

## **Covid-19 vaccination in Côte d'Ivoire: using behaviour change theories to build the Ministry of Health's communication strategy**

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### **Abstract**

Countries around the world are embarking on vaccination campaigns in order to reverse the curve of Covid-19 infections and achieve herd immunity. However, successful vaccination campaigns require an understanding of the end users of these injections. In this context, theories of behaviour change, notably the Health Belief Model (HBM), allow us to explain the attitudes and behaviours of populations towards the Covid-19 vaccine. Our study is based on the results of a survey conducted in September 2021 by U-report UNICEF Côte d'Ivoire among 23,078 Ivorian respondents on the 2019 Coronavirus vaccination. It reveals that respondents did not get vaccinated mainly because they do not believe in the effectiveness of the Covid-19 vaccine (22%), because they heard negative rumours about the vaccine (19%) or because they do not have sufficient resources to go to vaccination sites (19%). It is therefore important for the Ministry of Health of Côte d'Ivoire to implement an awareness campaign based on the Health Belief Model in order to remove perceived barriers to vaccination and highlight the benefits of vaccination.

**Keywords :** Crisis Communication, Covid19, Public Communication, Social Marketing, Health Communication, Vaccine Hesitancy, Côté d'Ivoire

## 1. Introduction

In December 2019, the world was hit by an unprecedented health crisis with disastrous economic and social consequences. The world found itself fighting an enemy invisible to the naked eye. It is the new and highly contagious coronavirus 2019, detected in Wuhan, China.

In the early stages of the pandemic, the only way to deal with this public health threat was through behaviour change. Governments around the world were trying to get their populations to adopt a series of preventative measures that are supposed to protect them from Covid-19 infection (wearing masks, social distancing, regular hand washing, etc.).

However, since the first Covid-19 vaccines became available in late 2020, vaccination has become the main challenge in the fight against the 2019 Coronavirus. That said, the availability of vaccines does not translate into a de facto adoption by the populations. Even worse, many voices are even being raised to denounce the Covid-19 vaccine. This mistrust has brought the "anti-vaxxer" community back into the spotlight. This community, who is well-known by vaccination experts assumes and affirms its refusal to be vaccinated against Covid-19, in spite of the restrictions imposed on the non-vaccinated in different parts of the world.

Such resistance to behavioural change and distrust of the 2019 coronavirus vaccines could have been anticipated with the use of the humanities and social sciences. In particular, through the use of existing models and theories of behaviour change, mostly inherited from psychology. These theories describe the factors that lead an individual to accept or reject a new behaviour. Better yet, some of these theories have been designed specifically to predict health-related behaviour. This is the case of the Health Belief Model (HBM) which appeared in 1950. The recent Covid-19 crisis in Côte d'Ivoire has allowed us to verify this.

Therefore, can theories of behaviour change explain the Ivorian population's reactions to the Covid-19 vaccine? Such a question raises other specific questions: Does the Ivorian population vaccinate against Covid-19? Does the Health Belief Model (HBM) allow us to explain the behaviour of the Ivorian population towards the Covid-19 vaccine? What are the prospects for health crisis management and communication based on the HBM?

Based on the results of a survey conducted in September 2021 by U-report UNICEF in Côte d'Ivoire among 23,078 Ivorian respondents on the 2019 Coronavirus vaccination, we were able to verify that behavioural change theories, especially the HBM, allow us to understand the behaviour of the public in times of health crisis and to better formulate messages aimed at

inducing behavioural change in the general interest, as is the case for the Covid-19 vaccination.

This study aims to demonstrate the importance of behavioural change theories in understanding public responses to vaccines during health crises. We do so by drawing on the Ivorian experience. In Côte d'Ivoire, 73% of the target population is not fully vaccinated (WHO, March 2022). Only 46% of the target population has received at least one dose of the Covid-19 vaccine (WHO, March 2022).

Beyond the logistical issue, which has since been resolved, if the Ivorian population does not get vaccinated it is because they are not convinced of the effectiveness of the Covid-19 vaccine (22%). Some cite rumours as a source of demotivation to get vaccinated (19%) and others find that they do not have enough money to get vaccinated (19%). In other words, the Ivorian population does not perceive the benefits of vaccination and believes that there are many obstacles to it.

## **1.1 Theoretical And Methodological Framework**

### 1.1.1. Literature review

To achieve the goal of herd immunity, it is important that public health professionals fully understand their targets, i.e., the end-users of Covid-19 vaccines. To do this, they need to draw on work in the social sciences, especially psychology, on behavioural change and the adoption of innovations.

