



Covid-19 Vaccine Hesitancy among Immigrants in Finland: Implication for Global Health

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The aim of the study is to enhance the acceptance of COVID-19 vaccine and other vaccines among immigrant populations in Finland and in low-income countries. The objectives include to understand the perspective of covid-19 vaccine hesitancy among immigrants' population living in Finland, to determine the factors responsible for COVID-19 vaccine hesitancy among the target group, to find the target group-based ideas and solutions to COVID-19 and other vaccine hesitancy, and to recommend a future vaccine hesitancy intervention and health campaign framework tailored in the participants' ideas and solutions. The study is a Master's degree thesis of Global health and Crisis management of Laurea University of Applied Sciences beneficial to the immigrant communities in Finland and to low-income countries and the global health community.

The need to eradicate COVID-19 necessitated and renewed the effort to manage ever rising vaccine hesitancy among immigrant population in Finland specifically and the low-income countries generally. Understanding the deep-rooted causes of hesitancy among the target population and adopting intervention programmes tailored in their own ideas and values is believed to be a long stride towards improved global health through immunization. Understanding the historical development, challenges and successes associated with vaccines and vaccination is a key to managing apathies, rejections and hesitancy that currently affect the effective deployment of vaccines.

A qualitative study method involving interviews was used. Data were collected for the study in a structured and result-oriented manner. Semi-structured interviews with open-ended questions were used to collect data from the key informants. Data were analyzed using an inductive thematic analysis method.

The study found distrust of the COVID-19 vaccine arising from combination of multiple factors, elevated level of ignorance complicated by both disinformation and misinformation, religious and cultural beliefs affecting personal choices as the main factors responsible for COVID-19 vaccine hesitancy among the immigrants living in Finland. Proper and targeted education of the population on the critical components of the vaccine and vaccination, massive sensitization of the populace and campaign against propaganda using familiar and trusted professional members of their society as well as improved vaccine research and clinical trials and localization of vaccine production are the suggested solutions to COVID-19 vaccine hesitancy.

The study recommends that in construction of future health campaign and sensitization, that Global healthcare planners should focus on implementing targeted education, with massive sensitization involving trusted members of the community. Also recommended is an improved vaccine research and localized production of vaccines, to effectively improve COVID-19 vaccine acceptance among the African immigrants and in other low-income countries and consequently reduce hesitancy.

Keywords: COVID-19, Vaccine hesitancy, Immigrants, Intervention programmes, Finland

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1 Introduction

There is an overwhelming need currently to curtail the spread and possibly eradicate totally the dreaded COVID-19 infection ravaging the world. The global effect of the pandemic including restrictions to normal life and total lockdown in some places is considered one of the worst and most severe restriction to liberty and free life since the end of the World War II (Pantano, Pizzi, Scarpi & Dennis 2020). Different intervention measures were put in place following the first reported outbreak in Wuhan China in December 2019. Considering that the effect of the outbreak was reverberating across all sectors and through all countries and cities rapidly, emergency interventions were initiated at different levels and different sectors. For those in the sale and retail business, travel, and tourism, as well as government businesses especially in the EU, UK, America and China, economic interventions from government and authorities were provided. On the other hand, healthcare intervention goals are aimed at controlling the spread and possibly eradicating the viral infection completely while medically treating those already infected and/or hospitalized. Other interventions include but not limited to restriction of person-to-person contact, use of personal protective equipment (PPEs) like face masks and hand hygiene practices including hand washing and use of hand sanitizers and disinfectants. Similarly, efforts were increased at developing vaccines and biologicals that are capable of instilling immunity against the COVID-19 virus.

Vaccines and vaccination or immunization is believed and recognized as one of the most successful public health measures for prevention of viral diseases and it is crucial to limiting the spread of COVID-19 (Bendau, Plag, Petzold & Ströhle 2021; Dube, Gagnon, Nickels, Jeram & Schuster 2014). Efforts are being intensified mostly in vaccine production and administration as an effective preventive measure. Among the leading researchers and investors in this regard are world leading pharmaceutical firms and educational/research institutions including BioNTech Pfizer, Oxford Astra Zeneca, Moderna, among others. Through the combined effort of these institutions supported by different governments, agencies, non-governmental organizations (NGOs), and the world health organization (WHO), emergency production and approval of COVID-19 vaccines was achieved. Similarly, through the painstaking effort and resilience of healthcare workers, massive immunization programmes were undertaken across the globe.

Of great concern though is the increasing level of hesitancy for these vaccines due to several identified and unidentified factors. Different classification and levels such as meso-level and micro-level (Schmid, Rauber, Betsch, Lidolt & Denker 2017) have been given to these factors to better understand them. Similar apathy for COVID-19 vaccine has been voiced out by notable individuals and groups around the world, chief among them are immigrants from low-

income countries living in the high-income countries of Europe and America as well as other people living in the low-income countries.

This study is an effort at getting the views of these category of persons with emphasis on COVID-19 vaccines acceptance and rejection with the intention to develop a workable solution to COVID-19 vaccine hesitancy.

2 Background

Understanding the historical development, challenges and successes associated with vaccines and vaccination is a key to managing apathies, rejections and hesitancy that currently affect the effective deployment of vaccines and biologicals in prevention of viral diseases and the control of spreading pandemics especially COVID-19.

2.1 History of Vaccine and Vaccination

It is believed that before the 20th century, infectious diseases were the major cause of population depletion especially in children and young adults 20 years and younger. Some of these diseases include but not limited to measles, polio, rubella, chicken pox, typhoid, influenza, mumps, scarlet fever, cholera, dysentery, whooping cough among others. Many prominent persons including presidents and head of states were reported to have been infected one time or the other in their early childhood. Some early intervention or management strategies used those days include the use of the iron lungs in polio cases (Haelle 2018.) According to Kayser and Ramzan (2021), vaccine development and history is filled with important scientific lessons which led to future insight in prophylactic vaccine and subsequently the current novel vaccine platforms that produces mRNA vaccines like COVID-19 vaccine.

Through the concept of germ theory (Haelle 2018), the early scientists and doctors discovered that diseases can be transmitted through the air by sharing breathing space, contact through fluids from an infected person to a healthy person. It was also discovered that those who recovered from certain diseases and infections were never reinfected, a phenomenon which was later identified as immunity (Haelle 2018). Following this discovery according to Haelle (2018), doctors in India, Africa and China were able to develop preventive care in a process called variolation. Having laid the foundation through the process of variolation, previously dreaded infectious diseases like polio is nearly eradicated while diseases like smallpox are completely eradicated (Kayser and Ramzan 2021; Barakat 2021). According to (Bandyopadhyay, Garon, Seib, & Orenstein 2015), using live attenuated oral polio vaccine

(OPV) and inactivated polio vaccine (IPV), the world has today effective tools in eradicating polio. Similarly, other live and attenuated vaccines have been effectively deployed in the prevention and control of other infectious diseases through immunization. Through painstaking efforts and with passing time and experience, government intervention was introduced. As noted in Conis (2019), diseases like measles became a target of federally supported eradication-through vaccination campaign and this has formed the basis of epidemiological challenges of the modern vaccination era.

2.2 Hesitancy through ages

Vaccine hesitancy is believed to be as old as vaccine and vaccination itself and has been attributed to several factors. Vaccines or immunization hesitancy is considered by the WHO as one of the top ten threat to global health and this has been a persistent threat over the years affecting both high-, middle- and low-income populations globally (Bendau et al. 2021; Alsubaie et al. 2019.) The consequence of immunization hesitancy is believed to be grave and seriously demanding attention and interventions aimed at curbing it completely for a better global health. Immunization hesitancy has been found to be driven by several factors including lack of or misleading information on the content of vaccines as well as possible risks associated with it. Other factors are lack of confidence on either the source of the vaccine or the healthcare personnel responsible for it. Complacency arising from ignorance and inconveniences associated with availability and/or cost of vaccines are other important factors (Alsubaie et al. 2019; Bendau et al. 2021; Larsson, Jarrett, Eckersberger, Smith, & Paterson 2014.) Similarly, cultural, and religious beliefs as well as other behavioral tendencies affect the acceptance level of vaccines in a complex situation usually determined by the type of vaccine, the geographical location, and the time in question (Bendau et al. 2021; MacDonald 2015). Interesting definition is the one offered that “vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence” (MacDonald 2015.)

Previously, vaccine hesitancy was believed to be common in the low-income countries, but recent finding indicate that the trend has also grown in the developed world. As noted by Dube et al. (2014) vaccine hesitancy has also increased significantly in the developed world in recent years with growing number of people perceiving vaccines to be unsafe. Specifically, there has been a significant number of people as shown in recently conducted research and surveys, that are seriously opposed to COVID-19 vaccination. Bendau et al. (2021) reported that up to 5.2% and another 6% of German population are either unwilling or absolutely unwilling to receive COVID-19 vaccines while Dube et al. (2014) believes that between 5-10% of people have strong anti-vaccination convictions globally.

