

“Assessing the COVID-19 vaccine literacy, perception, attitudes, behaviors and beliefs among the public in the Kingdom of Saudi Arabia”

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Abstract

This study aims to evaluate how well people understand the Covid-19 vaccine and its significance to both themselves and their society. In his study, the researcher relied on residents all over the Kingdom of Saudi Arabia, as the sample size reached 385 respondents. This study depended on a questionnaire to assess Saudis' COVID-19 vaccine knowledge. The online survey was voluntary and kept private using Google Forms. The results of the study showed a medium level of knowledge of the COVID-19 vaccines among the participants. So thus, the study highlighted the factors affecting the functional, interactive factors, attitudes, and attitudes towards the vaccination of the COVID-19 vaccine. The findings from this study would facilitate robust comprehension of the Assessing the Covid-19 Vaccine Literacy, perception attitudes in KSA. This study's findings support the need for ongoing public education campaigns to improve vaccination literacy. And setting up organizations in KSA that verify credible health information sources.

Keywords: COVID-19, vaccine literacy, Perception, attitudes, beliefs.

المخلص

تهدف هذه الدراسة إلى تقييم مدى فهم الناس للقاح Covid-19 وأهميته لكل من أنفسهم ومجتمعهم. اعتمد الباحث في دراسته على المقيمين في جميع أنحاء المملكة العربية السعودية، حيث بلغ حجم العينة 385 مستجيباً. اعتمدت هذه الدراسة على استبيان لتقييم معرفة السعوديين بلقاح COVID-19. كان الاستطلاع عبر الإنترنت تطوعياً وظل خاصاً باستخدام نماذج Google. أظهرت نتائج الدراسة مستوى متوسط من المعرفة بلقاحات COVID-19 بين المشاركين. لذلك، سلطت الدراسة الضوء على العوامل التي تؤثر على العوامل الوظيفية والتفاعلية والمواقف تجاه التطعيم بلقاح COVID-19. ستسهل نتائج هذه الدراسة الفهم القوي لتقييم معرفة القراءة والكتابة للقاح Covid-19، ومواقف الإدراك في المملكة العربية السعودية. تدعم نتائج هذه الدراسة الحاجة إلى حملات تثقيف عامة مستمرة لتحسين معرفة التلقيح. وإنشاء منظمات في المملكة تتحقق من مصداقية مصادر المعلومات الصحية.

الكلمات المفتاحية: كورونا - محو الأمية - التصور - المواقف - المعتقدات

CHAPTER ONE: INTRODUCTION

1. Introduction:

The COVID-19 pandemic impacted health, society, and the economy. (Biasio et al., 2020). Without WHO sanction, social media platforms have been sharing data on new cases and deaths, often with unapproved medical information. (Biasio et al., 2020). Because of the volume and range of data, there is info emic. (Biasio et al., 2020). declared a pandemic in March 2020 due to the spread of COVID-19, indicating that most nations had failed to control the deadly virus. Covid-19 was found in China. (Singh and Singh, 2020). COVID-19 cases were reported from nearly every nation in Asia, Australia, Europe, and North America. (Biasio et al., 2020). Italian scientists had verified the condition in almost 27,000 people by March 16, 2020, resulting in 2,158 deaths. (Sterpetti, 2020). Symptoms were gone in many affected patients. (Sterpetti, 2020). Hospitalized patients with serious symptoms had a 15% death rate. Elderly patients with multiple severe diseases had a higher mortality rate. (Sterpetti, 2020). The virus was present in children and young people, but they rarely showed symptoms. (Sterpetti, 2020).

High body temperature, coughing, severe fatigue, and breathing problems were COVID-19 symptoms. People with respiratory problems can catch viruses and bacteria from the air. (Singh and Singh, 2020). It can also be spread by touch. (Singh and Singh, 2020). Many schools, colleges, institutions, bars, restaurants, cafes, and other public places have halted due to COVID-19. (Singh and Singh, 2020). Celebrations, religious services, and other social events were suddenly postponed or cancelled. (Singh and Singh, 2020). UNESCO reported in 2020 that 61 nations have closed schools to prevent the spread of the disease. UNESCO reports that 39 nations' school, college, and university closures have affected over 420 million children and youth. (Singh and Hasan).

The government of the Kingdom of Saudi Arabia (KSA) has been using various methods to deal with the virus epidemic. (Al-Hanawi et al., 2020). Since Saudi Arabia confirmed its first case of COVID-19 on Monday, 2 March 2020, the country's government has been keeping a careful eye on the situation and working hard to come up with country-specific measures that are compliant with WHO standards. (Al-Hanawi et al., 2020). All businesses across the nation were shut down, with the exception of pharmacies and grocery stores. (Al-Hanawi et al., 2020). Since March 24, 2020, when the government imposed a statewide curfew, no one has been allowed to enter a mosque or the two Holy Mosques in Makkah and Al-Medina for the purposes of performing the umrah or prayer. (Al-Hanawi et al., 2020).

The current pandemic necessitates vaccination education as a fundamental health literacy requirement. (Rauh et al., 2020). Immunizations are only effective if individuals are aware of, able to obtain, and willing to administer them. (Rauh et al., 2020). Knowledge about immunizations (Rauh et al., 2020). Knowledge of the risks and benefits of vaccination, effective education, access, and vaccination systems, policies that promote vaccination and equity, transparency, clarity, the ability to distinguish between fact and fiction, listening, encouraging questions, and dialogue all contribute to a higher level of vaccine literacy among the general public. (Wake., 2021).

Having knowledge about the latest Covid-19 vaccinations has been seen to be associated with different demographic groups, attitudes, and values. (Singh et al., 2022). The researchers in Saudi Arabia wanted to see how much the public knew about the significance of vaccinations. We'll look into how socioeconomic status relates to people's knowledge, understanding, and acceptance of the Covid-19 vaccine. The study's findings should show the predictive characteristics that influence people in KSA's behavior, interaction, perception, and attitudes towards the Covid-19 vaccine.

The results of this study could be utilized to facilitate future public health interventions, alterations to policy, and public education initiatives regarding the COVID-19 pandemic. It is hoped that this research will shed light on the significance of vaccine literacy and its effect on both public and individual health.

2. Research Aim and Objectives :

The objective of this study is to evaluate the knowledge base, opinions, and convictions concerning the Covid-19 Vaccine in the Kingdom of Saudi Arabia and their significance to people and the general public.

This aim is achieved through the following objectives:

- 1- Assess individual literacy of the COVID-19 vaccine.
- 2- Assess perceptions, attitudes, and beliefs toward the COVID-19 vaccine.

3. Significance of the Study

The Kingdom of Saudi Arabia (KSA) is a vast country with an estimated population of over 34 million people. (STATS., 2021). The country is subdivided into thirteen provinces and a number of cities, municipalities, and villages. Vaccinations are now free for anyone over the age of 12, one of the government's many measures to prevent the spread of disease. (Yancy et al., 2020).

