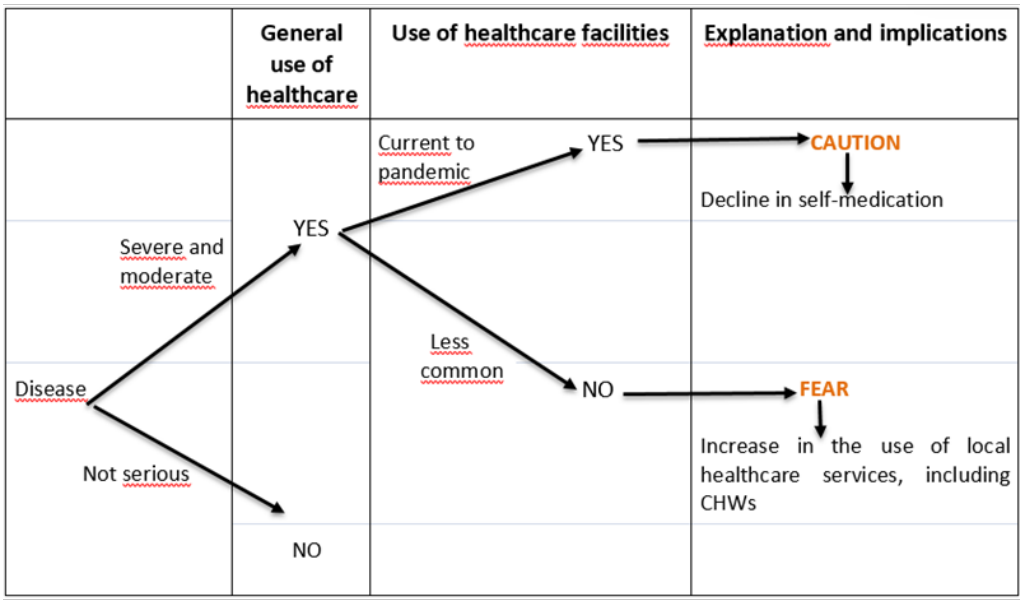
- Study the effects of COVID-19 on the use of healthcare in general. Consulting health centres,CHWs, traditional healers and practicing self-medication constitute healthcare use. In fact, the individual may do nothing facing the disease. This was the case for 48% of diarrhoea cases and 51% of fever cases in 2018 (INSTAT data, 2019). According to Wellay et al. (2018) and Razakamanana (2021), the perception of the nonseriousness of the disease, the financial problem, and the problem of geographical access can explain the non-use of healthcare. Furthermore, in the context of COVID-19, this non-use can be explained by mobility restrictions, social distancing measures and fears of contracting the virus. In the context of this research, we assume that COVID-19 has led the population to seek treatment by any means out of fear of the pandemic.

- Determine the effects of COVID-19 on health centre attendance: did caution and fear lead people to seek treatment and go directly to health centres as soon as a symptom of COVID-19 appeared, or did they avoid health centres to avoid contracting the virus? In fact, it has been observed that people's behaviour differs according to the illness (diarrhoea or fever).

- Identify alternative ways for people to seek healthcare during the pandemic. It has been noted that in the case of diarrhoea, there has been an increase in the use of healthcare in general but a drop in visits to health centres. The third objective is to identify other alternatives for individuals seeking healthcare.

The hypotheses concerning the healthcare-seeking behaviour of individuals can be summarised as follows:

Figure 1: Hypotheses related to the healthcare-seeking behaviour of individuals



According to Xiao et al. (2021), in regard to seeking healthcare, individuals either seek treatment right away from caution and vigilance against COVID-19, or, out of fear of contracting the virus, they avoid health facilities. In addition, mobility restrictions, social distancing measures and fears of contracting the virus in health facilities may also explain the renunciation of routine healthcare, particularly preventive visits. Then, the overload of work to bring the pandemic or epidemic under control can lead to the interruption of other routine activities. During Ebola in 2014-2015, for example, Liberia and Guinea showed substantial reductions in the provision of maternal, child and reproductive health services, as well as interruptions in HIV, tuberculosis, and malaria testing.

Given these situations, previous papers have not identified the other alternatives people have for seeking healthcare in the face of the pandemic. Other than going to the health centre, what do they do to look after themselves? In fact, an increase in the use of other alternatives, particularly local healthcare, such as CHWs or traditional healers, may compensate for the drop in visits to health centres. Finally, behaviour may depend on a person's symptoms. Some symptoms, such as fever, are universally known to be linked (but not necessarily) to COVID-19, while others, such as diarrhoea, are less frequent and less well known.