2.3 Interventions for immunization hesitancy

There are several identified programmes for tackling immunization hesitancy globally with some being more effective than others. Vaccine hesitancy is an emerging phenomenon with tools needed to effectively deal with it still at developmental stages with only very few intervention programmes effectively reducing vaccine hesitancy in specific population (Eskola, Duclos, Schuster & MacDonald 2015). Among the WHO intervention programmes identified for tackling immunization hesitancy are Application of social marketing to address immunization and vaccine hesitancy, tailoring immunization programs (TIP), Health communication and dialogue-based intervention, Vaccination requirement/mandate strategy and non-financial incentives strategy (Butler & MacDonald 2015; Jarrett, Wilson, O'Leary, Eckersberger & Larson 2015.)

2.3.1 Health communication strategy

Communication forms the basis of societal or population relationships. Accordingly, there is no alternative to effective health communication when tackling resistance arising from deep rooted socio-cultural beliefs including religious, political and gender-based biases. Evidence abounds that suggest that effective health communication help change perspective and help people adapt positive attitude not just to vaccine acceptance but to other health related issues (Goldstein, MacDonald & Guirguis 2015.) Some school of thought believe that in properly communicating the gains as well as the possible side effects of vaccines, the hesitant groups can be persuaded to change their stance. The description given by (Schiavo, May Leung, & Brown 2014) that health communication is a multifaceted and multidisciplinary field and is concerned with reaching different people, groups, and populations with the intention to engage, exchange health ideas and influence both the policy makers as well as the healthcare professional and patients/client alike is one of such school of thought. All this is to adopt and sustain a positive health and social behaviour that ultimately promote public health for the entire population. It is an established fact that poor communication is a major determinant of vaccine hesitancy (Goldstein et al. 2015; Butler and MacDonald 2015) such that excellent communication strategies through mass media, direct contact communication and currently, through social media can and is an effective way of tackling immunization hesitancy.

Some effective communication media were identified in Jarrett et al. (2015) where dialogue-based interventions were discussed. For instance, the effective and increased acceptance of the polio vaccine arising from dialogue with religious and traditional leaders in the affected communities especially in sub-Saharan Africa. Social mobilization of parents in Pakistan and Nigeria led directly to increased acceptance and reduced hesitancy for measles and polio

vaccine respectively (Jarrett et al. 2015.) Others are increased acceptance of EPI vaccines because of communication tool-based training for healthcare workers. Social media and mass media efforts targeted at the right audience also positively affected immunization hesitancy.

2.3.2 Tailoring immunization programmes

The TIP is “a theory and evidence based behavioral insight framework designed by the WHO/EU vaccine preventable disease and Immunization programme (VPI) to provide proven methods and tools that can help national immunization programs design targeted strategies that lead to increased uptake of infant and child vaccination, thereby increasing the immunization coverage rates and curbing the risks of vaccine preventable diseases in the region” (Butler & MacDonald 2015). This tool can be considered an effective one for tackling vaccination hesitancy following its successful application in select EU countries including Sweden, UK, and Belgium. The well-organized structure of TIP including the identification and prioritization of vaccine hesitant subgroups, the diagnoses of possible supply barriers and finally the application of evidence based and an informed response to the population’s hesitancy makes it an effective tool. Considering that this intervention strategy seeks to identify the root cause of hesitancy in each population through an in-depth study of behavioral patterns of the people and using the feedback from the population to design appropriate responses, claims can be laid of it as one of the top and functional strategy for improving vaccine acceptance and decreasing hesitancy. Emphasis must be made though, that the tool is not fail proof considering the complexity of the population behavioral pattern and the constantly changing trends. “From acknowledging this basic principle, it becomes evident that regular updating and dissemination of best practices and lessons learnt should be facilitated. This includes regular synthesis, review and sharing of best practices for vaccine hesitancy monitoring, intervention, and prevention, as well as promoting training and making research findings available globally and regionally” (Eskola et al. 2015). In other words, constant update of the TIP tool is essential for its continuous relevance as a strategy effective against immunization hesitancy.

2.3.3 Application of social marketing

Social marketing of vaccine brands has been identified as one of the strategies and consequently a program employable in the tackling of immunization hesitancy. Social marketing as defined, “takes commercial marketing principles and applies them to influence target audience behaviors that will benefit the individual and society, that is, its primary goal is public good. Social marketing thus provides a potentially helpful lens when examining

immunization program issues such as hesitancy” (Nowak, Gellin, MacDonald & Butler 2015.) In social marketing as an intervention strategy, efforts are geared towards brand positioning such that the target population is prompted to think about the value of immunization in a different way. The benefits and positive attributes of the vaccine brand is presented from the perspective of the patients or their wards by going beyond background characteristics but further tailoring the vaccines to suit the yearnings of the target population (Nowak et al. 2015.) Attention is paid to the vaccine/vaccination specific issues and in answering the silent questions of the population, vaccine brands are tailored in a most acceptable way. Some of the questions which when promptly answered in branding vaccines and vaccination programs include, the risk and benefit: understanding the level of belief of the patient in the safety of the vaccine and providing them with all the answers about what they want to know. In Larsson et al. (2015), basic questions like understanding the first thing the clients want to know, how they would prefer the vaccine (oral or injectable), how accessible the vaccines would be, the cost and how confidently they believe in the capabilities or competence of the healthcare professionals are some of the branding traits that determines how much the population accept or reject vaccines or vaccination programmes.

Evidence suggest that social marketing strategies has been effective in shoring up the acceptance of vaccines. According to WHO SAGE group conclusions as reported, “marketing and communication practices along with social marketing frameworks and principles likely have much utility when it comes to addressing vaccine hesitancy” (Nowak et al. 2015). This forms a strong basis to add that social marketing is one of the effective strategies for tackling immunization hesitancy.

2.3.4 Vaccination requirement and Mandate strategy

The strategy of vaccination requirement or compulsory mandate are usually applied by governments or authorities in special situations especially in pandemics or infectious disease outbreaks to control spread of the disease or infection. Most of the time, these come as government-imposed rules and restrictions including the mandatory acceptance of immunization as a prerequisite to either work or interact with others in a social setting or gatherings. These are usually considered by most vaccine hesitant group or population as harsh or unfriendly but seen by the imposing authority as necessary for public safety (Jarrett et al. 2015.) Mandated vaccination or sanction against non-vaccination is one of the successful intervention programmes against immunization hesitancy. Commonly, this strategy is also seen in healthcare workplaces and have encouraged the acceptance of influenza vaccines by nurses and other healthcare workers. “Vaccination requirements were most strongly associated with vaccination for both seasonal and pandemic influenza. We found that

employer requirements backed by penalties were more strongly associated with vaccination than requirements without penalties” (Jarrett et al. 2015.) Most recently, this strategy has been used as an effective tool for combating COVID-19 vaccine hesitancy in Finland and other parts of EU and the world generally.

High level of opposition is usually associated with this strategy considering its direct conflict with individual human rights and the liberty to choose or refuse care. Of special concern also is the possibility of manipulation of vaccination records especially in the low-income countries due to “forced” or mandatory vaccination. Individuals who are opposed to vaccination but who desperately need access to social services and other services restricted to vaccine mandate, can make attempts at bypassing the vaccination and obtaining the required certificates through fraudulent means, an action which can significantly sabotage the mass immunization effort and endanger global health.

2.3.5 Non-Financial incentive strategy

Provision of incentive materials has been seen in some population as an effective strategy to encourage immunization acceptance. According to Jarrett et al. (2015), there are evidence in India as in other low-income countries, which indicate that the provision of basic incentives like food, drinks, clothing among others have motivated parents in low-income cadre to present themselves or their children for vaccination. The effect of this strategy is believed to be moderate. It is believed that in the low-income countries, people who live below the poverty line and who desperately need basic life necessities can accept incentives as a motivation to receive vaccination or get immunization for their children. Incentives as a strategy usually work in conjunction with other effective strategies especially community engagement. Community engagement strategy involves networking with community active groups and clubs as well as other groups who could negotiate and deliver incentives to the local population where necessary (Qamar et al. 2020).

2.4 Immigrant population in Finland

According to the Statistical Finland data, the demographics in Finland has greatly changed because of constant migration of people from and to Finland. It is estimated that the immigrant population in Finland has risen to as much as 400,000 people in 2019 and has continued to grow over the years. Significant number of the immigrants as contained in the Finnish statistical data and records are from the Soviet Union including Russia and Estonia, others are majorly from the middle East and Africa including majority from Syria and Somalia.

