



Knowledge Attitudes and Practices of Students Regarding the Vaccine against Covid-19. Case of Students Living on the University Campuses of the University of Lubumbashi

Martin Banza Mwana Bute¹, Cathy Kahite Lugoma¹, Yannick Mutombo Mupanda¹, Vedydy Bonga Numba Watanga¹, Mbuyu Umba Djino¹, Placide Kangweji Mulaji¹, Edmond Kalinde Nkomba¹, Umba Thierry Clément¹, Jean-Luc Banze Lukanda¹, François Lumbwe Yemba², Francis Kalombo Umba³, Laurene Faida Amisa⁴, Christian Makali Ntamwenge^{5,6}, Antoine Kasongo Nyandwe⁵, Néné Moma Kasongo^{5,6}, Balthas Kabeya^{4,7}, Jacques Camille Musolo Kwambamba⁸, Kabyla Ilunga Benjamin^{5,9}, Simon Ilunga Kandolo^{9*}

¹Higher Institute of Medical Techniques of Manono, Manono, Democratic Republic of the Congo

²Higher Institute of Higher Techniques of Kalemie, Kalemie, Democratic Republic of the Congo

³University of Manono, Manono, Democratic Republic of the Congo

⁴National HIV/AIDS Control Program, Kolwezi, Democratic Republic of the Congo

⁵Department of Public Health, Faculty of Medicine, University of Lubumbashi, Occupational Medicine Research Unit, Lubumbashi, Democratic Republic of the Congo

⁶Pediatrics Department, Sendwe Provincial Referral General Hospital, Lubumbashi, Democratic Republic of the Congo

⁷Faculty of Medicine, University of Kolwezi, Kolwezi, Democratic Republic of the Congo

⁸National Social Security Fund, Katanga I Provincial Directorate, Lubumbashi, Democratic Republic of the Congo

⁹School of Public Health, University of Lubumbashi, Lubumbashi, Democratic Republic of the Congo

Email: *silungak@gmail.com

How to cite this paper: Bute, M.B.M., Lugoma, C.K., Mupanda, Y.M., Watanga, V.B.N., Djino, M.U., Mulaji, P.K., Nkomba, E.K., Clément, U.T., Lukanda, J.-L.B., Yemba, F.L., Umba, F.K., Amisa, L.F., Ntamwenge, C.M., Nyandwe, A.K., Kasongo, N.M., Kabeya, B., Kwambamba, J.C.M., Benjamin, K.I. and Kandolo, S.I. (2022) Knowledge Attitudes and Practices of Students Regarding the Vaccine against Covid19. Case of Students Living on the University Campuses of the University of Lubumbashi. *Open Access Library Journal*, 9: e8996.

<https://doi.org/10.4236/oalib.1108996>

Received: June 14, 2022

Accepted: July 23, 2022

Published: July 26, 2022

Abstract

Introduction: More than a year after its appearance, SARS-CoV-2 continues its global race. Scientists around the world are making rapid progress in developing safe and effective vaccines that will help reduce morbidity as well as mortality from COVID-19. Several vaccines have been developed and vaccination campaigns launched across the world, with hopes of controlling the pandemic. **Methodology:** We conducted a descriptive study with an analytical aim to contribute to the fight against COVID-19 in the university residences of Lubumbashi. The data was encoded in Excel and exported to Epi info for analysis. **Results:** Nearly six out of ten students agreed to be vaccinated. The refusal of the vaccine was motivated in 95.24% of cases by post-injection manifestations and in 4.76% of cases by lack of confidence in the vaccine. The post-injection manifestations as well as the confidence in the

Copyright © 2022 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

vaccine are the basis of the refusal to be vaccinated ($P = 0.00$). Confidence in the vaccine is influenced by post-injection manifestations ($P = 0.00$). In 66.8% of cases, students always observe barrier gestures, while 33.2% only respect them at their faculty or school. We have observed that nearly three (3) out of ten students consider COVID-19 to be bad luck 13.5% as one of the diseases of dirty hands. **Conclusion:** This study provides key information related to medical student vaccination in Lubumbashi. In conclusion, we notice that the acceptability of the vaccine against COVID-19 constitutes a public health problem, which is why we recommend that health authorities be able to advocate for awareness and respect for barrier measures.