People's unfamiliarity with the vaccine's long-term effects, safety data, and efficacy influence the public's perception of the COVID-19 vaccination. Research conducted in Saudi Arabia suggested that demographic factors such as age and level of education may influence the COVID-19 vaccination's acceptability. Consequently, our research must investigate the relationship between socioeconomic status and knowledge of the COVID-19 vaccine (Al-(Mohaithef et al., 2021). Analysis of Saudi people's knowledge, comprehension, and other perception barriers based on facts and data on practices is a scientific method for generating solutions to problems and attaining the government's desired social goals. (Almaghaslah et al., 2021).

Assessment of public knowledge and awareness of COVID-19 can provide deeper insights into current beliefs and behaviour, aiding in the identification of variables that motivate individuals to adopt healthy practices and responsive behaviour in the face of pandemics. (Al-Hanawi et al., 2020). Assessing public understanding is crucial for identifying knowledge deficits and enhancing ongoing preventive efforts. (Al-Hanawi et al., 2020). Therefore, the purpose of this study is to determine how well the general public comprehends the significance of the COVID-19 vaccine.

Building upon prior research that emphasized the importance of recognizing and appreciating the benefits of the COVID-19 vaccine in Saudi Arabia, our study seeks to further explore this issue.

The results of this research will provide Saudi Arabian policymakers and decision-makers with an understanding of the Covid-19 vaccine literacy and its associated factors, thus allowing for the formulation of plans to educate those that are less informed, as well as to manage citizens during a pandemic. This research is pioneering in its examination of the determinants of functional and interaction capabilities among Saudi nationals.

4. Variables in the study :

4.1. Dependent variable

1. VL functional skills/ Literacy level. It expresses the level of reading or listening to information about future COVID-19 vaccines or current vaccines.
2. VL interactive/critical skills Literacy level. It expresses the level of looking for information about future COVID-19 vaccines or current vaccines.
3. COVID-19 vaccines perceptions and attitudes.
4. Current vaccine behavior.
5. Vaccination beliefs.

4.2. Independent variable/s

1. Age
2. Gender
3. Nationality
4. Native Language
5. Monthly Income
6. Marital Status
7. Education Degree
8. Chronic disease

5. Research questions

1. What is the literacy level (functional and interactive skills) of the Covid-19 vaccine among the participants in SA?
2. What are the perceptions, attitudes, behavior, and beliefs toward COVID-19 vaccination?
3. What is the association of socio-demographic factors with the level of literacy, perception, attitudes, behavior of COVID vaccine?

6. Methodology

6.1. Research design

Populations across Saudi Arabia were sampled for this cross-sectional study.

6.2. Study Limits / scope

The purpose of this study was to canvass as many people as possible for their input. The scope of this investigation is narrowed to Covid-19 vaccine knowledge, attitudes, and beliefs. Participants are limited to those who are living in Saudi Arabia and aged 18 years and more.

6.3. Data Sources

The literature on vaccine knowledge, vaccine attitudes, and vaccine beliefs was mined for secondary data. The questionnaire used as the primary source of data was adapted from (Biasio et al., 2020).

7. Population and sample :

7.1. Sampling

Using a 95% confidence interval, a 50% response rate, and a population of 34,110,821, the sample size calculation landed at 385 respondents. This meant that people living there came from all over Saudi Arabia. There are 34,110,821 people living in Saudi Arabia, as of the most recent census (STATS., 2021). A sample size calculator was used to determine the optimal sample size at which the investigation could be statistically significant (OpenEpi., 2022). A larger sample size of 1004 people was used to get a more reliable result and make data collecting easier.

8. Data Collection

8.1. Data Collection tool sources and structure

Data was collected from a social media-disseminated online poll. We reused an old questionnaire with the researcher's approval. (Biasio et al., 2020). This cross-sectional study sought to assess Saudis' COVID-19 vaccine knowledge. The online survey was voluntary and kept private. Google Forms, a free online tool, was used to build, distribute, and collect survey data. Respondents visited the survey URL created by a web link collector. On January 3, 2022, a random sample of 1004 local students, friends, family, citizens, patients, and healthcare staff received the link via email, text message, and social media apps like WhatsApp and Twitter. The recipient was asked to share the questionnaire link without disclosing their list of recipients and finish it at their convenience. Respondents are informed that the poll is voluntary and that clicking through to the next page implies consent.

8.2. Data Collection tool reliability and validity

The validity and reliability of the questionnaire are very good. The internal consistency of the questions was good or adequate (Cronbach's alpha = 0.8500 and 0.7672, respectively) for both the functional and interactive-critical components.

9. Statistical methods

Descriptive tables were used to compute statistics using Open Epi software for Windows 3.01 with a 95% confidence level and 5% margin of error. For numerical variables, mean, standard deviation, median, and interquartile range were used, while categorical variables were described by rates and percentages. The independent samples t-test compared the 3 values on the 2 variables and the 2 groups. The three scores were analyzed using a one-way analysis of variance (ANOVA) when analyzing more than two groups. The three data were analyzed using Pearson's correlation. Multiple linear regression analysis was used to identify the factors that affected the three results. IBM SPSS 26 for Windows was used to analyze. Statistical significance was determined by the p-value.

CHAPTER TWO: LITERATURE REVIEW

1. Literature review :

1.1. COVID-19 literacy

1.1.1. Attitudes and hesitancy toward COVID-19 vaccination

Numerous articles have addressed the global acceptability or rejection of the COVID-19 vaccination. (Popa et al., 2022). Increasing immunization rates is essential for combating the COVID-19 pandemic, but doing so requires identifying the specific causes and determinants of vaccine aversion in this region. (Han et al., 2020). It has been demonstrated that perceived information overload exacerbates preexisting psychological discomfort, making many people susceptible to its debilitating psychological effects. Because underprivileged people are disproportionately susceptible to information overload and its negative psychological effects, effective and equitable policies and treatments should be encouraged to target them. This overwhelms the public with data, the majority of which is scientifically incorrect. (Naeem et al., 2020).

Overwhelming information may hinder COVID-19 pandemic control because the public may have trouble sorting it and making an informed opinion. (Mohammed et al., 2022). Modern writers say the info emic, which threatens public health, is a new front in the COVID-19 war. (Mohammed et al., 2022). Due to the many systemic autoimmune

diseases and immunosuppressive drugs, poor results in these people may be concerning. (Spihlman et al., 2020). Thus, vaccination views and immune system responses may vary. (Spihlman et al., 2020). This group's hesitation to get vaccinated may be due to a lack of data on the new COVID-19 vaccine's pros and cons. (Spihlman et al., 2020).

1.1.2. Strategies of overcoming vaccine hesitancy

Studies have shown that vaccine efficacy and safety data influence vaccination choices. Therefore, people need reliable vaccination information before making their option. (Budiyanti et al., 2021). Doctors' advice, official sources, and pervasive health advocacy can overcome vaccination safety skepticism. (Budiyanti et al., 2021). Digital literacy is still a big issue, especially in developing nations. (Budiyanti et al., 2021). In today's internet-connected world, an infoemic, or too much information, can make it hard to sort through and trust sources. (Budiyanti et al., 2021). Misinformation, including conspiracy theories, about vaccine safety has exacerbated the issue. (Budiyanti et al., 2021).