2. Literature review

Most of the literature on the impact of COVID-19 on other diseases has concluded that COVID-19 led to a decline in the use of healthcare in the event of the occurrence of other diseases because of the supply of services and changes in the behaviour of healthcare seekers. On the supply side, the pandemic led to a disruption of healthcare services due to cases overloading the healthcare system. As a result, other diseases have been neglected. Hogan et al. (2020) and Zawawi et al. (2020), studying the case of low-income countries such as Sub-Saharan Africa, have argued that efforts have been focused on the management of COVID-19, with insufficient budgets and human resources to ensure the prevention and treatment of other diseases such as HIV, tuberculoses and malaria. In terms of demand, some authors have argued that a health crisis can lead to an increase in healthcare use as soon as symptoms of a pandemic or epidemic appear due to caution or vigilance. However, with regard to COVID-19, most literature has noted a decline due to individuals' fear of contracting the virus from health facilities and health professionals and the difficulty of reaching health facilities due to mobility restrictions and social distancing measures. For example, according to the Global Fund (2020) report, in some countries, such as in Asia, antenatal first aid visits have fallen by 66% in the facilities surveyed, and consultations have dropped by 74% [20]. Furthermore, studying the case of rural South Africa, Siedner et al. (2020) detected a reduction of over 50% in child healthcare visits.

In view of these problems of access to healthcare, authors such as Hogan et al. (2020) and Weiss et al. (2020) have quantified the additional loss of life that could be caused by other diseases. Thus, using cases from low- and middle-income countries, Hogan et al. (2020) showed that deaths from HIV, tuberculosis and malaria over five years could increase by up to 10%, 20% and 36%, respectively, compared with if there were no COVID-19 pandemic. Weiss et al. (2020) estimated the burden of malaria using geospatial modelling approaches. For Madagascar, increases in cases were estimated at between 15% and 20%, and increases in deaths were estimated at between 60% and 80%.

Solutions to these problems have been proposed, including teleconsultation, which enables doctors and patients to maintain social distancing. However, teleconsultation can have its limits. Focusing on Africa, Mars (2013) suggests that poverty can be an obstacle. In fact, African countries still face problems of access to electricity and cell phones.

3. Methods

Data: matching of individuals surveyed in 2018 and 2020

In this research, the data used are those from the ERISC survey (Rapid Survey on the Socio-Economic Impact of Covid-19 in Madagascar) carried out in 2020 and that of MICS (Multiple Indicator Cluster Survey) in 2018. These are national surveys carried out by the National Institute of Statistics (INSTAT), funded by UNICEF and the World Bank. The two surveys present much the same information. However, the 2020 survey also included information on COVID-19. For both surveys, a two-stage stratified sampling method was used to select the survey sample. An indicator variable d was added to distinguish between the 2018 pre-pandemic period (d=0) and the 2020 pandemic period (d=1).

Only the same individuals who were surveyed in 2018 and surveyed again in 2020 were considered. The aim is to analyse the change in their behaviour following the occurrence of COVID-19. To identify the same individuals, the "exact matching" method was used, considering the individual's region of origin, gender, age (age in 2020 minus two years for age in 2018) and level of education of the head of the household to which the individual belongs. This is a matching method consisting of identifying observations with identical covariate values in two bases, treated and control [26]. In our case, these are the 2018 and 2020 bases. For both surveys, we asked whether the individual had been affected by diarrhoea or fever two weeks prior to the surveys.

Description of variables

The model is based on that of Arthur (2012), who studied the determinants of maternal healthcare in use in Ghana. The author considered wealth score and other patient characteristics in his model. In our case, a few additions are made to Arthur's (2012) model [27], and the modified model is as follows:

$$P(Y_i = 1|X = x_1 \dots x_n) = a_0 + a_1 d + a_2 R \quad + a_4 x_1 + \dots + a_n x_n \quad \textit{Equation 1}$$

The endogenous variable is the probability of seeking healthcare. d_i is the variable of interest, the indicator variable used to capture the effect of COVID-19 on individual behaviour. It takes the value of d=1 during the pandemic period and d=0 in 2018 before the onset of the pandemic.

R is the wealth score; because the ERICS and MICS surveys do not contain information on income, the wealth score of the household to which the individual belongs was considered. In fact, this variable is considered better than income and expenditure, which are often unavailable or inaccurate in the case of developing countries (individuals being reluctant to provide their exact income for fear of taxation). The wealth score is a composite measure of a household's overall standard of living. It was previously calculated in MICS and ERICS from data on the characteristics of the household to which individuals belong (assets owned, building materials, access to water and sanitation, etc.).