Other Sub-Saharan African countries including Nigeria, Kenya among others have a considerable number of their population in Finland (Interior 2018; Working Group for Cultural Policy 2021.) The preliminary data found at the Statistics Finland (2024) by the end of April 2024 shows a population of 5,613,972 with significant number of them being immigrant population or those with immigrant background born in Finland. The data shows a progressive increase in the number of foreign citizens in Finland from 1991 to 2024. Data shows that most of the immigrants living in Finland are concentrated at the larger cities with about one quarter of foreigners living in the greater Helsinki area and about half of them living in the Helsinki Metropolitan areas including Helsinki, Espoo, and Vantaa. Most of the immigrant population are young and working-age women and men in a relatively balanced manner. There are also a great number of youths and children mostly born in Finland to immigrant parents. As a matter of fact, it is believed that in the nearest future, people with foreign background will increase rapidly in Finland due to rapid immigration of people to the country and due to increased birth of children with foreign background (Working Group for Cultural Policy 2021.)

In the figure is the population growth structure as contained in the data of statistics Finland.

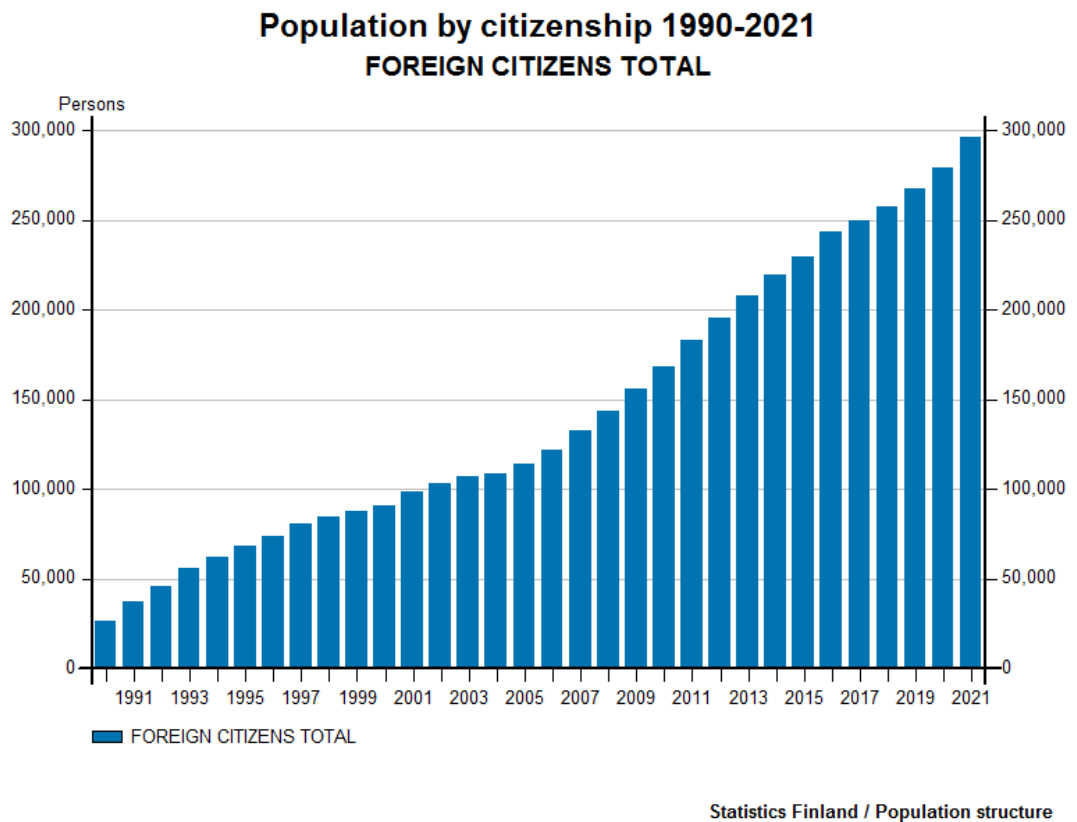
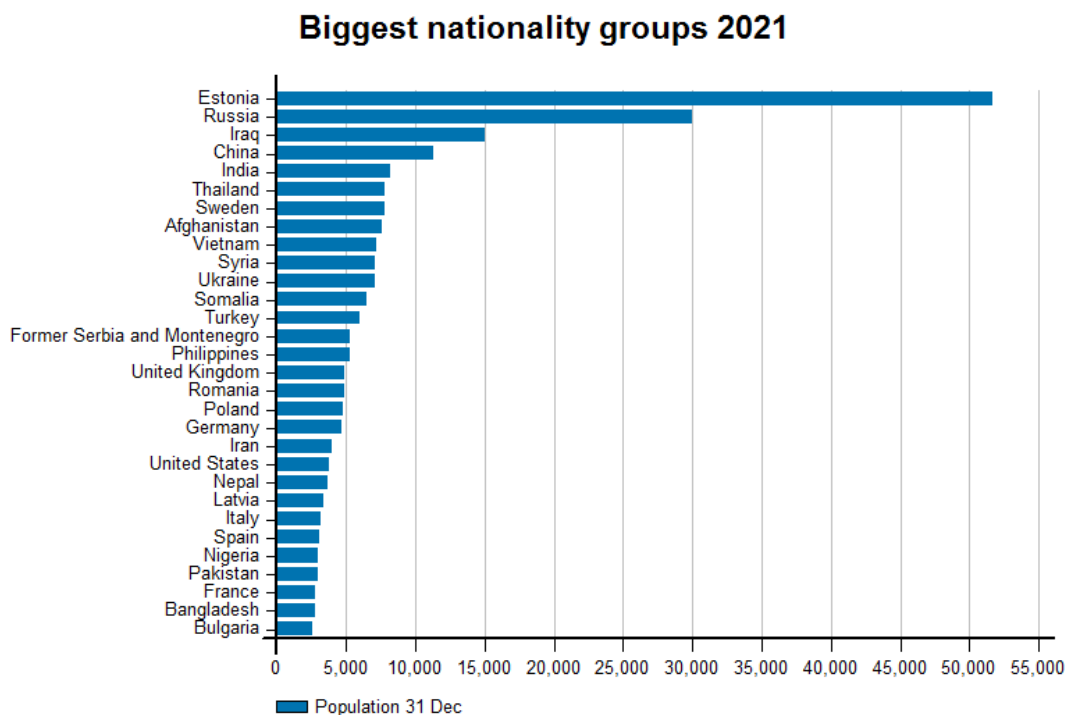


Figure 1: Immigrant population by citizenship

(Statistics Finland 2024)

2.4.1 Sub-Saharan African immigrants

There are several immigrants of the African origin living in Finland and the number of this group of immigrants have grown progressively as other immigrant nationals in Finland. According to the report of the Finnish ministry of Education and Culture (2021), Somalis and other English speakers constitute about 20,000 people each while Arabic speakers numbered about 30,000 for that year. It must be noted that most Sub-Saharan Africans and other Africans of the Middle East extraction reports English, French as well as Arabic as their languages (Statistics Finland 2021). These class of immigrants who have migrated to Europe and specifically to Finland have migrated as either students on student permits, refugees and asylum seekers or as economic migrants. In other words, different factors contributed to the movement of these people from Africa and the middle east to Finland. Among the most significant African nationalities according to the Statistics Finland (2021) records are Somalis and Nigeria and below is a figure 2 depicting the biggest immigrant nationality groups for 2021.



Statistics Finland / Population structure

Figure 2: Immigrant nationality groups

(Statistics Finland 2024)

It is important to note that the educational background of the immigrant population is an important and integral part of them that influences their integration and cultural adaptation to the Finnish society. In the UTH survey and register of completed educational degrees, a significant number of the immigrant population are found to be moderately educated. Up to 40% of the immigrant population are believed to be educated up to the tertiary level, 42% up to the upper secondary school level and the status of about 17% is unknown due to lack of registered information (Statistics Finland 2022.) Other interesting statistical information from Statistics Finland includes the record of population by the spoken or reported languages as shown in figure 3.

2.4.2 Other immigrants

As shown in figure 2 above, Estonia, Russia, Iraq, and China are the top 4 most significant immigrant population in Finland as of 31st December 2021. Other top nationalities that made the top 30 includes India, Afghanistan, Syria among others. These classes of immigrants have moved mostly for reasons of family reunion, work, refugee and asylum seeking due to devastating effect of war in their home countries. Others have moved for studies and for other undefined reasons.