Risk perceptions and decisions may be influenced by social media content regarding new infectious diseases and public health issues. (Angawi and Albugmi, 2022). People's responses to an infectious disease epidemic also differ depending on how seriously they consider the threat, which is based on their prior beliefs about the disease's likelihood of occurrence. (Angawi and Albugmi, 2022). Governments and public personalities should always be trusted as the most reliable sources of information. (Angawi and Albugmi, 2022).

WHO standards advise governments and public institutions, regardless of political affiliation, to effectively communicate with the public during epidemic outbreaks. (Angawi and Albugmi, 2022). In addition, the Chinese people did not trust government-produced information on the pandemic due to the government's lack of transparency in disseminating it. (Angawi and Albugmi, 2022). However, an individual's risk perception and subsequent behavior are complex and influenced by a variety of psychological and cultural factors. (Angawi and Albugmi, 2022).

The Health on Net (HON) Foundation Code of Conduct (HON Code) is an assemblage of standards formulated by the non-profit organization Health on Net (HON), situated in Geneva, Switzerland, for the purpose of accrediting trustworthy health data on the internet. (Budiyanti et al., 2021). The HON Code is based on the principles of Authority, Complementarity, Confidentiality, Attribution, Justifiability, Authorship Transparency, Sponsorship Transparency, and Editorial and Advertising Policy Integrity. (Budiyanti et al., 2021). In Indonesia, the right to access trust-worthy health information is upheld by Articles 7 and 8 of Law No. 36 of 2009 on Health; however, numerous impediments and difficulties still exist in its implementation. (Budiyanti et al., 2021).

1.1.3. The dissemination of COVID-19 vaccination information

One of the obstacles to education for persons living with HIV/AIDS (COVID-19) is a lack of relevant information. (Budiyanti et al., 2021). Numerous developing nations struggle to acquire current health data for a variety of reasons, including a lack of resources and infrastructure. (Budiyanti et al., 2021). Uneven IT infrastructure development has forced individuals to rely on the guidance of health professionals and workers in their communities. (Budiyanti et al., 2021). The information provided by medical professionals is more trustworthy, but this is of no use if supplies are limited and distributed unequally. (Budiyanti et al., 2021).

Culture is also important. Local society and religious norms influence people's awareness of the COVID-19 vaccine's benefits. (Budiyanti et al., 2021). Social beliefs, such as the belief that the body can only take in natural substances from nature and not chemicals, add to the widespread rejection of vaccinations. (Budiyanti et al., 2021). This can be worsened by forming a mental model and distrusting the government. In this case, a community leader, role model, or another respected person should lead the communication plan and advocacy efforts. (Budiyanti et al., 2021). At social events like ceremonies, talk about the necessity of COVID-19 vaccination. (Budiyanti et al., 2021).

1.2. Theories underpinning the research

1.2.1. Public perceptions, behaviors, and beliefs towards COVID-19 vaccine literacy

Successful COVID-19 vaccination programs for individuals with systemic autoimmune diseases are threatened by the COVID-19-related pandemic. (Correa-Rodriguez et al., 2022). Consequently, it is essential to assess both the vaccination knowledge of patients with autoimmune disorders and the sociodemographic factors associated with this knowledge. (Correa-Rodriguez et al., 2022).

Anti-vaccine groups are fighting the COVID-19 vaccination program by disseminating false information about the vaccine. (Correa-Rodriguez et al., 2022). The spread of misinformation and pseudoscience like this could have serious consequences, such as immunization resistance. (Correa-Rodriguez et al., 2022). Vaccine literacy is described as "not just understanding about vaccines, but also constructing a system with less complexity to communicate and offer vaccines as a sine qua non of a working health system." Understanding the target population's thoughts, feelings, and attitudes toward the COVID-19 vaccine is essential for designing successful strategies to raise vaccination rates. (Correa-Rodriguez et al., 2022).

Ritov and Baron found that when faced with a choice between two potentially harmful actions, parents favor the inaction of not vaccinating their child over the action of vaccinating it. (the probability that the child should have an adverse effect). Few studies have tried to assess vaccination intent, confirmation bias, and risk perception all at once to better understand an individual's cognitive style, despite the fact that there is a link between these factors. (Casigliani et al., 2022). To increase vaccination trust and acceptance, researchers recommend accounting for cognitive biases in all methods (Correa-Rodriguez et al., 2022).

1.2.2. The level of vaccine literacy and its association with demographic vaccine literacy

Vaccination acceptance has been found to be related to factors such as age, fear of contracting COVID-19, and the belief that vaccination is crucial for one's health and the welfare of society. (Rania et al., 2022). Younger adults (18–34) were more apt to support mandatory vaccinations for children than older adults (45–54). Individuals between the ages of 25 and 34 and 35 and 44 reported the greatest rates of childbearing, which may explain why this age range is more likely to worry about their children's safety than older or younger generations. (Rania et al., 2022).

Numerous articles have highlighted the fact that many parents are still hesitant to vaccinate their children out of concern for the vaccine's safety and adverse effects. (Rania et al., 2022). Law 119 of 2017 mandates additional immunizations for minors aged 0 to 16 in Italy. (Rania et al., 2022). Women typically decide whether or not to vaccinate their children; Wang et al. noted that women's resistance and reluctance to implement the COVID-19 vaccine can be an impediment to COVID-19 vaccination for children. (Rania et al., 2022). Evidence indicates that the elderly is most likely to receive vaccinations against seasonal influenza and other infectious diseases such as COVID-19. (Rania et al., 2022).

Graduate degree holders outscored high school dropouts on the VL interactive/critical skills exam, implying that they are better able to make decisions and tackle difficult problems. (Rania et al., 2022). In contrast, as literacy rates rise, fewer people express agreement with the statement, "I feel that vaccinations among health care personnel are a condition for working in the health sector." The public's vote could be influenced by the resistance of health professionals. (Wang et al., Rania et al., 2022).

2. Previous studies regarding vaccine literacy

Official results on regional or national adverse events and the safety of COVID-19 immunizations have been encouraging, according to the European Medicines Agency and individual state Ministries of Health. (Popa et al., 2022). Maslow's "safety" level was seriously threatened by worries about the COVID-19 vaccine's efficacy and side effects (Russia: 61.5%; Romania: 40%), the possibility of side effects (Russia: 59.8%; Poland: 48.4%), the possibility of anaphylaxis or other serious allergic reaction (Poland: 33.2%), and other factors. (Popa et al., 2022).

Publicly available studies on vaccine trust in Eastern European countries reveal four main themes: (1) people have a strong preference for certain vaccine brands; (2) they are skeptical of clinical trials supporting COVID-19 vaccines; (3) attitudes have changed over time and experience since the introduction of the vaccine; and (4) spirituality, religion, conspiracy theories, false information, and social ties play a significant role in shaping people's beliefs and vaccine trust. (Popa et al., 2022).

