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## Community health workers and COVID-19 in a Brazilian state capital

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### ABSTRACT

Community health workers (CHWs) are the main bridge between health services and the community, and therefore play a vital role in the COVID-19 response. The aim of this study was to determine the COVID-19-related health status of CHWs, their basic knowledge of the disease and the role they played in the pandemic response in 2020. A descriptive cross-sectional study was conducted with CHWs working in Campo Grande between December 2020 and January 2021. The data were collected using an electronic questionnaire. Around 40% of the sample reported at least one risk factor for COVID-19, 44% had experienced at least one COVID-19 symptom, and 76% had experienced symptoms of mental suffering during the first year of the pandemic. Mental suffering was associated with the onset of flu-like symptoms after the start of the pandemic and changes in work processes. Knowledge gaps were observed, mainly related to forms of transmission and disease prevention. In view of the uncertainty about how long this health emergency will last and the vital role CHWs play in the Brazilian Health System, health managers and society need to pay greater attention to these professionals in order to improve the effectiveness of the country's COVID-19 response.

### KEYWORDS

Community health workers; COVID-19; primary health care; unified health system; emergency preparedness; disaster; medicine & society; social inequality; work

## Introduction

Since the beginning of 2020, Brazil and the rest of the world have been tackling the challenges posed by COVID-19. More than one year on, countries are still trying to find ways of responding to the pandemic and prevent COVID-19-related severe outcomes and deaths, the collapse of health systems and economic crisis (Barreto et al. 2020). Many experts suggest that lack of preparedness, staffing shortages and lack of equipment and supplies and physical infrastructure are determining factors in the rapid collapse of hospital services (Noronha et al. 2020). Front line health professionals have been especially affected, not only due to the increased risk of infection, but also by the mental health effects of the pandemic, heavy workloads, and countless patient deaths (Greenberg 2020). The situation is no different in Brazil, with the effects of the pandemic being felt especially hard by primary health care workers (Maciel et al. 2020).

Primary health care (PHC) plays a fundamental role in the National Health Service's (Sistema Único de Saúde - SUS) COVID-19 response. By fulfilling its role as the front door of the health care system and developing health promotion and disease prevention activities at the community

level, PHC has the potential to resolve the vast majority of cases, thus easing pressure on hospitals, which in many cases are already overwhelmed (Sarti et al. 2020). PHC professionals, especially community health workers (CHWs), play a vital role in ensuring the effectiveness of health promotion and disease prevention actions (Ballard et al. 2020; Maciel et al. 2020).

CHWs are the main bridge between health services and the community and thus play a key role in the COVID-19 response (Maciel 2020). Their roles and responsibilities include helping the health team identify and monitor suspected cases, active tracing, home visits, patient reception, and health education (Brasil 2020a).

CHWs are among the most vulnerable healthcare workers due to their socioeconomic status and the peculiarities of their occupation. Studies suggest that the COVID-19 pandemic has aggravated the vulnerability of CHWs, showing that it has an impact on both their mental and physical health and work routine (Lotta et al. 2020).

Campo Grande is the capital of the state of Mato Grosso do Sul, located in Brazil's Midwest region. Data from the *National Register of Health Establishments* (CNES) show that the municipality has 1,590 CHWs responsible for 906,092 inhabitants (CNES 2020; IBGE 2020). According to the Campo Grande department of health, the city's first case of COVID-19 was confirmed on March 14, 2020, and the first COVID-19 death was reported on April 13, 2020 (SESAU 2020a). By May 1, 2021, 94,523 confirmed cases and 2,479 COVID-19 deaths had been reported in the city (SESAU 2021).

Considering the context of Campo Grande CHWs and expectations about their performance in the context of the pandemic, the aim of this study was to determine the COVID-19-related health status of CHWs, their knowledge about the disease, and the role they played in the pandemic response in 2020.