X_i represents the control variables. These include the patient's gender (1=female; 0=male) and age, and the characteristics of the household to which the patient belongs, including the level of education of the head of household (1=primary and below, 2=secondary, 3=high school and above) and the household's region of residence (1=Central Highlands, 2=East, 3=West, 4=South, 5=North) and area of residence (1=rural or 0=urban) [29-30]. Only information available in both MICS and ERISC is considered as control variables. Finally, ε_i are the residuals

Y_i is the use of healthcare by individual i. Three models have been developed.

- Model 1 studies the effects of COVID-19 on the use of healthcare in general in the event of diarrhoea (equation 1.1) or fever (equation 1.2). *Y* is binary, with 1 indicating individuals who sought healthcare and 0 indicating those who did not. In fact, individuals may choose not to seek healthcare at all, particularly when they consider their illness not to be serious. However, in times of pandemic, the WHO has recommended that people should seek treatment as soon as any symptom of COVID-19 appears, without waiting for the disease to worsen, and to avoid the spread of cases. In addition, healthcare use means consulting modern healthcare providers, buying medicines after self-medication, taking medicinal plants after consulting traditional healers, or resorting to CHWs.

- Model 2 studies the effects of COVID-19 on health centre attendance for diarrhoea (equation 2.1) and fever (equation 2.2). *Y* is binary and equals 1 if patients consult health centres. Hospitals and public and private health centres are considered. It is equal to 0 if patients use CHW, self-medication or traditional healers.

- In model 3, we study the other alternatives available to individual in the event of diarrhoea (equation 3.1) and fever (equation 3.2) during the pandemic. In view of the health situation, do they prefer to use health centres or CHWs? or health centres or self-medication? or health centres or traditional healers?

Estimation method

The aim of this paper is to study the effects of COVID-19 on healthcare use. During the pandemic, health restriction measures were implemented in Madagascar. These measures aimed to limit the spread of COVID-19. However, these measures only concerned certain areas, specifically those with a high urban density and a highly mobile population. This situation, combined with measurement errors, could give rise to an endogeneity problem. In line with Gao et al. (2020) and Glaeser et al. (2022), we therefore consider mobility as an instrument [31-32]. In the case of Madagascar, it was specified whether individuals lived in an unconfined area or an area affected by the mobility restrictions. This variable is the instrumental variable C to correct the endogeneity problem (C=1=areas with restrictions and C=0=areas without restrictions). For the instrument to be valid, it must be correlated with the explanatory variable in question, and there must be no direct effect on the outcome variable. The Wald test of endogeneity is therefore used. The null hypothesis for this test is the absence of endogeneity.

The result of this test showed a p-value greater than 0.05 for the different models concerning the use of healthcare in cases of fever or diarrhoea, so probit models without instrumental variables are used. The *C* variable representing mobility restriction is considered as a control variable. The models are as follows:

$$P(Y_i = 1|X = x_1 \dots x_n) = a_0 + a_1 d + a_2 R \quad + a_3 C + a_4 x_1 + \dots + a_n x_n \quad \textit{Equation 2}$$

where Y is the endogenous variable, *d* is the COVID-19 indicator variable, R is the wealth score, C indicates areas where mobility restrictions have been implemented and X is the control variable.

For robustness, and in line with the studies of Li et al. (2020), the results of the logit estimation method are presented in the Appendix.

4. Results

Descriptive analysis

In terms of individuals, as many women as men suffer from diarrhoea or fever (49.3% vs. 50.6%, respectively). These diseases mainly affect children, with an average age of 6 years (standard deviation = 5 years). In fact, children are the most vulnerable to disease, as their immunity is low. During the pandemic period, 24% of individuals came from areas where mobility was restricted.

Regarding the characteristics of the households to which the individuals affected by these diseases belong, the majority of heads of household are men (84%). The average age of heads of household is 39 years (standard deviation=13), with a minimum of 15 years and a maximum of 86 years. In terms of level of education, 46.6% and 23.7% of heads of household had completed primary and lower secondary school, respectively (Table 1).