Except for Russia, clinical trials utilizing COVID-19 immunizations in Eastern European nations demonstrated short-term effectiveness against symptomatic COVID-19 infection. (Popa et al., 2022). 63% of Romanian vaccination sceptics cited concerns that the COVID-19 vaccine was still in its inception and lacked sufficient evidence to warrant widespread use. (Popa et al., 2022). Vaccines have been used in Russia, but unlike the rest of Eastern Europe, not all of them have solid evidence from phase III clinical studies. Only the efficacy of the Sputnik V vaccine in phase III trials (91,6%) was discovered in February 2021. (Popa et al., 2022).

According to a Polish study of Facebook remarks, after the initial immunization episode, support for the COVID-19 vaccination increased from 7% to 22%. Acceptance increased in Russia (from 41.7% to 63.2%) when the drug's safety and efficacy were demonstrated for comparable reasons. (Popa et al., 2022). After providing trial participants with encouraging messages about the significance of getting vaccinated against COVID-19, attitudes toward vaccination were measured. (Popa et al., 2022). Current data suggests that achieving the vaccination rates necessary for community protection or "herd immunity" may be impossible without extensive education, participation, and innovative public health approaches. (Popa et al., 2022).

Although recent studies indicate an uptick in vaccine adoption in the United States, some individuals' reluctance to act prematurely prevents the public from receiving the necessary protections. (Ratzan and Parker, 2020). There is an increasing number of individuals, from regular citizens to medical experts to corporate executives, who are concerned about the safety of the Covid-19 vaccine. (Ratzan and Parker, 2020). Social media anti-vaccine activists have made

significant inroads, casting question on the existence of Covid-19 and the efficacy of vaccination. (Ratzan and Parker, 2020). A well-informed population is more likely to make ethical decisions, and vaccination is an issue with which every citizen should be familiar. (Ratzan and Parker, 2020).

CHAPTER THREE: RESEARCH METHODOLOGY

1. Research approach :

This research was conducted using a quantitative method. Quantitative research, as is well known, is an in-depth analysis of a phenomenon conducted with the use of mathematical and statistical methods. And we did it with a completely anonymous web-based survey (Apuke, 2017).

2. Research design :

Inclusion criteria are the standards by which participants in research are selected. In contrast, exclusion criteria are those set up by the researcher to rule out prospective participants who do not meet the inclusion criteria. Following these guidelines, the scholar will be able to produce credible results. (Haifete, 2016). Participants had to be at least 18 years old, residents of Saudi Arabia, willing to take part in the study, and able and willing to fill out a questionnaire; however, those under 18 and those not living in Saudi Arabia were not eligible to participate.

3. Sampling :

3.1. Sample size and selection of sample

The number of people to include in the study was determined using the use of the open epi website. In total, 1004 people from various cities in Saudi Arabia were included in the study's sample. Participants had to be Saudi Arabian residents, 18 years old and above, and agree to take part in the study and fill out the questionnaire. Four people were disqualified because they claimed to be under 18 years old when they signed up.

3.2. Sampling techniques

In the span of time between January 3 and February 14, 2022, cross-sectional surveys of the Saudi populace were carried out. The internet-based self-reported questionnaire was developed with the factors of social and physical isolation, mobility limitations, and lockdowns in mind. (using "Google Forms"). Since most people in the KSA have access to email, SMS, and social media sites like Twitter and WhatsApp groups, we were able to easily disseminate the survey link through these channels. Using a sample size calculator, we determined how many people would need to participate in the research to get reliable results. (OpenEpi., 2022). Using the sample size calculator with the parameters of a 95% confidence interval, a 95% margin of error, a 50% answer distribution, and a population of 34,110,821, we get a sample size of 384. To ensure statistical significance, the ideal sample number was calculated using a sample size calculator. (OpenEpi., 2022). The original sample size was 1002, but that was raised to 1004 to ensure a more accurate reflection of the population and to facilitate data collection.

Means, standard deviations, medians, and interquartile ranges were given for numerical variables, while frequencies and percentages were reported for categorical variables. The two groups and three factors were examined using an independent samples t-test. One-way analysis of variance (ANOVA) was used to analyze the three scores because there were more than two groups. The three values were correlated using Pearson's correlation. The three results' factors were examined using multiple linear regression. Data were examined using IBM SPSS 26 for Windows. Statistical importance was indicated by a 0.05 p-value.

3.3. Interpretation of the survey's results

In the present study, the researcher defined all numerical values (means, frequencies, percentages, ANOVA test coefficients, and Pearson's correlation coefficients). These values will be calculated using scales that show value order and disparity. The scholar normalized results by contextualizing raw data. The next step was data interpretation, which determined the data's meaning, implications, relevance, and findings.

4. Data Collection

4.1. Data Collection tools

For this cross-sectional study, we used the general population of Saudi Arabia as our research population. With the researcher's blessing, we used a questionnaire from a previous study (Biasio et al., 2020).

The researcher drafted the questionnaire's English content and then had it translated into Arabic. The supervisor retranslated the questionnaire into English to make sure it made sense.

We explained the study's context and goals on the web survey's first page. Respondents agree to finish the survey by proceeding to the next page. Respondents were told they could stop participating at any time without giving a reason and that their answers would be anonymous. Participants had to be 18 or older, understand the questionnaire, and agree to the study. See (Appendix II).

4.2. Data Collection Methods

After approval from King Abdul-Aziz University's health care and hospital administration department in Jeddah, Saudi Arabia's school of economics and management. The Jeddah Health Affairs office approved the study's path. The expert collected data immediately. Saudi adults received 1,044 online surveys. From the start, the study focused on survey administration. Participants are informed that they must click the link to the next page to agree to the questionnaire. The questionnaire requires no personal information, so researchers assured participants that their participation was risk-free, would only be used for study, and would take five minutes. You can leave this study at any time.

4.3. Validity and Reliability

The author consented to using the questionnaire from a prior study. (Biasio et al., 2020). Validity and reliability are good in the survey. Cronbach's alpha values for functional and interactive-critical items ranged from good to adequate (0.85 and 0.7672, respectively) with minimum values of 0.7857 and 0.7274, respectively. Validity was assessed using PCA. We used PCA to reduce the data to two factors that explained 49.49% of the range. Varimax rotation showed that all functional VL questions loaded on one component and all communicative-critical skills questions loaded on the other. It's possible to predict how each inquiry will impact the two variables. The variables were statistically favorably correlated. Thus, the questionnaire's validity was confirmed by the high correlation between functional and interactive-critical scale items.

5. Ethical Considerations

The research protocol was approved by the college of economics and administration at King Abdul-Aziz University in Jeddah, Saudi Arabia, and the department of health service and hospital management. The proposal for this study was approved by Jeddah Health Affairs, and this is documented in IRB Log No. A01255. See (Appendix III).

