



Original Article

Factors Associated with COVID-19 Vaccine Hesitancy Among Health Personnel in Yaounde, Cameroon

Facteurs associés à l'hésitation à la vaccination Anti-COVID-19 chez le personnel de santé de Yaoundé

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ABSTRACT

Background. Health care personnel constitute a group at high risk of contracting COVID-19. However, the vaccination rate in this group in our context remains low. The objective of our study was to determine the factors associated with COVID-19 vaccine hesitancy among health care workers in Yaounde. **Methods.** We conducted a cross-sectional study of 360 health personnel in three hospitals in the city of Yaounde from January to March 2022, i.e., 3 months. All health personnel who gave their free consent were included. Ethical clearance was obtained from the Institutional Ethics and Research Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I. A logistic regression was performed to search for factors associated with reluctance to vaccinate, with a significance level of 0.05. **Results.** The vaccination rate against COVID-19 was 34% (123). Factors associated with vaccine hesitancy were female gender (OR [95% CI] =3.5[2.2-5.5]; p<0.001), working outside a COVID-19 management unit (OR [95% CI] =6, [2.1-18.5]; p=0.001), fear of the harmfulness of COVID-19 vaccines (OR [CI 95%] =2.7[1.7-4.2]; p<0.001), and doubt of vaccine efficacy (OR [CI 95%] =4.0[2.5-6.4]; p<0.001). **Conclusion:** Health personnel are still reluctant to vaccinate in our context. Factors associated with hesitancy to vaccination against COVID-19 could help deconstruct apprehensions.

RÉSUMÉ

Introduction. Le personnel de santé constitue un groupe à haut risque de contracter la COVID-19. Cependant, le taux de vaccination dans ce groupe dans notre contexte demeure encore faible. L'objectif de notre étude était de déterminer les facteurs associés à l'hésitation à la vaccination contre la COVID-19 chez le personnel de santé exerçant à Yaoundé. **Méthodologie.** Nous avons mené une étude transversale sur 360 personnels de santé de trois hôpitaux de la ville de Yaoundé, de Janvier à Mars 2022, soit 3 mois. Ont été inclus tous personnels de santé ayant donné leur libre accord. Une clairance éthique a été obtenue du Comité Institutionnel d'Éthique et de Recherche de la Faculté de Médecine et des Sciences Biomédicales de l'Université de Yaoundé I. Une régression logistique a été réalisée pour rechercher les facteurs associés à l'hésitation à la vaccination, avec un seuil de significativité à 0,05. **Résultats.** Le taux de vaccination contre la COVID-19 était de 34% (123). Les facteurs associés à l'hésitation à la vaccination étaient le sexe féminin (OR [IC95%]=3,5[2,2-5,5] ; p<0,001), travailler en dehors d'une unité de prise en charge COVID-19 (OR [IC95%]=6, [2,1-18,5]; p=0,001), la peur de la nocivité des vaccins anti COVID-19 (OR [IC95%]=2,7[1,7-4,2] ; p<0,001), et le doute de l'efficacité des vaccins (OR [IC95%]=4,0[2,5-6,4] ; p<0,001). **Conclusion.** Le personnel de santé se montre encore hésitant à la vaccination dans notre contexte. Les facteurs associés à l'hésitation à la vaccination contre la COVID-19 pourraient aider à déconstruire les appréhensions.

INTRODUCTION

The coronavirus disease has left its mark on people's consciousness and memories, as it has rapidly become one of the deadliest pandemics in the world, with more than 6,500,000 deaths in 224 affected countries and territories [1, 2]. The idea of a vaccine against COVID-19 was born from the imperative need to control the spread of the disease, which had become difficult by the simple application of barrier measures, and, above all, from the discovery of new variants. To date, more than twelve

billion doses of vaccine have been administered worldwide, including more than six hundred thousand doses for Africa [3]. In Cameroon, health authorities initiated COVID-19 vaccination on April 12, 2021 and more than 1.5 million doses of vaccine have been administered for a vaccination rate of 11.2% in the general population to date [3,4]. In many countries, coronavirus

HIGHLIGHTS**What is already known on this topic**

The vaccination rate against COVID-19 remains low among health personnel in our context.

