



## Article Original

## Factors of Acceptance of Covid-19 Vaccination in Displaced Persons's Camps in North-Kivu, South-Kivu, Tanganyika and Ituri: An Analytical Cross-Sectional Study

*Facteurs Associés à l'Acceptation de la Vaccination Covid-19 dans les Camps des Déplacés du Nord-Kivu, Sud-Kivu, Tanganyika et Ituri : Une Étude Transversale Analytique*

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### ABSTRACT

**Introduction.** Displaced persons in the east of the Democratic Republic of Congo were not spared from Covid-19. The aim of this study was to identify factors associated with vaccine acceptance among displaced persons. **Materials and methods.** A cross-sectional analytical study was conducted among displaced persons in camps supported by the International Organization for Migration (IOM) in Ituri, North Kivu, South Kivu and Tanganyika. The data were analyzed using SPSS 27. **Results.** Most of respondents were aged between 25 and 35 (34%). Health workers (80%) were the main source of information about Covid-19, 79% of respondents were in favour of vaccination and 55% had been vaccinated. Poor knowledge of preventive measures (ORa: 1.78; CI95%: 1.02 - 3.72), lack of awareness of Covid-19 (ORa: 2.31; CI95%: 1.39 - 3.84) and unfamiliarity with a vaccination site (ORa: 3.5; CI95%: 2.2 - 5.5) were associated factors in non-acceptance of vaccination. **Conclusion.** Healthcare staffs were the main sources of information, and the majority of respondents were in favor of Covid-19 vaccination, but only just over half had been vaccinated. Low awareness of preventive measures, lack of awareness of vaccination and lack of knowledge of a vaccination site were independently associated with non-acceptance of Covid-19 vaccination. Involving community relays in raising awareness of Covid-19 and bringing vaccination sites closer to beneficiaries could improve acceptance of vaccination.

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**Key words:** Acceptance, vaccination, Covid-19, displaced persons

**Mots clés:** Acceptation, vaccination, Covid-19, personnes déplacés

### RÉSUMÉ

**Introduction.** Les déplacés de l'Est de la République Démocratique du Congo n'ont pas été épargnés par la Covid-19. L'objectif de cette étude était d'identifier les facteurs associés à l'acceptation du vaccin chez les déplacés. **Matériels et Méthodes.** Une étude transversale analytique a été menée auprès des déplacés des camps appuyés par l'Organisation Internationale pour les Migrations (OIM) en Ituri, Nord-Kivu, Sud-Kivu et Tanganyika. Les données ont été analysées à l'aide du logiciel SPSS 27. **Résultats.** La majorité des enquêtés étaient âgés de 25 à 35 ans (34%). Les personnels de santé (80%) étaient la principale source d'information sur la Covid-19, 79% d'enquêtés étaient favorables à la vaccination et 55% étaient vaccinés. La faible connaissance des moyens de prévention (ORa : 1,78 ; IC95% : 1,02 - 3,72), le manque de sensibilisation sur la Covid-19 (ORa : 2,31 ; IC95% : 1,39 - 3,84) et la méconnaissance d'un site de vaccination (ORa : 3,5 ; IC95% : 2,2 - 5,5) étaient les facteurs de non acceptation de la vaccination. **Conclusion.** Les personnels de santé étaient les principales sources d'information et la majorité d'enquêtés étaient favorables à la vaccination Covid-19 mais seulement un peu plus de moitié étaient vaccinés. Le faible niveau connaissance de moyens de prévention, l'absence de sensibilisation sur la vaccination et la méconnaissance d'un site de vaccination étaient indépendamment associés à la non-acceptation de la vaccination Covid-19. Impliquer les relais communautaires dans la sensibilisation sur la Covid-19 et rapprocher les sites de vaccination des bénéficiaires pourraient améliorer l'acceptation de la vaccination contre le Covid 19.



### HIGHLIGHTS OF THE STUDY

#### What is known about the subject

In the DRC, many authors have addressed the subject of acceptance of vaccination in the general population, but few have focused on the displaced population.

#### The question addressed in this study

Perception, knowledge, attitudes and practices of displaced persons regarding Covid-19 vaccination.