Subject Areas

Public Health

Keywords

COVID-19, Acceptability, Vaccine, University, Lubumbashi

1. Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a new type of coronavirus that causes the Coronavirus Disease 2019 (COVID-19), which has been the most challenging pandemic in this century. Considering its high mortality and rapid spread, an effective vaccine is urgently needed to control this pandemic [1].

Coronaviruses (CoVs) are a group of related viruses that can cause respiratory tract infections in humans ranging from mild symptoms to lethal outcomes. Until now, there are seven genera of CoVs that are known to infect humans [2].

Vaccine hesitancy has been considered by the World Health Organization (WHO) as “one of the top-ten threats to global health” causing serious problems in achieving coverage for population immunity [3].

At the end of 2020, the new hope to counter the global pandemic—the COVID-19 vaccine—appeared. The first vaccines against COVID-19 were administered to the general public in Slovakia on 5 January [4].

The COVID-19 pandemic in the DRC is documented in the country from March 10, 2020, the date on which the first case was confirmed in the territory by the INRB. The DRC thus becomes the 11th African country affected by COVID-19. As of July 11, 2020, there are a total of 7,122 cases of COVID-19 infection, with 175 deaths and 1,785 recovered, bringing the number of active patients to 5162. As of the 11 of the same months, the cumulative cases increases to 7,905 cases, 189 deaths and 3,513 cured. Although very far from South Africa (250,687 cases), this number of infected places the DRC in 10th position (out of 57) among the most infected countries in Africa. Despite the efforts made so far in this country, it should be noted that there is still a long way to go to contain

this pandemic and limit its spread, particularly in compliance with the barrier measures published by the authorities in the name of the population [5].

The COVID-19 pandemic is a global public health crisis. The stakes involved in the development of a vaccine are economic rather than political. Overall, 20% of those infected develop a severe or critical form of the disease, with a crude case fatality rate currently above 3%, which increases in the elderly and in those with certain underlying pathologies [6].

The spread of COVID-19 in the world is a real health shock in that, since its occurrence, it has significantly affected morbidity and mortality rates as well as the capacities of national health systems, even in advanced countries, to take good care for patients. On March 31, 2020, the number of infected people worldwide was estimated at 735,560, with a fatality rate of 4.76%. This figure changes very quickly over time. In the space of a month, as of April 30, 2020, the number of people infected with COVID-19 worldwide has increased to 3.33 million, a 4.53-fold increase with a fatality rate of 7% [7].

Vaccination in general has been considered the most life-saving intervention for a century and has gradually established itself as the best solution against infectious diseases. Vaccine hesitancy is *ipso facto* considered one of the ten greatest health threats by the WHO. In March 2020, 10 days after the first confinement, nearly 25% of the 5108 French people questioned, representatives of the general population, declared that they would probably or certainly refuse the vaccines against COVID-19 if it existed [1].

2. Methodology

We conducted a cross-sectional study on the campus of the university residences of the University of Lubumbashi in the Democratic Republic of the Congo in the province of Haut-Katanga, city of Lubumbashi from 01/01/2021 to 30/06/2021. Our study is descriptive cross-sectional, and the study population consists of students residing in university residences.

2.1. Study Population and Sampling

Our study population consisted of student living on the University of Lubumbashi campus.

Regularly registered students who are housed in one of two homes during our study period were included in our study, while all non-regularly registered students as well as those regularly registered and staying in one of the homes outside from our study were excluded from our study.

Our sampling is probabilistic at two stages: The first stage allowed us to identify the different homes that were considered as clusters. Of these homes, we have chosen two, one of which houses the girls (Wards 2) and the other the boys (Wards 10). The second stage consisted in choosing in a simple random way at the rate of 50% in each cluster after drawing up two sampling frames for the two clusters.

