Vaccine-Preventable Disease In Adults, Cross-Sectional Study In KSA

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ABSTRACT

Objective: The main objective of the study is to evaluate vaccination coverage and the prevalence of vaccine-preventable illnesses in Saudi Arabia's adult population.

Methods: A cross-sectional study was conducted to assess the knowledge, attitudes, and practices regarding adult vaccinations among members of the community in Saudi Arabia. Data were collected through a structured questionnaire that included demographic information, medical history, and vaccine-related questions. The questionnaire was distributed both electronically and in paper form to ensure access to a diverse sample.

Results: The study included 630 participants. The study included 630 participants. The most frequent age among them was 18-29 years (n= 259, 41.1%), followed by 40-49 years (n= 164, 26%), then 50-59 years (n=111, 17.6%). The most frequent gender among study participants was female (n=450, 71.4%), followed by male (n=180, 28.6%). The most frequent region among study participants was central (n= 264, 41.9 %), followed by western (n= 152, 24.1%),

then northern (n=90, 14.3%), and outside the kingdom (n=79, 12.5%). Occupation of study participants, most of them were Government Employees (n=173, 27.5%), followed by students (n=134, 21.3%), then the Privet sector (n=126, 20%), and unemployed (n=113, 17.9%). Monthly income of study participants, with most of them less than 3,000 (n= 303, 48.1%), followed by 10,000–14,999 (n= 151, 24%%), and then 6,000–9,999 (n=103, 16.3%), the least monthly income was 3,000–5,999 (n= 73, 11.6%). Participants were asked Do you regularly visit a healthcare provider (at least once per year). Most of the participants answered yes (n=330, 52.4%), followed by no (n=300, 47.6%). Participants were asked, Have you ever refused or delayed a recommended adult vaccine Most of the participants answered no (n=478, 75.9%), followed by yes (n=152, 24.1%). Participants were asked whether they would be willing to receive an adult if provided for free at their nearest health center. The majority responded maybe (n = 287, 45.6%), followed by yes (n = 251, 39.8%), while a smaller proportion answered no (n = 92, 14.6%).

Conclusion: The results indicate a strong statistically significant association between willingness to receive adult vaccines and several demographic and health-related characteristics of the participants.

INTRODUCTION

One of the biggest achievements in the field of public health is thought to be vaccination. Through lowering mortality and morbidity from a variety of infectious diseases, vaccination programs save the lives of millions of adults and children each year. **[1]** To lower the incidence and prevalence of vaccine-preventable diseases (VPDs), vaccination programs depend on a high uptake rate. Additionally, by slowing the spread of VPDs and lowering the risk of infection among high-risk groups and exposed individuals within the community, high vaccination coverage rates offer indirect protection for the entire population, often known as herd immunity. **[2]** Most wealthy countries have high childhood vaccination rates, indicating that vaccination is still largely regarded as a public health precaution in these nations.**[3]**

However, a significant portion of the population may be undervaccinated, as these national figures may conceal. Communities in many nations that were either under-vaccinated or not vaccinated were found to be associated with the appearance of outbreaks of VPDs, including measles, poliomyelitis, and pertussis. **[4]** Even those who have had vaccinations may have significant doubts and reservations about them, according to a number of studies. These worries about the effectiveness and safety of vaccines pose a threat to the work that vaccination programs around the world do. In Saudi Arabia, there have been recent reports of vaccine hesitancy. 17% of the participants in Alabbad et al.'s study expressed reluctance to get the influenza vaccine. Additionally, it was demonstrated by Alsubaie et al. that 20% of Saudi parents were hesitant to get vaccinated. **[5], [6]**

When people delay accepting or refusing vaccines even when the public has access to vaccination services, this is known as vaccine reluctance. Vaccine hesitancy is influenced by a number of factors, including the vaccine's type, timing, and location. **[7]** Complacency, convenience, and confidence are some of the factors that also affect the development of vaccine reluctance. Since vaccine hesitancy is not directly linked to vaccine uptake, it is difficult to take a broad view of it. People who are vaccine-hesitant may promptly accept all advised vaccinations but still harbor serious concerns about getting them. Because of this, vaccine reluctance may differ from one vaccine to another. Additionally, some people may be wary of

the flu shot, yet they readily accept all other vaccinations. As a result, recent vaccinations tend to make people more hesitant about getting them. **[8], [9]**

In addition to taking into account a variety of factors that may influence the decision-making process, such as prior experiences with healthcare services, family histories, emotions, and peer discussion, it is important to consider a wider socio-cultural framework when researching various factors that influence vaccine acceptance, including vaccination decision-making. **[10], [11]**