#### What is new about this study

- Displaced persons were in favour of Covid-19 vaccination, but few were vaccinated.
- The low level of knowledge of means of prevention, the lack of perception of the seriousness of Covid-19, the lack of awareness of vaccination and the lack of knowledge of a vaccination site were determining factors.

#### Implications for practice, policy and future research

Involving community relays in raising awareness of Covid-19 and bringing vaccination sites closer to

## INTRODUCTION

Covid-19 began in China and was initially an international public health emergency before being declared a pandemic [1, 2]. It has had serious repercussions for health, security and the economy in Africa, and the Democratic Republic of Congo (DRC) has not been spared. There is no specific treatment for Covid-19, and vaccination is the only effective means of prevention. Several companies have developed vaccines that are generally safe, 95% effective and capable of protecting against severe forms of the disease. However, some mild adverse reactions cannot be ruled out [3,4]. By July 2022, more than 18.5% of people in the African region had received their first dose of vaccine. Mauritius (75.3%), Seychelles (77.5%) and Rwanda (76.1%) are the three countries that have exceeded the target of 70% of people fully vaccinated, while six countries have recorded between 40% and 70% vaccination of the primary vaccination series; These were Botswana (58.4%), Cabo Verde (52.4%), Comoros (46.5%), Liberia (44.8%), Mozambique (40.0%) and Sao Tome and Principe (45.1%). However, eight countries had not yet administered the vaccine to more than 10% of their population. These were Burundi (0.1%), Cameroon (4.5%), Madagascar (4.5%), Malawi (7.6%), Mali (7.6%), DRC (2.6%) and Senegal (6.3%) [5]. A study including Afghan refugees resettled in the United States who had a high level of education and were less concerned about the vaccine were more likely to accept vaccination [6]. In Yopougon, acceptability of the Covid-19 vaccination was estimated at 54%, while only 41% of respondents had actually been vaccinated, and of these 66.1% had received two doses of vaccine. Fear of side effects, vaccine ineffectiveness, rumors and denial of the disease were the main reasons for vaccine hesitancy [7]. The evaluation of the acceptability of the Covid-19 vaccination in Bamako revealed that on average 53.9% of respondents were willing to accept the vaccine, the main reason being protection against the disease. In Uganda, 18.1% of refugees questioned in a survey were prepared to accept the Covid-19 vaccination. Acceptance was associated with age and country of origin [9]. In the DRC, in

February 2023, 10.2% of the total population had received their first dose of Covid-19 vaccine and a total of 9.7 million had been fully vaccinated, i.e. 8.1% of the total population, including migrants and forcibly displaced persons [10].

The aim of this study was to identify factors associated with vaccine uptake among displaced persons in eastern DRC.

## MATERIALS AND METHODS

A cross-sectional analytical study was carried out in March 2023 in IDP sites supported by the International Organization for Migration (IOM) in the provinces of Ituri, North Kivu, South Kivu and Tanganyika.

### Study population

The study population was made up of heads of households living in IOM-supported IDP sites in the provinces of Ituri, North Kivu, South Kivu and Tanganyika.

### Inclusion criteria

All heads of households living in the IDP sites concerned by the study were included.

### Exclusion criteria

All heads of households living in the IDP sites concerned by the study but who had not given their consent to participate in the study were excluded.

### Sample size calculation and sampling technique

The sample size was calculated using the following formula:  $n \geq \frac{Z_{\alpha}^2 * p * q}{d^2}$  with n: sample size, p: proportion of respondents accepting the COVID 19 vaccination: 50%, q: proportion of respondents not accepting the COVID 19 vaccination i.e.  $1-p=1-0.5=0.5$   $q=1-p=0.50$ ,  $\alpha$ : precision risk =0.05,  $Z_{\alpha}$  = deviation corresponding to a confidence level of 95%. Predicting a 20% non-response rate, the minimum sample size was increased to 461. The sample size was increased to 1100 to increase the power of the study.

The number of people to be surveyed at each site was determined in proportion to the weight of its population in the total populations of all the sites.

