Science, Education and Innovations in the Context of Modern Problems
Issue 10, Vol. 8, 2025

RESEARCH ARTICLE

COVID-19 Vaccine Hesitancy in Algeria: A Sociological Analysis of Trust, Risk Perception, and Expert Systems

Harrouz Bouhafs
Dr.
University of Continuing Education
Algeria
E-mail : harrouz.bouhafs@jgmail.com; https://orcid.org/0009-0004-8255-5487

Mhammed Sbai
Prof.
University of Ahmed draia – Adrar
Algeria
E-mail: sbaimhammed@univ-adrar.edu.dz; https://orcid.org/0000-0001-9674-0529

Abderrahman Baotman
Prof.
University of Ahmed draia – Adrar
Algeria
Email: baotman1980@univ-adrar.edu.dz

Abdelkrim Benkhaled
Prof.
University of Ahmed draia – Adrar
Algeria
E-mail: benkhaled@univ-adrar.edu.dz; https://orcid.org/0000-0001-9674-0529

Issue web link https://imcra-az.org/archive/384-science-education-and-innovations-in-the-context-of-modern-problems-issue-10-vol-8-2025.html

Keywords COVID-19 vaccination; vaccine hesitancy; risk perception; trust in expert systems; sociology of health; Algeria

Abstract

This study examines COVID-19 vaccine hesitancy in Algerian society through a sociological lens that connects health-related behavior to social representations of risk, levels of trust in expert systems, and the contestation of medical and institutional discourses within a context of epidemic uncertainty. Employing a descriptive-analytical research design, data were collected via an electronic questionnaire administered to a non-probabilistic purposive sample of 430 individuals who expressed hesitancy toward or refusal of COVID-19 vaccination. Statistical analysis was conducted using SPSS to identify dominant perceptual patterns and explanatory trends. The findings indicate that vaccine hesitancy among respondents is largely driven by a diminished perception of the severity and personal risk of COVID-19, coupled with an amplified perception of vaccine-related risks. This hesitation is further reinforced by fragile trust in pharmaceutical companies, vaccine-producing countries, and official medical discourse, as well as by the widespread belief that COVID-19 vaccines are either unnecessary or unsafe. Moreover, the study identifies a form of "pragmatic acceptance" of vaccination, wherein compliance is motivated not by personal conviction but by structural constraints such as travel regulations, employment requirements, or academic obligations. The study concludes that vaccine hesitancy in Algeria cannot be understood as a purely individual or irrational decision. Rather, it represents a complex socio-cognitive construct produced through the interaction of collective risk imaginaries, contested expert knowledge, and weakened institutional trust within late-modern risk societies.

Citation

Harrouz B.; Mohammed Sbai A. B; Abderrahman B. (2025). COVID-19 Vaccine Hesitancy in Algeria: A Sociological Analysis of Trust, Risk Perception, and Expert Systems. *Science, Education and Innovations in the Context of Modern Problems*, 8(10), 1858–1871. https://doi.org/10.56334/sei/8.10.119

Received: 16.07.2025	Accepted: 25.9.2025	Published: 26.10.2025 (available online)

1- Introduction:

The COVID-19 pandemic is considered one of the most complex health crises in contemporary history, not only because of the widespread nature of the virus and its tangible effects on health systems and national economies, but also due to the profound changes this pandemic has brought about in individuals' perceptions of it, as well as regarding the information provided by health authorities, and in the concept of the risks arising from it, In this context, newly developed vaccines emerged as one of the most important topics in social discourse, especially through social media and in public social discussions, where they are seen as a subject loaded with symbols and cultural interpretations, and a field of conflict between the individual and the institution.

From this perspective, the issue of vaccine effectiveness is no longer limited to its biological characteristics only, but also extends to the readiness of individuals and groups to receive it, This has made "vaccine hesitancy" a central topic in public health studies and the sociology of risk, The literature defines vaccine hesitancy as a spectrum of attitudes ranging from delay to caution to refusal, shaped by a complex equation that includes trust in institutions, perception of benefits and risks, and the quality of information circulating in the public sphere (Dubé et al., 2013; Larson et al., 2014), This approach emphasizes that hesitancy is not merely an individual cognitive error but a social phenomenon produced within specific cultural, political, and communication contexts.

From a sociological perspective, the approaches of 'risk society' and 'reflexive modernity' provide a deeper understanding of vaccine hesitancy; Beck (1992) argues that modern societies continuously reproduce risks through technology and institutions, generating new forms of anxiety and uncertainty, Moreover, the proliferation and conflict of expert experiences in the public sphere lead to a tense relationship between individuals and systems of expertise, making health decisions negotiable decisions built on trust or doubt in the legitimacy of official knowledge (Giddens, 1991), In this context, the vaccine becomes not only a medical intervention but also a matter of belief, perception, and identity, around which scientific, media, and popular narratives may intersect and compete for legitimacy in the citizen's mind.

In this context, studies on this subject show that vaccine hesitancy is usually linked to recurring factors: low trust in governments and health organizations, fear of side effects and the rapid pace of vaccine development, the spread of misinformation through social networks, as well as demographic and cultural differences in defining risk and sources of knowledge (Lazarus et al., 2021; Sallam, 2021), European findings also indicate that the perception of a "social necessity" or "pragmatic benefit" (such as travel or work) may encourage conditional acceptance rather than genuine health conviction (Paul et al., 2021), These data confirm that hesitancy is fueled by the interaction of epidemic experience with structures of trust, communication, and value systems.

In Algeria the phenomenon of hesitancy to take the COVID-19 vaccine emerged, similar to what is currently observed in the rest of the world , This reflected a complex interaction between historical residues in the relationship with the state, levels of trust in the healthcare system, and the prevalence of popular discourse in interactive life or on social media platforms, which often dominated official narratives, From this perspective, the importance of this topic has emerged, as it reveals social and cognitive depths that go beyond apparent rejection or hesitation, It goes further by shedding light on the cultural framework that reshapes individuals' attitudes toward health decisions, and it uncovers how medical information is redefined within the community's consciousness in local contexts charged with interpretation and doubt.