What question this study addressed

To determine the factors associated with COVID-19 vaccine hesitancy among health care workers in Yaounde.

What this study adds to our knowledge

Factors associated with vaccine hesitancy were female gender, working outside a COVID-19 management unit fear of the harmfulness of COVID-19 vaccines, and doubt of vaccine efficacy.

How this is relevant to practice, policy or further research.

Knowing these factors could help deconstruct apprehensions.

disease is recognized as an occupational disease for health care workers [5]. In Africa, more than ten thousand health care workers have been infected with coronavirus since the beginning of the pandemic, and in Cameroon, 4703 infected health care workers have been recorded, including 61 deaths [1,3]. Health care workers are therefore a priority in all COVID-19 vaccination programs. Despite the combined efforts of governments and learned societies, COVID-19 vaccination still faces many obstacles to its popularization worldwide [6]. African countries, including Cameroon, have a heavy socio-cultural history, which may contribute to the reluctance to vaccinate the general population. However, how can we explain the low vaccination rate among this particular group of health workers? The objective of our study was to determine the factors associated with COVID-19 vaccine hesitancy among health personnel working in some referral hospitals in Yaounde.

MATERIALS AND METHODS**Study population**

The study population consisted of all health personnel of Cameroonian nationality who had given their informed consent. Any health personnel wishing to withdraw from the study were excluded. The study was conducted using non-probability consecutive and exhaustive sampling.

Type, location, and timing of the study

We conducted a cross-sectional analytical study in three public hospitals in the city of Yaounde, namely the Central Hospital of Yaounde, the General Hospital of Yaounde, and the Gynaecological-Obstetric and Paediatric Hospital of Yaounde. Data collection was done from February to April 2022, i.e., three months.

Sampling procedure

At each study site, all health care personnel were approached. During an interview with them, an informed consent form was proposed and we submitted our physical and self-administered questionnaire. Confirmation of the vaccination was done after presentation of the vaccination card of the interviewed subject.

Study variables

The following variables were collected: sociodemographic data, namely sex, age, marital status, religion and number of years of experience; data related to prevention of COVID-19, history of COVID-19 and vaccination, such as vaccination status; their perception of vaccination; and reasons for not vaccinating.

Statistical analysis

SPSS (Statistical package for social sciences) version 23.0 was chosen for data analysis with a statistical significance level set at 5% ($p < 0.005$). A univariate analysis using a Chi² test or Fisher's exact test and then a multivariate analysis using the multinomial logistic regression method were used to identify factors associated with non-vaccination. The strength of association was measured by the Odd Ratio (OR) with its 95% confidence interval (95% CI).

Administrative and Ethical Considerations

In order to carry out this work, we obtained administrative research authorizations from the management of each hospital included in the study and ethical clearance from the Institutional Research Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I. The information collected was used exclusively within the framework of this study and in strict compliance with medical confidentiality.

RESULTS

Table I: distribution of general characteristics of our study population.

Variable	Effective	Percentage (%)
Sex (n = 360)		
Man	138	38.3
Woman	222	61.7
Age groups (years) (n = 360)		
[20-30 [	103	28.6
[30-40 [	136	37.8
[40-50 [	88	24.4
[50-60]	33	9.2
Matrimonial Status (n = 360)		
Married (an)	151	41.9
Single	183	50.8
Divorced (an)	7	1.9
Widow (fifth)	19	5.3
Religion (n = 360)		
Christianity	350	97.2
Islam	10	2.8
Professional experience (years) (n = 360)		
[1-10 [	248	68.9
[10-20 [	86	23.9
[20-30 [	24	6.7
[30-40]	2	0.6
Screening for COVID-19 if suspected (N = 360)		
Always	124	43.8
Sometimes	110	38.9
Never	49	17.3
History of COVID-19 (n = 234)		
Yes	173	61.3
Not	87	38.7
Attitude in case of COVID-19 (n = 173)		
Quarantine	135	75.8
No special attitude	23	13.2
Support in a specialized center	75	42.4
Use of traditional medicine	99	55.6
Self-medication	12	6.7

General characteristics of the study population

More than 60% of the participants were women (222; 61.7%). In terms of age, the most represented modal class was [30-40[years (136; 37.8%) and [1-10[years in terms of years of professional experience (248; 68.9%). Majority of participants still took their COVID-19 screening test in the event of suspicious symptoms (124; 43.8%), 61.3% (173) had a history of SARS-CoV-2 infection and 75.8% (135) self-quarantined if infected or confirmed (Table I).

