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Mandatory Vaccination in Côte D'Ivoire: Knowledge, Attitudes and Practices of Health Workers in the National Institute of Public Hygiene and Port-Bouët General Hospital

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Abstract

Context: The mandatory vaccination of healthcare workers is intended to reduce their risk of contamination, as well as being a source of contamination for patients. However, the Covid-19 pandemic highlighted the refusal of healthcare workers to be vaccinated.

Objective: This study was to investigate the knowledge, attitudes and practices of healthcare workers regarding compulsory vaccination.

Methods: This cross-sectional, analytical study was conducted from January to March 2023 in two public hospitals in Abidjan and included all staff. The Pearson chi-square test was used.

Results: A total of 390 people were interviewed. Women predominated (52.30%), with an average age of 38. Paramedical staff were in the majority (73.85%).

The need to vaccinate healthcare staff was known by 64.61%, and prevention was cited as the reason in 95.64% of cases. Yellow fever (58.20%) and Covid-19 (52.82%) were the vaccines for which most respondents were up to date. More than 2/3 of them (88.72%) consented to compulsory vaccination. Fear of adverse effects was the most common reason for refusal (86.41%). Acceptance of compulsory vaccination was associated with having a vaccination record and with the doctors' socio-professional category.

Conclusion: There are still obstacles to the vaccination of healthcare staff. Appropriate communication aimed at paramedical staff is needed to overcome them. The emergence of diseases with epidemic potential highlights the importance of introducing vaccination legislation or regulations.

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Introduction

Vaccination is universally recognized as a significant and effective public health advancement in the prevention of infectious diseases that can reduce morbidity, mortality, and health-related costs [1,2].

Since their introduction in the 18th century, alongside the increase in the use and popularity of vaccines, the public has been concerned about their safety and effectiveness. This loss of confidence, known as "vaccine hesitancy," involves both vaccinated and unvaccinated individuals. Observable among both healthcare workers and the general population, the Covid-19 pandemic has brought it into sharper focus [3].

WHO classifies vaccine hesitancy as one of the ten (10) most significant threats to global health. Indeed, low vaccination coverage, particularly among healthcare workers, can lead to epidemics, increase absenteeism, and reduce productivity [4].

Therefore, mandatory vaccination has been instituted for healthcare workers in some countries, such as France, for hepatitis B since 1991, leading to a considerable reduction in the incidence of this work-related disease [5].

With the emergence of Covid-19, law no. 2021-1040 of August 5, 2021, introduced mandatory vaccination for healthcare, social, and medico-social workers in France, and for access to specific places, leisure activities, and events. This measure was strongly contested by healthcare workers.

In Côte d'Ivoire, as in most African countries, there is no mandatory vaccination policy. Low vaccine coverage among healthcare workers is not only a public health issue but also an ethical one. It could reflect a lack of interest and/or a failure to recognize the importance of vaccination in protecting the health of medical staff and patients. The objective of this study was to examine the knowledge, attitudes, and practices of healthcare workers in two hospitals in Abidjan with regard to mandatory vaccination.

Methodology

Study design and framework

We conducted a cross-sectional analytical study from January to March 2023, lasting three months. It took place in two healthcare facilities: the National Institute of Public Health in Treichville and the Port-Bouët General Hospital. The National Institute of Public Health (INHP) is a national public administrative institution that focuses primarily on the prevention of infectious diseases through vaccination, general hygiene, medical monitoring, and epidemiological surveillance. The Port-Bouët General Hospital primarily provides curative health care to the population.

Study population

Included in the study were all the healthcare workers in preventive and curative care services who were working in these facilities. These included medical staff, nurses, midwives, nursing assistants, senior healthcare technicians, laboratory technicians, and students (medicine, INFAS).

Data collection

Data collection was carried out using an anonymous written questionnaire, which was given to participants and then collected within an hour of completion. The recovery of questionnaires was associated with the verification of vaccination records for those who had them.