One of the best public health measures for preventing and controlling infectious diseases is vaccination, which is widely acknowledged. The incidence, severity, and mortality linked to many communicable diseases have been considerably decreased over the past century thanks to vaccines. **[12], [13]** Immunization programs around the world have historically prioritized childhood vaccination, but adult vaccination is becoming increasingly recognized as being crucial for reducing the burden of disease, particularly in older and vulnerable populations. In addition to providing individual protection, adult vaccinations also lower healthcare costs, enhance quality of life, and help create herd immunity. **[14]**

Rapid urbanization, changes in lifestyle, rising chronic disease rates, and regular exposure to large-scale mass gatherings like the Hajj and Umrah have all increased the risk of adult vaccine-preventable disease (VPD) outbreaks in Saudi Arabia. The Kingdom's adult vaccination rate is still below ideal, even though vaccines are available to prevent diseases like tetanus, diphtheria, pertussis, influenza, hepatitis B, human papillomavirus (HPV), and pneumococcal infections. **[15]. [16]** Certain groups are particularly at risk but frequently under-immunized, including the elderly, healthcare professionals, those with diabetes or cardiovascular disease, and people with impaired immune systems.

Comprehensive adult vaccination programs are essential, as the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have underlined time and time again. In many nations, including Saudi Arabia, there is still a sizable disparity in implementation, awareness, and access. The dearth of information regarding the epidemiology of VPDs in adults is one of the major obstacles. Policymakers' capacity to create and implement efficient adult vaccination schedules and awareness campaigns is hampered by this shortcoming. **[17], [18]**

Low adult vaccine uptake has been noted in previous Gulf research for a number of reasons, including a lack of information, a perception of low risk, logistical difficulties, and a lack of advice from medical professionals. Moreover, vaccination hesitation may also be influenced by cultural views and false information. **[19]**

The goal of extending adult immunization services is in line with Saudi Arabia's Vision 2030, which stresses preventative healthcare as a national purpose. In light of this, it is imperative to carry out a thorough analysis of the prevalence of diseases that can be prevented by vaccination among Saudi adults. Understanding the most common VPDs in adults, their risk factors, public awareness, and vaccine hurdles can all be gained from a cross-sectional survey. The findings of this kind of research can assist in developing focused vaccination campaigns, direct resource allocation, and support evidence-based legislation.

This research aims to close the knowledge gap by assessing adult immunization status and identifying VPD high-risk populations in different parts of Saudi Arabia. In order to support national initiatives to lower avoidable morbidity and death and promote a preventive health culture among adults, the research will concentrate on both illness prevalence and behavioral variables.

METHODS

Study design

In order to determine the prevalence of vaccine-preventable diseases (VPDs) and related risk factors among Saudi Arabian adults, this study will use a cross-sectional approach. The cross-sectional design makes it possible to collect data at a particular moment in time, which is perfect for determining prevalence and assessing correlations between factors, including health habits, knowledge, and immunization status.

Study approach

A cross-sectional study design was adopted to assess the knowledge, attitudes, and practices regarding adult vaccinations among members of the community. Data were collected using a structured self-administered questionnaire that included demographic information, medical history, participants' knowledge about vaccines, and related behaviors. The questionnaire was distributed both electronically and in paper form to ensure wide accessibility and inclusion of diverse population groups across various regions.

Study population

To ensure geographic and demographic diversity, the study will be carried out in a few chosen urban and rural areas within the Kingdom of Saudi Arabia, spanning many provinces. Adult citizens who are at least 18 years old, of both sexes, and come from a range of socioeconomic and professional backgrounds will be the target market.

Criteria for Inclusion:

- ✧ Saudi Arabian residents who are at least eighteen years old
- ✧ Participation willingness and informed consent
- ✧ Saudi nationals and foreigners alike

Study sample

A multistage stratified random sampling technique will be used:

- Stratification by region (Central, Eastern, Western, Northern, Southern)
- Random selection of healthcare centers, universities, public venues, and workplaces
- Systematic random sampling of eligible individuals at each selected site

Study tool

For the current study, a questionnaire was adopted for data collection, which was also categorized as a study tool.

Data collection

Data will be collected using a structured questionnaire, designed in both Arabic and English. Data Analysis.

Data analysis

Descriptive statistics will be used to summarize the demographic characteristics of the study participants, including age, gender, region, marital status, education level, occupation type, and monthly income, as well as medical history and chronic diseases. Frequencies and percentages will be calculated. To examine the relationship between demographic variables and participants' knowledge, beliefs, and practices regarding adult vaccinations, the Chi-square test will be used to determine the significance of associations between categorical variables.