## Methods

We conducted a descriptive cross-sectional study with CHWs working in Campo Grande between December 2020 and January 2021. The CHWs' contact details were obtained from the managers of the city's primary care centers (PCCs), whose contact details were obtained from the Campo Grande Health Department (SESAU). Using a messaging app, we invited the CHWs to complete an online questionnaire within a preset deadline. All participants received an informed consent by e-mail and agreed to participate, by selecting the "I agree" option available prior the questionnaire response.

The questionnaire was based on a CHW survey carried out by the Oswaldo Cruz Foundation (FIOCRUZ 2020a), adding other questions relevant to the current study. The following information was collected: (i) CHW profile (level of education, race, income, sex, and years of experience as a CHW); (ii) COVID-19 health status (risk factors, symptoms experienced during the pandemic, COVID-19 testing and results, and aspects related to mental health, including symptoms and medication use); and (iii) role during the pandemic (prevention habits and use of personal protective equipment (PPE) and supplies, interaction with the population, access and information sources, CHW's perceptions of their role during the pandemic, and knowledge about COVID-19). The latter was assessed using a set of questions covering general aspects of the disease (etiologic agent, signs and symptoms, COVID-19 case management procedures at the time of data collection, risk groups) and COVID-19 prevention and transmission. Each question had four alternatives, one of which was correct. The questions addressed information that the researchers considered to be important for the general public based on technical guidance produced by the World Health Organization (WHO), Pan American Health Organization (PAHO) and FIOCRUZ (FIOCRUZ 2020b; PAHO 2020; WHO 2020).

Other data related to the CHWs' work status, training, and care protocols were obtained directly from the SESAU.

A descriptive analysis of the variables was performed, grouping the results into three core categories: CHW profile, COVID-19 health status, and role during the pandemic. With regard to the latter category, the analysis of knowledge about COVID-19 was divided into two sub-groups (general aspects of the disease and prevention and transmission) and the results were expressed as the percentage of correct answers to the questions from each respective group.

Bivariate analysis was used to determine the association between certain variables, which were selected based on the researchers' perception of potential relationships. Bivariate analysis was used to test for associations and strength of association was measured using the chi-squared test. When the assumption of the chi-square test was not met (expected frequency of less than 5), Fisher's exact test was used. The analyses were performed using R version 4.0.4 and the packages *descr* and *MASS*, adopting a significance level of 5% ( $\alpha = 0.05$ ) for all tests.

The study protocol was approved by the Federal University of Mato Grosso do Sul's Research Ethics Committee (CAAE 39690320.8.0000.0021).

## Results

Of the 1,590 CHWs working in Campo Grande during the data collection period, 284 (from 48 of the city's 70 PCCs) accepted the invitation to participate in the study and answered the questionnaire.

### *CHW profile*

Results shows that 80.99% of the respondents were women and 19.01% men. Mean age was 40.09 years (standard deviation = 9.54 years), with the majority being aged between 18 and 39 years (56.97%), followed by between 40 and 59 years (40.24%) and 60 years and over (2.79%). Most of the CHWs (57.39%) declared themselves brown, while 31.69%, 8.85% and 1.06% declared themselves white, black, and indigenous and yellow, respectively. With regard to education, 32.04% had completed higher education, 61.97% had completed high school, and 5.99% had only completed junior high school.

Most of the CHWs had a family income of between one and three minimum wages (77.82%), followed by between three to six minimum wages (11.27%) and up to one minimum wage (9.51%). With regard to years' experience as a CWH, 42.40% reported between three and 10 years and 38.87% reported more than 10.

### *COVID-19 health status*

Most of the participants (61.6%) reported that they experienced none of the risk factors (including hypertension, diabetes, obesity, organ transplant, long-term use of corticosteroids, or other chronic health conditions).