CHAPTER FOUR: DATA ANALYSIS AND RESULTS

1. Results

1.1. Personal characteristics of the participants

The study included 1004 adults. Table 1 summarizes individuals' demographics. 35.6% were 30–39, and 28.8% were 40–49. 64.1% were women. 95% of poll respondents are native Arabic speakers, and 91% are Saudi. 32.4% earned over \$12,000 per month, while 31.3% earned less than \$4,000. Most (66.6%) are married. 80.4% had a bachelor's or better degree. 40.2% worked.

Table 1: Personal characteristics of the participants

1. Characteristics	2. Frequency	3. Percentage
4. Age groups		
5. < 30	6. 219	7. 21.8 %
8. Between 30 to 39	9. 357	10. 35.6 %
11. Between 40 to 49	12. 289	13. 28.8 %
14. ≥ 50	15. 135	16. 13.4 %

17. Gender		
18. Male	19. 360	20. 35.9 %
21. Female	22. 644	23. 64.1 %
24. Nationality		
25. Saudi	26. 915	27. 91.1 %
28. Non-Saudi	29. 89	30. 8.9 %
31. Native language		
32. Arabic	33. 959	34. 95.5 %
35. English	36. 45	37. 4.5 %
38. Monthly Income		
39. Less than 4000	40. 314	41. 31.3 %
42. 4000 to 8000	43. 153	44. 15.2 %
45. 8000 to 12000	46. 212	47. 21.1 %
48. More than 12000	49. 325	50. 32.4 %
51. Marital Status		
52. Single	53. 335	54. 33.4 %
55. Married	56. 669	57. 66.6 %
58. Education degree		
59. Less than a university degree	60. 197	61. 19.6 %
62. Bachelor's degree	63. 472	64. 47.0 %
65. Postgraduate Diploma	66. 209	67. 20.8 %
68. Master's degree	69. 99	70. 9.9 %
71. Doctorate (Ph.D.)	72. 27	73. 2.7 %
74. Occupation		
75. Employed	76. 404	77. 40.2 %
78. Healthcare operator	79. 231	80. 23.0 %
81. Housewife	82. 137	83. 13.6 %
84. Retired	85. 49	86. 4.9 %
87. Student	88. 118	89. 11.8 %
90. Unemployed	91. 64	92. 6.4 %

1.2. Vaccination history and behavior

Table 2 shows that more than half (62.5%) of the participants had gotten the seasonal influenza vaccination, but 63.7% had not. 79.4% of people can get the flu shot this year (2022), but 54.8% don't. 62% of individuals planned

to get immunized against other infectious diseases. 29.2% of respondents said vaccines are safe, while 27.6% objected. Natural immunity makes vaccinations unnecessary, but only 9.6% of respondents firmly agree.

Table 2: Vaccination history and behavior

	Frequency	Percentage
Have you been vaccinated against seasonal influenza before?		
No	377	37.5 %
Yes	627	62.5 %
Have you vaccinated against seasonal influenza last season in 2021?		
No	640	63.7 %
Yes	364	36.3 %
Do you intend to get a flu vaccination this year 2022?		
No	550	54.8 %
Yes	454	45.2 %
I have the ability to get the flu vaccination.		
No	207	20.6 %
Yes	797	79.4 %
Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)		
No	382	38.0 %
Yes	622	62.0 %
1- I am not favorable to vaccines because they are unsafe		
Strongly agree	80	8.0 %
Agree	93	9.3 %
Neutral	261	26.0 %
Disagree	293	29.2 %
Totally Disagree	277	27.6 %
2- There is no need to vaccinate because natural immunity exists		
Strongly agree	96	9.6 %
Agree	133	13.2 %
Neutral	236	23.5 %
Disagree	312	31.1 %
Totally Disagree	227	22.6 %

1.3. COVID-19 literacy level, perception, and attitude scores

The mean functional skills score on the COVID-19 literacy questionnaire is 2.89 (SD=0.83), as shown in Table 3. With a mean of 3.06 (SD=0.65) for average interpersonal skills and a mean of 3.79 (SD=0.71) for average perceptions and attitudes regarding the COVID-19 vaccination, it is clear that both dimensions are well represented.

Table 3: COVID-19 literacy level, perception, and attitude scores

	Mean	SD
Average Functional skills score	2.89	0.83
Average interactive skills score	3.06	0.65
COVID-19 vaccines perceptions and attitudes average score	3.79	0.71

1.4. Association of average functional skills scores with some demographic variables

Table 4 shows that nationality correlated with functional skills level ($p < 0.001$). Saudis scored lower (2.86 ± 0.82) than non-Saudis (3.21 ± 0.83). English-speakers had a higher mean score (3.48 ± 0.72) than Arabic-speakers (2.86 ± 0.83), p -value < 0.001 .

Table 4: Association of average functional skills scores with some demographic variables

	Total Score	N	Mean	SD	P value
Gender	Male	360	2.92	0.85	0.50
	Female	644	2.88	0.82	
Nationality	Saudi	915	2.86	0.82	< 0.001
	Non-Saudi	89	3.21	0.83	
Native language	Arabic	959	2.86	0.83	< 0.001
	English	45	3.48	0.72	
Marital Status	Single	335	2.95	0.82	0.14
	Married	669	2.86	0.83	

1.5. Association of average functional skills scores with some demographic variables (continued)

As shown in Table 5, One-way-ANOVA was used to compare the average functional score across age groups (< 30, 30–39, 40–49, and 50+). The groups differed, p -value= 0.004. The Bon ferroni exam assessed group differences. The average functional score was higher between 30 and 39 years old (2.93 ± 0.84) than over 50 years old (2.68 ± 0.85), p value= 0.021. The group under 30 had a higher average functional score (3 ± 0.78) than the group over 50 (2.68 ± 0.85), $p = 0.003$.

Table 5: Association of average functional skills scores with some demographic variables (continued)

	Total Score	Mean	SD	P value
Age groups	< 30	3.00	0.78	0.004
	Between 30 to 39	2.93	0.84	
	Between 40 to 49	2.87	0.83	
	≥ 50	2.68	0.85	

Monthly Income	Less than 4000	2.85	0.84	0.789
	4000 to 8000	2.92	0.84	
	8000 to 12000	2.91	0.83	
	More than 12000	2.90	0.82	
Education degree	Less than a university degree	2.91	0.82	0.208
	Bachelor's degree	2.86	0.85	
	Postgraduate Diploma	2.86	0.82	
	Master's degree	3.06	0.76	
	Doctorate (Ph.D.)	3.00	0.85	
Occupation	Employed	2.89	0.84	0.291
	Healthcare operator	2.96	0.84	
	Housewife	2.85	0.81	
	Retired	2.66	0.87	
	Student	2.94	0.79	
	Unemployed	2.86	0.83	

1.6. Association of average functional skills scores with current vaccine behaviors

Table 6 shows the results of an independent t-test comparing the average functional skills score of participants who answered yes or no to queries about their recent vaccination behavior. The yearly flu vaccine improved functional skills by 2.940.83 compared to 2.810.82 ($p = 0.013$).

Functional skills tests were greatly improved by getting the 2021 seasonal flu shot. Functional values were higher for those who answered yes (2.960.83) than those who answered no (2.850.83) ($p = 0.038$).