Ethical considerations

It will be carried out on 10% of the total respondents (may be 25-30), and the results will be

checked thereof. Further, any type of discrepancy will be removed, and the questionnaire or data sheet will be revised. A pilot study may also be conducted to state the precision level of the statistical tools and even the selection criteria of the respondents. The above-stated process will be followed throughout the pilot study, and the outcomes will be analyzed. The duration, manner, and viability will also be evaluated.

RESULTS

The study included 630 participants. The most frequent age among them was 18-29 years (n= 259, 41.1%), followed by 40-49 years (n= 164, 26%), then 50-59 years (n=111, 17.6%). Figure 1 shows the age distribution among study participants. The most frequent gender among study participants was female (n=450, 71.4%), followed by male (n=180, 28.6%). Figure 2 shows the gender distribution among study participants.

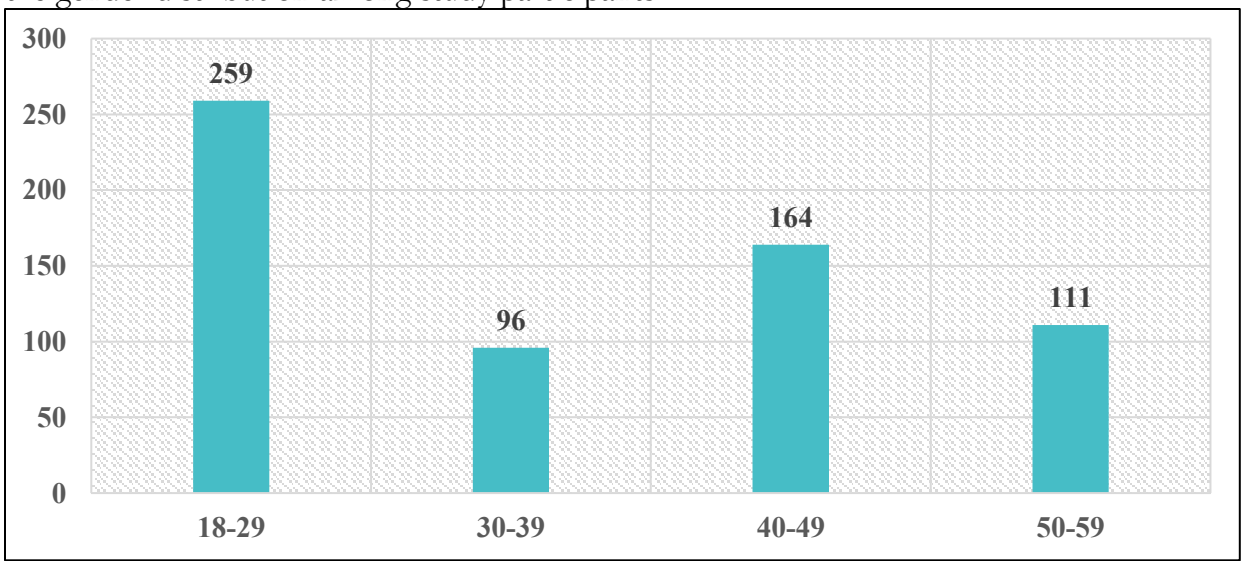

Figure 1: Age distribution among study participants

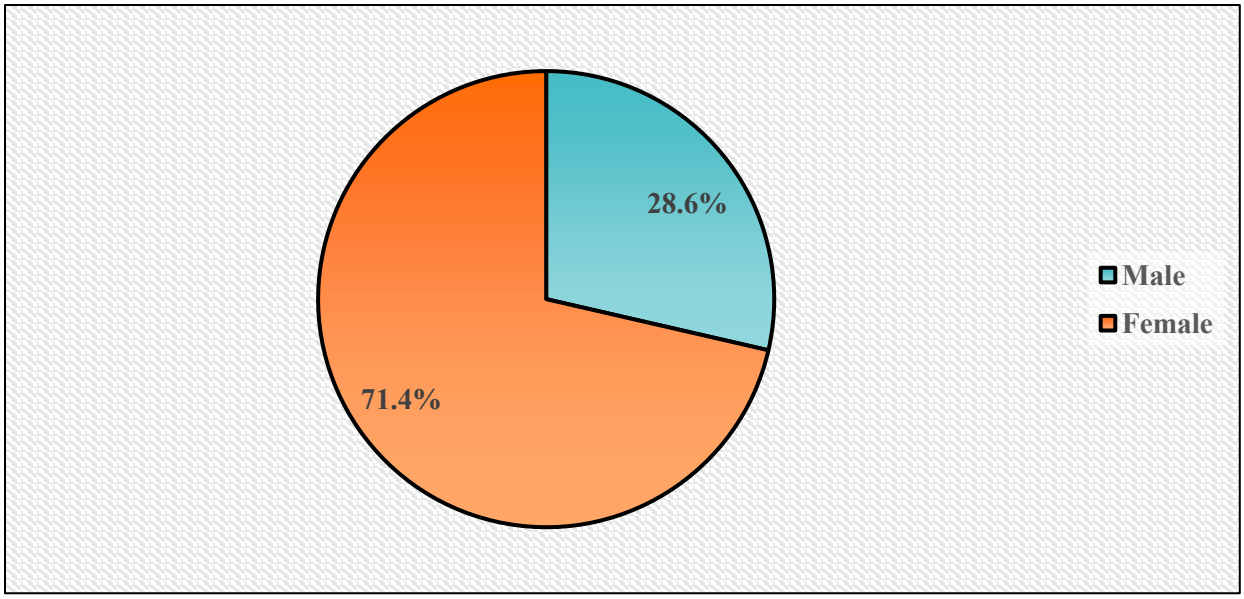

Figure 2: Gender distribution among study participants

The most frequent region among study participants was central (n= 264, 41.9 %), followed by western (n= 152, 24.1%), then northern (n=90, 14.3%), and outside the kingdom (n=79, 12.5%). Figure 3 shows the region among study participants.

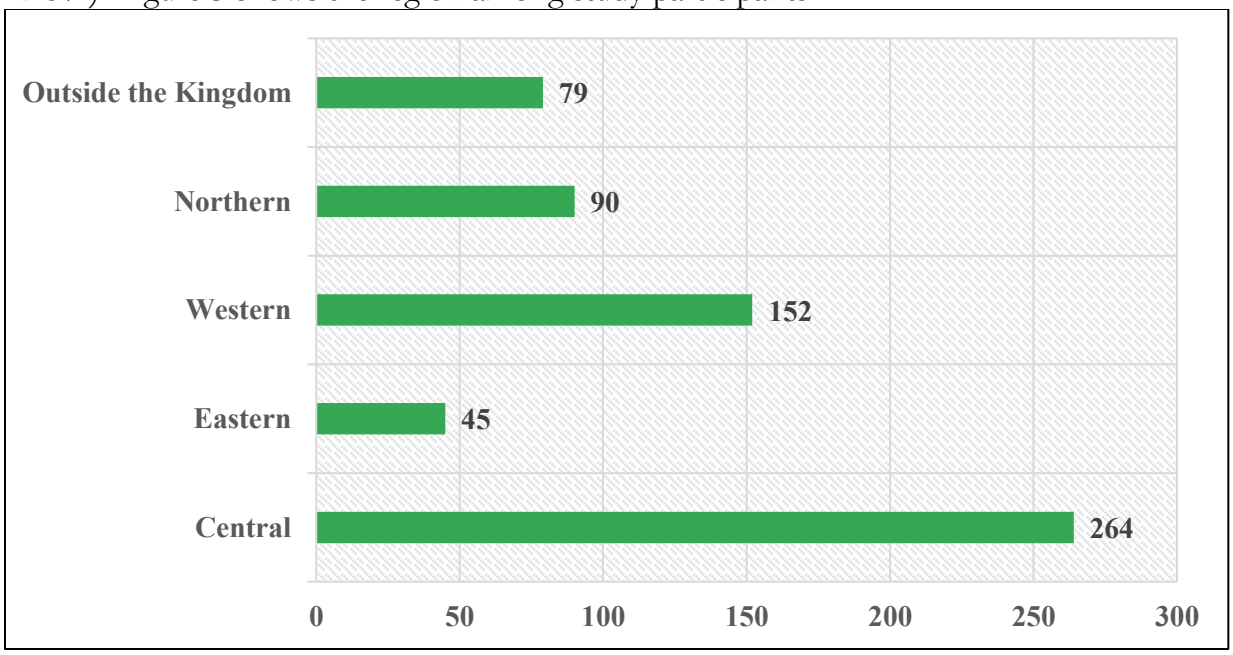

Figure 3: region among study participants

Occupation of study participants, most of them were Government Employees (n=173, 27.5%), followed by students (n=134, 21.3%), then the Privet sector (n=126, 20%), and unemployed (n=113, 17.9%).

Monthly income of study participants, with most of them less than 3,000 (n= 303, 48.1%), followed by 10,000–14,999 (n= 151, 24%%), and then 6,000–9,999 (n=103, 16.3%), the least monthly income was 3,000–5,999 (n= 73, 11.6%). The monthly income among study participants is shown in Figure 4.