Vaccine availability does not translate into de facto vaccine uptake. Health authorities have focused more on the supply of vaccines and their availability, but have not adequately studied the demand. (Zhaohui Su et Al., 2020)

Vaccine “non-adopters” do not represent a single group of individuals but rather several groups that have distinct reasons for not being vaccinated. (Zhaohui Su et Al., 2020). Some of these reasons include: hesitations about the efficacy and safety of the vaccine. Others do not feel vulnerable to Covid-19. Non-adopters of vaccines do not necessarily base their decision on scientific evidence. They may, for example, cite fear of side effects, although these are not widespread. (Zhaohui Su et Al., 2020)

For all these reasons, it is critical that health experts deliver their evidence-based educational messages to vaccine hesitant before the misinformation of Covid-19 anti-vaxxers does (Zhaohui Su et Al., 2020). Alternatively, rather than using the terms 'vaccine non-adopters' and 'vaccine hesitant' interchangeably, health experts may consider adopting a more precise

classification of vaccine non-adopters, such as 'conspirators' (people who are too uninformed to adopt the vaccine), 'uninformed' (people who are insufficiently informed to adopt the vaccine), and 'vaccine hesitant' (people who are considering adopting the vaccine but lack the right conditions or context to do so). This classification would allow health communication professionals to target their messages and tailor their strategy to each of these groups (Zhaohui Su et Al., 2020).

There is a correlation between the level of willingness to be vaccinated against the Covid-19 coronavirus and fear of Covid-19 disease and the perceived severity of Covid-19 disease (Samouh et Al., 2021). Therefore, these communication topics should be important targets for potential interventional educational programmes to improve vaccination rates (Samouh et Al., 2021).

(Samouh et Al., 2021) and (Barello et Al., 2020) both conclude that there is no significant difference in the intention to vaccinate among students regardless of their field of study. Specifically, medical and health science students are no more or less likely to be willing to be vaccinated than students in other fields of study. Although preliminary, these studies of Moroccan (Samouh et Al., 2021) and Italian (Barello et Al., 2020) students suggest that attitudes towards vaccination are only marginally influenced by individuals' level of health knowledge, and probably more by other motivational and psychological factors.

One of these factors is risk perception (Bavel et Al., 2020). However, the results suggest that strong fear appeals only produce a large change in behaviour when people feel a sense of self-efficacy (Bavel et Al., 2020). Optimism bias is an equally important factor that determines the subject's perceived susceptibility to illness. This is the propensity of people to believe that bad things only happen to others (Bavel et Al., 2020).

Furthermore, the emotional aspect of the subjects' decision making should not be neglected. Emotion is one of the modifying factors in the process of behaviour change (Bavel et al., 2020).

In addition, the importance of social context in risk communication and community engagement, but especially in the public's response to behaviour change communication campaigns, should be taken into account. This includes social norms, social disparities, culture and political polarisation (Bavel et Al., 2020 and Kra and Konan, 2020).

In addition, the information received and the knowledge gained have a great impact on people's decision making. In the context of Covid-19, health professionals have to deal with conspiracy theories, fake news, rumours and disinformation campaigns that make it difficult

to distinguish between scientific evidence and less reliable information (Bavel et Al., 2020 and Kra and Konan, 2020).

Researchers have often found a link between political beliefs and attitudes towards vaccines. (Kennedy J., 2019). Opponents of the ruling power are more likely to refuse the Covid-19 vaccine. (Patrick Peretti-Watel et Al., 2020).

In a similar approach to ours, some studies use Protection Motivation Theory (PMT) to explore willingness to be vaccinated against Covid-19 (Bhati et Al., 2020; Kowalski & Black, 2021).

The PMT aims to examine how individuals may adopt or reject protective actions against potential threats due to two underlying cognitive processes (Floyd et Al., 2000). In PMT, protective health behaviours, such as vaccination against Covid-19, will be adopted if the individual believes that a threat is serious with a high probability of occurrence, that the proposed actions are effective in reducing the threat, and that the perceived costs are acceptable (Ling et Al., 2019).

Other researchers use the Technology Acceptance Model (TAM) to analyse the factors influencing acceptance of the Covid-19 vaccine in Indonesia (Faturohman et Al., 2021). The study in Indonesia found that Covid-19 vaccine acceptance is influenced by vaccine efficacy as well as risk perception (Faturohman et Al., 2021). The TAM model suggests that high perceived usefulness significantly increases Covid-19 vaccine acceptance and high perceived ease of use significantly increases perceived usefulness in Indonesian subjects (Faturohman et Al., 2021).

Since perceived usefulness affects vaccine acceptance, the government should focus on vaccine usefulness when promoting the Covid-19 vaccine to Indonesian citizens. In addition, since perceived ease of use significantly affects user acceptance of the Covid-19 vaccine, the easier it is to obtain the vaccine in the community, the more likely it is that citizens will be willing to be vaccinated (Faturohman et Al., 2021).

In Côte d'Ivoire, the Government of Côte d'Ivoire's "incommunication" actions have greatly influenced the perception of Covid-19 risk among the Ivorian population. Confusion in the response to Covid-19 has also arisen from disagreement among health experts as to which treatment is effective in combating Coronavirus 2019. The most striking example is Hydroxychloroquine (Goa, 2020). The same is true of developed vaccines. Indeed, scandals surrounding certain vaccines, notably AstraZeneca, have contributed to reducing public confidence in these new vaccines against Covid-19.