Regarding the sample size, as it was said in the sampling, we took 50% in each cluster. Home 2 accommodates 192 female students and Home 10 accommo-

dates 193 students. The size is donations: 193 students.

2.2. Data Collection

The data of our study were collected on a form and encoded with Excel, analyzed with the software Epi info version 7.2.0.1 to be analyzed.

3. Results

From **Figure 1**, we notice that 95% or 49.22% of the students were of the Pentecostal religion.

As shown in **Table 1**, the average age is 23.3 years with a male predominance (50.3%).

As shown in **Table 2**, in 65.28% of cases, students were not ready to be vaccinated against 67% or 34.72%; One hundred and twenty-nine (129) students said that they always respect the barrier measures (gestures).

As shown in **Table 3**, there is a link between the acceptability of the vaccine and the post-injection manifestations as well as confidence in the vaccine ($P = 0.00$).

As shown in **Table 4**, confidence in the vaccine depends on post injection manifestations ($P = 0.00$).

As shown in **Table 5**, the obligatory nature of the vaccine depends on the confidence in the vaccine ($P = 0.0003$).

As shown in **Table 6**, knowledge of the importance of the vaccine depends on confidence in the vaccine as well as post-injection manifestations ($P < 0.05$).

As shown in **Table 7**, compliance with barrier measures has no connection with gender, level of education or age ($P > 0.05$).

4. Discussion

Figure 1 indicates that 95% or 49.22% of the students were of the Pentecostal religion.

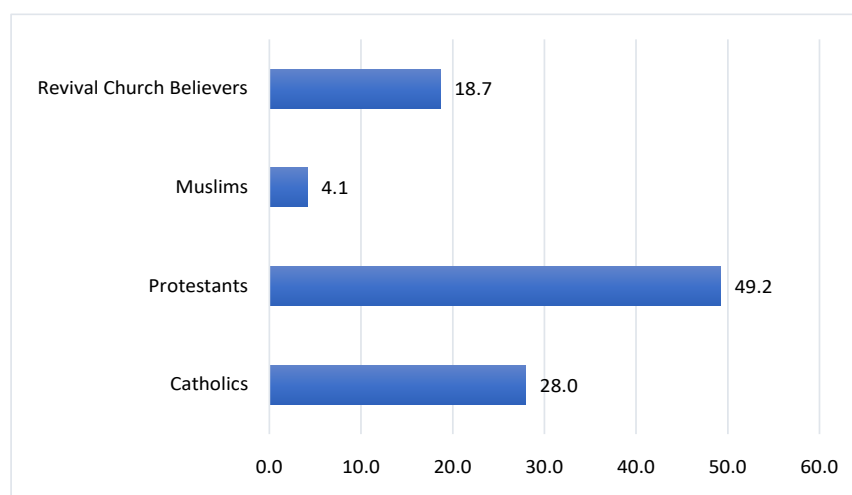


Figure 1. Distribution of student by religion.

Table 1. Sociodemographic characteristics.

Variables	Frequency	percentage	Minimum	Maximum	Means (\pm)
Age(year)					
18 - 24	136	70.5	18	30	23.3 Years (\pm 2.57)
>24	57	29.5			
Total	193	100			
Gender					
Female	96	49.7			
Male	97	50.3			
Total	193	100			

Table 2. Distribution of students according to knowledge, attitudes and practices on COVID-19.

Variables	Frequency (%)
Vaccine acceptability	
No	126 (65.3)
Yes	67 (34.7)
Reasons for refusing to get vaccinated	
Post-vaccination event	120 (95.2)
Lack of confidence in the vaccine	6 (4.8)
Knowledge of barrier gestures	
No	6 (3.1)
Yes	187 (96.9)
Moment of Respect for barrier gestures	
At the Faculty/School	64 (33.2)
Anytime	129 (66.8)
Source (Origine) of COVID-19	
Witchcraft	54 (27.9)
Diseases of dirty hands	26 (13.5)
Others	113 (58.5)

Table 3. Association between acceptability and other study variables.