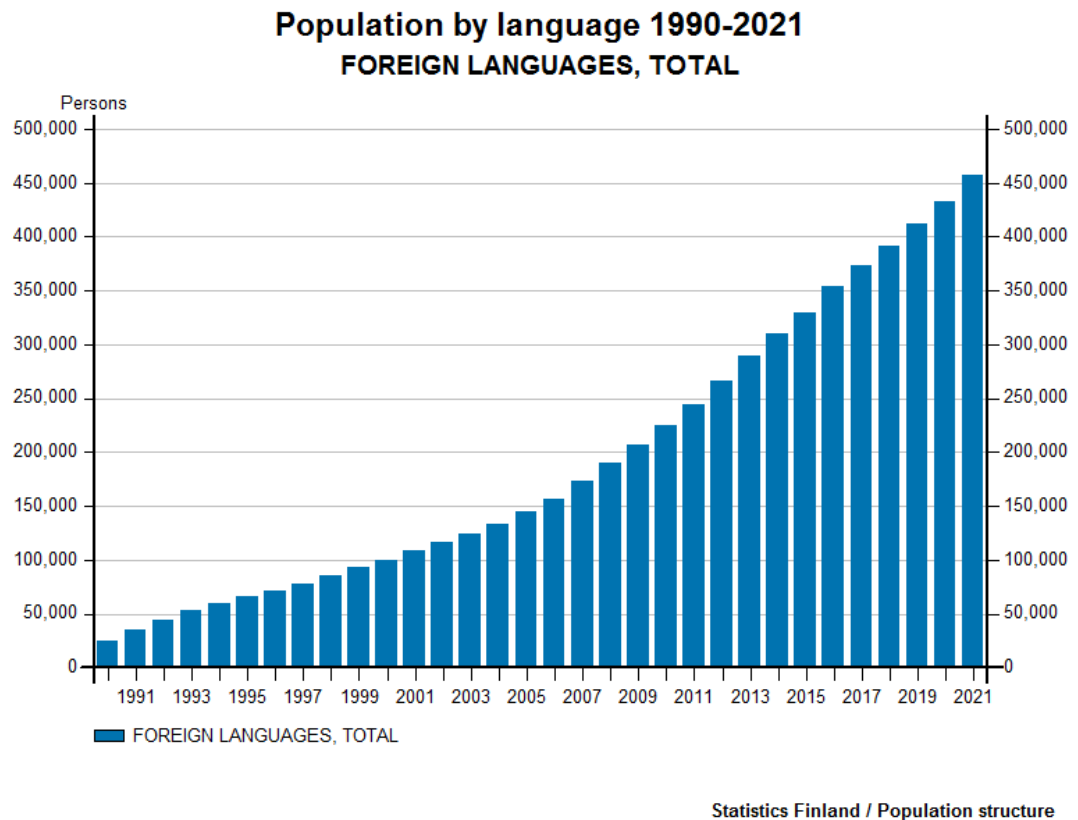


Figure 3: Immigrant population by language

(Statistics Finland 2024)

3 Aims and Objectives

The aim of the study is to enhance the acceptance of COVID-19 vaccine and other vaccines among immigrant populations in Finland and in low-income countries.

Objectives of the study includes:

- To find out the target group ideas of factors responsible for COVID-19 vaccine hesitancy.
- To find the target group-based ideas and solutions to COVID-19 and other vaccine hesitancy.
- To recommend a vaccine hesitancy intervention and future health campaign framework tailored in the participants' ideas and solutions.

The result of the study is a guide to developing a global healthcare window workspace that increases the acceptance of COVID-19 vaccine.

4 Study method

The study used a qualitative method, specifically interviews. To properly appreciate and understand the deep-rooted cause of immunization hesitancy, the study extracted responses from the participants through qualitative interviews that are in-depth and detailed enough. The study intends to identify the list of deep rooted and intricate factors affecting vaccine acceptance and rejection through interviews with a small group of select informants. These key informants were selected from within the larger target study group and include those who are knowledgeable and willing to participate in the interviews. Specifically, a focused interview was used to learn the views and experiences of members of the target population as it relates to vaccinations generally and COVID-19 vaccination specifically.

4.1 Qualitative study method

Qualitative study is considered by many scholars to be methodological, in-depth and is seen as an approach that seeks to understand the complexities of human behaviour. According to (Pathak, Jena & Kalra 2013), qualitative method is used to understand peoples' beliefs, experiences, attitude, behaviour, and interactions. Qualitative method is unique in its plurality and when properly applied is effective in addressing research questions in a multiple context. The method is flexible and diverse in both data collection and analysis and is a valuable tool in examining myriad phenomena (Köhler, Smith & Bhakoo 2022.)

Qualitative research, unlike the quantitative method focuses on detailed exploration in both data collection and interpretation. As highlighted in (Holloway and Wheeler 2009), "the use of qualitative study method can reveal patients' perspective and provide valuable insights for improving patient care". The effectiveness of the qualitative study method in studies like this is further strengthened in the relativeness of the research questions to the intentions of the researcher to allow flexible and unhindered responses from the respondents. According to Denny and Weckesser (2022), "the main method in qualitative studies involves interviews and focus groups with purposive and strategic recruitment of participants, with the aim of achieving a sample that is relevant to the research questions". This aptly describes the method and the approach used in the study.

4.2 Setting of the study

PICO model which is an adapted framework used in both qualitative and quantitative studies represent the study population, the intervention meant for the population, comparison and outcome. Though with limitations, (Frandsen, Bruun Nielsen, Lindhardt, & Eriksen 2020) believes that PICO is an effective theoretical framework that enhances drafting of research questions in a focused and precise manner and is recommended for structuring searches in qualitative studies. Similarly, (Eriksen and Frandsen 2018) acknowledged the limitation of

PICO model but emphasized on its vital role in conceptualizing model in evidence-based medicine (EBM). Using the PICO model as an effective tool, the study setting is as follows,

Table 1: PICO model for hesitancy prevention

Population	Adult (18 years and above) African immigrants living in the Helsinki region
Intervention	COVID-19 vaccine acceptance campaign program tailored in the participants ways and ideas
Comparison	Collect data related to their preferences in information dissemination
Outcome	Participation of the target group in the co-creation of culturally specific information media specified for their population

4.3 Data collection

Data were collected for the study in a structured and result-oriented manner. Semi-structured interviews with open-ended questions were used to collect data from the key informants. The choice of open-ended questions was to encourage the participants to freely express their opinion and prevent any possible limitations that could alter their responses. According to Cresswell (2023), “using open ended questions enhances the revelation of unforeseen insights which in turn increases the understanding of the study topic through the emergence of themes”. By allowing respondents to freely express their views in open ended questionnaires, and the possibility to elaborate further, the complexity of their perspective is captured which adds to the quality and reliability of the collected data, this according to Patton (2015) is a richer and more detailed way of collecting data when compared to closed ended question type.

Two categories of participants were interviewed, and these include (a) informants who are members of the target group, are healthcare professionals or may have participated in vaccination programmes intended to curb the spread of COVID-19 in Finland. (b) Informants who are members of the target group, who are not healthcare professionals but to whom the vaccines were made available.

The study recruited the participants in the two categories above mostly through purposive sampling and by seeking recommendations from other participants and professionals and finally using networking and snowball sampling to get more informants. Though with the possibility of the researcher's bias in the selection of participants, the purposive sampling method is considered ideal for the study due to the specificity of the target population and it allows researchers to gain insights from information rich cases that can provide in-depth understanding of the subject under study (Cresswell 2023; Patton 2015.) The study recruited participants in an open and most transparent way using the methods highlighted above. The recruitment targeted common convergent points and other public spaces where the study population are readily available, examples include shopping malls and African shops in the Helsinki region, train stations, churches, and event centers. Others include workstations and any other recommended places.

Firstly, participants were randomly selected and gradually accepted or eliminated based on key factors. The key factors include 1. Willingness and availability to participate in the study, 2. Meeting the recruitment criteria as mentioned above. Selected participants were further streamlined to belong to either the (a) or (b) categories as highlighted earlier. Eleven (11) participants were selected, five (5) belonging to category A and six (6) belonging to category B. The participants rights and privileges were clearly stated, and their rights and choices respected accordingly. Participants were provided with information sheet with details of their rights and privileges and their consent sort for an obtained accordingly. The participants information sheet is attached as appendix 1.

Selected participants were interviewed in the safest and most conducive environment (Physically in a "Teams" recorded meeting) and especially taking into consideration their preferences. Microsoft Teams recording tools was used to record the interview and the data securely stored in the researcher's personal computer. Participants personal data were not collected nor used, instead, they were identified using codes (Respondent 1-11 labelled as R1 to R11) for the purpose of confidentiality. Below is a table of respondents.

Table 2: Table of respondents: N=11 (A: Healthcare related, B: Non-Healthcare related)

Code	Category	Number of words in transcript
R1	A	1055
R2	A	735
R3	B	962
R4	B	902
R5	A	940
R6	B	1138
R7	A	1123
R8	B	1627
R9	A	1084
R10	B	1159
R11	B	1058
Total number of words		11783

4.4 Data analysis

Thematic data analysis was applied. Data were prepared through coding and organization followed by categorization and labelling. Themes and patterns in the interview data were identified and interpreted following the thematic analysis guide provided in (Terry and Hayfield 2021). The reflexive thematic analysis method was applied, considering that the respondents are not native English speakers and may have produced complex transcripts needing thorough insights and critical reflection. There was a high level of critical thinking applied with much effort applied while maintaining balance between flexibility and systemic analysis.