In this paper, we base our analysis on existing psychological work on theories of behaviour change. We focus on theories of health behaviour change because of their relevance to the context of Covid-19 vaccination. For the purpose of this study, we rely on the Health Belief Model, developed in 1950 by Rosenstock, Hochbaum, Kegeles, and Leventhal.

This model has the advantage of including items common to most of the models of health behaviour change we have reviewed such as the Protection Motivation Theory (which appeared in 1975), the Technology Acceptance Model (which appeared in 1986) and the Diffusion of Innovations Theory (which appeared in 1962). Thus, although not mentioned by name in the scientific literature we reviewed, many of the items included in the Health Belief Model are referred to and provide some consistency in understanding the factors that impact on the process of health behaviour change in the individual.

#### 1.1.2. Theoretical references

One of the central functions of public communication is to promote responsible behaviour (Pasquier, 2012). During a health crisis such as Covid-19, the authorities in charge of its management promote new behaviours that are supposed to slow down the spread of the virus and reduce the negative effects of the crisis.

In the context of the Covid-19 pandemic, the government of Côte d'Ivoire, through the Ministry of Health, is using the principles and techniques of social marketing and behaviour change communication to influence the Ivorian population to accept, reject, modify and voluntarily abandon certain behaviours in the general interest. Public communication and crisis communication thus use persuasion to encourage behaviour change.

In recent decades, researchers have been interested in developing programmes to change individual and collective behaviour. This has led to the development of theories and models including the Health Belief Model. The Health Belief Model (HBM) is a model of psychology used to explain and predict health-related behaviours, particularly the use of health services. It was developed in the 1950s by Rosenstock, Hochbaum, Kegeles, and Leventhal.

According to this model, individuals' beliefs about health problems, perceived benefits and barriers, and self-efficacy explain whether or not they adopt a health behaviour. Furthermore, a cue to action must trigger the new behaviour. (Glanz et Al., 2008). The individual evaluates the following elements related to the health problem before being ready to act:

##### 1. Perceived Severity

Perceived severity refers to the subjective assessment of the severity of the health problem and its potential consequences.

2. Perceived susceptibility

Perceived susceptibility refers to the subjective assessment of the risk of developing the health problem or disease in question.

3. Perceived benefits

They refer to an individual's assessment of the benefits of health promotion behaviour and whether these are worthwhile.

4. Perceived barriers

Perceived barriers refer to barriers that may deter or prevent the new behaviour from being adopted.

5. Cues to action

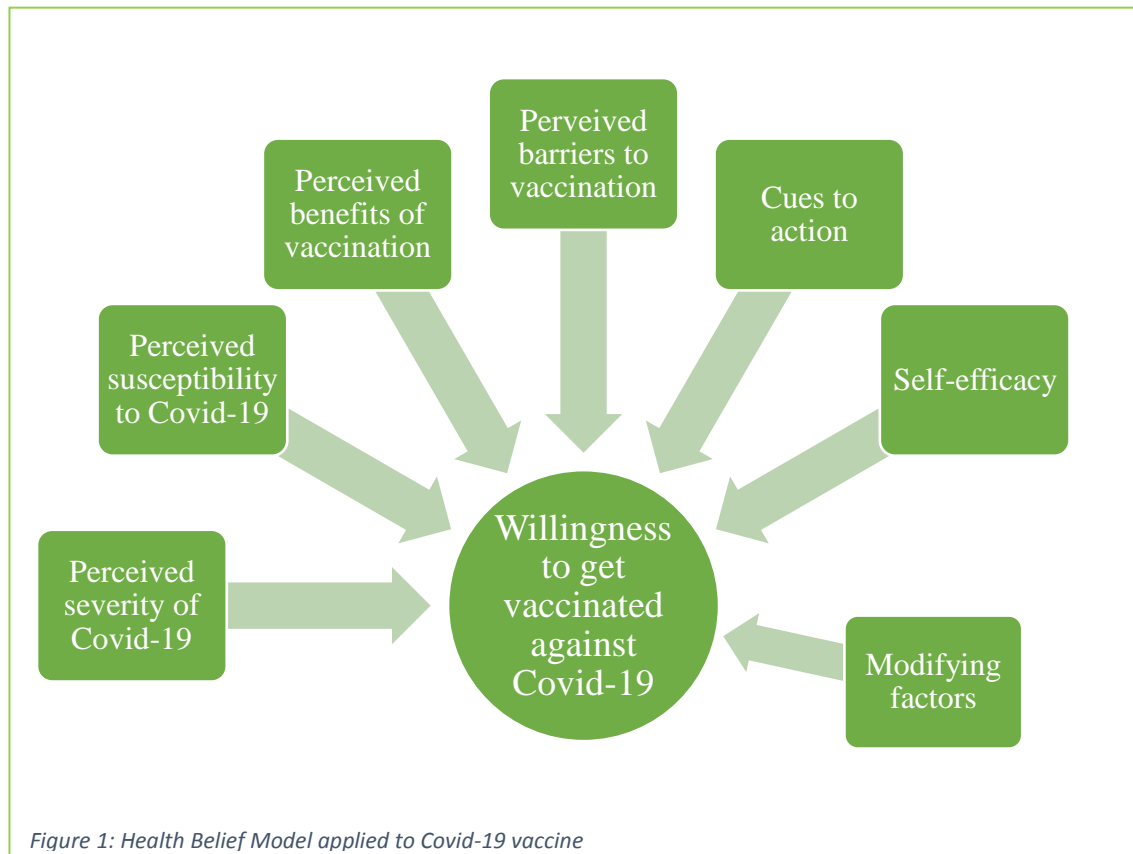
A stimulus or trigger is needed to initiate engagement in health-related behaviours.