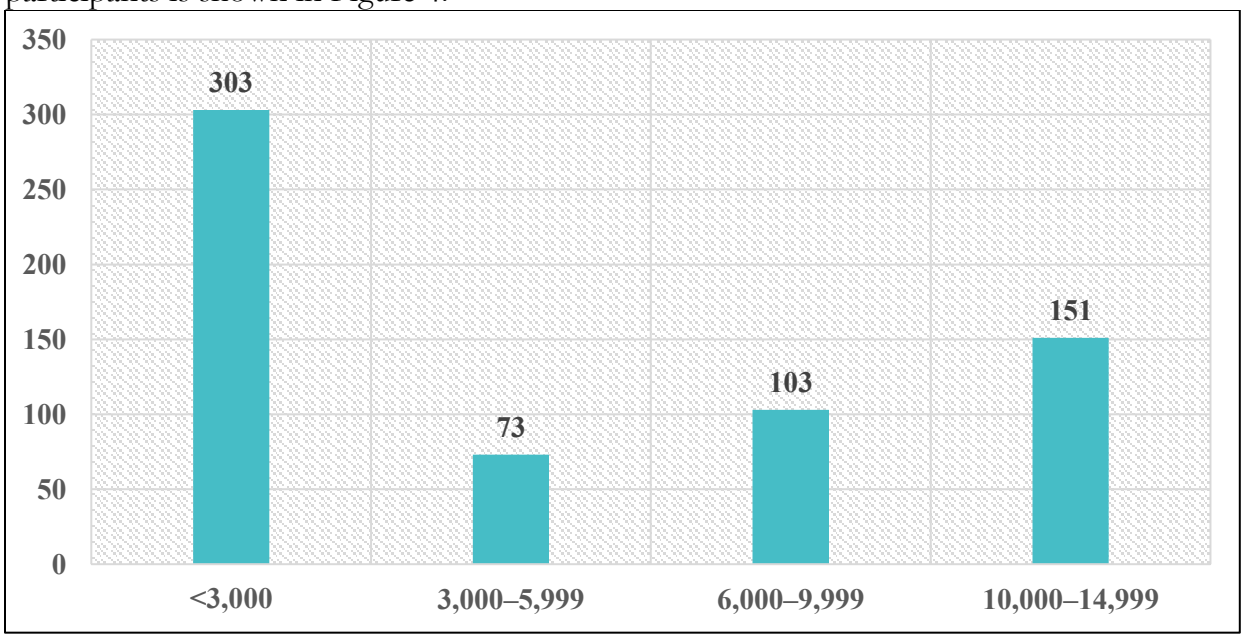

Figure 4: Monthly income distribution among study participants

Participants were asked Do you regularly visit a healthcare provider (at least once per year). Most of the participants answered yes (n=330, 52.4%), followed by no (n=300, 47.6%). Figure 5 shows the frequencies of the participants who regularly visit a healthcare provider.

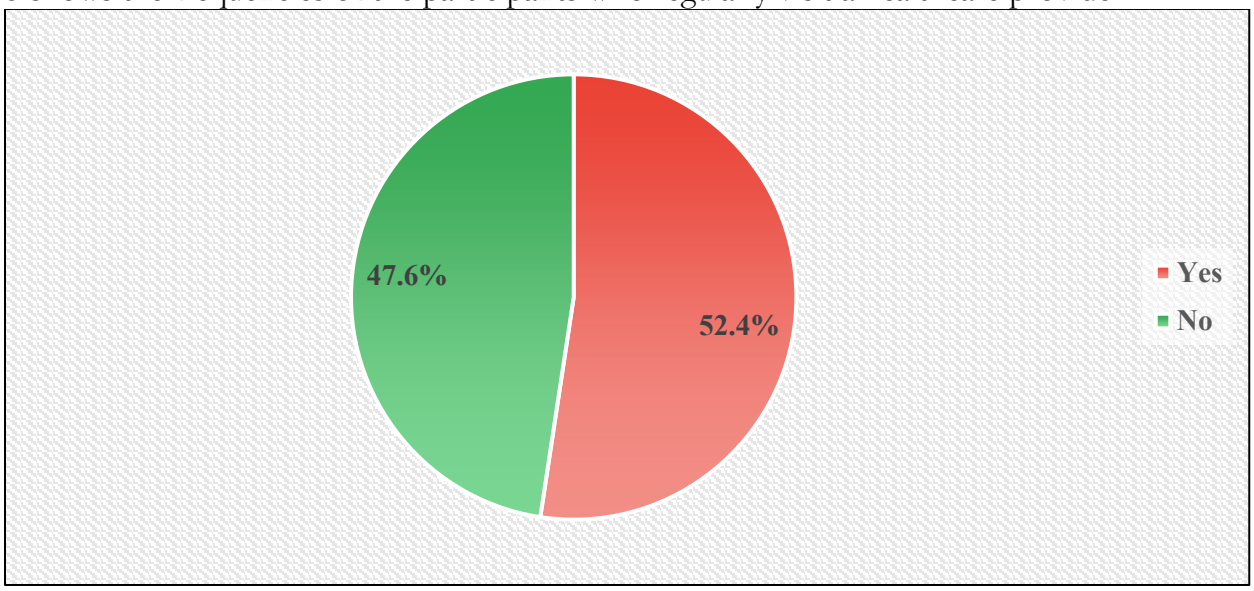

Figure 5: frequencies of the participants who regularly visit a healthcare provider