Variables	Vaccine acceptability		PR	P-value
	No	Yes		
Age				
18 - 24	90	46	1.1	0.40
>24	36	21		
Sexe				
Male	66	31	1.1	0.26
Female	60	36		

Continued

<i>Niveau d'étude</i>				
Under graduat	64	36	0.96	0.41
Graduat	62	31		
<i>Post injection events</i>				
No	25	48	0.40	0.00
Yes	101	19		
<i>Vaccine confidence</i>				
No	113	21	3.8	0.00
Yes	13	46		

Table 4. Association between confidence in the vaccine and the other variables.

Variables	Vaccine confidence		PR	P-value
	No	Yes		
Gender				
Male	67	30	0.9	0.52
Female	67	29		
Education level				
Under graduat	66	34	0.90	0.18
Graduat	68	25		
Post-injection manifestation				
No	34	39	0.56	0.00
Yes	100	20		

Table 5. Association between the obligatory nature of the vaccine and the other variables of the study.

Variables	Compulsory nature of the vaccine		PR	P-value
	Non	Oui		
Niveau d'étude				
Under graduat	23	77	1.07	0.47
Graduat	20	73		
Confiance au vaccin				
No	20	114	0.38	0.0003
Yes	23	36		

Table 6. Association between knowledge of vaccine importance and study variables.

Variables	Knowledge of the importance of the vaccine			P-value
	No	Yes	PR	
Gender				
Male	42	55	1.2	0.17
Female	34	62		
Education level				
Under graduat	37	63	0.88	0.29
Graduat	39	54		
Post-injection manifestation				
No	19	54		
Yes	57	63	0.55	0.0002
Vaccine confidence				
No	73	61	10.71	0.00
Yes	3	56		

Table 7. Association between compliance with barrier measures and study variables.

Variables	Respect for barrier measures			P-value
	No	Yes	PR	
Gender				
Male	3	94	0.9	0.65
Female	3	93		
Study level				
Under graduat	4	96	1.86	0.38
Graduat	2	91		
Age				
18 - 24	5	131	2.1	0.43
>24	1	56		

Table 1 indicates that there were more students whose age is between 18 and 24 years old with an average age of 23.3 years old, a minimum age of 18 years old and a maximum age of 30 years old. This result can be explained by the fact that the age between 18 and 24 represents the age group of most Congolese students. These observations have also been made in Algeria [8].

We observed a large proportion of male students 97 (50.3%) (**Table 3**). Our results are different from those of a study conducted at the Higher Institute of Medical Techniques of Lubumbashi which reveals that most respondents were under the age of 25 (49.2%); the mean age was 26.4 ± 6.5 years. Female students were more observed (75.2%) [9]. On the other hand, some studies have found that women were in the majority [8].

According to **Table 2**, most students (65.3%) do not agree to be vaccinated and post-injection manifestations represent the large proportion of refusal to be vaccinated. Vaccine acceptability has a significant relationship with post-injection manifestations (**Table 4**). Our results are different from the study of medical students at a single allopathic medical school in Southeast Michigan which found that nearly all participants had positive attitudes toward vaccines; however, only 53% indicated they would participate in a COVID-19 vaccine trial and 23% were unwilling to take a COVID-19 vaccine [10]. Arati and the other authors found the same results in a study conducted on medical and dental students [11]. In Morocco, among health science students in Morocco, 26.9% of participants said they were willing to receive the vaccine against COVID-19 [12]. In Italy, Barello *et al.*, found that 86.1% of students would choose to be vaccinated against the COVID-19 coronavirus compared to 13.9% who would not [13].