6. Self-efficacy

Self-efficacy was added to the components of the Health Belief Model in 1988 by Rosenstock (Glanz et Al., 2008). Self-efficacy refers to an individual's perception of his or her personal competence to successfully perform a behaviour.

The individual asks himself whether he is capable of behaving in a new way, as described and recommended by the health authorities. In the context of the Covid-19 vaccination, he wonders whether he is able to go to a vaccination centre and receive the two doses as recommended by the health authorities in Côte d'Ivoire.

However, it should be noted that there are modifying factors. These are factors that modify the degree to which an individual perceives each of the above elements. Its appreciation is influenced by; socio-demographic factors; socio-economic factors and knowledge, among others.



### 1.2. Methodological framework

We base our qualitative analysis on the study of the Health Belief Model (HBM). This model enabled us to analyse the communication aspects on which the Ministry of Health, Public Hygiene and Universal Health Coverage of Côte d'Ivoire (MSHPCMU) should focus in its efforts to encourage the population of Côte d'Ivoire to be vaccinated. It served as a theoretical reference base for analysing the reasons why each Ivorian might adopt or, on the contrary, refuse the vaccine against Covid-19.

Second, our quantitative analysis is based on the results of a survey conducted by U-Report Côte d'Ivoire, the social platform developed by UNICEF in partnership with the Ivorian government, on which young Ivorians express themselves on major current issues through short surveys. The statistical data provides us with the attitudes and beliefs of Ivorians towards the Covid-19 vaccine.



This survey, dated 17 September 2021, involved 23,078 respondents with a response rate of 92%. The sample was 66% male and 34% female.

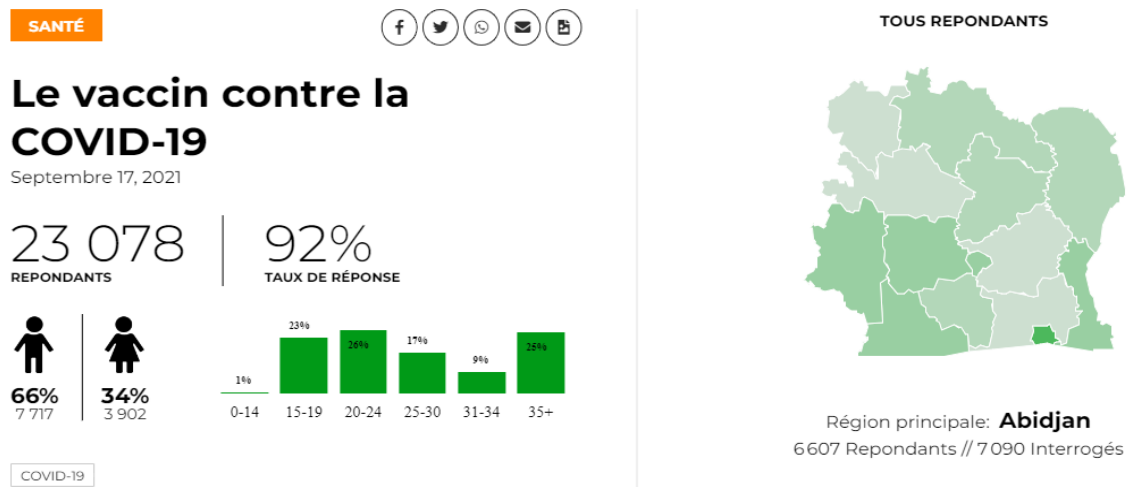


Figure 2: U-Report Sample for September 2021 survey on Covid-19 Vaccination in Côte d'Ivoire

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

The main region of the survey is Abidjan, the epicentre of the Covid-19 epidemic in Côte d'Ivoire since 11 March 2020. 49% of respondents were aged between 15 and 24 years. 26% were aged between 25 and 34 years. This is therefore a sample with a high proportion of young people. 75% of the sample is under 35 years old. These figures align perfectly with the demographic structure of Côte d'Ivoire where 77.3% of the total population, or slightly more than 3 out of 4 people are under 35 years old. (Official Census RGPH, 2014). Only 25% of the sample considered is over 35 years old.