Most of the CHWs (56%) experienced flu-like symptoms related to COVID-19 regardless of diagnosis after the start of the pandemic. The large majority of respondents (88.6%) took at least one COVID-19 test in 2020, with rapid antibody tests being the most common type of test. Most of the CHWs who had test (76%) tested negative, with 12.8% testing positive for the disease. Most of the sample (76%) reported experiencing at least one of the following symptoms of mental distress: insomnia, sadness, anguish, excessive panic/fear, and anxiety. Almost a third of CHWs (30%) reported using medications to reduce mental health symptoms (Table 1).

**Table 1.** COVID-19-related health aspects among CHWs, Campo Grande, 2020.

Variable	n	%
Risk factor		
None	175	61.62
1 comorbidity	79	27.82
2 comorbidities	28	9.86
3 comorbidities	2	0.70
Flu-like symptoms after the start of the pandemic		
Yes	125	44.17
No	158	55.83
Not informed	1	–
COVID-19 testing		
1 test	151	57.20
2 or more tests	83	31.44
Has not done a test	30	11.36
Not informed	20	–
Testing method		
Molecular test (RT-PCR)	15	5.68
Molecular test (RT-PCR) + serology test	61	23.11
Serology test	158	59.85
Has not done a test	30	11.36
Not informed	20	–
Test result		
Negative	190	76.0
Positive	32	12.8
Discordant <sup>a</sup>	28	11.2
Not informed or has not done a test	34	–
Symptoms of mental distress after the start of the pandemic		
Yes	216	76.06
No	68	23.94
Use of mental health medications after the start of the pandemic		
Yes	88	30.99
No	196	69.01

Note: During the study design and at the time of data collection, there was still no consensus in the scientific community about the possibility of reinfection by SARS-CoV-2.

<sup>a</sup>Two tests with different results, regardless of the time interval between tests.

## Role during the pandemic

### Prevention habits and use of personal protective equipment

Most of the CHWs (85.5%) reported that they wear masks (Table 2). However, only 51% reported using a mask at all times during work in accordance with the recommended guidelines.

With regard to water and soap, 11.27% of CHWs reported lack of availability of these supplies. Most of the respondents (80%) reported that they often used hand sanitizer, while 6% said they never used it. Most of the CHWs (85%) said that hand sanitizer was provided by the SESAU, while 15% used their own or received donations.

### Interaction and experiences with patients in the health center micro-area

The vast majority of CHWs (82.75%) said they were involved in the active tracing of COVID-19 cases, with 54.62% reporting increased interaction and 27% decreased interaction with patients during 2020 (Table 3). Over one-third of the CHWs (37%) reported the death of at least one patient in the micro-area where they worked (Table 3).

### Access to information and CHWs' perceptions of their role during the pandemic

With regard to access to information about COVID-19 during the pandemic, 72.18% said they had received institutional materials on the management of COVID-19. The most common

**Table 2.** Prevention habits and personal protective equipment and supplies, Campo Grande, 2020.

PPE and supplies	n	%
Masks		
Frequency of use		
At all times	243	85.56
Only during contact with patients	18	6.34
Intermittent mask use	23	8.10
Time of use		
Adequate	145	51.06
Inadequate	52	18.31
Not informed	87	30.63
Means of obtaining masks		
Used their own	54	19.01
Donation	3	1.06
Provided by the SESAU	227	79.93
Quantity available		
Insufficient	172	60.56
Sufficient	112	39.44
Water and soap (availability)		
Yes	252	88.73
No	32	11.27
Hand sanitizer		
Frequency of use		
Often	226	79.58
Never	17	5.99
Sometimes	41	14.44
Means of obtaining hand sanitizer		
Used their own	36	12.68
Donation	8	2.82
Provided by the SESAU	239	84.15
Not used	1	0.35

**Table 3.** Interaction and experiences with patients in the health center micro-area during the COVID-19 pandemic, Campo Grande, 2020.