As this phenomenon represents a fundamental dimension in the effectiveness of health policies, understanding it is not achieved solely through medical or statistical approaches, but requires diving into the social logic that drives attitudes towards vaccination, encompassing all the cognitive residues, ethical references, and previous institutional experiences it carries, Accordingly, addressing the topic of individuals' refusal or hesitation to take the vaccine in Algerian society is an important entry point for understanding the relationship between the state and the citizen in the health domain, and a mirror for measuring the level of social trust at a moment when priorities and meanings are being rearranged under the pressure of the crisis.

1.1 Study Problematic:

The problematic of this study is defined based on the shift caused by the COVID-19 pandemic in the structure of the relationship between the individual and the healthcare institution, as well as in the patterns of meaning-making

about risks within Algerian society. Although vaccination was presented as the central scientific solution to overcome the pandemic crisis, the social response to it did not follow a path of automatic compliance. Instead, wide areas of hesitation and refusal emerged, revealing that health decisions are not built solely on medical or neutral knowledge data, but are shaped at the intersection of risk perception with patterns of trust in systems of expertise and the processes of ignorance and ambiguity production in the public and digital spheres.

On this basis, the study raises its central question: How do hesitant Algerians form their attitudes toward the COVID-19 vaccine within the context of a risk society characterized by epistemic uncertainty and conflicting discourses? From this general question, a series of procedural sub-questions emerge, transforming the problem into specific paths for field analysis :

1- What is the general stance of the hesitant individuals towards the COVID -19 vaccine?
2- How is the stance of the hesitant formed in light of their perception of dual risks ?
3- What are the most common social-cognitive justifications behind refusing or delaying the vaccine ?
4 -What role does trust/doubt in the producers (countries/companies) play in shaping the stance of the hesitant?
5- To what extent does the pattern of « pragmatic acceptance » of vaccination appear among the hesitant?

1.3 Hypotheses:

To answer these sub-questions, we initially proposed the following hypotheses :

1- The attitudes of the hesitant are distributed in a non-homogeneous manner, with the patterns of hesitation/delay and conditional acceptance prevailing compared to outright refusal.

2- The level of hesitation/refusal increases as the perceived risk of the virus decreases and the perceived risk of the vaccine increases.

3- Doubt about the vaccine's effectiveness and fear of its side effects are the most dominant justifications for hesitation compared to other reasons.

4- Hesitant attitudes intensify when vaccines are associated with negative perceptions of their manufacturer or producing companies, and the intensity of hesitation weakens toward vaccines of less suspicious origin.

5- Within the hesitant group, there is a pragmatic acceptance of vaccination driven more by practical constraints « travel/work/study » than by cognitive conviction in the vaccine's efficacy.

1.4 -Objectives of the study

This study aims to analyze the social and cognitive attitudes of Algerians who are hesitant or refuse to receive the Covid-19 vaccine, starting from understanding this refusal as a complex phenomenon that cannot be reduced to just health or medical attitudes, Through this, the study seeks to achieve the following objectives:

1. To reveal the prevailing representations among the group of hesitant or refusing individuals regarding the nature of the vaccine, its effectiveness, and its safety.

2. To investigate the extent to which factors such as trust in institutions, media discourse, and knowledge sources influence the construction of attitudes towards vaccination.

3. To monitor the impact of social variables (gender, education level, personal experience with the disease) on the attitude towards the vaccine.

4. To provide a sociological analysis of the attitude towards vaccination as an attitude that transcends individual health decisions to become a social act governed by a cultural and institutional context.

1.5- The Theoretical Framework and Study Concepts :

The phenomenon of hesitancy towards COVID-19 vaccines falls within the shifts that have affected individuals' relationship with medical expertise systems in a pandemic context characterized by uncertainty, multiple sources of knowledge, and conflicting narratives, The decision to vaccinate is not simply a rational medical response to the risks of infection; rather, it is socially produced within structures of risk perception, patterns of trust and distrust in institutions, and mechanisms through which representations of health and illness are formed in public and digital spaces.

Vaccine hesitancy as a multidimensional social phenomenon :

Contemporary studies confirm that "vaccine hesitancy" encompasses a range of attitudes, from delay and caution to outright refusal, and it results from a social configuration rather than a simple individual "knowledge deficit." It is

approached as a product of the interaction of cognitive, cultural, political, and communicative factors, the most important of which are the level of trust in health and governmental institutions, the assessment of benefits versus risks, and the type of information circulating in the public sphere (Dubé et al., 2013, pp. 1763–1764; Larson et al., 2014, pp. 2150–2152), This analytical definition shows that hesitancy operates as a social response to the tension between official scientific knowledge on one hand, and everyday/popular and digital knowledge on the other, making attitudes toward vaccination an indicator of broader social relations concerning legitimacy, trustworthiness, and the symbolic authority of experts.

In this context, sociological interpretations of hesitancy intersect with new public health analyses that view social actors as reinterpreting medical recommendations according to their personal experiences and their perceptions of self and risks, so that health becomes an 'individual responsibility' managed within the framework of daily choices that go beyond technical compliance with institutional standards (Petersen & Lupton, 1996, p. 9), Accordingly, hesitancy becomes a stance formed within the 'market of health meanings,' which is teeming with competing discourses.

Confidence in expert systems :

Trust is considered a central mediator between risk perception and the decision to get vaccinated, Global studies show that the willingness to vaccinate increases when trust is built in health authorities and governments and in the transparency of information, and decreases when perceptions of doubt about intentions or competence are entrenched (Lazarus et al., 2021, pp. 225–227), In analyses of hesitancy, trust here is not understood as a private psychological attitude, but as a social-institutional relationship that is historically shaped through citizens' experiences with the state and the healthcare system, and through their perceptions of justice, honesty, and institutional effectiveness.
The literature also shows that trust is not uniform, but distributed across levels: trust in the product (companies/countries), trust in the intermediary (doctor/institution), and trust in communication channels (media/digital platforms), Therefore, weakness in trust at any level may redirect the vaccination decision towards postponement or refusal, These findings align with conclusions from reviews on vaccine hesitancy, which highlighted that doubts about the source of the product and medical communication are among the strongest determinants of hesitancy (Dubé et al., 2013, pp. 1763–1764; Larson et al., 2014, pp. 2150–2156).