Participants' perceptions regarding adult vaccinations were assessed using several statements measuring their agreement or disagreement concerning the effectiveness and safety of vaccines, concerns about side effects, and the influence of religious beliefs on vaccination decisions. The following Table 1 presents the frequencies and percentages of responses to each statement.

Table 1: Participants' Attitudes toward Adult Vaccination

statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Do you believe adult vaccinations can prevent severe complications of chronic diseases	185 (29.4%)	220 (34.9%)	178 (28.3%)	32 (5.1%)	15 (2.4%)
Vaccines are safe for adults	181 (28.7%)	222 (35.2%)	193 (30.6%)	29 (4.6%)	5 (0.8%)
I am concerned about vaccine side effects	162 (25.7%)	214 (34%)	190 (30.2%)	51 (8.1%)	13 (2.1%)
Religious beliefs influence my decision to get vaccinated	160 (25.4%)	214 (34%)	188 (29.8%)	54 (8.6%)	14 (2.2%)

Participants were asked, Have you ever refused or delayed a recommended adult vaccine Most of the participants answered no (n=478, 75.9%), followed by yes (n=152, 24.1%).

Participants were asked whether they would be willing to receive an adult if it were provided free at their nearest health center. The majority responded maybe (n = 287, 45.6%), followed by yes (n = 251, 39.8%), while a smaller proportion answered no (n = 92, 14.6%).

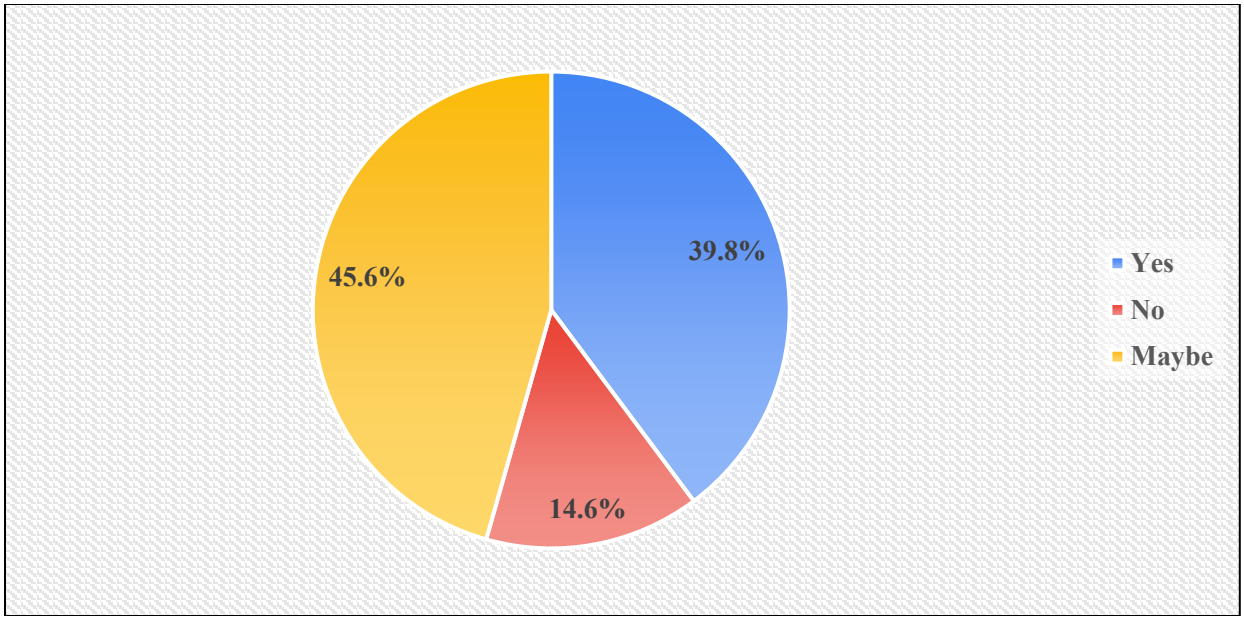

Figure 6: Provide Free Vaccination among study participants

CONCLUSION

The results indicate a strong statistically significant association between willingness to receive adult vaccines and several demographic and health-related characteristics of the participants.