Table 1: Information on healthcare use for diarrhoea and fever (in %)

	Before COVID-19	During COVID-19	Difference: Chi2 (p-value)	Before COVID-19	During COVID-19	Difference: Chi2 (p-value)
	Diarrhoea			Fever		
Use of healthcare						
Yes	51.14	74.68	16.8*** (0.00)	60.58	68.52	2.74*** (0.09)
No	48.86	25.32		39.42	31.48	
Total	100%	100%		100%	100%	
Selected healthcare pathway						
Health centres	67.87	62.71	12.11*** (0.00)	67.03	86.49	15.63*** (0.00)
CHW	9.84	23.73		9.58	6.76	
Self-medication	19.57	11.86		20.03	2.70	
Traditional healer	2.51	1.69		3.37	4.05	
Total	100%	100%		100%	100%	

Sources: Data of MICS 2018 and ERISC 2020, Authors, 2023

An increase in the use of healthcare services in general was noted in 2020, whether for diarrhoea or fever. However, in the case of diarrhoea, a drop in visits to health centres was noted, while an increase was observed in the case of fever. In view of this situation, in the case of diarrhoea, an increase in the use of health centres in 2020 was noted. In the case of fever, in addition to recourse to health centres, recourse to traditional healers also increased slightly. However, self-medication decreased.

Impact of the COVID-19 pandemic on the use of healthcare services for diarrhoea and fever

Table 2 includes cases of diarrhoea and fever, whether simple, moderate or severe. The Wald test showed that there was no endogeneity problem. Thus, the probit estimation method without instrumental variables was used. During the COVID-19 period, the probability of seeking healthcare increased in cases of diarrhoea. In the case of fever, however, the relationship was not significant. Therefore, although fever is a widespread symptom of COVID-19, the fact that there was a pandemic did not have a significant effect on people's behaviour. Other variables, such as region of origin and wealth score, explain healthcare use. The higher the wealth score, the higher the probability of seeking healthcare was. Moreover, this probability is higher for the population residing in other regions than for those living in the central highlands, where the prevalence of the pandemic was highest.

Table 2: General use of healthcare for diarrhoea and fever: Probit estimate

	Diarrhoea	Fever
Covid-19	0.88***	0.19
	(0.18)	(0.14)
Gender	-0.00	0.00
	(0.06)	(0.05)
Head of household's level of education	0.02	0.04
	(0.05)	(0.04)
Age	0.06	-0.07
	(0.07)	(0.06)
Age2	-0.02	0.01
	(0.02)	(0.02)

continued next page

Table 2 Continued

	Diarrhoea	Fever
Region		
Central High Land (reference)		
East	0.43***	0.23***
	(0.09)	(0.07)
West	0.72***	0.24***
	(0.11)	(0.10)
South	0.45***	0.29***
	(0.09)	(0.08)
North	0.59***	0.39***
	(0.09)	(0.08)
Wealth level	0.13***	0.10***
	(0.04)	(0.03)
Lockdown	0.06	0.14**
	(0.07)	(0.06)
Constant	-0.43***	0.00
	(0.10)	(0.08)
Chi-2	99.12***	47.48 ***
R2	0.04	0.01
Wald test	0.42	2.26
Observations	1 851	2 614

Notes: the values in brackets are the standard deviation; ***, **,*, respectively significant at 1%, 5% and 10%.
Sources: data of MICS, 2018 and ERISC, 2020; Authors, 2023

Table 3 shows the use of health centres. It has been pointed out that in the case of diarrhoea, the fact that there was a pandemic had no effect on the use of health centres. However, the use of healthcare in general has increased for diarrhoea. The question then arises: if individuals did not consult health centres, what alternative did they choose (Table 4)? On the other hand, in the case of fever, among those who had done something about their illness, the pandemic prompted people to turn to health centres. This use of health centres also depends on the gender of the patient and the level of wealth of the household to which the individual belongs. When the patient is female, the probability of using a health centre is higher than when the patient is male. Also, the richer the household, the higher the probability was.

Table 3: Effects of COVID-19 on diarrhoea and fever attendance at health centres: Probit estimate

	Diarrhoea	Fever
Covid-19	-0,22	0,75***
	(0,20)	(0,23)
Gender	0,17*	0,15**
	(0,09)	(0,07)
Head of household's level of education	0,01	0,04
	(0,06)	(0,05)
Age	0,05	-0,07
	(0,10)	(0,08)
Age2	-0,01	0,01
	(0,02)	(0,02)
Region		
Central High Land (reference)		
East	-0,00	-0,03
	(0,14)	(0,11)
West	-0,28	-0,14
	(0,16)	(0,14)
South	-0,14	-0,12
	(0,14)	(0,11)
North	-0,24	-0,09
	(0,14)	(0,11)
Wealth level	0,37***	0,30***
	(0,07)	(0,05)
Lockdown	0,09	-0,00
	(0,10)	(0,08)
Constant	0,57***	0,54***
	(0,16)	(0,12)
Chi-2 proba	55,13***	86,64***
R2	0,05	0,05
Wald Test	0,56	0,00
Observations	935	1 537