Risk Perception:

The decision to vaccinate is related to the structure of risk perception rather than purely objective danger, According to Slovic's work, individuals tend to increase their perception of risk when the threat becomes "close and lived," that is, linked to personal experience or the immediate social environment, rather than to abstract statistics (Slovic, 2000, pp. 12–17), In an epidemic situation, the perception of the virus risk intersects with the perception of vaccine risk, and both are reshaped within the collective imagination through personal experiences, media portrayals, and social network narratives, Consequently, hesitancy becomes the result of a "cognitive balancing" between two risks, as the literature shows: those who perceive the virus risk as low and the vaccine risk as high tend to be hesitant or refuse vaccination (Dubé et al., 2013, pp. 1763–1764; Sallam, 2021, pp. 1–3).

The Specificity of COVID-19 Vaccines and the Reshaping of Risk Perception : In this study, the COVID-19 vaccine is understood as a biotechnology situated at the intersection of science, economy, and politics, rather than merely as a neutral medical tool, From the perspective of the sociology of medical technology, modern vaccines transform into 'social objects' around which conflicting meanings are produced relating to safety, efficacy, political intent, and economic profit, making their acceptance or rejection part of society's relationship with systems of expertise and health governance (Petersen & Lupton, 1996; Rose, 2007), The specificity of COVID-19 vaccines—in terms of accelerated development during a global emergency, the multiplicity of producing companies and countries, and intensive marketing accompanied by geopolitical competition—has increased their entry into a 'manufactured risk' space that accumulates doubt rather than builds certainty, This aligns with the risk society and reflexive modernity thesis, which posits that scientific products may be socially received as sources of threat as much as they are presented as means of salvation (Beck, 1992; Giddens, 1991), At the same time, vaccination policies operated as a mechanism of "biopolitics," where bodies and populations are managed through regulatory tools such as the health passport and linking vaccination to the ability to travel, work, and study, This produces a pattern of "pragmatic compliance" based on social necessity rather than cognitive conviction (Foucault, 2003; Bourdieu, 1980), Therefore, the stance toward the COVID-19 vaccine cannot be reduced solely to an individual assessment of risk, but rather to a broader social structure shaped by the history of trust in the state and the health system, representations of global

pharmaceutical capitalism, and digital uncertainty that simultaneously reproduces skepticism toward both the product and its discourse (Petryna, 2009; Proctor, 2008).

1.6 - Study methodology and tools:

The study adopted a quantitative -analytical approach within a sociological framework, aiming to examine the attitudes and perceptions associated with vaccine refusal or hesitancy within a specific segment of Algerian society, An electronic questionnaire was designed targeting individuals who reported refusing or hesitating to receive the COVID -19 vaccine, and it was then distributed through social media networks and the most commonly used digital platforms, allowing access to a sample that specifically reflects the perceptions of this group.

The sample consisted of 430 individuals selected using a non-probability purposive sampling method during the period from September 18 to October 31, 2021, After retrieving the responses, the data were coded and statistically processed using SPSS software (version 25), The questionnaire included a set of questions related to attitudes toward vaccination, reasons for refusal or hesitancy, and the level of trust in the producing and recommending authorities, in addition to some reference demographic variables (gender, educational level, and disease-related experience), The quantitative analysis was utilized within a qualitative sociological interpretive framework, aiming to link numerical indicators with the cultural, cognitive, and social structures that shape attitudes toward vaccination in a specific Algerian context.

In this context, the study primarily relied on the questionnaire as the central tool, which was specifically designed for the group of rejecters/hesitant individuals, It was divided into two main sections: the first section was dedicated to general/background information, and the second section aimed to measure respondents' attitudes and the degree of their hesitation based on the most prominent reservations and ideas circulated in the media and research regarding the objections and concerns of this group, To ensure the reliability of the tool, the internal consistency coefficient, Cronbach's alpha, was calculated using SPSS for all questionnaire items, reaching a value of 0.79 across 34 items, which indicates an acceptable level of reliability and good internal stability among the elements.

Table 01 : shows the reliability degree of the questionnaire using Cronbach's alpha coefficient.

The number of elements	Alpha de Cronbach	axles
34	0.79	the questionnaire

Source: Prepared by a researcher with the assistance of(spss 25)

As for the sample, the questionnaire was directed at Algerians aged 15 and over who identify themselves as hesitant or refusing COVID-19 vaccination, Accordingly, a non-probabilistic purposive sampling method was used, resulting in 430 valid responses for analysis.

2- Presentation and discussion of results:

In order to identify the general characteristics of the study sample, we have edited the table below based on their answers in this regard:

Table 02 :shows the distribution of sample members by gender and educational level.

characteristics		%	N
sex	Male	53,95	232
	Female	46,05	198
Educational level	primary	00	00
	middle	10,47	45
	secondary	12,56	54
	university	76,98	331

Source: Prepared by a researcher with the assistance of(spss 25)

By analyzing the data in the table above regarding the distribution of the sample members by gender and educational level, it appears that males constituted the largest percentage of participants at 53.95%, compared to 46.05% for females, This result indicates a slight inclination among males to participate in electronic surveys related to health

issues, a phenomenon previously addressed by *Paul and Fancourt* in their analysis of factors influencing responses to COVID-19 vaccine-related surveys, where they observed that male interaction was relatively higher in studies conducted through digital mediums (Paul & Fancourt, 2021), This relative dominance of males can also be explained by their greater engagement in the digital field compared to some female groups, especially in conservative societies that may restrict access to technological means, Regarding the educational level, a percentage of 76.98% was recorded for university graduates, followed by 12.56% for the secondary education group and 10.47% for the intermediate education group, while no participation was recorded from those with primary education.

This distribution reveals that the study primarily relied on individuals belonging to a segment with a high educational level, which aligns with what (Bethlehem, 2010, p. 162) noted in this regard that online distributed questionnaires often attract the most educated and the most engaged with digital media, creating a bias in representation and impacting the ability to generalize the results to the entire population.

Table 03 :shows the statements of the sample members regarding their infection with the Coronavirus.