### Sampling technique

**Sites selection.** Of the 165 sites in the four provinces, we chose to select 20%. A total of 33 sites were selected using a two-stage sampling procedure. The first stage consisted of selecting the sites according to the following procedure. The first step was to determine the number of sites to be selected per province. For the sake of representativeness, we grouped the sites into four categories according to the size of their respective populations. The first category comprised sites with a population of at least 500, the second those with a population of 501 - 1000, the third those with a population of 1001 - 5000 and the fourth those with a population of over 5000.

In the second stage, we determined the proportion of the 33 sites represented by each group of sites, which were then allocated to the overall number of sites to be selected. Finally, the number found per site category was distributed among the four provinces, respecting the proportion of sites per province.

Once the number of sites to be sampled had been determined by category, the sites were selected by simple random sampling using the Open Epi random number generator.

**Selection of households in the sites.** The number of households corresponded to the number of heads of household. As the households were all listed in the sites, we selected the required number by simple random sampling, taking into account the weight of each site in relation to the total population of all the sites selected.

#### Data collection

Data was collected by face-to-face interview using a pre-tested questionnaire deployed on tablets in the Kobocollect software. The following variables were collected: socio-demographic characteristics of respondents, economic characteristics of households, source of information on Covid-19, level of knowledge of respondents about Covid-19, attitude of heads of households towards vaccination against Covid-19, vaccination practices of heads of households, perception of heads of households about Covid-19.

#### Data processing and analysis

The data collected were analyzed in SPSS 27. Categorical variables were presented as frequencies and quantitative variables summarized as median and interquartile range. Odds ratios were calculated as measures of association with a p-value of < 0.05 and 95% confidence interval.

#### Ethical considerations

We requested approval by the Ethics Committee of the School of Public Health at the University of Goma under number prior to the study. And informed consent was obtained from each survey participant.

#### Bias

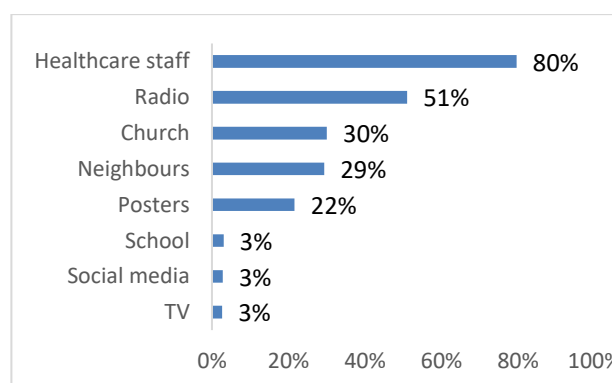
The inclusion and exclusion criteria were scrupulously respected in order to control selection bias.

## RESULTS

Of the 1,100 heads of household selected, 1,033 took part in the survey, representing a participation rate of 93.9%. The median age of the heads of household was 35, with extremes ranging from 17 to 88. The majority of respondents were aged between 25 and 35 (34%), female (63.5%), farmers/breeders (67%), married (79%), Protestant (40%) and had no education (39%) (**Table I**). The main sources of information from which heads of household had heard about COVID-19 were health workers (80%), followed by the radio (51%) (**Figure 1**). Nearly 95% of heads of household had already heard of Covid-19. Direct contact (greeting with the hand) with a Covid-19 patient was the means of Covid-19 transmission most cited by respondents.

**Table I. Socio-demographic and economic characteristics of respondents**

Variables	n(%)
<b>Age groups (n= 803)</b>	
≤ 24 years	150 (19)
25 – 35 years	276 (34)
36 – 45 years	162 (20)
≥ 46 years	215 (27)
<b>Sex (n= 1033)</b>	
Female	656 (63,5)
Male	377 (36,5)
<b>Professional situation (n= 1033)</b>	
Households	67 (6,5)
Day labourer	32 (3,1)
Student	6 (0,6)
Farmer	688 (67)
Merchant	61 (5,9)
None	139 (13,5)
State employee	12 (1,2)
Others	28 (2,7)
<b>Marital status (n= 1033)</b>	
Single	45 (4)
Married	818 (79)
Separated	57 (6)
Widower	113 (11)
<b>Religion (n= 982)</b>	
Adventiste	95 (9)
Anglicane	12 (1)
Assemblée	23 (2)
Catholic	250 (24)
Church of the Revival	137 (13)
Muslims	14 (1)
Protestant	413 (40)
Tempérant	38 (4)
<b>Education level (n= 1033)</b>	
None	401 (39)
Primary	386 (37)
Secondary school	240 (23)
University	6(1)
<b>Daily household expenditure (n= 1033)</b>	
< 2000 FC	445 (43)
2000 – 6000 FC	463 (45)
> 6000FC	125 (12)