Interaction and experiences with patients	n	%
Active tracing of COVID-19 cases		
Yes	235	82.75
No	49	17.25
Contact with the population		
Increased	136	54.62
Decreased	67	26.91
No change	46	18.47
Not informed	35	—
Death of a patient in the CHW's micro-area		
Yes	105	36.97
No	179	63.03

information source when the CHWs had doubts was a health professional (60%), followed by the Internet (28%).

Almost 48% of the CHWs reported that they did not feel secure about their knowledge of the disease and almost 11% said that CHWs should not be involved in the response or that they did not make any difference during the pandemic (4%). However, the vast majority (85%) believe that they play an important role in the COVID-19 response.

### **CHW knowledge about COVID-19**

With regard to general aspects of the disease, 40% of the CHWs missed at least one question. The most common wrong answers were to the questions about what to do in the case of mild symptoms—with 12% of the CHWs responding that the patient should go to a hospital—and the

**Table 4.** Percentage of right answers to the questions assessing basic knowledge about COVID-19, Campo Grande, 2020.

Sets of questions	n	%
General aspects of the disease		
100% right answers	168	59.15
50 to 99% right answers	115	40.49
Less than 50% right answers	1	0.35
Prevention and transmission		
100% right answers	0	0
50 to 99% right answers	275	96.83
Less than 50% right answers	9	3.17

**Table 5.** Bivariate analysis for the variables having received official information about COVID-19 and CHWs' knowledge about COVID-19, feeling secure with information on COVID-19, perceptions of their role during the pandemic and mask use.

Variables	Received official information about COVID-19		p value
	No (%)	Yes (%)	
Knowledge about general aspects of the disease			.527*
100% right answers	43 (25.6)	125 (74.4)	
50 to 99% right answers	36 (31.3)	79 (68.7)	
Less than 50% right answers	—	1 (100.0)	
Knowledge about prevention and transmission			.712*
100% right answers	—	—	
50 to 99% right answers	76 (27.6)	199 (72.4)	
Less than 50% right answers	3 (33.3)	6 (66.7)	
Feel secure with information on COVID-19			.010
No	48 (35.3)	88 (64.7)	
Yes	31 (20.9)	117 (79.1)	
CHWs' perceptions of their role			.016*
Important	60 (24.8)	182 (75.2)	
Makes no difference	4 (36.4)	7 (63.6)	
Shouldn't be involved	15 (48.4)	16 (51.6)	
Mask use			.085
At all times	63 (25.9)	180 (74.1)	
Only during contact with patients	9 (50.0)	9 (50.0)	
Intermittent mask use	7 (30.4)	16 (69.6)	

\*Fisher's exact test.

survival conditions of the virus (the virus can survive on surfaces such as wood, clothing and hair), which only 69% of CHWs answered correctly (Table 4).

Regarding the COVID-19 prevention and transmission, none of the CHWs answered all of the questions correctly. The most common wrong answer was to the question about the time a SARS-CoV-2 infected person is able to spread the virus—with 6% of respondents saying they did not know and around 25% answering less time (three or seven days)—followed by the question about washing hands and cleaning surfaces, with around 55% of the CHWs answering that only hand sanitizer or only bleach were effective against the virus, failing to mark the answer mentioning generic disinfectants.

With regard to the association between CHW profile, COVID-19 health status and role during the pandemic (Tables 5 and 6), a statistically significant association was found between having received official information about COVID-19 and CHWs' perceptions of their role during the pandemic ( $p$  value = .016) and feeling secure with the information they have about the disease ( $p$  value = .010). No statistically significant association was found between having received information about the disease and wearing a mask or knowledge of general aspects of the disease and prevention and SARS-CoV-2 transmission.

The presence of at least one symptom of mental distress was associated with the appearance of flu-like symptoms after the start of the pandemic ( $p$  value = .002) and with increased contact

**Table 6.** Bivariate analysis for the variables symptoms of mental suffering and symptoms of flu-like syndrome, contact with population, deaths of patients in the micro-area, and COVID-19 test results.