Participants who answered yes had a higher functional score (2.930.83) than those who replied no (2.750.81), p value= 0.006. This suggests that being vaccinated is correlated with better functional skills.

Table 6: Association of average functional skills scores with current vaccine behaviors

		Total Score			
		N	Mean	SD	P value
1-Have you been vaccinated against seasonal influenza before?	No	377	2.81	0.82	0.013
	Yes	627	2.94	0.83	
2-have you vaccinated against seasonal influenza last season 2021?	No	640	2.85	0.83	0.038
	Yes	364	2.96	0.83	
3-Do you intend to get a flu vaccination this year 2022?	No	550	2.82	0.82	0.004
	Yes	454	2.97	0.84	
4- I have the ability to get the flu vaccination.	No	207	2.75	0.81	0.006
	Yes	797	2.93	0.83	
	No	382	2.80	0.82	0.009

5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)	Yes	622	2.95	0.83	
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1.7. Association of average interactive skills scores with some demographic variables

The correlation between the mean score on the test of interaction abilities and gender, nationality, native language, and marital status was investigated using a t-test. According to Data Table 7. There was a statistically significant association between nationality and the interactive skills score, p value= 0.001. Non-Saudi participants (3.27 ± 0.55) got a higher mean score than Saudi (3.04 ± 0.65). A statistically significant difference was found regarding the native language, participants whose native language was English had a higher mean score (3.40 ± 0.46) than those whose native language was Arabic (3.04 ± 0.65), p -value < 0.001.

Table 7: Association of average interactive skills scores with some demographic variables

		Total Score			
		N	Mean	SD	P value
Gender	Male	360	3.04	0.69	0.576
	Female	644	3.07	0.62	
Nationality	Saudi	915	3.04	0.65	0.001
	Non-Saudi	89	3.27	0.55	
Native language	Arabic	959	3.04	0.65	< 0.001
	English	45	3.40	0.46	
Marital Status	Single	335	3.06	0.66	0.957
	Married	669	3.06	0.64	

1.8. Association of average interactive skills scores with some demographic variables

Table 8. One-way analysis of variance was used to compare mean interaction scores between under 30, 30–39, 40–49, and 50+. Groups differed significantly ($p = 0.020$). The Bonferroni test determined group differences. The functional score was lower for those 30–39 (2.99 SD 0.64), p value= 0.019, than for those 50+ (3.18 SD 0.58).

ANOVA compared the average interaction value by monthly income. (Less than 4000, 4000 to 8000, 8000 to 12000, and more than 12000). The groups differed ($p = 0.025$). The Bonferroni test determined group differences. In this study, those with incomes between \$8,000 and \$12,000 had a lower interaction value than those with \$12,000 or more ($p = 0.016$). (3.13 SD 0.58).

The average interaction score was compared between groups with different levels of schooling (no college degree, Bachelor's degree, Postgraduate Diploma, Master's degree, and Doctorate). A p value of 0.033 indicated statistical difference between groups. To determine importance, we used the Bonferroni test. With a p value of 0.023, those with less schooling had a lower average interaction score (2.99 SD 0.64 vs. 3.39 SD 0.43 for Ph.D.s).

Table 8: Association of average interactive skills scores with some demographic variables

		Total Score		
		Mean	SD	P value
Age groups	< 30	3.07	0.69	0.020
	Between 30 to 39	2.99	0.64	

	Between 40 to 49	3.09	0.64	
	≥ 50	3.18	0.58	
Monthly Income	Less than 4000	3.04	0.66	0.025
	4000 to 8000	3.08	0.61	
	8000 to 12000	2.96	0.73	
	More than 12000	3.13	0.58	
Education degree	Less than a university degree	2.99	0.64	0.033
	Bachelor's degree	3.05	0.66	
	Postgraduate Diploma	3.10	0.63	
	Master's degree	3.09	0.65	
	Doctorate (Ph.D.)	3.39	0.43	
Occupation	Employed	3.06	0.64	0.348
	Healthcare operator	3.08	0.63	
	Housewife	2.99	0.63	
	Retired	3.09	0.71	
	Student	3.15	0.60	
	Unemployed	2.98	0.79	

1.9. Association of average interactive skills scores with current vaccine behaviors

See Table 9 for the results of a t-test that compared the average interaction skills score of those who answered yes or no to vaccination queries. Participants who got the seasonal influenza vaccine had a significantly higher mean score of 3.120.63 on the interaction skills subscale than those who did not (2.95 SD 0.66) ($p=0.001$). Before the 2021 flu season, seasonal flu shot recipients had higher interpersonal skill. Those who said "yes" had a substantially higher functional score (3.14 SD 0.64) than those who said "no" (3.01 SD 0.65) ($p=0.002$).

Table 9: Association of average interactive skills scores with current vaccine behaviors

	Total Score				
		N	Mean	SD	P value
1- Have you been vaccinated against seasonal influenza before?	No	37 7	2.95	0.66	< 0.001
	Yes	62 7	3.12	0.63	
2-have you vaccinated against seasonal influenza last season 2021?	No	64 0	3.01	0.65	0.002
	Yes	36 4	3.14	0.64	
3-Do you intend to get a flu vaccination this year 2022?	No	55 0	2.96	0.67	< 0.001
	Yes	45 4	3.19	0.59	
4-I have the ability to get the flu vaccination.	No	20 7	2.78	0.73	< 0.001
	Yes	79 7	3.13	0.60	
5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)	No	38 2	3.02	0.64	0.104
	Yes	62 2	3.09	0.65	

1.10. Association of average COVID-19 vaccines perceptions and attitudes score among some demographic variables

A t-test was used to compare average scores on questions about the COVID-19 vaccine's efficacy, safety, and effectiveness by gender, country of origin, main language spoken at home, and marital status. Data Table 10 indicates. This score was significantly linked to a person's nation of origin ($p=0.004$). Saudi and non-Saudi individuals averaged 3.76 SD 0.71 and 3.99 SD 0.67, respectively. English speakers had a higher mean score (4.31 SD 0.39) on the COVID-19 vaccine view and attitudes survey than Arabic speakers (3.76 SD 0.71), $p = 0.001$.

Table 10: Association of average COVID-19 vaccines perceptions and attitudes score among some demographic variables

	Total Score				
		N	Mean	SD	P value
Gender	Male	360	3.94	0.68	< 0.001
	Female	644	3.70	0.71	
Nationality	Saudi	915	3.76	0.71	0.004
	Non-Saudi	89	3.99	0.67	
Native language	Arabic	959	3.76	0.71	< 0.001
	English	45	4.31	0.39	

Marital Status	Single	335	3.81	0.71	0.434
	Married	669	3.77	0.71	

1.11. Association of average COVID-19 vaccines perceptions and attitudes score among some demographic variables (continued)

Table 11 shows the results of a one-way analysis of variance on four age groups' average COVID-19 vaccine perceptions and opinions. (those under 30, those between 30 and 39, those between 40 and 49, and those over 50). Statistically, the two groups differed ($p = 0.009$). The group disparities were determined using the Bonferroni test. With a p -value of 0.005, this study found that those aged 50 and older had the best average score (3.96), followed by those aged 30–39 (3.73), 40–49 (3.75), and 30–49 (3.73).