The post-injection manifestations as well as the confidence in the vaccine are the basis of the refusal to be vaccinated ($P = 0.00$). Confidence in the vaccine is influenced by post-injection manifestations ($P = 0.00$). Our results are similar to those found by Lucia *et al.* who found that fear of serious side effects was independently predictive of a lower likelihood of intention to participate in a COVID-19 vaccine trial (AOR = 0.41, $P = 0.01$) [10]. In the United States, according to a theory-based analysis (multi-theory model: MTM), behavioural trust ($b = 0.089$, $p < 0.001$), participatory dialogue ($b = 0.056$, $p < 0.001$) and changes in the Physical environment ($b = 0.066$, $p = 0.001$) were significantly associated with acceptance of the COVID-19 vaccine among those who were not hesitant to take the vaccine and accounted for 54.8% of the variance. Of those who were hesitant to take the COVID-19 vaccine, the MTM construct of behavioural trust ($b = 0.022$, $p < 0.001$) was significant with political affiliation to the Republican Party ($b = -0.464$, $p = 0.004$), which was negatively associated with vaccine acceptance [14]. In Egypt, the most confirmed barriers to vaccination against COVID-19 were insufficient data regarding the adverse effects of the vaccine (potential 74.17% and unknown 56.31%) and insufficient information regarding the vaccine itself (72.76%) [15]. In Italy, the most common reasons given for refusing the vaccine were: being against vaccines in general, safety concerns/thinking that a hastily produced vaccine is too dangerous, seeing the vaccine as unnecessary due to the harmless nature of COVID-19, general lack of trust, doubts about the effectiveness of the vaccine, belief of being already immune, doubt about the provenance of the vaccine [16].

Regarding the time indicated to respect the barrier measures (rules), 66.8% of students always observe them while 33.2% only respect them at their faculty or school (**Table 2**). Compliance with the barrier measures against the “COVID-19” coronavirus in the premises of the Faculty of Medicine of Sousse was an obligation for all students. Failure to comply with this measure may be subject to disciplinary action for breach of article 18 of the internal regulations “Student be-

haviour” [17]. In addition, Ngoyi in his study conducted in Lubumbashi indicates that 82.9% of students do not respect the barrier measures [9].

Regarding knowledge of the source of COVID-19, **Table 2** shows that bad luck was cited in 27.9% of cases, the disease of dirty hands diseases (13.5%) while most students cited other causes (58.5%).

People who do not trust the vaccine do not advocate for the compulsory nature of the vaccine against COVID-19 (**Table 5**) and the compulsory nature of the vaccine depends on the trust in the vaccine ($P = 0.0003$). In France, the Ministry of Solidarity and Public Health as well as the Ministry of Higher Education, Research and Innovation had instructed the implementation of the vaccination obligation for students and pupils in Health [18].

Concerning the Knowledge of the importance of the vaccine, **Table 6** shows a significant link with confidence in the vaccine ($P = 0.00$), and post-injection manifestations ($P = 0.0002$).

Knowledge of the importance of the vaccine depends on confidence in the vaccine as well as post-injection manifestations ($P < 0.05$) (**Table 6**).

In our study, we found no link between compliance with barrier measures and gender, level of education and age ($P > 0.05$) as shown in **Table 7**.

5. Conclusion

We conducted a cross-sectional study on the acceptability of the COVID-19 vaccine in the university residences of the University of Lubumbashi. In 49.22% of cases, the students were of the Pentecostal religion with an average age of 23.3 years old. Most students (65.3%) do not agree to be vaccinated and post-injection manifestations represent a large proportion of refusal to be vaccinated. Vaccine acceptability has a significant relationship with post-injection manifestations. It is important that good awareness of vaccination is done to make the vaccine against COVID-19 acceptable among students.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Li, Y.D., Chi, W.Y., Su, J.H., Ferrall, L., Hung, C.F. and Wu, T.C. (2020) Coronavirus Vaccine Development: From SARS and MERS to COVID-19. *Journal of Biomedical Science*, **27**, 1-23. <https://doi.org/10.1186/s12929-020-00695-2>
- [2] Centers for Disease Control and Prevention (2020) Human Coronavirus Types. <https://www.cdc.gov/coronavirus/types.html>
- [3] Godlee, F. (2019) What Should We Do about Vaccine Hesitancy? *BMJ*, **365**, 4044. <https://doi.org/10.1136/bmj.l4044>
- [4] Slovakia Public Health Authority (2021) COVID-19 in Slovakia. Analysis of Disease COVID-19 Based on Epidemiological Enquiry Realized by Regional Public Health Authorities from 1.9.2020 to 30.9.2020. <https://covid-19.nczisk.sk/sk>