Variable	Symptoms of mental suffering		<i>p</i> value
	No (%)	Yes (%)	
Flu-like symptoms			.002*
No	41 (32.8)	84 (67.2)	
Yes	26 (16.5)	132 (83.5)	
Contact with the population			.007*
Increased	27 (19.9)	109 (80.1)	
Decreased	15 (22.4)	52 (77.6)	
There was no change	20 (43.5)	26 (56.5)	
Patient deaths in the micro-area			.636
No	45 (25.1)	134 (74.9)	
Yes	23 (21.9)	82 (78.1)	
COVID-19 tests results			.627*
Positive	6 (18.8)	26 (81.2)	
Negative	43 (22.6)	147 (77.4)	
Discordant	4 (14.3)	24 (85.7)	

\*Fischer's exact test.

with the population ( $p$  value = .007). There was no significant association between symptoms of mental suffering and patient deaths in the micro-area and COVID-19 test results (Table 6).

## Discussion

Our findings provide important insights into CHW's work processes during the first 10 months of the pandemic, highlighting inappropriate use of PPE and supplies, knowledge gaps in relation to disease and its prevention and transmission, and that CHWs had a generally positive perception of their role during the pandemic.

Most of the CHWs in the current study were brown women. This may be explained by the origins of Brazil's Community Health Worker Program (Ávila 2011). The same situation is found in many other countries that have CHWs, demonstrating that these workers generally belong to the most vulnerable segment of the population (Bhaumik et al. 2020). The fact that the CHWs were predominantly young (97.2% up to 59 years old) may be seen as a positive factor, insofar as at the beginning of the pandemic severe cases occurred mainly in individuals aged 60 years and over (WHO 2020).

Years of experience as a CHW is also an important finding, since those working as a CHW for over 10 years (38.8%) experienced the H1N1 pandemic in 2009 and are therefore expected to be better prepared for dealing with the COVID-19 pandemic. However, despite the experience there is an historical lack of professional qualifications and training courses for these workers in Brazil. At the beginning of the CHWs Program, there were training and qualification initiatives promoted by the Ministry of Health and several state and municipal health councils in the country. Nevertheless, over the years this has ceased to be a continuous practice, which reflects the devaluation suffered by these workers (Santos et al. 2008).

Despite the relatively young age of the sample, almost 40% of the participants had at least one underlying health condition considered a risk factor for COVID-19, which may have affected the definition of the CHWs work routines. The occurrence of multiple chronic conditions is related to increased incidence of unfavorable clinical outcomes such as hospitalization, admission to the Intensive Care Unit (ICU) and death (Ferrari 2020; Nunes et al. 2020). The assessment of underlying health conditions is therefore important for planning and adjusting work routines and enabling the adoption of measures to prevent occupational infection, especially among workers at greater risk of severe COVID-19 (Ferrari 2020; Gallasch et al. 2020).



More than 44% of the CHWs reported experiencing at least one COVID-19 symptom. A survey with 1,978 CHWs conducted by FIOCRUZ observed that 33% of the respondents reported at least one symptom between April and May 2020. The higher rate observed by the current study may be due to the longer study period (December 2020 to January 2021).

The large majority of respondents (88%) took at least one COVID-19 test during the study period. It is interesting to note that this percentage is higher than the proportion of CHWs who reported at least one COVID-19 symptom. This may be explained by the fact that CHWs who have been in contact with suspected cases of COVID-19 are tested in accordance with SESAU guidelines (SESAU 2020b). The findings therefore suggest that health professionals did not encounter difficulties accessing tests. The guidelines recommend rapid testing for health professionals after the first seven days of symptoms (SESAU 2020b), which may explain the higher frequency of antibody tests than molecular tests.