Using the thematic analysis system, the result of the study was systematically developed from detailed and extensive analysis of the interview data. Responses from the respondents were thoroughly examined and codes representing their thoughts and ideas extracted. The codes

were subsequently developed into themes which are reflections of the respondents' answers to the three research questions raised in the study.

The data analysis steps taken in accordance with Terry and Hayfield (2021) are as follows: Thorough reading and proofreading of the transcripts to familiarize with the contents, with the intention to extract the actual meaning and intentions of the respondents. Note that parts of the transcripts contain broken English needing proper familiarization to be able to deduce their actual meaning. Initial codes were thereafter generated that represent the most important and critical aspect of the data. Then a pattern of themes was generated by grouping the initial codes, which were then reviewed against the data and further refined, as necessary. The themes were then named with each of them clearly defined and the scope determined. Finally, a comprehensive and organized report of the data was created which represents the true content of the transcript and the intentions of the respondents. Find attachment of extract of respondents quotes in appendix 4.

4.5 Reliability, validity and credibility of the qualitative study

The need for trustworthiness in qualitative research cannot be overemphasized. (Nowell, Norris, White & Moules 2017) proposed strategies for ensuring trustworthy research and these include credibility, transferability, dependability, and confirmability. "To be accepted as trustworthy, qualitative researchers must demonstrate that data analysis has been conducted in a precise, consistent, and exhaustive manner through recording, systematizing, and disclosing the methods of analysis with enough detail to enable the reader to determine whether the process is credible" (Nowell et al. 2017). To ensure high quality research and to produce a trustworthy finding that are reliable, valid, and credible, the following were applied:

On Reliability: Triangulation of data by using multiple sources and by properly cross-checking all information. The author ensured consistency in data coding through multiple and independent analysis of same data.

Validity and transferability: The research method used effectively measured the intended variables (Face validity), the data collection methods and analytical tools and methods were comprehensive enough to properly capture the research questions and the study objectives (content validity) and finally, there were genuine effort to align the study findings with relevant established theories and theoretical framework.

Credibility: The study used code-recode strategy to establish the dependability and reliability of the research procedures with the methods verifiable. Similarly, to confirm the reliability of

the study, the opponent to the study, the supervisor or other relevant or interested participants in the study were allowed unhindered access to the research procedures and can review the findings and interpretations of the findings. Their perspective was accommodated as required. Peer reviews is also very much allowed, and other research scholars, fellow student and teachers will be encouraged to criticize the research procedure and the findings and to make recommendations where appropriate. Finally, detailed information about the study plan, the setting, data collection and data analysis are readily available to enable other researchers or interested parties to make informed decisions about the study.

4.6 Research Integrity and ethical considerations

Based on the tenets of the Finnish ethical principle of research with human participants as captured in the Finnish national board on research integrity (TENK guideline 2019), the study avoided every ethical conflict and operated based on allowable rules and regulation. The study does not need any special ethical board approvals having followed the ethical guidelines as contained in (TENK 2019). Since the research is not funded by any authority, every possible conflict of interest was eliminated. Furthermore, no minors nor people with limited capacity were involved in the study.

In preserving the integrity of this study and in maintaining the ethical standard required of study of this nature, all the required ethical documentations were sort for, and all required approvals obtained before the study commenced. Attached in Appendixes 1 and 2 respectively are participants' information sheet and data management plan. The author undertook to obtain the informed consent, to maintain data privacy and confidentiality, to properly manage data ownership. No part of the study was falsified, and the research data will be shared where necessary or relevant. Steps were taken to reference and acknowledge all materials and sources used in the study report and to report any identified misconduct. All conflict of interest if any were reported, and all the research findings presented truthfully. All contributors were properly credited and finally, the research data will be safely stored for a reasonable period.

5 Result

Results of the study are presented below, organized by the research questions. These were developed from set of respondents' answers to the three research questions raised in the study.

5.1 Factors responsible for COVID-19 vaccine hesitancy (Question 1)

- a. Risk of other infections and fear: The respondents expressed fear of other diseases and possible death mediated by COVID-19 vaccination as factors responsible for hesitancy. Some respondents believed that taking the vaccine might expose them to other infections or health risks including infertility.
- b. Distrust of the vaccine: Many respondents expressed a general distrust in the COVID-19 vaccine, stemming from various sources, including previous negative experiences with medical interventions. There was a prevalent fear regarding the potential side effects and unknown long-term impacts of the vaccine.
- c. Unknown sources: concerns were raised by some of the respondents about the origins and manufacturing processes of the vaccines, leading to skepticism about their safety and efficacy.
- d. Religious and cultural beliefs: Certain religious and cultural beliefs were reported to play a significant role in COVID-19 vaccine hesitancy, with some respondents viewing vaccination as contrary to their beliefs.
- e. Conspiracy theories: The spread of conspiracy theories about the vaccine and its effects contributed significantly to the hesitancy. This was reported by some of the respondents as a key factor that contributes to COVID-19 vaccine hesitancy.
- f. Ignorance: A lack of accurate information and understanding about the vaccine's benefits and safety was reported as a major barrier. Some of the respondents through their responses expressed some level of ignorance and lack of knowledge about the vaccine.

Below are some of the relevant quotes from the respondents representing the most identified factors.

R1: "I would say first of all, fear it was, uh, some of people were fearful. What if I take the vaccine and I'll end up dying? Or infected with other different diseases or things like that. And others may be religious issues, but OK, so the major one is fear and then the other factors could be religion." And maybe because the vaccine itself had not actually been fully tested for them to agree to be used and they were different brands"

R2: "Well, first, it's maybe because of their underlying health issues. Maybe when there is the religious values, some religions don't recognize it vaccines at all, and it's a preference, I guess. Well, it's what is the notion that people have about type. Vaccines are just thrown at people, especially COVID vaccine. It

was not much research job point before being administered to people, so it just came they came up with the vaccine and they started”

The analysis of the respondents’ answers highlighted the following primary themes as the major factors responsible for COVID-19 vaccine hesitancy among immigrants living in Finland

- Distrust of the vaccine arising from combination of multiple factors.
- Elevated level of ignorance complicated by both disinformation and misinformation.
- Religious and cultural beliefs that affect personal choices.
- Other miscellaneous factors affecting the acceptance of the COVID-19 vaccines.

5.2 Solution to COVID-19 vaccine hesitancy (Question 2)

To address these issues, respondents suggested several strategies to manage COVID-19 vaccine hesitancy among their population and these includes.

- a. Targeted education and awareness campaigns: Respondents identified increasing awareness and providing accurate information through targeted education campaigns as crucial steps towards curbing hesitancy.
- b. Use of familiar professionals for health campaigns: Employing familiar and trusted healthcare professionals to disseminate information and address concerns was recommended as an effective means of managing hesitancy by the respondents.
- c. Local production of vaccines: Some respondents believed that locally produced vaccines would be more trusted and accepted. Some respondents insisted on improved participation of indigenous stakeholders and localization of vaccine production.
- d. Campaigns against propaganda: There was a strong call from some of the respondents for campaigns to counteract misinformation and propaganda related to the vaccine.
- e. Community engagement: Engaging directly with communities to address their specific concerns and build trust was highlighted as an effective approach.

Some of the extracts of the respondents’ responses pointing at these suggestions are highlighted.

R5: “In my opinion, I think if they get more education about the vaccine, like if they get a lot of explanation, what it might cause and what it might not cause and all that if they get education about the Vaccine, I think most people might accept.”

R6: “I think people should be educated properly on the risks involved with the vaccine, the importance of the vaccine, and who were, you know, where the vaccine is coming from.”

R8: “More education for people would be the possible reason and also if there will be any vaccine, every country supposed to make their own research and bring their own vaccine than waiting for any other country to decide which vaccine to take and they are not to trust in any other country to bring the type of vaccine they should take.”

Analytical themes developed for question 2 are:

- Proper and targeted education of the population on the critical components of the vaccine and vaccination.
- Massive sensitization of the populace and campaign against propaganda using familiar and trusted professional members of their society.
- Improved vaccine research and clinical trials.
- Localization of vaccine production to increase confidence.

5.3 Implementation strategies (Question 3)

Regarding the implementation of these solutions, the study found that the following methods would be most effective:

- a. Physical visits to communities: Conducting in-person visits to communities to provide information and answer questions directly was suggested by most of the respondents
- b. One-on-One engagement: Respondents recommended personal engagement with individuals to build trust and address personal concerns.
- c. Use of regular media and social media: Leveraging both traditional media and social media platforms to reach a broader audience and disseminate accurate information was noted as an effective way of reaching the target population.