## 2. Presentation of results

There have been four epidemic waves in Côte d'Ivoire between March 2020 and April 2022. As of 22 April 2022, the country had 81,870 confirmed cases, of which 81,047 had been cured, 799 had died and 15 were active. (MSHPCMU, 2022). The cure rate is very high in the country (about 98%) with a low death rate estimated at 1% of patients. However, the pandemic has had major social, educational and economic consequences.

Thus, in order to guard against a 5th wave and to protect the entire Ivorian population against Covid-19, the State of Côte d'Ivoire, through the Ministry of Health, is promoting the application of certain preventative measures (the wearing of masks in enclosed spaces and large gatherings), the early management of confirmed cases, but above all vaccination.

Since the first deliveries, Côte d'Ivoire has received more than 21 million doses of Covid-19 vaccine, of which 12,724,020 (60.5%) came from the COVAX initiative, 36% from the African Vaccine Fund, and 1.5% from bilateral agreements and donations (WHO, March 2022). A total of 10,203,744 million doses were administered and 27% of the target population, 18 years and older, was fully immunised. (WHO, March 2022)

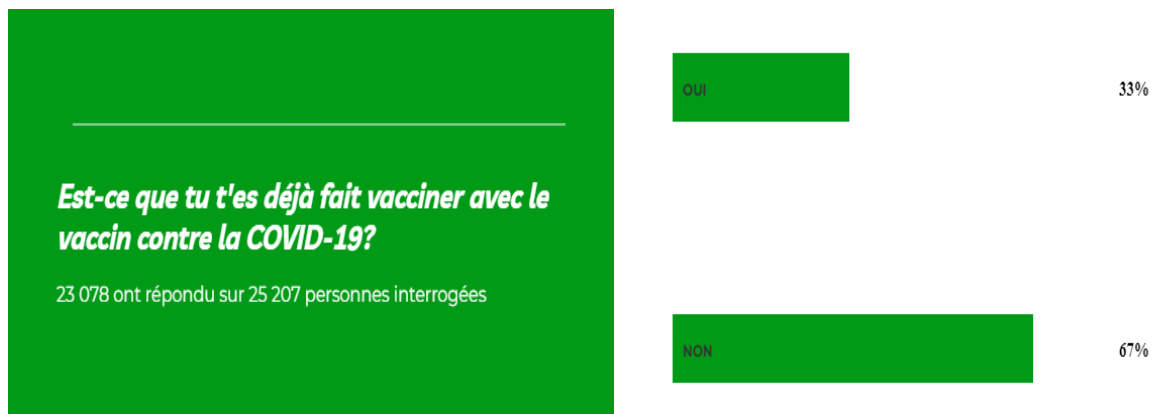


Figure 3: People vaccinated against Covid-19 in the sample

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

Of the 23,078 respondents to U-report's survey of Ivorians on vaccination against Covid-19, 67% had not been vaccinated. There are several reasons why some Ivorians get vaccinated and others do not.

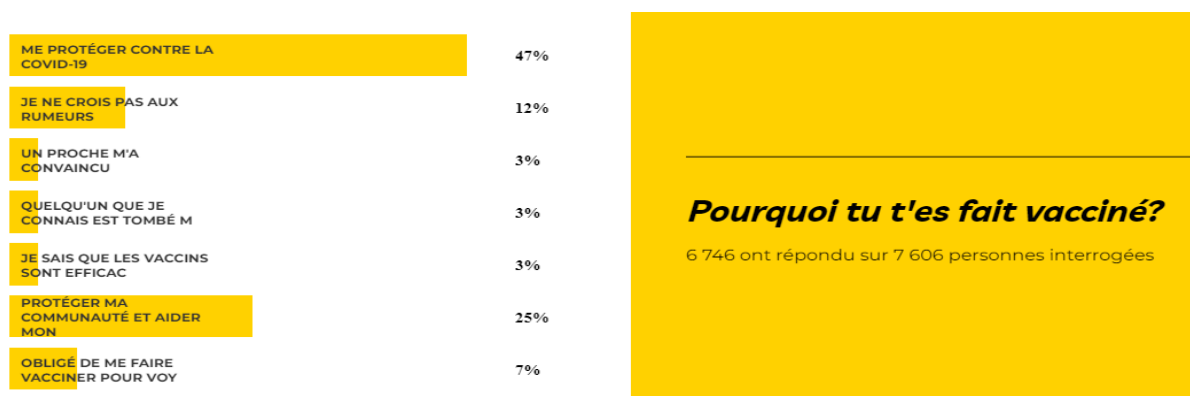


Figure 4: Reasons why Ivorians do not vaccinate

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

Of the 6,746 respondents, 47% said they had been vaccinated to protect themselves against Covid-19. 25% said they were vaccinated to protect their community. 12% were vaccinated because they were not influenced by rumours. Other reasons given were travel (7%), the

effectiveness of the vaccines (3%), a relative falling ill (3%) and being convinced by people around them (3%).

It can be seen that 72% of the respondents were vaccinated for protection purposes. For them, it was either to protect themselves or to protect their community.