Around one-quarter of the respondents (24%) tested positive at least once, regardless of the test, in comparison to 56.4% in the abovementioned survey performed by FIOCRUZ. This may be due to the relatively large number of CHWs undergoing testing in Campo Grande, regardless of symptoms. In this regard, if only symptomatic testing were carried out, it is likely that the percentage of positive cases would be similar to that of the FIOCRUZ survey (FIOCRUZ 2020a).

Although official data on COVID-19 deaths among CHWs in Brazil is not available, it is known that the disease has a major impact on these and other health workers. CHWs experience constant emotional overload at work stemming from the pressure imposed by the community and health team. In addition, they experience feelings of helplessness when they are asked to address demands that often extend beyond their professional reach (Santos 2008). Although CHWs are seen as health workers by the community, the health system often fails to provide the same recognition. This is illustrated by lack of training and prioritization in the distribution of PPE and supplies (Lotta 2020; Maciel et al. 2020), which has been aggravated by the pandemic. Changes in everyday work practices and the angst caused by the pandemic lead to even greater levels of stress and psychological suffering. With the suspension of home visits, CHW-patient contact has decreased and changes in patient flows have meant that CHWs have taken on new roles in patient care, welcoming and reception (Maciel et al. 2020). These situations may have contributed to the high percentage of CHWs (76%) reporting at least one symptom of mental suffering and the consequent use of psychotropic drugs.

Our findings reveal that the occurrence of mental suffering symptoms was associated with the onset of flu-like symptoms after the start of the pandemic and changes in work processes, such as increased contact with the population. Several studies have reported the negative effects of the pandemic on the mental health of frontline professionals (Greenberg 2020; Mayfield-Johnson et al. 2020; Vizheh et al. 2020), posing a challenge for the psychological resilience of these workers. A qualitative study with CHWs showed that high levels of stress and responsibility in the workplace trigger the appearance of symptoms of mental suffering such as depression and anxiety (Mayfield-Johnson et al. 2020). Considering the increased pressure and workload, it is crucial to provide support and motivation and foster individual and collective protection through training and continuing education, especially through information and digital communication platforms (Vizheh et al. 2020).

The findings show inappropriate use of PPE and supplies, including masks, soap and hand sanitizer. A study in the United States and United Kingdom reported higher incidence of reuse or inappropriate use of PPE among health professionals belonging to more vulnerable ethnic groups (Nguyen et al. 2020). It is known that CHWs are among the most vulnerable workers in Brazil's health system, due to their socioeconomic status and nature of their work. In addition, studies have shown a lack and/or poor-quality of PPE in Brazil, especially masks and hand sanitizer, revealing precarious and unsafe CHW working conditions (Nogueira et al. 2020). Although most of the CHW in the current study reported appropriate use of PPE, the percentage

professionals who did not use a mask at all times or regularly wash their hands is worrying, going against basic infection prevention guidelines.

According to guidelines for health services and professionals produced by Brazil's health protection agency, ANVISA (Brasil 2020a), health facilities should provide CHWs with PPE in adequate quantity and quality for all activities, in particular surgical masks, training on how to use this equipment, hand washing facilities with soap and water, and 70% alcohol hand sanitizer. Health services should ensure the availability of PPE and develop strategies to protect health professionals, especially the most vulnerable groups, from COVID-19.

The situation observed in the current study may be partly due to the general shortage of PPE across most of Brazil at the beginning of the pandemic (Bentes 2020). In this regard, lack of federal government coordination at the domestic and international level have resulted in shortages of masks, gloves and face-shields (McCauley and Hayes 2020). In addition, lack of clarity in protocols covering the use of PPE, such as duration of mask use, may also have contributed to uncertainties among professionals.