Q1/ Have you ever had the corona virus?	**N**	**%**	**ranking**
yes	150	%34,88	1
I'm not sure	141	%32,79	2
NO	139	%32,33	3
The Total	430	100%	/

Source: Prepared by a researcher with the assistance of(spss 25)

We recorded in the table above the results of the respondents' answers regarding whether they had previously contracted the coronavirus, where 34.88% of the participants reported that they had indeed contracted it, while 32.79% said they were 'unsure', and 32.33% stated that they had never been infected, These distributions reveal a notable convergence among the three categories, indicating a cognitive and personal ambiguity among a significant portion of individuals regarding their experience with infection, whether due to a lack of diagnosis, unclear symptoms, or weak institutional health tracking.

The relatively high percentage of the 'unsure' category (32.79%) reflects a lack of health certainty, which can be linked to the weakness of the preventive and diagnostic system during waves of the epidemic, as well as the low health literacy among ordinary citizens in distinguishing between COVID-19 symptoms and those of seasonal colds or flu, The report from the Vaccine Hesitancy Working Group (WHO SAGE Working Group, 2014) indicated that the lack of clarity in health information and diagnosis contributes to forming attitudes based on intuition rather than knowledge, resulting in a double effect: either an overconfidence in false reassurance or excessive hesitation in taking subsequent preventive measures, including vaccination.

As for the percentage of respondents who reported a previously confirmed infection (34.88%), it indicates that nearly one-third of the sample have direct experience with the virus, which may be related to the formation of their attitudes towards vaccination, This result is consistent with what Lazarus et al (2021) reported, that experience or exposure related to COVID-19 is considered one of the factors that can be associated with vaccine acceptance or hesitancy, in addition to factors such as trust in vaccines and safety perceptions.

As for the percentage of those who have not been infected with the virus, estimated at (32.33%), this data can be interpreted in two opposing directions: on one hand, it may generate a false sense of security regarding future infections, and on the other hand, it may increase their level of caution, leading them to adopt more preventive measures, However, the main determinant in both cases remains the extent of trust in institutional and medical narratives regarding infection risks and vaccine effectiveness.

Table 04 :shows the respondents' attitudes towards the possibility of taking the vaccine.

Q2/ Are you ready to take the corona vaccine?	**N**	**%**	**ranking**
Yes now	00	%00	3
Yes, but after a while	126	%29,30	1
NO	115	%26,74	2

hesitant	102	%23,72	3
only conservative	87	%20,23	4
The Total	100%	430	/

Source: Prepared by a researcher with the assistance of(spss 25)

Based on the data we collected in the table regarding the positions of Algerians who are hesitant to take the Corona vaccine, it became clear that 29.30% of the sample indicated their willingness to take the vaccine 'but after a while', while 26.74% refused to receive it, and 23.72% expressed their hesitation, Meanwhile, 20.23% described themselves as 'only cautious', with no individuals agreeing to take the vaccine 'now' at a rate of 0%, This indicates high levels of hesitation and general caution towards the vaccine in Algeria, as more than 70% of the sample are either refusing, hesitant, or cautious, while none are willing to take it immediately, suggesting a deep-rooted crisis of trust in society towards the healthcare system or the vaccine itself.

This indicates a deep-rooted crisis of trust in the health system or the vaccine itself within the community, This result is consistent with the findings of Lazarus and his colleagues in a global study involving respondents from more than 19 countries, where they showed that the willingness to receive the vaccine is significantly influenced by the level of trust in governments and health institutions, and that rates of hesitation are higher in countries where there are popular doubts about official information or institutional transparency (Lazarus et al., 2021).

The classification of a large number of individuals as 'just conservatives' or 'hesitant' shows a pattern of symbolic avoidance that may be linked to fear of social pressure or accountability, Larson and others discussed this phenomenon within the framework known as preventive hesitation,' where individuals tend to take verbally moderate positions that reflect emotional hesitation rather than a decisive cognitive stance (Larson et al., 2014), This may also be attributed to the hypothesis that many members of Algerian society perceive vaccines as an experience related to authority and official discourse rather than as an individual health choice.

As for the Arab level, a study conducted by Sallam (2021) on several Arab countries showed that the delay and hesitation in accepting the coronavirus vaccine was not only due to ignorance, but was also attributed to religious, cultural, and psychological factors related to previous experiences with vaccines and local perceptions of immunity.

Therefore, these results confirm the validity of the first hypothesis, which states that the attitudes of the hesitant are distributed in a non-uniform manner, and that the patterns of hesitation, postponement, and conditional acceptance are the most prevalent within the sample.

Table 5: shows the respondents' opinions regarding the potential pressures to obtain the vaccine

Q3/ If you had to get vaccinated, would that be a response?	**N**	**%**	**ranking**
Legislation of the law	42	%7,49	4
Working procedures	112	%19,96	2
Study requirements	102	%18,18	3
travel requirements	305	%54,37	1
The Total	430	100%	/

Source: Prepared by a researcher with the assistance of(spss 25)

This table illustrates the trends of the sample individuals regarding their potential motivations for receiving the vaccine, should it be mandated, The results show that more than half of them (54.37%) link their willingness to the priority of travel, while 19.96% expressed acceptance if it is a condition for work, and 18.18% if it is related to study, Meanwhile, the percentage of those who might comply simply due to legal obligation did not exceed 7.49%, This clearly reflects an individual pragmatic logic at the expense of a collective obligation logic, as the respondents' attitudes towards vaccination are based on a functional utilitarian rationale; they view the vaccine as a means to achieve external goals such as mobility or ensuring professional or educational continuity, rather than as a health preventive option or a collective commitment..

These results reflect what Pierre Bourdieu called « Le sens pratique » , meaning that individuals adopt positions that align with the requirements of the social field in which they operate (Bourdieu, 1980), The stance on vaccination here does not stem from a purely health-related conviction, but rather from an assessment of a social or administrative situation that may threaten or facilitate their interests, Furthermore, the symbolic coercion represented by the conditions of travel or work becomes, in reality, more influential than health or medical discourse.

It is worth noting that the lowest approval rate was associated with the idea of mandatory vaccination (7.49%), suggesting that legal motivation is not a primary driver for the respondents, In light of what Dubé et al, (2013) indicated-that weak trust in vaccines or in official health authorities is one of the main determinants of hesitancy-adopting more persuasive and transparent communication policies seems necessary to avoid deepening the trust gap.