Definition of variables

The questionnaire covered socio-demographic and professional characteristics, their knowledge of vaccination and mandatory vaccination, their perceptions and attitudes regarding mandatory vaccination, and their own vaccination status.

Analyses statistiques

Statistical analysis of the data was performed using SPSS 25 software. Descriptive statistics were presented as means with standard deviation and extremes for quantitative variables and as proportions for qualitative variables. Pearson's chi-square test was used to test for correlation, with an expected significance threshold set at $p<0.05$ ($\alpha=5\%$).

Ethical considerations

To uphold ethical principles, we obtained authorisation from the Director General of Health of Côte d'Ivoire. Verbal consent to participate in the survey was requested from participants. The confidentiality of data was maintained and anonymous status was respected.

Results

Study population

Our study population consisted of 390 healthcare workers. Women accounted for 52.30% of respondents, with a sex ratio of 0.91. The average age was 38 (+/-3) years, with a minimum of 20 and a maximum of 56 years. Medical staff accounted for 26.15% of the study population and paramedical staff for 73.85%. This included nurses (40.77%), nursing assistants (17.43%), laboratory technicians (5.9%), midwives (4.62%), medical students (3.59%), and health technicians (1.54%). It should be noted that only 38 (9.74%) of them had previously received training in vaccinology prior to our study, and 381 (97.69%) had expressed a desire to receive such training.

Vaccination knowledge and mandatory vaccination

The vast majority of healthcare workers (90.25%) considered vaccines to be a way of preventing disease, while 2.56% considered it a way of curing disease. Seventy-two percent of the study population stated that vaccines were substances prepared in laboratories from microorganisms (killed, inactive, or attenuated), and 41.02% considered vaccines to be medicines. Some stated that vaccines were serums (6.15%). According to 88.21% of respondents, mandatory vaccination exists in Côte d'Ivoire, and the vaccines concerned, mentioned by the respondents, were BCG (76.45%), hepatitis B (58.13%), and MMR (54.36%). Among respondents, 64.61% said they were aware of vaccination for healthcare workers, and the reason given for this vaccination was prevention in 95.64% of cases.

Vaccination status

When asked about their compliance with the vaccination schedule for 14 vaccines recommended for healthcare workers, most respondents were up to date, according to their vaccination records, for yellow fever (82.54%) and COVID-19 (74.91%). Vaccination coverage was average for hepatitis B (70.54%) and meningitis (68.36%). A small proportion of our study population was up to date with influenza (6.90%) and hepatitis A (1.09%) vaccinations. Complete data on vaccination status are shown in Table 1.

Perceptions and attitudes of healthcare workers toward mandatory vaccination

Most healthcare workers believed that vaccines are important for reducing and eliminating several diseases (87.69%) and useful for dealing with various epidemics, especially in developing countries (72.30%). Vaccination should therefore be a prerequisite for healthcare workers before practicing in the healthcare sector (74.36%), as it is a duty for healthcare professionals because they must be role models for patients (64.87%). The majority of respondents agreed with mandatory vaccination for healthcare workers (88.72%) Table 3.

Nevertheless, a few (11.28%) believed that vaccination should be a personal choice and not mandatory (10%), and also that it is patients who should be vaccinated to protect themselves against disease (1.28%).

When asked about their reasons for refusing mandatory vaccination, non-consenting healthcare workers most frequently cited fear of adverse effects (97.39%) and fear of becoming ill after being vaccinated (65.6%) Table 2.

Factors associated with mandatory vaccination

We investigated the factors associated with healthcare workers' acceptance of mandatory vaccination Table 3. Regarding socio-professional category, doctors (OR=1.26; P=0.001) were more likely to accept mandatory vaccination. No previous training in vaccinology (OR=1.73; P=0.02), having a vaccination record (OR=0.81; P<0.001), and hearing about mandatory vaccination for healthcare workers (OR=1.87; P<0.001) were significantly associated with acceptance of mandatory vaccination.

Figure 1: Vaccination status of healthcare personnel.