Figure 5: Reasons why Ivorians do not vaccinate

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

When the 13,804 respondents were asked why they had not been vaccinated, 22% said they did not believe in the effectiveness of the vaccine. 19% mentioned rumours that were circulating. 19% mention a lack of money to go to vaccination centres. 11% said they did not even know about vaccination centres. For 7% of respondents, vaccination sites are too far away. As for the rest, they say that they do not want to be contaminated in the centres (6%) or that they are not afraid of being contaminated because they have already had Covid-19 (5%).

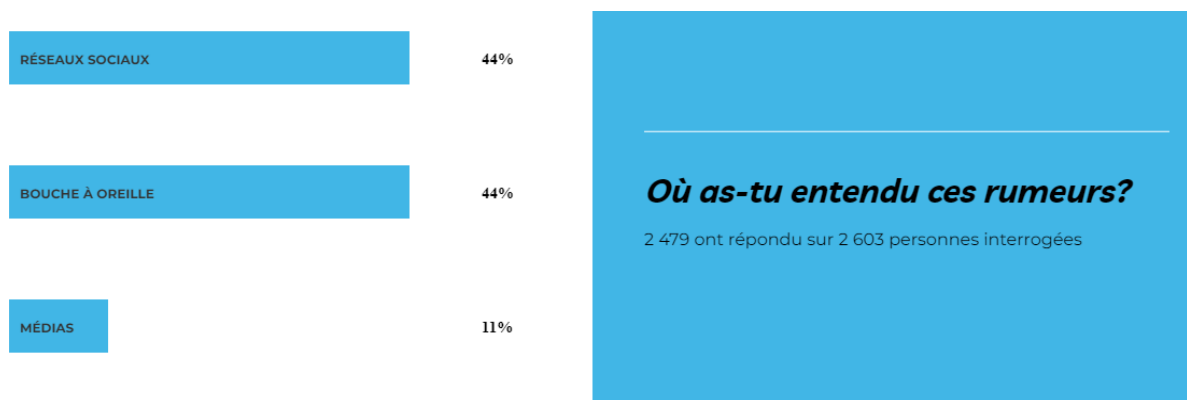


Figure 6: Source of the Covid-19 vaccine rumours

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

Exposure to misinformation was also associated with doubts about the effectiveness of Covid-19 vaccines, suggesting that it may influence the approval and adoption process (Loomba et Al., 2021). 44% of respondents have heard rumours on digital social networks. Another 44% have heard rumours through word of mouth. Very few (11%) rumours come from traditional media (Press, TV, Radio).

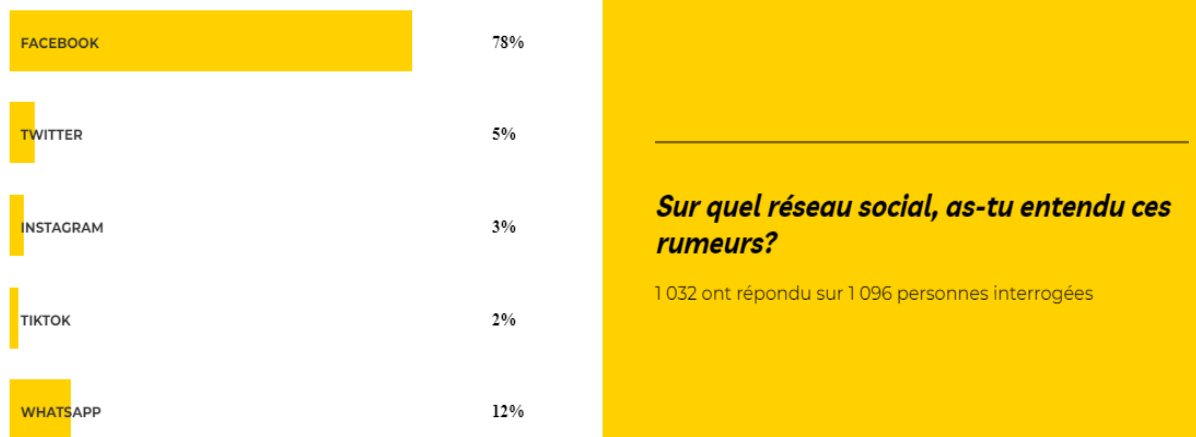


Figure 7: Social Media sources of the rumours about the vaccine against Covid-19

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

Facebook is the main source of rumours about the Covid-19 vaccine. 78% of respondents say that the rumours they heard came from the social network Facebook. 12% of our respondents claim to hear many rumours on WhatsApp. This is due to the fact that Facebook and WhatsApp are the most used social networks in Côte d'Ivoire. Indeed, Facebook has more than 5 million users, WhatsApp 5.1 million and Instagram about 1 million users on Ivorian soil (Abidjan.net, 2021).