The link of the decision to the condition of travel reveals the centrality of mobility in the Algerian social imagination, as it is viewed as a means of social advancement or an openness to new opportunities, This tendency reflects a logic of rational choice, as individuals treat vaccination as a circumstantial tool associated with achieving tangible interests (such as travel or job security), rather than a collective health commitment, According to Coleman, social actors base their decisions on an assessment of benefits versus costs, which explains why the idea of vaccination was not accepted as a health value in itself as much as it was accepted as an external condition to achieve personal goals (Coleman, 1990).

On the other hand, the review by Larson et al, (2014) confirmed that many frequency patterns are not due to outright rejection, but rather to the reinterpretation of the vaccine within networks of individual and institutional interests, This reflects the sociological complexity of vaccination, where cognitive factors intertwine with social pressures, making the construction of a collective health belief a long-term process that requires multi-level interventions.

Overall, the results of this table confirm the validity of the fifth hypothesis, which states the existence of a « pragmatic acceptance » of vaccination, governed more by practical necessities than by scientific conviction.

Table 06 : shows the reasons respondents refused to take the vaccine.

Q4/ Do you repeat your current abstinence from taking the vaccine? for the following reasons:	Number of respondents	%	Missing responses
Fear of long-term complications	110	%12,91	320 (74,42%)
Insufficient information about the vaccine and its side effects	269	%31,57	161 (37,44%)
The rapid way that vaccines are made	181	%21,24	249 (57,91%)
Your fear for your immunity	89	%10,45	341 (79,30%)
Not believing in the necessity of vaccination	203	%23,83	227 (52,79%)
Pregnancy and lactation	00	%00	/

Source: Prepared by a researcher with the assistance of(spss 25)

Based on the data we collected in the table above, 31.57% of respondents reported that their current refusal to take the vaccine is due to a "lack of information about it and its side effects," while 23.83% expressed "a disbelief in the necessity of vaccination." Meanwhile, 21.24% indicated that "the speed at which the vaccines were developed" raises doubts for them, and 12.91% stated that their refusal is due to "fear of long-term complications," compared to 10.45% who expressed "concern for their own immunity." No responses related to pregnancy and breastfeeding were recorded, These results indicate that vaccine refusal is not a single stance, but rather the outcome of multiple patterns of cognitive caution, existential doubt, and distrust in the institutions producing medical knowledge, Foremost among these stances is the absence of information or its inadequacy, which represents a structural barrier in building public trust, especially in post-colonial societies where the relationship with the healthcare institution is burdened by a legacy of suspicion and epistemic inequality (Larson et al., 2014).

What is striking in this table is that abstention is not only confined to the column of "cognitive stance" (lack of information), but extends to the "existential stance," where 23.83% declare that they do not believe in the necessity of vaccination at all, This level of rejection reflects what Petersen and Lupton described in the framework of "new public health," where health decisions become an individual responsibility based on personal conviction and experience more than a collective obligation tied to scientific or institutional consensus (Petersen & Lupton, 1996, p9), Here, dealing with health is governed by individual choices that may be influenced by diverse information

sources, which explains the fragility of attitudes towards vaccination in light of the limited reliable official channels and the proliferation of unregulated digital channels that reproduce doubts and reservations.

As for the 21.24% that addressed the speed of vaccine production, it reflects a popular conception of science based on skepticism, This result highlights what Ulrich Beck noted in his analysis of the "society of risks", where science is no longer a source of reassurance, but has shifted in the public's view to a potential threat due to its connection with political and economic power (Beck, 1992,p6), Moreover, skepticism regarding the speed of vaccine production here is not merely an individual stance, but rather a reflection of deeper social anxieties about the risks of science in times of crisis.

Some participants' concerns about long-term complications or the effect of the vaccine on autoimmune immunity indicate a pattern of hesitancy that is not based on outright refusal, but rather on a personal precautionary perception of risks; the vaccination decision is reinterpreted through a weighing of expected benefits against potential harm, even if this is not always based on precise medical knowledge, This aligns with what Dubé et al. (2013) reported, that a significant portion of hesitancy is associated with concerns about safety and side effects, particularly regarding new vaccines and their long-term risks, and that the public's perception of risks may be shaped within a space of doubts and uncertainties more than through expert standards (Dubé et al., 2013, pp. 1763-1764).

Table 7 : shows the opinions of the respondents regarding the types of manufactured vaccines.

Q5/ What kind of vaccine can you take in the future?	N	%	ranking
Chinese	95	%22,09	2
Russian	18	%4,19	5
European	39	%9,07	4
American	58	%13,49	3
I will never take any vaccine	220	%51,16	1
The Total	430	100%	/

Source: Prepared by a researcher with the assistance of(spss 25)

The table above shows the positions of sample individuals regarding the types of vaccines they may be willing to receive in the future, with 51.16% stating that they "will not take any type of vaccine," while 22.09% expressed acceptance of a "Chinese" vaccine, 13.49% for an "American" vaccine, 9.07% for a "European" vaccine, and only 4.19% chose the "Russian" one, These results highlight a prevailing negative attitude that goes beyond mere hesitation to full rejection, necessitating a sociological reading of the phenomenon as a reflection of a deep crisis of trust in institutions and scientific knowledge, The refusal of more than half of the sample to choose any vaccine reveals what Anthony Giddens referred to as "disquieted modernity," where science produces its own tools but simultaneously becomes subject to doubt due to its separation from shared social traditions (Giddens, 1991, p.3), This hesitation is not only understood in its medical dimension, but is also linked to political and media contexts that have fueled skepticism through conflicting narratives about the effectiveness of vaccines, their rapid production, and the nature of the accompanying economic interests.

The acceptance of the Chinese vaccine is relatively low (22.09%), which can be explained by what international relations literature suggests, namely that the image of China in the Global South is often associated more with economic partnerships and solidarity than with colonial dominance, giving it a "symbolic capital" different from that of the United States and Europe (Callahan, 2016), In contrast, the low trust in the Russian vaccine indicates the limited symbolic and media presence compared to the others.