The study of variance examined how participants' monthly income affected the mean score across the board. (Less than 4000, 4000 to 8000, 8000 to 12000, and more than 12000). The two groups differed ($p = 0.023$). The Bonferroni test revealed group variations. This study found that those with \$8000–\$12000 incomes had a lower average score than those with \$3800–\$8500 incomes (p -value 0.028). (3.89 SD 0.64).

Table 11: Association of average COVID-19 vaccines perceptions and attitudes score among some demographic variables (continued)

		Total Score		
		Mean	SD	P value
Age groups	< 30	3.80	0.73	0.009
	Between 30 to 39	3.73	0.69	
	Between 40 to 49	3.76	0.73	
	≥ 50	3.96	0.63	
Monthly Income	Less than 4000	3.77	0.71	0.023
	4000 to 8000	3.89	0.64	
	8000 to 12000	3.68	0.80	
	More than 12000	3.82	0.67	
Education degree	Less than a university degree	3.76	0.77	0.306
	Bachelor's degree	3.78	0.68	
	Postgraduate Diploma	3.84	0.68	
	Master's degree	3.70	0.76	
	Doctorate (Ph.D.)	3.97	0.88	
Occupation	Employed	3.78	0.69	0.067
	Healthcare operator	3.81	0.68	
	Housewife	3.62	0.79	
	Retired	3.86	0.76	
	Student	3.87	0.68	
	Unemployed	3.85	0.78	

1.12. Association of average COVID-19 vaccine perceptions and attitudes score with current vaccine behaviors

Data Table 12. An independent t-test was used to assess participants' COVID-19 vaccine perception and attitudes scores. The sample's COVID-19 vaccine perception and attitude survey average was favorably correlated with their vaccination habits. Yes-answerers had higher mean grades than no-answerers. (p 0.001).

Table 12: Association of average COVID-19 vaccine perceptions and attitudes score with current vaccine behaviors

	Total Score	N	Mean	SD	P value
1-Have you been vaccinated against seasonal influenza before?	No	377	3.65	0.75	< 0.001
	Yes	627	3.86	0.67	
2-have you vaccinated against seasonal influenza last season 2021?	No	640	3.70	0.73	< 0.001
	Yes	364	3.94	0.64	
3-Do you intend to get a flu vaccination this year 2022?	No	550	3.60	0.75	< 0.001
	Yes	454	4.01	0.58	
4-I have the ability to get the flu vaccination.	No	207	3.46	0.87	< 0.001
	Yes	797	3.87	0.64	
5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever).	No	382	3.65	0.78	< 0.001
	Yes	622	3.87	0.65	

1.13. Correlation matrix between COVID-19 vaccine literacy level scores (Functional and interactive) and COVID-19 vaccine perception and attitudes score

Table 13 correlates the average functional score, average interaction score, and COVID-19 vaccination impression and attitudes score. The average functional score and COVID-19 vaccination perception and attitudes score had a weakly positive association (Pearson association= 0.207, p0.001). The average functional subscale score had a mildly positive correlation of 0.288 (Pearson) and a significance level of 0.001 with the average perception and attitudes and interaction subscale scores. With a Pearson Correlation of 0.066 and a p-value of 0.035, the average engaging and functional scores were barely correlated.

Table 13: Correlation matrix between COVID-19 vaccine literacy level scores (Functional and interactive) and COVID-19 vaccine perception and attitudes score

		Average Functional score	Average interactive score	COVID-19 vaccines perceptions and attitudes score
Average Functional score	Pearson Correlation	1		
	P value			
Average interactive score	Pearson Correlation	0.066	1	
	P value	0.035		
COVID-19 vaccines perceptions and attitudes score	Pearson Correlation	0.207	0.288	1
	P value	< 0.001	< 0.001	

1.14. Multiple linear regression predicting variables affecting the average functional score

Table 14 shows numerous linear regression results with coefficient 95% confidence intervals. The linear regression study showed that older people and native speakers had higher functional scores. English speakers score 0.46 (95% CI= 0.13, 0.78, p value= 0.06) higher than Arabic speakers. Compared to 30, scores fell 0.18 and 0.36 points for those 40–49 and > 50.

Variables	Total Score				
		Coefficient	P-value	95% CI of the coefficient	
Age groups	< 30	Ref.			
	Between 30 to 39	-0.10	0.154	-0.24	0.04
	Between 40 to 49	-0.18	0.017	-0.32	-0.03
	≥ 50	-0.36	< 0.001	-0.54	-0.18
Nationality	Saudi	Ref.			
	Non-Saudi	0.14	0.247	-0.10	0.37
Native Language	Arabic	Ref.			
	English	0.46	0.006	0.13	0.78
1-Have you been vaccinated against seasonal influenza before?	No	Ref.			
	Yes	0.03	0.607	-0.10	0.16
2-have you vaccinated against seasonal influenza last season 2021?	No	Ref.			
	Yes	-0.02	0.810	-0.15	0.12
3-Do you intend to get a flu vaccination this year 2022?	No	Ref.			
	Yes	0.04	0.519	-0.09	0.17
4-I have the ability to get the flu vaccination.	No	Ref.			
	Yes	0.11	0.138	-0.03	0.25
5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)	No	Ref.			
	Yes	0.10	0.079	-0.01	0.21

1.15. Multiple linear regression predicting variables affecting the average interactive score

Table 15 shows numerous linear regression results with coefficient 95% confidence intervals. Higher education, desire to get a flu shot in 2022, and ability to get the shot all increased interactivity scores, according to linear regression analysis. Doctoral degree holders had a higher involvement score than high school graduates (Mean: 3.39; 95% CI: 0.04-0.56; p=0.024). People who plan to get flu shots in 2022 had an average score of 0.12, 95% CI= 0.02, 0.22, p value= 0.016 higher than those who don't. Flu shots improved scores by 0.27 (95% CI= 0.16, 0.38, p0.001).