COVID-19 vaccination coverage

The rate of vaccination against COVID-19 was 34% (123) (Figure 1).

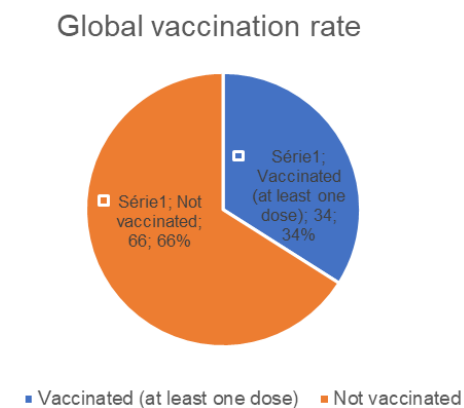


Figure 1: Distribution of COVID -19 vaccination coverage in our study population.

Factors associated with reluctance to vaccination against COVID-19 in our study

Being female increased the risk of not vaccinating by 3.5 (OR [CI 95%] = 3.5 [2.2-5.5] ; $p < 0.001$). Working in a COVID-19 management unit significantly prevented non-immunization (OR [CI 95%] = 0.2 [0.08-0.6] ; $p < 0.001$). A lack of history of symptoms suggestive of COVID-19 was also significantly associated with non-immunization against the disease (OR [CI 95%] = 1.9 [1.1-3.5] ; $p < 0.001$). In addition, healthcare workers who found COVID-19 vaccines ineffective vaccinated 4 times less than others (OR [CI 95%] = 4.034 [2.5-6.4] ; $p < 0.001$) and the fear of vaccine harm increased the risk of not vaccinating by 2.7 (OR [CI 95%] = 2.7 [1.7-4.2] ; $p < 0.001$) (see Table II).

After logistic regression, female gender, working outside a COVID-19 management unit, finding vaccines ineffective, and the fear of the harmfulness of the vaccines remained risk factors for hesitancy (See Table III).

DISCUSSION

The objective of our study was to determine the factors associated with non-vaccination against COVID-19 among health personnel working in some referral hospitals in Yaounde. Several variables were significantly associated with non-vaccination after multivariate analysis: female gender, proximity to COVID-19 cases in the course of work and doubt about the efficacy of COVID-19 vaccines. Female health workers were 3.4

times more likely to be unvaccinated; this was consistent with the findings of Li et al. in China in 2021[7] and Terefa et al. in Ethiopia in 2021[8] who found similar trends in their studies. One explanation would be that men are more affected by SARS-CoV-2 infections than women [9], and by perceiving this high risk of infection, they would be more receptive to vaccination in order to protect themselves from the disease. This would suggest that the perceived risk of contracting the disease may have influenced the vaccination decision of the health personnel in our study. The modal group [50-60] years of age had the highest number of vaccinated health workers (54.5%). In fact, studies have shown that people over 50 years of age are among the groups most at risk of developing severe disease; it could be explained that in this group we find the largest number of people who have adopted vaccination, thus preventing the occurrence of severe disease [10]. This would indicate that the perception of the risk of infection could have an influence on the decision to be vaccinated or not. Nevertheless, age group was not significantly associated with non-vaccination in this study, a result that would be in agreement with the findings of Koh et al. in 2021 in Singapore [11] and Moucheraud et al. in 2021 in Malawi [12] where socio-demographic characteristics, including age, were not significantly associated with non-vaccination against the coronavirus in a population of health workers. On the contrary, Unroe et al [13] found in the United States of America in 2020 that older health workers were more likely to be vaccinated against the disease than younger ones.