**Figure 1. Source of information on Covid-19**

In addition, 91% of heads of household had a low level of knowledge of the symptoms of Covid-19, while only 41% knew how to prevent it (**Table II**).



**Table II. Respondents' level of knowledge about Covid-19**

Variables	n (%)
<b>Having heard of Covid-19</b>	
No	51 (5,2)
Yes	928(94,8)
<b>Knowledge of Covid-19 transmission</b>	
Accolades	91 (22)
Contact with a Covid-19 body	80 (4)
Direct contact with a Covid-19 patient (greeting with the hand)	494 (23)
Failure to maintain a distance of one meter	332 (15)
Failure to wear the mask correctly	350 (16)
Eating without washing hands	438 (20)
Others	19 (1)
<b>Level of knowledge of Covid-19 symptoms</b>	
Good (≥ 10)	4 (0,4)
Medium (6-9)	88 (8,5)
Low (0-5)	941 (91,1)
<b>Level of knowledge of how to prevent Covid-19</b>	
Good (≥ 3)	427 (41)
Low (0-2)	606 (59)

Household heads were in favor (79%) of Covid-19 vaccination. Knowledge of the benefits of vaccination and the recommendation of health workers were the main reasons for favorable attitudes to vaccination. On the other hand, fear of side-effects, fear of infertility, fear of reduced longevity and religious prohibition were the main reasons for an unfavorable attitude to vaccination. Most of the respondents were prepared to recommend Covid-19 vaccination to someone close to them (Table III). Concerning heads of household, 55% of them were vaccinated against Covid-19 and the main reasons for non vaccination were fear of injections, having read or heard negative information about Covid-19 vaccines and fear of contracting vaccines'induced disease (Table IV).

**Table III. Attitudes of heads of household towards vaccination against Covid-19**

Variables	n (%)
<b>Attitudes to vaccination</b>	
Unfavorable	212.(21)
Favorable	821.(79)
<b>Reasons for favoring Covid-19 vaccination</b>	
Knows the benefits of vaccination	168.(20,5)
Recommendation from health workers	138.(16,8)
Being able to travel	88.(10,7)
Workplace requirements	1.(0,1)

**Table III (ctd). Attitudes of heads of household towards vaccination against Covid-19**

Variables	n (%)
<b>Reasons for unfavorable attitude to Covid-19 vaccination</b>	
Causes infertility to men and women	21.(11)
Decrease in longevity	28.(14)
Decreased intelligence quotient	5.(3)
Mark of beast 666	17.(9)
Black race extermination weapon	6 (3)
Vaccine development in brief	2 (1)
Fear of side effects	43 (22)
The vaccine does not protect against Covid-19	3 (2)
Lack of a vaccine developed by Africans	3 (2)
Mandatory	5 (3)
Incoherent speeches by politicians	2 (1)
Prohibition of religion	4 (2)
No reason	34 (17)
Others	24 (12)
<b>Willingness to recommend vaccine Covid-19 to a friend or family member</b>	
No	196 (19)
Yes	837 (81)

**Table IV. Covid-19 vaccination practices of heads of household**

Variables	n (%)
<b>Vaccinated against Covid-19</b>	
Yes	563(55)
No	470(45)
<b>Reasons for not taking the Covid-19 vaccine</b>	
Vaccines not effective/not trusted	21(5)
Fear of contracting disease caused by vaccine	54(12,9)
No risk of contracting the disease	13(3,1)
Religious reasons	11(2,6)
Fear of injections	114(27,2)
Confidence in traditional treatment	11(2,6)
Lack of knowledge about vaccination sites	46(11)
Having read/heard negative information about vaccines	95(22,7)
Others	54 (12,9)