Notes: the values in brackets are the standard deviation; ***, **,*, respectively significant at 1%, 5% and 10%.
Sources: Data of MICS, 2018 and ERISC, 2020; Authors, 2023

In Table 4, for diarrhoea, it was observed that individuals preferred to use community health workers (CHWs) rather than health centres during the pandemic. This could explain the non-significance of the relationship in Table 3. CHWs are volunteers who have been trained in the management of simple cases of illness. This choice also depends on the area of residence and the level of wealth of the household

to which the individual belongs. In fact, there is a preference for health centres over CHWs and self-medication when the patient is female and when household wealth is high.

Regarding fever, it has been observed that individuals prefer to consult health centres (HC) rather than self-medicate. This behaviour also depends on the level of wealth. In the case of fever, individuals from households with a high wealth score prefer to use the Health Centre rather than self-medication, CHWs or traditional healers.

Table 4: Other healthcare alternatives available to individuals in case of diarrhoea and fever during the pandemic: probit estimate

	Variables	CHW Vs HC	Self-medication Vs HC	traditional healer Vs HC
Diarrhoea	Covid-19	0.64**	-0.13	0.25
		(0.33)	(0.34)	(0.58)
	Gender	-0.36**	-0.17	-0.22
		(0.16)	(0.14)	(0.23)
	Head of household's level of education	0.11	-0.06	-0.24
		(0.12)	(0.10)	(0.18)
	Age	0.09	0.00	-0.78***
		(0.20)	(0.17)	(0.28)
	Age2	-0.01	0.00	0.17**
		(0.05)	(0.04)	(0.07)
	Region			
	Central High Land (ref)			
	East	-0.07	0.02	0.32
		(0.24)	(0.23)	(0.38)
	West	0.51*	0.29	0.28
		(0.27)	(0.26)	(0.47)
	South	0.00	0.33	0.12
		(0.25)	(0.23)	(0.41)
	North	-0.60**	0.67***	0.12
		(0.29)	(0.22)	(0.41)
	Wealth level	-0.67***	-0.45***	-0.23
		(0.15)	(0.11)	(0.17)
	Lockdown	-0.30	-0.05	-0.02
		(0.19)	(0.75)	(0.27)
	Constant	-1.67***	-1.33***	-1.73***
		(0.29)	(0.00)	(0.42)
	Chi-2 proba	98.97 ***		
	Wald test	0.56		
	Observations	935		

continued next page

Table 4 Continued

	Variables	CHW Vs HC	Self-medication Vs HC	traditional healer Vs HC
Fever	Covid-19	-0.48	-1.86***	-0.56
		(0.37)	(0.57)	(0.54)
	Gender	-0.33***	-0.17	0.00
		(0.13)	(0.10)	(0.17)
	Head of household's level of education	0.02	-0.06	-0.14
		(0.09)	(0.08)	(0.13)
	Age	0.11	0.15	-0.14
		(0.15)	(0.13)	(0.20)
	Age2	0.00	-0.04	0.02
		(0.04)	(0.03)	(0.05)
	Region			
	Central High Land (ref)			
	East	0.09	0.09	-0.32
		(0.19)	(0.16)	(0.24)
	West	0.63***	-0.15	-0.05
		(0.23)	(0.23)	(0.30)
	South	0.05	0.26	-0.04
		(0.80)	(0.17)	(0.24)
	North	0.02	0.31*	-0.76**
		(0.21)	(0.17)	(0.33)
	Wealth level	-0.51***	-0.35***	-0.32**
		(0.11)	(0.08)	(013)
	Lockdown	-0.27*	0.14	-0.08
		(0.15)	(0.12)	(0.19)
	Constant	-1.79***	-1.17***	-1.71***
		(0.22)	(0.18)	(0.27)
	Chi-2 proba	122.77***		
	Wald test	0.00		
	Observations	1 537		

Notes: the values in brackets are the standard deviation; ***, **,*, respectively significant at 1%, 5% and 10%.
Sources: Data of MICS, 2018 and ERISC, 2020; Authors, 2023