Some relevant direct quotes from respondents supporting the answers to question 3 are below.

R1: “I would say like trying to get them visiting them personally if possible. If you have enough time, because like with the age group, we go, the age group mostly of the time, because if they are older people, most of them cannot still look things in the Internet. Mostly the old listen to the radios and watch TV, but not everyone else. Those things, and like visit much mass congregation, especially churches or schools.”

R5: “So and talking to them you by talking to them, I mean sitting down with them. One on one is the other way. One can reach them to talk to them by showing them pictures or through the social media.”

The study through analysis developed themes found that a targeted campaign based on the ideas above can be delivered to the study population through:

- Social media
- Physically through outreach to communities, groups, and to individuals.
- Campaign to include posters, jingles, and sounds.

These findings underscore the importance of tailored communication strategies and community involvement in addressing vaccine hesitancy among immigrants in Finland. Appendixes 4 and 5 respectively contain select respondents’ direct quotes and the thematic development of the themes.

6 Discussion

The outcome of the study reflects deep-rooted convictions and belief of the African immigrant population living in Finland, and by implication, a representation of the feelers among the general population of Africans and other low-income countries on COVID-19 vaccine and other related vaccines. The study was designed to answer critical questions that would help in understanding the perspective of the target group and to take steps in developing evidence-based solutions based on the group's ideas and convictions. There were three key study questions aimed at achieving the goals of the study. The first question aimed to identify the key factors responsible for COVID-19 vaccine hesitancy among the target population while the second question seeks to find the solutions to the identified problems. The third question is an attempt to understand how best to implement the identified solutions.

6.1 Contributing factors

The study identified three key factors as being responsible for Covid-19 vaccine hesitancy among the immigrant population and these factors include distrust of the vaccine, elevated level of ignorance complicated by misinformation and lastly, religious, and cultural beliefs influencing personal choices.

6.1.1 Distrust of the vaccine

Distrust of the vaccines was identified as key component wielding so much effect on people's decision to reject the COVID-19 vaccines. The study observed that a combination of factors including rapid development and government approval of the vaccines without satisfactory clinical trials, potential side effects including infertility, uncertainty about the source of the vaccine, fear that the vaccine contains viruses that could cause diseases, fear of death and permanent disabilities among others, raised a high level of distrust and consequently overwhelming rejection of the vaccine. These factors were further exacerbated by lack of effective communication between the authorities, the pharmaceutical firms, and the local population. As noted in Freimuth et al. (2017) and in Larson et al. (2011), when there is lack of transparent communication, the level of distrust is elevated. Most of the respondents reported, as seen in the extracts of the interview transcript, factors that caused them to distrust the vaccine and most of them points to either ineffective communication or no communication at all. Findings of the study tends to agree with (Alsubaie et al. 2019 and Bendau et al. 2021), that lack of confidence on the source of the vaccine and the healthcare personnel responsible for vaccination are key factors that contribute to vaccine hesitancy. Though there are different reasons suggested by the respondents that causes them to distrust the vaccine, they all tend to share similar apprehension. Interestingly, these studies though conducted in different settings, the results show similarity in thought by both group of respondents. The study therefore is of the opinion that distrust as a factor causing hesitancy should be of utmost importance and every intervention effort should take practical steps to address it.

6.1.2 Elevated level of ignorance

Elevated levels of ignorance and misinformation was highlighted in the study as another key factor that drives COVID-19 vaccine hesitancy, and this was further complicated by barrage of disinformation, fake news and conspiracy theories that was promoted on the social media. In the works of (Alsubaie et al. 2019 and Bendau et al. 2021), lack of or misleading information on the content of the vaccine, complacency arising from ignorance among other factors were also chief in determining the acceptance of COVID-19 and other vaccines. This gives validity to the findings of the study that ignorance complicated by misinformation significantly effects COVID-19 vaccine acceptance. There were a lot of misconceptions about the origin of the virus and the intentions of the developers of the vaccines. Some of the respondents reported that they were the target of government plans to depopulate Africa through COVID-19 infection and vaccine induced sterility. As captured in the excerpts from the interview transcript in appendix 4, respondents believed that they were doing noble thing by rejecting

the so called “evil” plan of government and world leaders. Some of these narratives were also promoted by anti-vaccine groups who were mostly ignorant of the actual working of the vaccines, and this contributed immensely to public reluctance to accept the COVID-19 vaccine (Wilson & Wiysonge 2020). Many erroneously believed that the vaccine was unnecessary and that COVID-19 was the same as common flu and of no special relevance. Unfortunately, so many died of the complication of COVID-19 infection arising from these acts of ignorance.

6.1.3 Religious and cultural belief

Religious and deep-rooted cultural belief and values were identified as another principal factor causing COVID-19 vaccine hesitancy. These are beliefs and convictions that shape how people react to use of vaccines in prevention of diseases and infections. The study as illustrated in the excerpts from the transcript shows that personal choices of people with regards to accepting or rejecting the COVID-19 vaccine is influenced by their religion and their customs. The finding agrees with Griffith et al. (2021) and Dube et al. (2014) as well as Alsubaie et al. (2019), that cultural and religious values influence health behaviors. Some of the respondents believe in the power of divine healing and in the use of natural cure and as such, believe that vaccination is unnecessary. These route of cure especially the use of natural means can be argued to be effective against some class of diseases but there is doubt that they are effective against infectious and dreadful disease as COVID-19. There is not enough evidence to suggest that the unorthodox method is effective against the virus, hence those who rely on them may constitute actual global health threat when they refuse the vaccines.

6.2 Community based solutions to COVID-19 vaccine hesitancy

The study proposes interesting solutions to the vaccine hesitancy, and these are mostly solutions requiring action from both the policy makers as well as key stakeholders in healthcare services and delivery. Of the solutions identified, proper and targeted education, massive sensitization and campaign against propaganda, improve vaccine research and clinical trials as well as localization of vaccine production are the most prominent. The idea of community-based approach as identified in this study has earlier been suggested in Schiavo et al. (2014) as a central focus in dealing with epidemics and emerging diseases especially in low-income countries, hence, the findings of the study is supported by scientific evidence as effective ways of managing hesitancy.

6.2.1 Proper and targeted education

The need to educate the population on the critical components of the COVID-19 vaccine cannot be overemphasized. Understanding what constitute the vaccine, the mechanism of action in the body system and possible side effects and how to manage them, will no doubt improve the confidence of patients and clients who are offered the COVID-19 vaccine. For most people in the low-income countries with not high quality of formal education, there are always the tendency to doubt the reliability of foreign biologicals offered to them as healthcare solutions. People easily tend to consider them strange and some other times, as suspicious and dangerous. This is mostly because people in these climes are either used to other means of treating diseases or ailments and are not readily malleable to sudden changes in approach.

Education of these kind of population in a tailored manner specifically designed to answer their numerous queries, misconceptions and fears using evidence-based information is a sure way to increase confidence and therefore boost vaccine acceptance. In the World Health Organization's recommendation on vaccine communication strategies (WHO 2020), applying these steps is an acceptable approach to managing hesitancy. As opined in (MacDonald 2015; Goldstein et al. 2015; Jarrett et al. 2015), when communication is poor, there seems to be elevated level of distrust leading to vaccine rejection. All the studies agree with the findings of this study that through effective communication, the population can be properly educated to understand the workings of the vaccine which will in turn encourage acceptance. It was explicitly stated in Healy (2014) that educational interventions when combined with personal interaction functions becomes more successful. Targeted education, therefore, should pay attention to the language of the recipients, their cultures and values and must be ready to listen to their views about vaccine and vaccination. In sharing the ideas through an interactive education system, superior arguments and information about COVID-19 vaccine can be accepted by the target population.

6.2.2 Massive sensitization and anti-propaganda campaign

Just like in education as a strategy, mass sensitization creates the opportunity for the population to understand what is being offered to them and for what purpose. In implementing massive sensitization campaigns about COVID-19 vaccine, the authorities offer the population the opportunity to properly understand and appreciate the benefits of vaccination. Similarly, misleading information and disinformation are counteracted during sensitization campaigns. Studies have shown that in using trusted representative of the community, public attitude to vaccination is significantly improved (Betsch et al. 2015). Evidence suggests that dialogue-based intervention as captured in Jarrett et al. (2015)

promotes effective vaccine delivery and increases confidence and acceptance. Through dialogue with the target communities through their trusted representatives, vaccine hesitancy can be curbed. Traditional rulers and leaders, opinion leaders, religious leaders as well as trusted healthcare professionals are some of the effective representatives that can change the perception of vaccination through mass sensitization. Campaigns should be target specific when managing propagandas and disinformation. The resource persons must be able to offer the population evidence-based truth that can effectively counter the existing propaganda.