Household heads gave several reasons for non-vaccination, including the unavailability of vaccines and the difficulty to take an appointment. In addition, most respondents had ulterior motives (Figure 2)

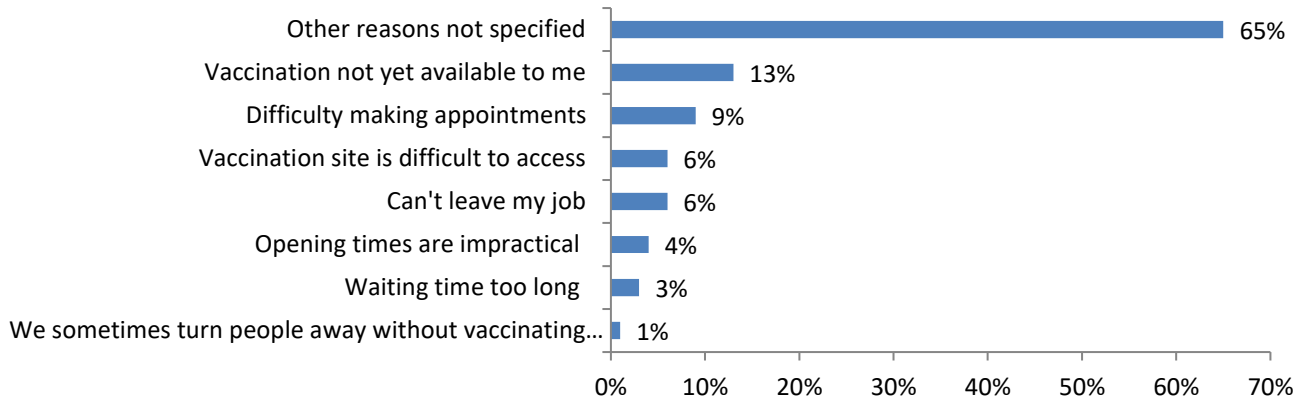


Figure 2. Reasons for non-vaccination against Covid-19

Logistic regression identified that residence in the provinces of Ituri and South Kivu was associated with non-acceptance of vaccination, whereas residence in the province of Tanganyika was not. A low level of knowledge of the means of prevention against Covid-19, a lack of perception of the seriousness of COVID-19, the fact of not having been sensitized against COVID-19 and unfamiliarity with a vaccination site were factors in non-acceptance of vaccination against COVID-19 (Table V).

**Table V. Factors associated with non-acceptance of Coviv-19 vaccination**

Variables	aOR	CI à 95%	p-value
<b>Province of residence</b>			
Ituri	4,6	1,4 – 15,1	0,011
Sud-Kivu	1,96	1,02 – 3,72	0,041
Low level of knowledge of how to prevent Covid-19	1,78	1,14 – 2,78	0,011
Covid-19 non-critical illness	2,27	1,22 – 4,21	0,010
Lack of awareness about vaccination	2,31	1,39 – 3,84	0,001
Unawareness of a nearby vaccination site	3,5	2,2 - 5,5	0,000
*aOR : Adjusted Odds Ratio      ** CI : Confidence interval			

## DISCUSSION

The main results of this study were as follows The median age of the heads of household was 35 years, with extremes of 17 to 88 years, and they were female (63.5%). The majority of households were of average economic status. Health workers were the main source of information about Covid-19 (80%), 91.1% of respondents had a low level of knowledge about the means of preventing Covid-19, 59% had a low level of knowledge about the means of prevention, 79% were in favour of vaccination and only 55% had been vaccinated. The low level of knowledge of the means of prevention against Covid-19, the lack of awareness of vaccination and the lack of knowledge of a nearby vaccination site were obstacles to vaccination among the respondents.