Figure 8: Rumours about the Covid-19 Vaccine

Source: U-report survey 21 September 2021 - <https://cotedivoire.ureport.in/opinion/5319/>

The main rumours heard by Ivorian respondents are the following:

- 30% of respondents have heard that the vaccine "makes you sicker".
- 28% heard that the vaccine "does not provide 100% protection against Covid-19"
- 25% have heard that the vaccine is being used to "wipe them out"
- 10% heard that vaccines are "just a business" for the pharmaceutical industry
- 7% heard that the vaccine was found "too quickly"

Such rumours make people fear the vaccine and question its usefulness and effectiveness. They are likely to dissuade any Ivorian from going to a vaccination centre against Covid-19.

The feedback from the Ivorian population and the understanding of the HBM items allow us to foresee perspectives for improving the results of the vaccination campaign against Covid-19 initiated in Côte d'Ivoire by the Ministry of Health, Public Hygiene and Universal Health Coverage (MSHPCMU).

### **3. Prospects for the Covid-19 vaccination campaign in Côte d'Ivoire based on the Health Belief Model**

The focus of the Ivorian Ministry of Health's Covid-19 vaccination awareness campaign should be based on the HBM items and feedback from the target populations.

Firstly, 72% of respondents were vaccinated for protection. For them, it was either to protect themselves (47%) or to protect their community (25%). The protection offered by the Covid-19 vaccine may constitute a relevant communication axis for the Ministry of Health's awareness campaign. Indeed, this is one of the advantages of the vaccine: it protects. The effectiveness of the vaccine should therefore be emphasised on the basis of scientific evidence in the awareness and community engagement campaigns.

Secondly, it is important to know the perceived barriers so that their removal can be integrated into the health crisis management strategy. For example, some respondents said they did not know where the vaccination sites were located (11%), others said they were far from their homes (7%) and finally, some said they did not have the means to go there (19%). Thus, as part of the crisis management and communication strategy, the Ivorian government should initially bring the vaccination sites closer to the population. Efforts in this direction are already underway with the multiplication of vaccination sites (68 in Abidjan as of 11/09/2021-Gouv.ci, 2021) and the existence of mobile vaccination units. These actions make

it possible to remove the barrier of perceived distance and the financial means required to get there. In the communication sphere, messages inviting people to be vaccinated must insist on the availability of the vaccine and that it is free throughout the country. The communication campaigns should also insist on the simplicity and speed of the vaccination process so that all Ivorians feel able to be vaccinated successfully (self-efficacy). The easier it is to obtain the vaccine in the community, the more likely it is that citizens will be willing to be vaccinated (Fatuohman et Al., 2021)

To boost its communication campaign around vaccination against Covid-19, the Ivorian Ministry of Health is already trying to send several "cues to action" to the Ivorian population, in particular by presenting numerous personalities, especially politicians, such as Prime Minister Patrick Achi, in the process of being vaccinated (on March 1<sup>st</sup>, 2021). The aim is to encourage people to follow in the footsteps of the many personalities who agree to be vaccinated.

Then, it seems important to insist on the severity of the Covid-19 disease because it is not perceived as severe enough by Ivorians to require a vaccine. Indeed, the relatively low mortality rate in Côte d'Ivoire (1% in 2022 – WHO, March 22) due to Covid-19 reduces the perception of the severity of this disease among the Ivorian public. There is a correlation between the level of acceptance of vaccination against the Covid-19 coronavirus and the fear of Covid-19 disease and the perceived severity of Covid-19 disease (Samouh et Al., 2021).

Furthermore, the vulnerability of all Ivorians to Covid-19 should be emphasised. If some Ivorians do not feel obliged to be vaccinated, it is also because they do not think they will get sick. Indeed, the optimism bias is an important factor that determines the perception of an individual's susceptibility to disease. It is the propensity of people to believe that bad things only happen to others and to believe that they are naturally safe (Bavel et Al., 2020).

Moreover, exposure to misinformation has also been associated with doubts about the efficacy of Covid-19 vaccines, suggesting that it may influence the adoption process (Loomba et Al., 2021). Rumours and misinformation are modifying factors that alter risk perception among subjects. 19% do not want to be vaccinated because of rumours. These rumours circulate in particular on social networks and mainly on Facebook. The Ministry of Health would therefore benefit from continuing its media monitoring, in particular on social media, mainly Facebook, in order to counter rumours and disinformation campaigns about the Covid-19 vaccine.

Finally, the Health Belief Model emphasises the importance of dialogue in any form (survey, focus group, interviews, meetings, etc.) with the population to be served in order to learn about their beliefs and attitudes towards the health behaviour to be promoted, in this case, it is the adoption of the vaccine against Covid-19.

#### **4. Discussion**

Our research shows that perceived severity is the most important factor influencing the decision to get vaccinated. This is evidenced by the fact that for 72% of the 6746 U-report respondents, the decision to vaccinate was motivated by a desire to 'protect themselves from Covid-19' (47%) or 'protect their community from Covid-19' (25%) on the other hand.