As for the average acceptance rates of American and European vaccines, they reflect a cognitive balance between recognizing Western scientific efficiency and skepticism about its political and economic intentions, This intersects with what Beck (1992) pointed out within the framework of the "Risk Society," where science is no longer presented as a tool for reassurance, but rather as a new source of social risks, especially when it intersects with power and economic systems.

Overall, the distribution of attitudes in this table reveals that Algerian public opinion does not treat the vaccine as a purely medical product, but as a socio-political symbol linked to trust or skepticism regarding its producer, This aligns with the analyses of Dubé et al (2013) regarding "vaccine hesitancy," where individuals form their health attitudes based on a mixture of cognitive, cultural, and political factors.

Hence, the results of this table confirm the validity of the fourth hypothesis, which holds that the intensity of reluctance is determined by the degree of negativity / positivity in the respondents' perceptions of countries and producing companies.

Table 8 :shows the respondents' trends regarding the possibility of changing their opinions about the vaccine

Q6/ Would you change your mind about taking the vaccine? If the following things happen:	Number of respondents	%	Missing responses
A huge increase in the number of injuries in your surroundings	112	%15,24	318 (73,95%)
Issuing a religious fatwa on the obligation of vaccination	51	%6,94	379 (88,14%)
Insistence on you by friends or relatives	90	%12,24	340 (79.07%)
Taking sufficient and reassuring information about the vaccine	210	%28,57	220 (51,16%)
Corona vaccine production in Algeria	98	%13,33	332 (77.21%)
Those who received the vaccine did not show any symptoms or complications	132	%17,96	298 (69,30%)
You won't change your mind	42	%5,71	388 (90.23%)

Source: Prepared by a researcher with the assistance of(spss 25)

The table above presents the potential positions of the sample individuals regarding the possibility of changing their opinions about vaccination if conditions change or new requirements become available, 28.57% of them reported that they would reconsider if 'sufficient and reassuring information about the vaccine' became available, while 17.96% linked their decision to observing that vaccinated individuals did not show symptoms or complications, Meanwhile, 15.24% indicated that they would change their position if there was a 'significant increase in the number of infections in their surroundings,' 13.33% if the 'vaccine was produced locally,' and 12.24% in the event of the 'insistence of friends or relatives.' On the other hand, 6.94% were satisfied to link the change to a 'religious fatwa,' and 5.71% confirmed their absolute refusal remained unchanged.

These results show that most participants do not adopt an outright rejecting stance, rather, they remain- to varying degrees- open to the possibility of changing their position if a more reassuring cognitive or emotional environment is available, "Reassuring information" emerged as a leading influencing factor, indicating that hesitancy is not explained solely as a lack of knowledge, but as a need for reliable, simplified, and easily understandable information, This aligns with what Dubé et al (2013) assert, that vaccine hesitancy is a multidimensional phenomenon with cognitive, cultural, and contextual roots, and that simply providing individuals with information is not sufficient unless it is delivered through trusted channels and in a manner that aligns with their ways of understanding and perceiving risks.

The 15.24% who link the decision to increased infections in the nearby surroundings point to the logic of 'proximity threat,' that is, responding when the threat becomes tangible and closely connected to daily life, Likewise, the 13.33% who associate vaccine acceptance with it being a local product reflect an aspect of 'national trust' and a preference for a nearby product, This tendency can be understood in the context of discussions in the global health ethics literature during the pandemic about the rise of 'vaccine nationalism' and the preference of countries and communities for what is seen as a national priority in times of scarcity and danger (Emanuel et al., 2020).

As for the religious factors, which had only a limited impact (6.94%), this indicates a decline in the role of these factors and trends in shaping health decisions compared to social and cognitive factors, Additionally, the percentage of 5.71% who confirmed their steadfast rejection remains relatively small, indicating that the majority of undecided individuals have the potential to be influenced through inclusive communication strategies, provided that they are built on respecting their cultural and cognitive sensitivities instead of authoritarian or strictly technical discourse.

In summary of the above results in this table, we can confirm the validity of the third hypothesis, which assumes that doubt about effectiveness and fear of side effects are the two most dominant reasons behind hesitation.

Table 9 :shows the respondents' opinions on the reality of the Corona pandemic.

Q7/ What do you think is the reality of the Corona epidemic?	N	%	ranking
A media exaggerated epidemic	290	67,44	1
A dangerous epidemic that must be combated	140	32,56	2
Doesn't exist at all	00	00	3
The Total	430	100%	/

Source: Prepared by a researcher with the assistance of(spss 25)

The table shows the respondents' opinions on the nature of the Corona pandemic, as 67.44% of them viewed it as 'a pandemic exaggerated by the media,' while 32.56% considered it 'a serious pandemic that must be resisted, ' No percentage was recorded for a group that denies its existence entirely, This distribution reveals deep sociological implications, as the respondents do not deny the existence of the phenomenon itself, but rather question the media's representation of it, This points more towards a crisis of trust in official knowledge production channels than to a direct medical stance, The idea of 'exaggeration' here can be read as a mechanism of symbolic resistance against the discourse of authority, where the crisis is redefined locally according to specific cultural and social standards.

From this perspective, the 67.44% rate indicates that individuals do not deny the existence of the virus as much as they reject its official narrative, This can be understood in light of Giddens' analysis of late modernity as a modernity that fosters fundamental institutionalized doubt, experiential knowledge no longer possesses an automatic persuasive power, because all knowledge is presented as a hypothesis open to challenge and revision, and because the very systems of expertise generate multiple and contested authorities, In this context, the general public simultaneously holds attitudes of trust, suspicion, rejection, and withdrawal toward institutional knowledge, explaining the fragility of the reception of the official narrative and its lack of entrenchment (Giddens, 1991, pp. 3-7).

On the other hand, the 32.56% who viewed COVID-19 as a serious epidemic reflect a different logic based on direct experience, whether through personal infection or the loss of loved ones, Research by Paul Slovic has shown that the perception of health risks increases significantly when an individual connects to a lived experience, rather than relying on statistical data or official discourse (Slovic, 2000), This highlights the dialectic of 'lived knowledge' versus 'institutional knowledge.'