Table 15: Multiple linear regression predicting variables affecting the average interactive score

Variables	Total Score			
		Coefficient	P-value	95% CI of the coefficient

Age groups	< 30	Ref.			
	Between 30 to 39	-0.09	0.110	-0.21	0.02
	Between 40 to 49	-0.01	0.928	-0.13	0.12
	≥ 50	0.06	0.427	-0.09	0.21
Nationality	Saudi	Ref.			
	Non-Saudi	0.11	0.225	-0.07	0.29
Native Languages	Arabic	Ref.			
	English	0.14	0.285	-0.12	0.39
Monthly income	Less than 4000	Ref.			
	4000 to 8000	-0.01	0.852	-0.14	0.12
	8000 to 12000	-0.11	0.087	-0.23	0.02
	More than 12000	0.01	0.849	-0.11	0.13
Education level	Less than ^a university degree	Ref.			
	Bachelor's degree	0.06	0.259	-0.05	0.18
	Postgraduate Diploma	0.10	0.137	-0.03	0.23
	Master's degree	0.10	0.237	-0.07	0.27
	Doctorate (Ph.D.)	0.30	0.024	0.04	0.56
1-Have you been vaccinated against seasonal influenza before?	No	Ref.			
	Yes	0.05	0.367	-0.05	0.15
2-have you vaccinated against seasonal influenza last season 2021?	No	Ref.			
	Yes	-0.04	0.497	-0.14	0.07
3-Do you intend to get a flu vaccination this year 2022?	No	Ref.			
	Yes	0.12	0.016	0.02	0.22
4-I have the ability to get the flu vaccination.	No	Ref.			
	Yes	0.27	< 0.001	0.16	0.38
5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)	No	Ref.			
	Yes	-0.04	0.401	-0.12	0.05

1.16. Multiple linear regression variables affecting the average COVID-19 vaccines perception and attitudes score

Table 16 info. Multiple linear regression coefficients and 95% confidence intervals were given. A linear regression analysis shows that female gender, better monthly income, a stronger desire to get vaccinated against influenza in 2022, and access to the vaccine all increase functional scores. The mean difference between female and male subjects was -0.22 (95% CI= -0.31, -0.13), with a p-value less than 0.001. Income between \$8,000 and \$12,000 had a lower score (-0.15, 95% CI= -0.27, -0.02) than income below \$4,000. Statistically important. (p 0.022). Those who planned to get flu shots in 2022 had higher scores (95% CI= 0.16, 0.37, p 0.001). Flu shots increased mean scores by 0.22 (95% CI= 0.10, 0.33, p-value 0.001).

Table 16: Multiple linear regression predicting variables affecting the average COVID-19 vaccines perception and attitudes score

Variables	Total Score				
		Coefficient	P-value	95% CI of the coefficient	
Age groups	< 30	Ref.			
	Between 30 to 39	-0.07	0.244	-0.19	0.05
	Between 40 to 49	-0.06	0.368	-0.19	0.07
	≥ 50	0.12	0.134	-0.04	0.27
Gender	Male	Ref.			
	Female	-0.22	< 0.001	-0.31	-0.13
Nationality	Saudi	Ref.			
	Non-Saudi	-0.11	0.254	-0.31	0.08
Native Language	Arabic	Ref.			
	English	-0.12	0.222	-0.31	0.07
Monthly income	Less than 4000	Ref.			
	4000 to 8000	0.03	0.71	-0.11	0.16
	8000 to 12000	-0.15	0.022	-0.27	-0.02
	More than 12000	-0.06	0.313	-0.18	0.06
1-Have you been vaccinated against seasonal influenza before?	No	Ref.			
	Yes	-0.02	0.685	-0.13	0.08
2-have you vaccinated against seasonal influenza last season 2021?	No	Ref.			
	Yes	-0.01	0.9	-0.12	0.10
3-Do you intend to get a flu vaccination this year 2022?	No	Ref.			
	Yes	0.27	< 0.001	0.16	0.37
4-I have the ability to get the flu vaccination.	No	Ref.			
	Yes	0.22	< 0.001	0.10	0.33

5-Do you plan to be vaccinated against other infectious diseases? (Such as hepatitis, pneumonia, meningitis, tuberculosis, and yellow fever)	No	Ref.			
	Yes	0.08	0.097	-0.01	0.17

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

1. Principle Findings

1. Even while over 60% of the sample had previously received the seasonal flu shot, just 33% had done so in the previous year.
2. Two, although 79.4% of the population is eligible for the flu shot, only 35.2% of the population plans to obtain it in 2022. Of the people who took part, 62% said they intended to get vaccinated against other diseases.
3. twenty-nine percent of respondents did not feel that immunizations are safe, and twenty-seven percent strongly disagreed. Only 9.6% are in complete agreement that vaccinations are unnecessary due to preexisting immunity.
4. The results showed that the functional, interactive-critical, and COVID-19 vaccines' perceptions and attitudes were all in moderate levels of vaccination literacy.
5. Older ages and those who speak the language as their first are more likely to have higher functional scores.
6. the vaccine literacy interactive-critical scale was mostly determined by the amount of education, the intent to obtain a flu vaccination in 2022, and the accessibility of flu vaccinations.
7. Greater scores on the perception and attitude scales are linked to more positive demographics, including female identity, higher monthly income, a stronger desire to get vaccinated against influenza in 2022, and access to vaccination clinics.
8. Being mentally and physically prepared is crucial for confronting complex real-world issues in tandem with health systems.
9. To prevent the spread of diseases like COVID-19, the public must get accurate information about the illness.
10. When deciding how to best reach your target audience via online surveys, you should keep their average VL in mind.

2. Research Contributions

The first Saudi Arabian study on COVID-19 vaccine training. This study defines vaccination literacy and emphasizes its importance in public and individual health. The study's results will also be shared with policymakers to help them understand how functional and interactive skills, attitudes, and perceptions of the COVID-19 vaccine affected knowledge.

3. Implications and Recommendations

1. The primary goal of this study is to increase the public's knowledge, perception, attitudes, and beliefs about vaccination in the Kingdom of Saudi Arabia by shedding light on the factors that influence covid -19 vaccine literacy.
2. Findings from this study highlight the importance of developing and disseminating educational initiatives to improve the general public's knowledge of vaccines. Patients may be able to find timely and trustworthy information with the help of such programmers, which can be implemented through collaboration between medical personnel and healthcare providers in a wide range of contexts, such as hospitals, health centers, and educational or working environments. In this way, the harm caused by false information concerning COVID-19 vaccines may be lessened. furnish reliable, scholarly materials about the several vaccines available. Clear and uncomplicated so that anyone may grasp it.
3. Health on Net (HON) is being rolled out in the Kingdom of Saudi Arabia (KSA), providing access to verifiably reputable health information outlets. By setting up an ongoing organization, we can help promote the adoption of secure health IT.
4. Spreading the word about the need of getting vaccinated against COVID-19 must be a continual effort. for instance, using print media to disseminate brochures and fliers to local communities.

4. Cconclusions:

The purpose of this survey was to gauge the general population's knowledge, opinion, and value concerning the significance of the COVID-19 vaccine to both people and society in Saudi Arabia. The findings from this study would

facilitate robust comprehension of the Assessing the Covid-19 Vaccine Literacy, perception attitudes in KSA The study found that participants had an intermediate degree of functional, interaction, perceptual, and attitude literacy with regards to the COVID-19 vaccination. There was a statistically significant correlation between an increased functional score and both the subject's age and their primary language. Educational attainment, vaccination motivation, and access to flu shots were the primary factors in establishing the vaccination literacy interactive-critical scale. Gender, monthly income, purpose, and ability to get vaccinated against the flu all received higher scores than other factors. The COVID-19 vaccination literacy gap can be closed through targeted programs that reach people of different ages and genders, account for socioeconomic variations, and prioritize those with less education. The relevant ministries inform people transparently about the vaccines The information provided to the public about vaccines must also be presented clearly and understandably, and reliable sources must respond to questions in the local language

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