The results of our study are in line with the findings of other surveys conducted in other parts of the world using other theories and models of behaviour change. These include TAM (Faturhman et al., 2021), and PMT (Bhati et al., 2020; Kowalski & Black, 2021). In the PMT, protective health behaviours, such as vaccination against Covid-19, will be adopted if the individual believes that a threat is serious (perceived severity) with a high probability of occurrence (perceived susceptibility), that the proposed actions are effective in reducing the threat (perceived benefits and self-efficacy), and that the perceived costs are acceptable (perceived barriers) (Ling et Al., 2019).

However, one of the obstacles to vaccination is the emergence of variants, the need for multiple doses and the fact that one can contract the virus despite the vaccine. These data drastically reduce the perceived benefits of the Covid-19 vaccine. The Covid-19 vaccine is contradicted by the results of its efficacy, which are a counter-advertisement to the vaccine. This somewhat discredits the Ministry of Health communicators. Unfortunately, at this level, the solution can only come from clinicians. Indeed, it is only when the vaccine presents irrefutable efficacy and universally perceived benefits that the rhetoric of the health authorities will no longer be open to challenge.

Crisis management and communication strategies can only be successful if the evidence of science and medicine follows. Such strategies do not guarantee that all Ivoirians will be vaccinated once they perceive the severity of the disease, that barriers to vaccination will be removed and that the benefits of vaccination will be evident. However, these strategies do help to deconstruct the anti-vaccine argument and reinforce the Ministry of Health's rhetoric in favour of vaccination against Covid-19.

Furthermore, it should be noted that there are other factors that can influence the perception of the disease and therefore the need for the vaccine. These include the management of health

crisis communication by the Ministry of Health of Côte d'Ivoire, which was insufficient, especially in the early stages (GOA, 2020), the various rumours circulating, particularly on social media, and finally the political and social contexts in certain regions of Côte d'Ivoire (Kra and Konan, 2020).

Finally, it should be noted that the modifying factors described in the HBM are diverse and varied and cannot be listed exhaustively. These include political affiliation (Kra and Konan 2020), religion (Faturohman et Al., 2021), and knowledge about the vaccine (Bavel et Al., 2020).

Future studies could focus on assessing the degree of influence of each factor in the HBM on individuals' vaccination decisions. While it is important to act on all of these factors, it would be relevant to see which one(s) have the greatest effect on the individual's final decision to vaccinate or not.

It might also be interesting to assess the relevance of the diffusion of innovation theory (Rogers, 1962) insofar as the new Covid-19 vaccine can be considered an innovation in the medical field. This theory describes the factors that lead an individual to adopt an innovation. Although this study contributes to filling a gap in existing knowledge in the literature and offers some implications for public health professionals, there are limitations. Firstly, although the sample size is relatively large, it is very location-specific, namely Côte d'Ivoire and specifically the city of Abidjan. These results cannot be generalised to the rest of the country, let alone to other countries around the world. Similar studies in this vein would be welcome in order to observe the factors influencing the adoption of the vaccine in other parts of the world in order to identify the lines of communication to be exploited by the health authorities in their various awareness campaigns.

## **5. Conclusion**

Vaccine hesitancy is described as one of the greatest threats to global health. The Health Belief Model (HBM) study allows us to analyse public reaction to Covid-19 vaccination campaigns. Above all, it allows the Ministry of Health of Côte d'Ivoire to formulate messages taking into account the expectations of Ivorians before adopting this new vaccine against Covid-19.

Our study is one of the first to use the HBM to investigate the factors influencing the uptake of the Covid-19 vaccine in Côte d'Ivoire. The HBM allows us to explain at least in part why individuals would accept or refuse to be vaccinated against Covid-19. These factors are perceived severity, perceived susceptibility, perceived benefits, perceived barriers, self-



efficacy, cues to action and modifying factors. The modifying factors are diverse and varied and cannot be listed exhaustively.

The survey of 23,078 Ivorians conducted by U-Report - UNICEF Côte d'Ivoire shows that 72% of respondents were vaccinated for protection purposes. For them, it was either to protect themselves (47%) or to protect their community (25%). The protection offered by the Covid-19 vaccine may be a relevant communication axis for the MSHPCMU awareness campaign. Also, the messages inviting the population to be vaccinated must insist on the availability and free availability of the vaccine throughout the country in order to remove the main barriers to vaccination. The communication campaigns must also insist on the simplicity and speed of the vaccination process so that all Ivorians feel able to be vaccinated successfully.

Many of the realities described here can also be applied to future pandemics and public health crises. This article is intended as a guide for health authorities in Côte d'Ivoire and elsewhere in the design and implementation of communication campaigns for vaccine uptake.

Although this study contributes to filling a gap in existing knowledge in the literature and offers some implications for public health professionals, there are limitations. First, although the sample size is relatively large, it is very specific to one location, namely Côte d'Ivoire. These results cannot be generalised to the African continent, let alone the rest of the world. Second, our study is based on a single theory of behaviour change. Other models and theories could be explored for the adoption of the 2019 Coronavirus vaccine, such as the diffusion of innovation theory (Rogers, 1962). Finally, our study does not measure the degree of influence of each factor on the individual's final decision to be vaccinated. Future research in this area would be useful to address the various limitations of our research.

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