This difference with our results could be due to the fact that the study population in the Unroe et al. study [13] included many more elderly people in the [50-60] age group. Working outside of a COVID-19 management unit was significantly associated with non-vaccination among health care workers; thus, all those who did not work directly with these patients were six times more likely to not be vaccinated against COVID-19. Indeed, those who did not work on a ward that managed patients with suspected or confirmed SARS-COV-2 infection did not perceive the risk of contracting the disease as much as others and, as a result, did not always perceive the urgency of protecting themselves from the disease through vaccination. Ayman M. Hamdan-Mansour et al in Jordan in 2021 also found in their study that doubt about the efficacy of COVID-19 vaccines was a risk factor for non-vaccination among health workers [14]. Coronavirus vaccines have been a controversial issue in many communities around the world since the announcement of their clinical trials, there is indeed a great infodemia about COVID-19 vaccination and related vaccines on social networks and other media, which brandish rumors not only of their harmfulness, but also question their effectiveness; The role of social networks on opinions about COVID-19 vaccination could have been the reason for the non-vaccination observed among the nursing staff in our study. The refusal of many healthcare workers to participate in the study would have led not only to an underestimated sample size, but also to a lower vaccination coverage rate than reported.

Variables	Effective (%) N = 360		OR	CI [95%]	p
	Not vaccinated (%) n = 237	Vaccinated (%) n = 123			
Age					
[20-30 [	74 (71.8)	29 (28.2)	2.1	0.9-4.8	0.067
[30-40 [	84 (61.8)	52 (38.2)	1.3	0.6-2.9	0.448
[40-50 [	61 (69.3)	27 (30.7)	1.9	1.9-0.8	0.131
[50-60]	18 (54.5)	18 (54.5)	-	-	-
Gender					
Female	52 (23.4)	170 (76.6)	3.5	2.2-5.5	<0.001
Male	71 (51.4)	67 (48.6)	Ref.	Ref.	Ref.
Religion					
Christianity	233 (66.6)	117 (33.4)	2.9	0.8-10.8	0.097
Islam	4 (40.0)	6 (60.0)	Ref.	Ref.	Ref.
Work in a COVID-19 management unit	6 (31.6)	13 (68.4)	0.2	0.08-0.6	0.020
History of symptoms suggestive of COVID-19					
Have had symptoms	177 (62.8)	105 (37.2)	1.9	1.1-3.5	0.020
Haven't had symptoms	60 (76.9)	18 (23.1)	Ref.	Ref.	Ref.
Use of traditional medicine in case of illness	50 (63.3)	29 (36.7)	1.2	0.7-2.2	0.547
Perceived effectiveness of COVID vaccines					
Ineffective	164 (21.2)	44 (78.8)	4.0	2.5-6.4	<0.001
Effective	73 (48.0)	79 (52.0)	Ref.	Ref.	Ref.
Harmfulness of COVID-19 vaccines					
Fear of the harm of the anti-COVID vaccines	159 (75.0)	53 (25.0)	2.7	1.7-4.2	<0.001
Harmlessness of COVID vaccines	78 (52.7)	70 (47.3)	Ref.	Ref.	Ref.

Variables	OR [CI 95%]	p	a OR CI [95%]	p
Female gender	3.5 [2.2-5.5]	<0.001	3.4 [2.1-5.7]	<0.001
Work outside of a care unit of COVID-19	4.5 [1.7-12.3]	0.02	6.1 [2.1-18.5]	0.001
No history of symptoms suggestive of SRAS-COV-2 infection	1.9 [1.1-3.5]	0.02	1.6 [0.8-3.2]	0.137
Inefficiency of vaccines	4.0 [2.5-6.4]	<0.001	3.2 [1.9-5.3]	<0.001
Fear of the harmfulness of vaccines	2.7 [1.7-4.2]	<0.001	0.3 [0.2-0.6]	<0.001

CONCLUSION

Vaccination coverage in our study population remains low. Reluctance to vaccinate against COVID-19 among health care workers is influenced by several factors: female gender, proximity to COVID-19 cases in the course of their work, and doubts about the effectiveness of COVID-19 vaccines. Health care workers, the first line of defense in the fight against COVID-19, are still reluctant to be vaccinated in our context; these factors of non-vaccination, once elucidated, could help to remove the reluctance to vaccinate, with health care workers as the initial target. A health care workforce that is willing to vaccinate could contribute to the promotion of COVID-19 control and the popularization of COVID-19 vaccination. Nevertheless, the question of understanding why there is a fear of the effectiveness of COVID-19 vaccines among medical personnel remains.

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