Vaccinations up to date according to vaccination record	Number (n=275)	Percentage (%)
Yellow fever	227	82,54
COVID-19	206	74,91
Hepatitis B	194	70,54
Meningitis	188	68,36
Tetanus	133	48,36
Polio	77	28
BCG	87	31,63
Measles	60	21,88
Rubella	46	16,72
Diphtheria	45	16,36
Pertussis	44	16
Typhoid fever	34	12,36
Influenza	19	6,90
Hepatitis A	03	1,09

Table 2: Distribution of the study population according to reasons that may justify refusal for mandatory vaccination.

Reasons for declining mandatory vaccination	Number (n=44)	Percentage (%)
I am afraid of the side effects of vaccination.	43	97,39
I am afraid of getting sick after being vaccinated.	29	65,6
I am worried about long-term effects of vaccination on my health.	27	61,28
I think vaccines are not effective.	16	35,64
My religious beliefs are against vaccination.	7	16,76
I believe more in immunity acquired through infection than through vaccination.	33	7,51
I think vaccination does more harm than good.	1	0,28
I do not think I am at risk of contracting an infectious disease in hospital.	1	0,28

Table 3: Factors associeted with acceptance of mandatory vaccination: bivariate analysis.

	Acceptance of mandatory vaccination		P
Variables	**Yes (%)**	**No (%)**	
Provenance			**0,81**
Port-Bouët HG	176 (89,34)	21 (10,66)	
INHP	170 (88,08)	23 (11,92)	
Occupational categories			**0,001**
Medical	100 (98,03)	02 (1,97)	
Paramedical	246 (85,41)	42 (14,59)	
Vaccinology training			**0,02**
Yes	29 (76,32)	09(23,68)	
No	317(90,20)	35(9,80)	
Vaccination record			**0,001**
Yes	311 (93,68)	21 (6,32)	
No	35(60,35)	23(39,65)	
Knowledge of mandatory vaccination for healthcare workers			**0.00014**
Yes	238 (93,34)	17 (6,66)	
No	108 (80)	27 (20)	

Discussion

Study population characteristics

Women's predominance (52.30%) with a sex ratio of 0.91 confirms international trends toward feminization of the health workforce [6]. In addition, the predominance of paramedical staff in our study population (73.85%) is a characteristic found in several studies, notably that of Laraqui et al. in Morocco, with a proportion of 68.5%. This fact is frequently observed in urban health centers. [6,7]

The proportion of those who had received training in vaccinology was low (9.74%). These findings are concerning because they involve the paramedical staff and almost all of the medical staff. Attoh et al. in Abidjan, in a study evaluating the training of Ivorian health professionals, highlighted the fact that trained health professionals had a better level of knowledge about vaccines and vaccine administration than those who were not trained [8].

Vaccination knowledge, mandatory vaccination, and vaccination status

Though most (90.25%) respondents mentioned vaccination as a preventitive measure, smaller proportions, 70.25%

stated that vaccines were substances prepared in laboratories from microorganisms (killed, inactive or attenuated) and 6.25% stated that vaccines were serums. However, in the study by Nguefack et al. among the general population in Cameroon, the majority of mothers (99.2%) had very good knowledge of childhood vaccination and understood its definition [9]. The level of knowledge observed in our study is therefore low, given that the respondents were healthcare workers. In addition, 88.21% of respondents stated that mandatory vaccination existed in Côte d'Ivoire, which is not the case. This further illustrates their low level of knowledge on the subject of vaccination.

With regard to vaccination status, most respondents (70.51%) had a vaccination record. Yellow fever (82.54%) and COVID (74.91%) vaccines were administered to most respondents based on their vaccination records, while viral hepatitis B coverage was lower (70.54%). However, hepatitis B transmission in hospitals is a significant risk. Vaccination against this disease is therefore mandatory for healthcare workers in some countries, including France [5] . Reducing transmission risk through vaccination may not be a concern for the 29.46% of our sample who are unimmunised. Nevertheless, frequent vaccine stockouts, observed in our context, could also be a factor in this situation.