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ANNEX 1: DATA COLLECTION TOOL

1. Age:

☐ 18–29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60-69 ☐ 70 years and more

2. Gender:

☐ Male ☐ Female

3. Region:

☐ Central ☐ Eastern ☐ Western ☐ Northern ☐Southern ☐Outside the Kingdom

4. Marital Status:

☐ Single ☐ Married ☐ Divorced ☐ Widowed

5. Education:

☐ Primary ☐ Secondary ☐ Graduate ☐ Masters

6. Occupation:

☐ Unemployed ☐ Student ☐ Government Employee ☐ Private Sector

☐ Healthcare Worker ☐ Other: _____

7. Monthly income:

☐ <3,000 ☐ 3,000–5,999 ☐ 6,000–9,999 ☐ 10,000–14,999 ☐ 15,000 and above

8. Do you suffer from any of the following chronic conditions? (Check all that apply)

☐ Diabetes ☐ Hypertension ☐ Heart disease ☐ Asthma ☐ Cancer ☐ None

9. Do you regularly visit a healthcare provider (at least once per year)?

☐ Yes ☐ No

10. Have you ever received the following vaccines as an adult (after age 18)? (Check all that apply)

☐ Influenza (Flu shot) ☐ Pneumococcal vaccine ☐ Hepatitis B vaccine

☐ HPV vaccine ☐ Tdap (Tetanus, Diphtheria, Pertussis) ☐ COVID-19 vaccine

☐ MMR (Measles, Mumps, Rubella) ☐ Not sure ☐ I have not received any vaccines as an adult

11. Have you ever been diagnosed with any of the following? (You may select more than one answer)

☐ Influenza (Seasonal Flu) ☐Pneumococcal infections (Pneumonia)

☐Hepatitis B ☐Human Papillomavirus (HPV)

☐Whooping Cough (Pertussis) ☐Coronavirus (COVID-19)

☐Measles, Mumps ☐Herpes Zoster (Shingles)

☐Herpes ☐None

12. Do you keep a record of your adult vaccination history after 18 years old?
☐ Yes ☐ No ☐ Not sure
13. How familiar are you with the term "vaccine-preventable diseases"?
☐ Not at all familiar ☐ Slightly familiar ☐ Moderately familiar ☐ Very familiar
14. Which of the following do you think vaccines protect adults from? (Check all that apply)
☐ Flu ☐ Hepatitis ☐ COVID-19 ☐ Chickenpox ☐Herpes Zoster (Shingles)
☐ Measles ☐Whooping Cough (Pertussis) ☐Human Papillomavirus (HPV)
☐ Tuberculosis ☐ I don't know
15. Are vaccines important for adults as well as children?
☐ Yes ☐ No ☐ Not sure
16. Do you believe adult vaccinations can prevent severe complications of chronic diseases?
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
17. Vaccines are safe for adults:
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
18. I am concerned about vaccine side effects:
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
19. Religious beliefs influence my decision to get vaccinated:
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
20. What prevents you from getting vaccinated? (Check all that apply)
☐ Lack of awareness ☐ Fear of side effects
☐ Cost or unavailability ☐ No time ☐ Don't think it's necessary
☐ Cultural or religious reasons ☐ Other: _____
21. Have you ever refused or delayed a recommended adult vaccine?
22. ☐ Yes ☐ No If yes, please state the reason: _____
23. Do you work in a high-risk environment (e.g., healthcare, travel, food service)?
☐ Yes ☐ No
24. Have you traveled internationally in the past 2 years?
☐ Yes ☐ No
25. Have you received a vaccine as a requirement for Hajj, Umrah, or travel?
☐ Yes ☐ No
26. Would you be willing to receive adult vaccines if provided free at your nearest health center?
☐ Yes ☐ No ☐ Maybe

APPENDIX 2: Participants' responses to scale items

age	Frequency	Percent
18-29	259	41.1
30-39	96	15.2
40-49	164	26.0
50-59	111	17.6
Total	630	100.0

gender	Frequency	Percent
Male	180	28.6
Female	450	71.4
Total	630	100.0

region	Frequency	Percent
Central	264	41.9
Eastern	45	7.1
Western	152	24.1
Northern	90	14.3
Outside the Kingdom	79	12.5
Total	630	100.0

Marital Status	Frequency	Percent
Single	246	39.0
Married	354	56.2
Divorced	23	3.7
Widowed	7	1.1
Total	630	100.0

Education	Frequency	Percent
Primary	7	1.1
Secondary	141	22.4
Graduate	451	71.6
Masters	31	4.9
Total	630	100.0

Occupation	Frequency	Percent

Unemployed	113	17.9
Student	134	21.3
Government Employee	173	27.5
Private Sector	126	20.0
Other:	84	13.3
Total	630	100.0