Around 35% of the CHWs reported COVID-19 deaths in the micro-area, in comparison to 26.7% in the FIOCRUZ survey mentioned earlier (FIOCRUZ 2020a). It should be noted, however, that the FIOCRUZ study involved a shorter study period and numbers may have increased over the year. The pandemic has had an emotional impact on health professionals, due to countless losses of colleagues and patients and feelings of helplessness in the face of the disease. This impact may be even more pronounced among CHWs, as these individuals belong to the community in which they work and often have personal and affectionate ties with service users. Hence, the experience of loss is exacerbated by grieving, not for one, but for various close acquaintances.

With regard to routine, the pandemic has required the reorganization of PHC work processes, especially those involving patient flow. These changes have had a major impact on CHWs' work routine, with engagement with the community undergoing important modifications (Maciel et al. 2020). The vast majority of CHWs (82%) in Campo Grande reported an increase in active tracing activities, in accordance with Ministry of Health guidance (Brasil 2020b).

Studies demonstrating the importance of the role of CHWs in the pandemic response show that in countries with well-established community health programs, tasks, and responsibilities change substantially during health crises due to the need to redefine routine procedures and everyday practices (Maciel 2020). Most of the CHWs (54%) in the present study reported increased contact with patients; however, the form of contact has been redefined during the pandemic. In some Brazilian cities, CHWs continued making home visits without entering the patient's home, with the aim of identifying early signs and symptoms of severe COVID-19 and offering guidance on home isolation and prevention, thus minimizing direct contact (Giovanela et al. 2020). According to SESAU, the situation is the same in Campo Grande, with PPCs defining their own particular work processes. These changes show that CHWs have begun performing new activities to meet the demands of changing patient flows imposed by the pandemic.

Furthermore, with regard to patient contact, it is possible that low-risk CHWs have ended up taking on greater workloads as high-risk workers (38.3%) have been reallocated to functions that require less interaction. In this regard, before the vaccine, it was recommended that professionals at high risk of severe COVID-19 should be removed from the front line and reallocated to administrative activities, call centers or home office, or placed on leave in case of additional risk (FIOCRUZ 2020a).

With regard to capacity building, SESAU confirmed that CHWs did not receive COVID-19 training in 2020a; however, most respondents reported that they received guidance materials. In addition, according to SESAU, health facilities have organized themselves to provide information and minimum training on dressing and undressing procedures. It is understood that, at the beginning of the pandemic, the emergence of a new disease and scarcity of information made it difficult to organize local training courses. However, after the first months of the pandemic,

training should have been adopted as a key strategy for targeting specific groups and controlling the epidemic. As a possible consequence of lack of training, CHW used various information sources when they had doubts, with almost 30% of workers reporting that the main source was the Internet. These findings are cause for concern considering the infodemic witnessed throughout the pandemic. In this regard, the Internet has become a massive source of disinformation, constituting one of the main barriers to an effective COVID-19 response (Almeida-Filho 2021). In this regard, Henriques and Vasconcelos (2020) point out that the conflicting narratives on the government's websites has contributed to the spread of disinformation. There is no unified discourse on the precautions that should be adopted by health professionals and the general public. More than a year after start of the pandemic, issues such as the use of medications for COVID-19 prevention are still being discussed in Brazil, despite the widespread dissemination of evidence showing the ineffectiveness of these drugs (Galhardi et al. 2020). Likewise, largely controversial debates about the effectiveness of social isolation measures and even vaccines go on, fueled by the government (Greer et al. 2020). Thus, it is unreasonable to expect health professionals, especially CHWs, who are more susceptible to disinformation, to have clarity and feel secure about their conduct.

The above situation may be directly related to the feeling of insecurity expressed by almost half of the respondents. The most affected by this situation are not only CHWs, but also the population, as disinformation and feelings of insecurity may result in lack of assertive prevention measures.

Gaps in CHW knowledge were more pronounced in the questions related to transmission and prevention. The infectious period and products indicated for cleaning and disinfecting surfaces proved to be major points of uncertainty. These knowledge gaps do not seem to be restricted to CHWs. Ghimire, Dhungel, and Pokhrel (2020), for example, observed deficiencies in knowledge about COVID-19 prevention among other health professionals, including those with access to the Internet.