For yellow fever, relatively high rates could be explained by the fact the antiamaril vaccine is mandatory for entering and leaving Côte d'Ivoire, regardless of the traveller's destination. The COVID-19 vaccine was also required for entry into and exit from certain countries throughout the health emergency. It entitled the holder to a 'health pass' and was the subject of increased communication with healthcare workers, who were a target group.

Health workers' perceptions and attitudes towards mandatory vaccination

For most respondents, vaccines are important for reducing and eliminating several diseases (87.6%). Thus, the majority (89%) agreed with compulsory vaccination for healthcare workers, while 11% disagreed. Overall, the perception of the importance of vaccines in improving public health is positive, despite the infodemic and vaccine hesitancy among healthcare workers caused by COVID-19. A study by Navaré et al. in France, conducted shortly before the advent of COVID-19 vaccines, found that only 35% of hospital workers were in favour of vaccination against COVID-19 [10].

Regarding the reason for refusing mandatory vaccination, fear of adverse effects was the main reason (97.39%). Most studies show this reason for vaccine refusal among healthcare workers and the general population. In Attoh-Toure's study, the main reasons for vaccine hesitancy among healthcare service users in Abidjan were fear of side effects, vaccine ineffectiveness, rumours and denial of the disease [11].

Factors associated with acceptance of mandatory vaccination

Occupational status (OR=1.26; P=0.001), particularly membership of the medical professions, was one of the factors associated with acceptance of the vaccination requirement. This fact, frequently observed among healthcare personnel, could be explained by the more in-depth knowledge acquired during medical training on vaccination, but also on vaccine-preventable infectious diseases and immunity.

Paradoxically, not receiving training in vaccinology (OR=1.73; P=0.02) predisposed respondents to accept mandatory vaccination. It may be that in-depth knowledge of all aspects of vaccinology influences healthcare workers' behaviour in demanding greater freedom in the use of vaccines. They understand that vaccination is far from being a trivial or insignificant intervention, but rather one worthy of interest, to be embraced freely, not out of obligation. Indeed, without the need for coercion, those trained in vaccinology have better knowledge and better vaccination practices than those who are not trained. [8]

Having a vaccination record (OR=0.81; P<0.001) was a factor associated with acceptance of mandatory vaccination among respondents. This document is the best reflection of their commitment to and practice of vaccination as a means of prevention for themselves. Mandatory vaccination would simply be in line with their opinion on vaccination.

Lastly, hearing about mandatory vaccination for healthcare workers (OR=1.87; P<0.001) increased acceptance of mandatory vaccination among our respondents. As there is no vaccination requirement in Côte d'Ivoire, these healthcare workers probably had information about vaccination elsewhere in the world. This highlights the importance of scientific communication and exchange in understanding that a measure already in place and beneficial in some countries could also be beneficial in our context.

Limitations

During our work, we benefited from good collaboration with doctors and all staff, despite their busy schedules. However, our non-probabilistic sampling method could lead to selection bias and limit the extrapolation of results to all healthcare workers in Côte d'Ivoire.

Conclusion

Vaccinating healthcare workers is very important due to the risk of infection they face in the course of their work. The majority of healthcare workers agreed to mandatory vaccination, but many of their vaccinations were not up to date. There are still barriers to vaccinating healthcare workers, which can only be overcome by placing a strong emphasis on training and providing appropriate information.

Author declarations

Conflicts of interest

Authors declare no conflicts of interest.

Contributions of authors

Harvey ATTOH-TOURE and Audrey ABINA developed the study protocol; Audrey ABINA, Roland OUSSOU, Edwige AYE-VA-ADAM and Vatrai GNEBA collected and analysed the data; Harvey ATTOH-TOURE, Audrey ABINA and Soualihou NOUFE interpreted the data; Harvey ATTOH-TOURE, Audrey ABINA and Roland OUSSOU wrote the manuscript; Konan N'GUESSAN and Simplice DAGNAN reviewed it; All authors reviewed and approved the final version of the manuscript.

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