As for the complete absence of a stance that denies the existence of the virus among the respondents, it represents an indicator of collective awareness of the phenomenon, even if its interpretations vary, This is considered a positive factor compared to other societies where there was a complete denial of the pandemic, making the crisis in the Algerian context closer to a symbolic struggle for representation rather than a collective denial of reality.

Table10 :shows the respondents' opinions on acquiring immunity through infection with the epidemic.

Q8/ Do you think That the one who passed the Corona epidemic and recovered from it?	Those affected by the epidemic		Those who are not affected by the epidemic		Unsure		the total	
	N	%	N	%	N	%	N	%
gain immunity	42	9,77	29	6,74	18	4,19	89	20,70
Does not gain immunity	41	9,53	21	4,88	49	11,40	111	25,81
I do not know	70	16,28	102	23,72	58	13,49	230	53,49
TOTAL	153	35,58	152	35,34	125	29,08	430	100

Source: Prepared by a researcher with the assistance of(spss 25)

The data in the above table regarding the opinions of the respondents about the issue of acquiring natural immunity after contracting the coronavirus show that 20.70% believed that infection provides immunity, while 25.81% thought it does not provide any immunity, and 53.49% expressed that they did not know the answer, These percentages reveal a notable state of cognitive uncertainty among the sample individuals, as more than half of the respondents lack a specific position on a fundamental medical issue, This situation can be explained by conflicting scientific and

medical narratives since the beginning of the pandemic, as well as the absence of health communication policies capable of simplifying scientific information and engaging the public in understanding it.

The fact that 53.49% of respondents stated that they "do not know" reveals a striking state of epistemic uncertainty regarding post-infection immunity, This does not so much reflect individual incapacity as it does indicate the fragility of health communication channels and the absence of a simple, reliable discourse capable of translating scientific knowledge into stable public understanding, Rapid developments and global disparities in scientific positions regarding the effectiveness and duration of natural immunity have contributed to deepening this confusion, leaving the ordinary citizen unable to adopt a clear stance, This situation can be understood within the framework of the "agnostics of ignorance" perspective, which posits that non-knowledge may result from social and institutional conditions that generate or sustain confusion in the public sphere (Proctor, 2008).

As for the 25.81% who deny the existence of natural immunity after infection, this reflects a skeptical tendency fueled by the climate of fear and uncertainty characteristic of crisis-hit societies, In such contexts, epidemic threats are seen as invisible and shifting dangers, prompting individuals to assume the worst and underestimate the body's capacity for self-resilience, Bauman describes this situation as a newly emerged state of fear stemming from uncertainty and ignorance about the nature of the threat and the limits of control over it, where danger is present everywhere without being clearly seen, solidifying expectations of vulnerability and helplessness (Bauman, 2006, p. 9), Accordingly, denying natural immunity here does not reflect mere ignorance as much as it reveals deeper social frustration in the face of health systems' failure to provide reassuring certainty, thereby reinforcing a sense of continuous exposure to danger and weakening confidence in the 'body's immunity' alone.

The 20.70% of participants who expressed confidence in having sufficient immunity after infection indicate the persistence of a tendency that can be described as 'self-reliance' in interpreting health phenomena, the body is seen as capable of protecting itself by its natural means without an urgent need for external intervention, This stance can be understood in light of Max Weber's analysis of patterns of social action, particularly value-rational action, where Weber shows that actors' behavior may be based on an internal ideal/value-based conviction as a guiding motive for action, in addition to other material, emotional, or traditional motives (Weber, 1978, p. 339).

Accordingly, these divisions are not interpreted as medical differences as much as they are indicators of a crisis of trust in institutional knowledge, as the absence of a collective certainty about a pivotal health issue reflects a deficiency in the communicational structure of the healthcare system, more than it reflects a lack of awareness among individuals themselves.

Based on the results of Tables 09 and 10, we can confirm the validity of the second hypothesis, which states that hesitancy / refusal increases as the perceived risk of the virus decreases and confusion about the actual need for the vaccine increases.

3-Conclusion:

By analyzing the respondents' answers to the questionnaire, we found that most of them return their abstention to the lack of sufficient information about vaccines, and they believe that Corona is an epidemic that is only exaggerated by the media, and We found that 54.37% of the respondents may take vaccinations if they intend to travel, and 51% of them will remain reluctant to take vaccinations, regardless of the types of vaccines.

The results also reflect a state of cognitive division around fundamental medical concepts, highlighting the gap between official health knowledge and people's daily representations, where direct experience, personal impression, and social pressures still play a central role in guiding decision-making, The study shows, from a sociological perspective, that the vaccine is perceived in the public consciousness not only as a preventive measure but also as a symbol associated with authority, trust, belonging, and meaning, This makes the stance towards it a reflection of deeper social realities beyond mere medical choice.

Findings

The empirical findings of the study reveal several key sociological patterns shaping COVID-19 vaccine hesitancy in Algeria. First, respondents tend to underestimate the health risks posed by COVID-19, especially among younger age groups, while simultaneously overestimating the potential dangers and long-term side effects of vaccination. This imbalance in risk perception contributes significantly to reluctance and refusal behaviors.

Second, the data highlight a pronounced crisis of trust toward expert systems, including medical authorities, governmental institutions, and pharmaceutical corporations. Many respondents perceive vaccine development processes as rushed, opaque, or influenced by geopolitical and economic interests, which undermines confidence in official health narratives.

Third, the study uncovers the prevalence of alternative knowledge sources—particularly social media platforms—as primary reference points for health decision-making. These platforms often circulate contradictory, speculative, or conspiratorial interpretations that compete with institutional discourse and reinforce skepticism.

Finally, the research identifies a pattern of conditional or pragmatic vaccination, whereby individuals accept vaccination not out of belief in its medical necessity, but due to external pressures linked to mobility, employment, or education. This reflects a shift from trust-based compliance to constraint-based acceptance.

Ethical Considerations

This study was conducted in accordance with established ethical standards for social science research. Participation was entirely voluntary, and informed consent was obtained electronically from all respondents prior to data collection. Participants were assured of anonymity and confidentiality, and no identifying personal data were collected or stored. The study posed no physical or psychological risk to participants.