The need for effective communication cannot be over emphasized in this regard. Evidence abounds that suggest that in properly communicating, the populace is better informed, educated and hence, positively influenced. In Gupta et al. (2021) for instance, targeted communication strategies are seen as effective way of maximizing resources. Such is the understanding of the study, that effectively deploying the right resource persons including trained and trusted professionals, challenges of propaganda and misinformation can be tackled head-on. The views in MacDonald (2015) as well as Goldstein et al. (2015) are quite similar, which further strengthens the findings of the study.

6.2.3 Improved vaccine research and clinical trials

Most of the respondents attributed their fear of the vaccine to the vaccine's hurriedly preparation. It is believed that enough testing and clinical trials were not done, hence many considered the COVID-19 vaccine unsafe while others believed that it was not efficacious. There are those who believe that the vaccine is a laboratory preparation targeted at them. To effectively combat hesitancy, vaccine development and production must be seen to be transparent. Though one can argue, as was suggested by one of the respondents, that the COVID-19 vaccine development was hastened because the world was combating a pandemic, but then, for those school of thought that it was a targeted biological weapon, there needs to be overwhelming evidence to the contrary. Proper, timely and well-funded vaccine research and clinical trials is a key tool to providing the required evidence, visible in a more effective vaccine with low side effects, which in turn will further reduce hesitancy.

6.2.4 Localization of vaccine production

For those who fear the COVID-19 vaccine for the reason of its source, localization of the vaccine production could boost their confidence in the vaccine. As was opined by one of the respondents, "the COVID-19 vaccine is a weapon created by powerful people, if not, why are they not producing the vaccine in my country?" In other words, the respondent's belief in the vaccine was at the lowest level due to preconceived notion that the vaccine was designed

against him from a foreign country. The strategy of localizing vaccine production has not been properly studied on how it can improve vaccine acceptance. Though vaccine stock out has been identified as a cause of hesitancy (Dube et al. 2014), there has not been established evidence on how siting the vaccine production site would increase confidence. But relying on the respondent's suggestions and testimonies, it is right to argue that the confidence of locals could be increased if the COVID-19 vaccine is produced near them. More evidence though is required to firmly establish this, as such the study encourages more research into this proposed solution as a means of curtailing hesitancy. This is not an absolute claim, but the study believes that producing the vaccine in a familiar environment, under the supervision of local regulatory authorities will in no small measure increase the confidence of the local population and thus effectively combat vaccine hesitancy.

Globalization has made it easy to transmit and spread infectious diseases between borders and considering the growing population of immigrants especially in Finland as captured in Statistics Finland (2022), there is need to for the global health authorities to apply the solutions offered in this study for an improved COVID-19 vaccine acceptance among the African immigrants to the benefit of global health.

6.3 Limitation of the study

The author believes that the scope of the study was limited by the number of participants, this is considering the diverse diversity and size of sub-Saharan Africa. The number though is sufficient for the qualitative study method, but the author believes that involving more participants could possibly provide other views that were not captured in the study. More studies for the target group are therefore recommended, especially a mix study method that could possibly integrate the greater populations' views.

7 Conclusion

In addressing COVID-19 vaccine hesitancy among the immigrant population in Finland and in the low-income countries, a multifaceted approach is needed which must pay attention to the underlying factors identified in the study including distrust, ignorance as well as cultural and religious beliefs. Effort must be made by the authorities concerned to pay attention to the perspective of the target population.

The study believes that by implementing targeted education, sensitization campaigns, improved vaccine research and localized production of COVID-19 vaccine, the global health authorities and all the other healthcare stakeholders can effectively improve COVID-19 vaccine acceptance among the immigrant population in Finland and consequently deal with vaccine hesitancy and improve global health. The findings of the study have provided valuable

insights which will be applied in designing an effective intervention campaign for global health window.

8 Recommendation

The study therefore recommends that the relevant global health authorities in making future health campaign plans should act as follows:

- Develop targeted educational materials that can address the specific misconceptions and alleviate fear from the population. The educational materials should be tailored to different cultural demographics, and literacy levels in order to reach and significantly impact all the target population.
- There is need to strengthen community engagement and trust levels by involving community and religious leaders as a bridge to their people. Organization of dialogue forums and town hall meetings for one-on-one engagement with the people is key.
- Promote digital literacy to help improve the community's capacity to assess information and to distil credible information from numerous disinformation and propaganda.
- Improve vaccine accessibility through localization of vaccine production which in turn could offer the local population the platform to scrutinize vaccine making processes. This will increase transparency and boost confidence.
- Finally, more investment in vaccine research is necessary to allow for readiness in event of future pandemics.

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Appendix 1: Participant information sheet

Study title: Covid-19 Vaccine Hesitancy among Immigrants in Finland: Implication for Global Health

Invitation to participate in qualitative interview research study

We would like to invite You to take part in our research study, where we are COVID-19 vaccine acceptance and hesitancy among African immigrants' population living in Finland, to determine the factors related to the COVID-19 vaccine hesitancy and to proffer solutions to hesitancy. You are invited because you are an adult African immigrant and qualifies for this study. We aim to have a total of 10-12 persons invited for this study.

This information sheet describes the study and Your role in it. Before you decide, it is important that You understand why the research is being done and what it would involve for You. Please take time to read this information and discuss it with others if You wish. If there is anything that is not clear, or if You would like more information, please ask us. After that, we will ask You to orally consent to participate in the study. Your anonymous consent will be recorded as part of your interview during the Teams.

Voluntary nature of participation

Participation in this study is voluntary. You can withdraw from the study at any time without giving any reason and without there being any negative consequences. If You withdraw from the study, any data collected from You before the withdrawal can be included as part of the anonymous qualitative research data. No other data will be collected or combined with the interview data.

Purpose of the study

The purpose of the study is to develop a health campaign to be published in the Global Window open access platform to increase the COVID-19 vaccine acceptance among African immigrant populations in Finland. The objectives are: 1) to investigate the factors related to the COVID-19 vaccine hesitancy and the factors that facilitate the COVID-19 vaccine acceptance among African immigrants' population living in Helsinki region Finland, and 2) to find the population's ideas and solutions to COVID-19 vaccine hesitancy, and to develop a intervention framework tailored on the basis of the participants' ideas and solutions.

Who is organizing and funding the research?

This research is organized by Obiora Iyi, a Global Health and Crisis Management Master student in Laurea University of Applied Sciences, Vantaa Finland as a Master's Thesis.

What will the participation involve?

Your participation involves a short oral interview to be administered by the researcher during an anonymous Teams Meeting. Your experiences as an African immigrant living in Finland freely expressing views and opinion about the COVID-19 vaccines, its administration, and other relevant concerns is crucial for the success of this piece of research. The interview will last between 10-20 minutes and will be recorded and transcribed during the Teams Meeting by the Teams device. So, the access to the data is only for the researcher (OI). The Teams device server is in Europe, so no data will be moved outside the European Union. No personal or confidential data of yours will be collected or stored. Every collected data will be safely stored in the personal computer of the researcher (OI) with access code and password only for the researcher (OI). All the collected data will be deleted from the Teams server after all interviews have been completed by over writing and from the PC of the researcher after six months from the research report is published in the Theseus repository, in latest in January 2025. The interview will take place physically during Teams meeting, and you will be totally anonymous.

Possible benefits of taking part

The benefit of this study is to improve health and wellbeing of the global community and specifically the African immigrant population living in Finland. Also, the study may benefit the population of people living in low-income countries by having access to the Global Window platform. Personally, your knowledge of COVID-19 vaccine and vaccinations can be improved.

Possible disadvantages and risks of taking part

There are no known risks or disadvantages of participating in the study.

Financial information

Participation in this study will involve no cost to You. You will receive no payment for Your participation.

Informing about the research results

This study is a Master's Thesis of Obiora Iyi, and the study report will be published at the Theseus repository for thesis reports of Laurea University of Applied Science's students. Theseus is an open-access repository for all interested in seeking the report of this study by the researcher and Laurea University of Applied Science.

Termination of the study

The researcher conducting the study can terminate the study for force major reasons.

Further information

Further or more information related to the study can be requested from the researcher.

Contact details of the researcher

Researcher

Name: Obiora Iyi

Tel. number: [REDACTED]

Email: Obiora.iyi@student.laurea.fi

Supervisor of the thesis study

Name: Teija-Kaisa Aholaakko

Laurea University of Applied Sciences,

Tel. number: [REDACTED]

Email: teija-kaisa.aholaakko@laurea.fi

Appendix 2: Data management plan

In this piece of research, no personal data will be collected or processed, so data collected will not be used for automated decision-making either.

The qualitative data collection will be completed anonymously. As a participant, you gained the invitation to participate in the study via a hard copy flyer delivered by the researcher. No signed informed consent document will be collected from you, but the information enabling your voluntary participation in this study will be read for you at the beginning of the interview. In addition to that, before the interview starts, you will be guided not to deliver any personal or sensitive information including names, addresses, dates or places of birth, or names of organizations during the interview.