Monthly income	Frequency	Percent
<3,000	303	48.1
3,000–5,999	73	11.6
6,000–9,999	103	16.3
10,000–14,999	151	24.0
Total	630	100.0

visit healthcare provider	Frequency	Percent
Yes	330	52.4
No	300	47.6
Total	630	100.0

keep record adult vaccination history	Frequency	Percent
Yes	186	29.5
No	231	36.7
Not sure	213	33.8
Total	630	100.0

vaccines important adults	Frequency	Percent
Yes	424	67.3
No	67	10.6
Not sure	139	22.1
Total	630	100.0

prevent severe complications	Frequency	Percent
Strongly Agree	185	29.4
Agree	220	34.9

Neutral	178	28.3
Disagree	32	5.1
Strongly Disagree	15	2.4
Total	630	100.0

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Vaccines are safe for adults	181 (28.7%)	222 (35.2%)	193 (30.6%)	29 (4.6%)	5 (0.8%)
I am concerned about vaccine side effects	162 (25.7%)	214 (34%)	190 (30.2%)	51 (8.1%)	13 (2.1%)
Religious beliefs influence my decision to get vaccinated	160 (25.4%)	214 (34%)	188 (29.8%)	54 (8.6%)	14 (2.2%)

delayed recommended adult vaccine	Frequency	Percent
Yes	152	24.1
No	478	75.9
Total	630	100.0

work high-risk environment	Frequency	Percent
Yes	125	19.8
No	505	80.2
Total	630	100.0

provided free	Frequency	Percent
Yes	251	39.8
No	92	14.6
Maybe	287	45.6
Total	630	100.0

Do you suffer from any of the following chronic conditions? (Check all that apply)	freq.	%
Diabetes	62	9.8%
Hypertension	42	6.7%
Heart disease	22	3.5%

Asthma	38	6.0%
Cancer	4	0.6%
None	462	73.3%

Have you ever received the following vaccines as an adult (after age 18)? (Check all that apply)	freq.	%
Influenza (Flu shot)	186	27.6%
Pneumococcal vaccine	18	2.7%
Hepatitis B vaccine	37	5.5%
HPV vaccine	15	2.2%
Tdap (Tetanus, Diphtheria, Pertussis)	29	4.3%
COVID-19 vaccine	145	21.5%
MMR (Measles, Mumps, Rubella)	69	10.2%
Not sure	104	15.4%
I have not received any vaccines as an adult	71	10.5%

Have you ever been diagnosed with any of the following? (You may select more than one answer)	freq.	%
Influenza (Seasonal Flu)	339	38.7%
Pneumococcal infections (Pneumonia)	13	1.5%
Hepatitis B	5	0.6%
Human Papillomavirus (HPV)	1	0.1%
Whooping Cough (Pertussis)	4	0.5%
Coronavirus (COVID-19)	299	34.2%
Measles, Mumps	18	2.1%
Herpes Zoster (Shingles)	16	1.8%
Herpes	0	0.0%
none	180	21%

Which of the following do you think vaccines protect adults from? (Check all that apply)	freq.	%
Flu	326	15%
Hepatitis	206	9.6%
COVID-19	273	12.7%
Chickenpox	170	7.9%
Herpes Zoster (Shingles)	124	5.8%
Measles	198	9.2%
Whooping Cough (Pertussis)	176	8.2%
Human Papillomavirus (HPV)	346	16.1%
Tuberculosis	145	6.7%
I don't know	185	8.6%

What prevents you from getting vaccinated? (Check all that apply)	freq.	%
Lack of awareness	103	11.9%
Fear of side effects	427	49.5%
Cost or unavailability	25	2.9%
No time	145	16.8%
Don't think it's necessary	109	12.6%
Cultural or religious reasons	38	4.4%
Other: _____	15	1.7%

Chi-square Test:

Test Statistics

	age	gender	region	Provided free
Chi-Square	103.422[a]	115.714[b]	236.397[c]	102.543[d]
df	3	1	4	2

Asymp. Sig.	.000	.000	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 157.5.
b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 315.0.
c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 126.0.
d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 210.0.

Test Statistics

	age	gender	region	Marital Status	Education	Monthly income	Visit healthcare provider
Chi-Square	103.422[a]	115.714[b]	236.397[c]	553.556[a]	794.076[a]	198.876[a]	1.429[b]
df	3	1	4	3	3	3	1
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.232

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 157.5.
b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 315.0.
c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 126.0.

The results of the Chi-Square test indicate a strong statistically significant association between willingness to receive adult vaccines and several demographic and health-related characteristics of the participants. All variables showed p-values < 0.001, demonstrating highly significant relationships, except for one variable (visiting a healthcare provider), which did not show statistical significance.