- [5] UNICEF (2021) Guide de sensibilisation sur le coronavirus. 1-12.
- [6] OMS (2020) RIPOSTE À LA COVID-19.
- [7] UNESCO (2020) Incidences socio-économiques et culturelles du covid-19 sur l'Afrique réponses de l'unesco.
- [8] OMS (2020) Plan national de déploiement et de vaccination applicable aux vaccins contre la COVID-19 Présentation du document d'orientation sur le plan national de vaccination et de déploiement applicable aux vaccins contre la COVID-19.
- [9] Mehda, O. (2021) Connaissances, attitudes et pratiques à l'égard de COVID-19 chez les étudiants de l'université. Université Mohamed El Bachir El Ibrahimi B.B.A.
- [10] Ngoyi, J.M., Kabamba, L.N., Tambwe, P.N., *et al.* (2020) Connaissances, attitudes et pratiques liées au SRAS-COV-2 (COVID-19) chez les étudiants de l'Institut Supérieur des Techniques Médicales de Lubumbashi. *Revue de l'Infirmier Congolais*, **2**, 7-10.
- [11] Lucia, V.C., Kelekar, A. and Afonso, N.M. (2021) COVID-19 Vaccine Hesitancy among Medical Students. *Journal of Public Health (United Kingdom)*, **43**, 445-449. <https://doi.org/10.1093/pubmed/fdaa230>
- [12] Kelekar, A., Lucia, V.C., Afonso, N.M. and Ana, K. (2020) COVID-19 Vaccine Acceptance and Hesitancy among Dental and Medical Students. *Journal of Chemical Information and Modeling*, **21**, 1-9.
- [13] Khalis, M., Boucham, M., Luo, A., Marfak, A., Saad, S., *et al.* (2021) Covid-19 Vaccination Acceptance among Health Science Students in Morocco: A Cross-Sectional Study. *Vaccines*, **9**, 1-10. <https://doi.org/10.3390/vaccines9121451>
- [14] Barello, S., Nania, T., Dellafiore, F., Graffigna, G. and Caruso, R. (2020) 'Vaccine Hesitancy' among University Students in Italy during the COVID-19 Pandemic. *European Journal of Epidemiology*, **35**, 781-783. <https://doi.org/10.1007/s10654-020-00670-z>
- [15] Sharma, M., Davis, R.E. and Wilkerson, A.H. (2021) Covid-19 Vaccine Acceptance among College Students: A Theory-Based Analysis. *International Journal of Environmental Research and Public Health*, **8**, Article 4617. <https://doi.org/10.3390/ijerph18094617>
- [16] Saied, S.M., Saied, E.M., Kabbash, I.A. and Abdo, S.A.E.F. (2021) Vaccine Hesitancy: Beliefs and Barriers Associated with COVID-19 Vaccination among Egyptian Medical Students. *Journal of Medical Virology*, **93**, 4280-4291. <https://doi.org/10.1002/jmv.26910>
- [17] Troiano, G. and Nardi, A. (2021) Vaccine hesitancy in the era of COVID-19. *The Royal Society for Public Health*, **194**, 1-8.
- [18] Université de Sousse (2020) Note aux étudiants pour le respect des mesures d'hygiène et de prévention du 'Coronavirus-Covid/19'. Note aux étudiants pour le respect des mesures d'hygiène et de prévention du 'Coronavirus-Covid/19' Tout.