5. Discussion

It has been observed that the pandemic has led the population to seek treatment regardless of the type on offer. However, in the case of diarrhoea, the results are in line with most of the literature, which has noted a drop in the use of health centres due to people's fear of contracting the virus in these establishments. As an alternative, individuals chose to turn to CHWs. According to Bhaumik et al. (2020), in reviewing the literature on the roles of CHWs in Sub-Saharan Africa, their roles include ensuring the control and prevention of COVID-19 [34]. Their most common activities during pandemics are awareness-raising, community engagement and mobilisation (including combatting stigma), and tracking down contact cases. They should be responsible for referring cases to health centres. As such, their role is limited to prevention, not detection or treatment of COVID-19. In Madagascar, CHWs are not equipped with tests, nor have they received training in pandemic detection. However, they do have medicines to treat diarrhoea, such as zinc ORS. The risk is therefore the spread of cases if there are COVID-19 cases among the individuals who have consulted the CHWs.

According to Hogan et al. (2020) and Zawawi et al. (2020), studying the case of low-income countries, including Sub-Saharan Africa, the drop in healthcare use may be linked to the interruption of other health services that do not treat COVID-19 . However, in the case of Madagascar, the drop in cases of diarrhoea cannot be explained by this situation. In fact, since fever and diarrhoea are symptoms of COVID-19, in Madagascar, as soon as these symptoms appear, the protocol for detecting COVID-19 is immediately applied, and the patient is not yet assigned to another department but is diagnosed and treated immediately. On the other hand, the variable C, mobility restriction did not affect the behaviour of individuals. As it was neither the interruption of services nor the restrictions that influenced the behaviour of individuals, it can be asserted that it was fear that was the influence on behaviour.

Our results also showed that an increase in the use of health centres can occur as a result of individuals' caution and vigilance in the case of the appearance of symptoms during a pandemic. This is the case for fever. This situation was justified because people limited self-medication for fever during the COVID-19 period.

Finally, the use of healthcare can be explained by other variables. Indeed, the behaviour of individuals may also depend on their socioeconomic characteristics, such as the level of wealth of the household to which they belong. Although the

COVID-19 policy provides free case management, the level of wealth has a significant impact on individuals' decisions regarding their healthcare trajectory. Thus, it should be noted that in our case, the preference for health centres also depends on the level of household wealth.

This research may have limitations insofar as the explanatory variables considered are only those available in both the MICS and ERISC databases. Second, given the absence of information on income, the level of wealth was considered. Another major limitation of this research is the reduction in the number of observations after matching. At the outset, the two databases were made up of approximately 40,000 respondents each, but after matching, only a thousand were retained.

6. Conclusion

From these results, we can draw conclusions about people's behaviour in the event of a health crisis. In fact, the world is not safe from a new shock, mainly in low-income countries such as Madagascar, which lies in a tropical zone exposed to numerous endemic diseases and whose health system is not yet sufficiently developed. Health shocks offer an opportunity to reorient preventive behaviour and promote the implementation of health policies. Our results show that people's behaviour depends on the symptoms they experience. When it is a common symptom that individuals know is directly linked to the epidemic or pandemic, they act immediately out of caution and vigilance, consulting health centres. However, with regard to lesser-known symptoms, out of fear, they prefer to avoid places where they may encounter numerous cases, such as health centres, modern professionals or hospitals. Instead, they opt for other remedies, such as CHWs.

Given these facts, it is essential to step up communication on the various symptoms of an epidemic or pandemic, for example. The aim is to raise awareness of the symptoms so that as soon as they appear, people seek treatment as a precautionary measure. This will help prevent cases from getting worse. This involves sharing accurate, up-to-date information and working with the media, including social media, journalists and influencers. This policy would be attractive insofar as the cost of implementing it would be low compared to the cost of dealing with severe cases [36].

Second, it is also essential to strengthen other resources, such as the competence of CHWs to detect, diagnose and correctly treat the illnesses of those who are afraid to consult health centres, to avoid the spread of diseases. The aim is to ensure that those who do not have access to health services can always receive adequate treatment. Failure to make this investment could cost $4.80 billion in economic losses (Care, 2023)[3].

Finally, for the purposes of this paper, COVID-19 was considered, but the results can be superimposed on all other types of health shocks.

Notes

1. https://www.who.int/fr/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters consulted on October 14, 2022.

2. https://www.who.int/fr/health-topics/coronavirus#tab=tab_3, consulted on October 19, 2022.

3. https://www.care.org/fr/news-and-stories/health/our-best-shot-women-frontline-health-workers-around-the-world-are-keeping-you-safe-from-covid-19/ consulted on March 7, 2023

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