### Socio-demographic and economic characteristics of respondents

The heads of household were generally young, in line with the structure of Congolese populations in general [11]. In terms of the economic level of households, a very small proportion of households had more than 6,000 Congolese francs and lived from hand to mouth. This can be explained by the status of the camp populations, who are generally destitute and live from odd jobs.

### Assessment of knowledge, attitudes and practices

The main sources of information about Covid-19 were health workers, followed by the radio. In a survey conducted in North Kivu by the UNHCR and Intersos, the radio was the main source of information [12]. In rural areas, radio is the main accessible medium. In addition, numerous awareness-raising campaigns were carried out by health workers on Covid-19. Most of the displaced people had a low level of knowledge of Covid-19, both the symptoms and the means of prevention. The low level of education of our respondents could explain this state of affairs.

The heads of household were in favour of vaccination. Other studies using data from the DRC have found acceptance rates similar to those in our study. This similarity is probably due to the fact that these two studies were conducted on similar populations (same country) [13, 14].

Lack of awareness of the benefits of vaccination was the main reason for non-vaccination cited by the heads of households who were skeptical. It goes without saying that people who are aware of the benefits of vaccination are in favour of it.

On the other hand, negative ideas about Covid-19 vaccination are not conducive to a favourable attitude towards vaccination. A survey carried out in North Kivu revealed that a section of the population, mainly in rural areas, believes that Covid-19 is an invention and that the real reason for vaccination is hidden [12]. It is well known that rumors and misinformation are common when it comes to vaccination and are obstacles to good uptake of vaccination services.

Our study showed that 55% of people were vaccinated. This rate is different from those found by other authors. This difference can be explained by the difference in the target group considered [15, 16]. The head of household is not representative of the whole household. In addition, vaccination coverage was assessed on the basis of respondents' declarations.

Unavailability and the difficulty of making an appointment to receive the vaccine were cited as the main reasons for non-vaccination. In addition, a large proportion of respondents did not give specific reasons for refusing or hesitating to be vaccinated. We believe that this is probably due to the myths and conspiracy theories surrounding this disease [17, 18].

### Determinants of acceptance of COVID-19 vaccination

The low level of knowledge of the means of prevention against Covid-19 was a determinant of non-acceptance of vaccination. Other authors have reached similar conclusions [19, 20]. In fact, a low level of knowledge of the disease, and in particular of how to prevent it, is not conducive to good acceptance of vaccination, as patients are unaware that the vaccine is one of the means of prevention.

In our study, lack of awareness was a determining factor in non-acceptance of vaccination. Lack of awareness or insufficient awareness leaves room for popular ideas leading to reluctance [18]. It goes without saying that not knowing about the existence of a vaccination site in one's area does not encourage vaccination.

## CONCLUSION

The majority of heads of household had already heard of Covid-19 and health workers were the main sources of information. Nearly four-fifths of heads of household were in favor of COVID-19 vaccination, although only just over half had actually been vaccinated. Low awareness of preventive measures, lack of perception of the seriousness of Covid-19, lack of awareness of vaccination and lack of knowledge of a nearby vaccination site were independently associated with non-

acceptance of Covid-19 vaccination. Involving community intermediaries in raising awareness of Covid-19 and bringing vaccination sites closer to beneficiaries will improve acceptance of vaccination.

#### Authors' contributions

All authors participated in the revision of the manuscript and approved the final version.

#### Acknowledgements

We would like to thank IOM and its implementing partners, as well as the academic authorities of the University of Goma.

#### Conflicts of interest

The authors have declared that they have no conflicts of interest.

#### Financial support and other types of sponsorship

This study was financed entirely by IOM funds.

#### Formal patient consent

All respondents gave formal consent to participate in the study.

#### Ethical clearance

Ethical clearance was obtained from the Ethics Committee of the School of Public Health at the University of Goma under number UNIGOM/CEM/006/2022.

#### What are the main merits of this article?

This study has the merit of having tackled the subject of Covid-19 vaccination, to which the Congolese population has very little adherence, given the official results. The other particularity of this study is the target population, which is a specific population with specific realities. The multicentric nature of the study enabled us to obtain as wide a range of information as possible on the subject, so that we could propose appropriate solutions to decision-makers.

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