Author Contributions

- **Dr. Harrouz Bouhafs**: Conceptualization of the study, research design, data collection, and primary drafting of the manuscript.
- **Pr. Mhammed Sbai**: Theoretical framework development, sociological analysis, and critical revision of the manuscript.
- **Pr. Abdelkrim Benkhaled**: Methodological supervision, statistical analysis, and interpretation of results.
- **Pr. Abderrahman Baotman**: Literature review, contextual analysis, and final academic editing.

All authors have read and approved the final version of the manuscript.

Acknowledgements. The authors would like to express their sincere gratitude to all participants who generously contributed their time and perspectives to this research. Appreciation is also extended to academic colleagues who provided valuable methodological and theoretical feedback during the preparation of this study.

Funding. This research received no specific grant from any public, commercial, or non-profit funding agency.

Conflict of Interest. The authors declare no conflict of interest related to the conduct, analysis, or publication of this study.

References

1. Bauman, Z. (2006). *Liquid fear*. Polity Press.
2. Beck, U. (1992). *Risk society: Towards a new modernity*. Sage.
3. Bethlehem, J. (2010). Selection bias in web surveys. *International Statistical Review, 78*(2), 161–188. https://doi.org/10.1111/j.1751-5823.2010.00112.x
4. Betsch, C., Böhm, R., Chapman, G. B., & Korn, L. (2015). Using behavioral insights to increase vaccination policy effectiveness. *Policy Insights from the Behavioral and Brain Sciences, 2*(1), 61–73. https://doi.org/10.1177/2372732215600716
5. Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., & Böhm, R. (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLOS ONE, 13*(12), e0208601. https://doi.org/10.1371/journal.pone.0208601
6. Bourdieu, P. (1980). *Le sens pratique*. Les Éditions de Minuit.
7. Callahan, W. A. (2016). *China dreams: 20 visions of the future*. Oxford University Press.
8. Coleman, J. S. (1990). *Foundations of social theory*. Harvard University Press.
9. Douglas, M., & Wildavsky, A. (1982). *Risk and culture: An essay on the selection of technological and environmental dangers*. University of California Press.
10. Dubé, E., Laberge, C., Guay, M., Bramadat, P., Roy, R., & Bettinger, J. A. (2013). Vaccine hesitancy: An overview. *Human Vaccines & Immunotherapeutics, 9*(8), 1763–1773. https://doi.org/10.4161/hv.24657
11. Emanuel, E. J., Persad, G., Kern, A., Buchanan, A., Fabre, C., Halliday, D., Heath, J., Herzog, L., Leland, R. J., Lemango, E. T., Luna, F., McCoy, M. S., Norheim, O. F., Ottersen, T., Schaefer, G. O., Tan, K.-C., Wellman, C. H., Wolff, J., & Richardson, H. S. (2020). An ethical framework for global vaccine allocation. *Science, 369*(6509), 1309–1312. https://doi.org/10.1126/science.abe2803
12. Foucault, M. (2003). *Society must be defended: Lectures at the Collège de France, 1975–1976*. Picador.
13. Giddens, A. (1991). *Modernity and self-identity: Self and society in the late modern age*. Polity Press.

14. Hornsey, M. J., Harris, E. A., & Fielding, K. S. (2018). The psychological roots of anti-vaccination attitudes. *Psychological Science, 29*(2), 307–315. https://doi.org/10.1177/0956797617734857
15. Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Kasperson, J. X., & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis, 8*(2), 177–187. https://doi.org/10.1111/j.1539-6924.1988.tb01168.x
16. Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M. D., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine, 32*(19), 2150–2159. https://doi.org/10.1016/j.vaccine.2014.01.081
17. Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., Kimball, S., & El-Mohandes, A. (2021). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine, 27*(2), 225–228. https://doi.org/10.1038/s41591-020-1124-9
18. Lupton, D. (2013). *Risk* (2nd ed.). Routledge.
19. Meyer, M., Alfano, M., & de Bruin, B. (2021). Epistemic trust and the ethics of science communication. *Public Understanding of Science, 30*(5), 585–600. https://doi.org/10.1177/09636625211009999
20. Paul, E., Steptoe, A., & Fancourt, D. (2021). Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications. *The Lancet Regional Health – Europe, 1*, 100012. https://doi.org/10.1016/j.lanepe.2020.100012
21. Peretti-Watel, P., Ward, J. K., Vergelys, C., Bocquier, A., Raude, J., & Verger, P. (2020). "I think I made the right decision ... I hope I'm not wrong." Vaccine hesitancy, commitment and trust among French adults. *Social Science & Medicine, 246*, 112931. https://doi.org/10.1016/j.socscimed.2020.112931
22. Petersen, A., & Lupton, D. (1996). *The new public health: Health and self in the age of risk*. Sage.
23. Petryna, A. (2009). *When experiments travel: Clinical trials and the global search for human subjects*. Princeton University Press.
24. Proctor, R. N. (2008). Agnotology: A missing term to describe the cultural production of ignorance (and its study). In R. N. Proctor & L. Schiebinger (Eds.), *Agnotology: The making and unmaking of ignorance* (pp. 1–33). Stanford University Press.
25. Renn, O. (2008). *Risk governance: Coping with uncertainty in a complex world*. Earthscan.
26. Rose, N. (2007). *The politics of life itself: Biomedicine, power, and subjectivity in the twenty-first century*. Princeton University Press.
27. Sallam, M. (2021). COVID-19 vaccine hesitancy worldwide: A concise systematic review of vaccine acceptance rates. *Vaccines, 9*(2), Article 160. https://doi.org/10.3390/vaccines9020160
28. Slovic, P. (2000). *The perception of risk*. Earthscan.
29. Ward, J. K., Alleaume, C., & Peretti-Watel, P. (2020). The French public's attitudes to a future COVID-19 vaccine: The politicization of a public health issue. *Social Science & Medicine, 265*, 113414. https://doi.org/10.1016/j.socscimed.2020.113414
30. Weber, M. (1978). *Economy and society: An outline of interpretive sociology* (G. Roth & C. Wittich, Eds.). University of California Press.
31. World Health Organization. (2014). *Report of the SAGE Working Group on vaccine hesitancy*. WHO.