Lack of regular training can result in disinformation and may also be interpreted as a lack of appreciation of the value CHWs by health managers. This factor may also be related to the negative perceptions of the role of CHWs in the pandemic, expressed by around 15% of respondents. Thus, support provided by health managers to frontline professionals should focus on the provision of both PPE and continuous training. Transmitting information with total transparency, resolving uncertainties and misconceptions, is essential to strengthening the confidence of these professionals in their own conduct and work (da Silva 2021).

There is an information gap about the performance of these workers during the pandemic in other Latin American countries. This is often due to the lack of CHWs in those contexts. Most studies report evidence about CHWs in other low-and middle-income countries of Africa and Asia. It was observed that, in those contexts, CHWs were involved in all stages of population follow-up at the Primary Health Care, and their work flows and tasks were affected during the pandemic. However, as in Brazil, a need for better training to carry out the activities was perceived (Bhaumik et al. 2020).

In a study assessing CHWs' perceptions of professional training processes in a city in the Northeast region of Brazil, Rodrigues et al. (2019) highlighted the importance of providing introductory and technical courses, recommending training to refresh essential skills and knowledge. Within the context of the COVID-19 pandemic, continuing education has become even more necessary, through the reorganization of PHC with an emphasis on CHW work processes. CHWs' activities now include the monitoring of suspected and confirmed cases, which is vital for disease surveillance and risk communication at the local level, through home visits or remotely (Brasil 2020b; Lotta et al. 2020). Haines et al. (2020) suggest that a one to two-week basic COVID-19 and public health surveillance training course would be sufficient to develop essential skills and knowledge, especially when combined with ongoing training and supervision.

Our findings show that receiving COVID-19 guidance materials was associated with CHWs' perceptions of their role in the pandemic and feeling secure with the information they have about the disease. However, this may not have been enough to address the knowledge gaps observed by this study. The FIOCRUZ survey showed that insecurity expressed by CHWs in relation to their work activities was associated with the provision of COVID-19 training, with those who received training being less insecure than those who did not (do Rosário Costa et al. 2020). This demonstrates the importance of continuing education for improving worker performance and service organization and ensuring the continuity of care, considering the essential role CHWs play in implementing an effective COVID-19 response, especially in medium-sized and small cities (Mata et al. 2020).

Questionnaires based on the CHWs' self-reports can be pointed as a limitation of the study. Furthermore, the study is restricted to the first year of the pandemic and, therefore, does not address events of the second year, when the epidemiological situation was even more serious in the country. However, it is estimated that the study can serve as a basis for future discussion about the role of these workers in the health system.

## Conclusion

The findings of this study provide some valuable insights into the experiences of CHWs in Campo Grande during the first year of the COVID-19 pandemic. Working in direct contact with the population, these workers have felt the effect of the pandemic in various areas of their lives, ranging from health to work processes.

Effective preparation of CHWs to deal with the demands of health emergencies is vital. The considerable experience of the CHWs in this study, including experience of another pandemic, suggests that these professionals are minimally equipped. However, it is evident that most of the workers belong to high-risk groups, which may have influenced the organization of work processes.

The ease of access to testing is viewed as positive and necessary, considering the level of interaction between CHWs and the population. However, deficiencies were observed in the use of PPE. Moreover, important knowledge gaps raise questions about the effectiveness of the guidance provided by CHWs to the community.

A common thread running through all the aspects highlighted by this study is the need for formal training. The historic lack of training for CHWs in Brazil affects the population, especially in times of pandemic, when CHWs provide the main bridge between the community and the health system. In view of the uncertainty about how long this health emergency will last and the vital role CHWs play in the SUS, health managers and society need to pay greater attention to these professionals in order to overcome invisibility and improve the effectiveness of the country's COVID-19 response.

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