All information collected from you will be handled confidentially and according to the EU General Data Protection Regulations. The anonymous qualitative interview will be analyzed, and the results will be reported in a coded, aggregate form. Because no personal data of the participants will be collected, no registry of research participants will be established, or stored. After two years, in June 2026, the both the digital and hard copy anonymized qualitative interview data will be destroyed by permanently deleting stored files and physically incinerating papers by the thesis researcher Obiora Iyi.

The collected data will be used only for this intended piece of research study.

Researcher

Name: Obiora Iyi

Tel. number: [REDACTED]

Email: Obiora.iyi@student.laurea.fi

Supervisor of the thesis study

Name: Teija-Kaisa Aholaakko

Laurea University of Applied Sciences,

Tel. number: [REDACTED]

Email: teija-kaisa.aholaakko@laurea.fi

The original copy of this Participant Information document has been given to the participant when recruited by the researcher (OI) together with the information on Teams Meeting.

Interview date: To be agreed with each participant separately.

Teams link: The researcher shall open a Teams meeting and record the interview in real time.

Appendix 3: Semi-structured interview questions for the study

- What influenced your acceptance or rejection of the COVID 19 vaccine?
- What in your opinion are the major reason(s) or factors why people in your community would reject the COVID vaccine or any other vaccines?
- What other factors do you think can influence people's hesitancy to vaccines.
- What do you think can be done generally to improve COVID vaccine acceptance in your community?
- If you are offered the opportunity, how would you influence people in your community to accept the vaccine or how would you influence people to accept your ideas on vaccination?
- What are your other expectations, ideas, and solutions which you think if applied, can change your community's perception?

Appendix 4: Selected respondent's direct quote from the transcript

Question 1 on factors responsible for COVID-19 hesitancy.

R3: "I believe in in COVID-19 it's same like normal flu and it's not so big deal to take for vaccine. So always my mom says when the time has come for COVID-19 that everyone is scared and then my mom told me and we get sick for COVID-19 also we know that some people they die, but we can eat like natural and that's all it lemon"- a broken English expression of the family's choice of natural remedy.

R4: "Just because of, you know, the advocacy in it's like there is corona in it." Expressing fear that there were actual viruses in the vaccine.

R5: "Thinking of the they had that they want to conceive later on, but they it brings fertility problem. They thought the vaccine might bring uh, some other diseases. Like it will cause them blood clotting, it might cause them later on blood clotting. So that's why they didn't want to take."

R7: "There was so many news from the social media, from television, from newspapers that people are dying from the vaccines, people are having physical disabilities. And this kind of frightened people, and the vaccine was made like real quick after the pandemic. Now vaccine is usually something that they take time. They research they do a study, they do clinical trials, but this one was like really on a speed."

R8: "Is that the thing was created in the lab in The Wuhan in China and the American Government and the so many people that is involved in the creating the COVID themself to use it to make money from the people and the during the time of Bill gate when he was talking something about what is going to do in the future to reduce the population of people"

Question 2: On solutions to hesitancy

R1: "For me, I would say things like education and creating awareness could help, because if people can be educated and to be told why the vaccine has to be taken, how it helps, OK?"

Because if they have enough education and reasons why they can, they have to take the vaccine, it can really help so much”

R2: “Well, creating awareness, a lot of awareness everywhere about the vaccines and then doing more clinical researchers before administering or before bringing out the vaccine and approving it. Well, the vaccine they could have done more clinical researchers before giving it out to people, because now you hear people saying if they hear somebody died, they say it's because of he got he or she got COVID-19 vaccine”

Question 3:

R1: “I would say like trying to get them visiting them personally if possible. If you have enough time, because like with the age group, we go, the age group mostly of the time, because if they are older people, most of them cannot still look things in the Internet. Mostly the old listen to the radios and watch TV, but not everyone else. Those things, and like visit much mass congregation, especially churches or schools.”

R2: “I want to say by word of mouth and then of course giving the concrete examples or reasons as to why they should take it, and then maybe through WhatsApp, Texts and messages and Facebook on social media in general, but not for me”

R5: “So and talking to them you by talking to them, I mean sitting down with them. One on one is the other way. One can reach them to talk to them by showing them pictures or through the social media.”

R7: People in Africa is basically the Community health workers. But here in Finland it the social media”

Appendix 5: Systematically developed answers to the research questions

Table 3: Respondent's answers

Respondents	Question 1	Question 2	Question 3
R1	<p>Vaccine not fully tested.</p> <p>Do not believe that vaccine worked.</p> <p>Multiple vaccine types causing confusion.</p> <p>Fear of dying from the vaccine or getting infected with other diseases.</p> <p>Religious issues/belief.</p>	<p>Education and awareness</p>	<p>Personal visit to the people to educate.</p> <p>Use of radio and television.</p> <p>Use of mass congregation in churches, schools and community gatherings.</p> <p>Online or internet campaign for younger generation.</p>
R2	<p>underlying health issues</p> <p>Religious values</p> <p>Personal preferences.</p> <p>Vaccine was thrown at people without much research/testing.</p>	<p>Creating awareness</p> <p>Doing more clinical research before administering vaccines.</p> <p>Presenting concrete evidence to people.</p>	<p>By word of mouth.</p> <p>Text and messages on Facebook and other social media handles.</p>
R3	<p>Was already infected, hence no need to take the vaccine.</p> <p>Belief that COVID-19 is same as common flu, hence not a big deal and vaccine not necessary.</p> <p>Belief in natural remedy.</p> <p>Fear that the vaccine could cause the actual infection which can kill.</p>	<p>Offered none. Strongly believes that vaccination is not necessary.</p>	<p>Face to face visit, though does not believe it will change their attitude.</p>

R4	<p>Fear that vaccines contain virus.</p> <p>Lack of trust.</p> <p>Personal preferences.</p> <p>Belief that vaccines does not protect.</p>	<p>Showing people practical experiences.</p>	<p>Face to face interaction.</p>
R5	<p>Fear of fertility problems.</p> <p>Distrust of the vaccine.</p> <p>Possibility of other diseases coming from the vaccine. blood clot for instance.</p>	<p>More education about the vaccine and its effects.</p> <p>Presenting living examples of positive results, for instance, giving birth after taking the vaccine.</p>	<p>Outreach to the target group with pictures.</p> <p>Social media campaigns is an excellent idea.</p>
R6	<p>Ignorance</p> <p>Belief that they are strong enough to withstand the virus.</p> <p>Belief that vaccine is not needed.</p> <p>Scared/fear of the vaccine.</p> <p>Belief in natural means of protection.</p>	<p>Present choices to people and allow them to choose.</p> <p>Education.</p>	<p>Online campaign.</p>
R7	<p>Fear of the impact of the vaccine on body system and organs.</p> <p>Lack of trust.</p> <p>Information on the social media about the negative effects of the vaccine.</p> <p>Fear of death and disabilities.</p>	<p>Proper education on the source of vaccine, importance, and risks.</p> <p>Improved clinical trial and production time.</p> <p>Campaign against propaganda.</p>	<p>Sensitization outreach.</p> <p>Use of community health workers.</p> <p>Social media campaign.</p> <p>Compulsory vaccine mandate at healthcare institutions.</p>

	Vaccine was made quick. Poor or not enough clinical trials.		
R8	<p>Lack of trust in government, vaccine, and the pharmaceutical companies.</p> <p>Theories on depopulation plan using Covid-19.</p> <p>Belief in having enough immunity and not needing the vaccine.</p>	<p>Need for more education.</p> <p>Every country to make own vaccine and not depend on foreign countries.</p> <p>Localization of vaccine production.</p>	Not sure.
R9	<p>Negative information on the internet and social media.</p> <p>Depopulation theory.</p> <p>Fear that the vaccine changes the body system.</p> <p>Negative side effects like sleep apnea.</p> <p>Conspiracy theories and fear of dying.</p> <p>Suspicion that the vaccine is not effective.</p>	<p>Proper education about the vaccine and its effects.</p> <p>Use of practical examples.</p>	<p>Outreach to the people in rural areas.</p> <p>Using professionals like doctors and nurses who are close to the people to advertise the vaccine.</p> <p>Use of people that the locals trust.</p>
R10	<p>The vaccine was strange.</p> <p>Not sure of what will come next.</p> <p>Lack of trust with the production of the vaccine, the speed, and the source.</p> <p>Belief in natural health.</p>	Perception can only change if infected.	Outreach to the people by healthcare organizations.
R11	Ignorance and mindset	Real sensitization	Outreach by professionals to the grassroots.

		Education about the benefits of the vaccine.	One on one. Community gatherings Online campaigns like WhatsApp groups.
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