

Appendix

Appendix A: Study Questionnaire (English Version)

Survey Title: Knowledge, Attitudes and Practices Regarding Meningococcal Meningitis and Vaccination in Saudi Arabia

Introduction and Consent:

This research survey aims to assess public understanding and perceptions of meningitis (a brain and spinal cord infection) and its vaccine in Saudi Arabia. Your participation is voluntary and anonymous. All responses will be kept confidential and used for academic research purposes only. By proceeding, you provide informed consent to participate.

Section A: Socio-Demographic Information

- A1. Gender: ☐ Female ☐ Male
- A2. How old were you on your last birthday? _____
- A3. What is your marital status? ☐ Married ☐ Single (never married) ☐ Other _____
- A4. What is your nationality? ☐ Saudi ☐ Other _____
- A5. Residence (city)? _____
- A6. What is your occupation? _____
- A7. What is your highest level of education? _____

Section B: Knowledge about Meningococcal Meningitis

- B1. Meningitis is an inflammation of the membranes covering the brain and spinal cord. Have you ever heard of it?
☐ No ☐ Yes
- B2. How is meningitis transmitted?
☐ Droplets of respiratory fluid ☐ Through foods ☐ Through insects ☐ I do not know
- B3. Meningitis affects (more than one answer is possible):
☐ Infants ☐ Children ☐ Adolescents ☐ Adults ☐ Elderly ☐ I do not know
- B4. How can you prevent meningitis? (more than one answer is possible)
☐ Avoiding crowded places ☐ Using antibiotics ☐ With the administration of a vaccine ☐ I do not know ☐ Other _____
- B5. Meningitis is a serious disease:
☐ Agree ☐ Disagree ☐ Uncertain

Section C: Attitudes and Behaviors

- C1. In Saudi Arabia, is a vaccine available against meningococcal meningitis?
☐ I do not know ☐ No ☐ Yes
- C2. How worried are you that you, your children or someone you know can contract meningitis? (1=not worried; 10=very worried)
1---2---3---4---5---6---7---8---9---10
- C3. How useful do you believe the administration of a vaccine against meningococcal meningitis to be? (1=not useful; 10=very useful)
1---2---3---4---5---6---7---8---9---10
- C4. Would you receive the vaccination against meningococcal meningitis?

☐ No ☐ Yes

If NO, why not? (Select all that apply):

- ☐ Meningitis is not frequent in Saudi Arabia
- ☐ The vaccine is not useful
- ☐ The vaccine is not safe
- ☐ The vaccine is only recently available
- ☐ I do not believe in the usefulness of vaccinations
- ☐ I am opposed to many vaccinations
- ☐ The vaccine is expensive
- ☐ The vaccine was not recommended by my physician

If YES, why? (Select all that apply):

- ☐ Meningitis is frequent in Saudi Arabia
- ☐ The vaccine is useful
- ☐ The vaccine is safe
- ☐ The vaccine has been in use for a long time
- ☐ I believe in the usefulness of vaccinations
- ☐ I support many vaccinations
- ☐ The vaccine is not expensive
- ☐ The vaccine was recommended by my physician

Section D: Information Sources

D1. Have you received information about the meningococcal meningitis vaccine? (Select all that apply)

- ☐ No
- ☐ Yes, from whom? ☐ Mass media (TV/Newspaper) ☐ Physicians/Healthcare providers ☐ Internet ☐ Friends ☐ Family ☐ Other _____

D2. Do you feel you need more information about the meningococcal meningitis vaccine?

- ☐ No
- ☐ Yes, from whom? (Select all that apply): ☐ Mass media (TV/Newspaper) ☐ Physicians/Healthcare providers ☐ Internet ☐ Friends ☐ Family ☐ Other _____

Appendix B: Detailed Frequency Distributions for Knowledge Questions

Table B1. Detailed Frequency for Knowledge of Meningitis Transmission (B2)

Response	Frequency (n)	Percentage (%)
Droplets of respiratory fluid (Correct)	141	36.9
Through foods	21	5.5
Through insects	241	63.1
I do not know	0	0.0
Total	382	100.0

Table B2. Detailed Frequency for Knowledge of Meningitis Prevention (B4)

Response*	Frequency (n)	Percentage (%)**
With the administration of a vaccine	232	60.7
Avoiding crowded places	178	46.6

Using antibiotics	95	24.9
I do not know	15	3.9
Total Respondents	382	100.0
*Multiple responses allowed. **Percentages are calculated out of total respondents (N=382), summing to >100%.		

Appendix C: Detailed Logistic Regression Output Tables

Table C1. Full Model for Binary Logistic Regression Predicting Good Knowledge (Score ≥ 2)

Variable	Category (Reference)	B	S.E.	Wald	d f	p-value	Odds Ratio [Exp(B)]
Gender	Male (Female)	0.659	0.467	1.991	1	0.158	1.933
Age (in Years)	Continuous	0.055	0.027	4.273	1	0.039	1.057
Marital Status	Married (Single)	-0.010	0.500	0.000	1	0.985	0.990
Residence	Other (Mecca)	-0.876	1.013	0.747	1	0.388	0.417
Occupation	Student (Worker)	-2.156	0.353	37.217	1	<0.001	0.116
Education	Diploma (Reference)	3.121	1.862	2.808	1	0.094	22.670
	Middle School	22.315	40192.969	0.000	1	0.999	>1.0e9
	High School	2.317	1.523	2.313	1	0.128	10.142
	Bachelor's	2.493	1.508	2.735	1	0.098	12.100
	Master/PhD	3.866	1.799	4.618	1	0.032	47.746
Nationality	Non-Saudi (Saudi)	-1.163	0.508	5.235	1	0.022	0.313
Constant		-2.041	2.025	1.016	1	0.314	0.130
Model $\chi^2(11) = 62.887$, $p < 0.001$. Cox & Snell $R^2 = 0.152$, Nagelkerke $R^2 = 0.218$.							

Table C2. Full Model for Binary Logistic Regression Predicting Willingness to Receive Vaccine

Variable	Category (Reference)	B	S.E.	Wald	d f	p-value	Odds Ratio [Exp(B)]
Gender	Male (Female)	0.358	0.547	0.429	1	0.513	1.431
Age (in Years)	Continuous	0.000	0.027	0.000	1	0.993	1.000
Marital Status	Married (Single)	-0.707	0.649	1.189	1	0.275	0.493

Residence	Other (Mecca)	-0.457	1.252	0.133	1	0.715	0.633
Occupation	Student (Worker)	-1.402	0.391	12.898	1	<0.001	0.246
Education	Diploma (Reference)	0.691	30543.132	0.000	1	1.000	1.997
	Middle School	-0.707	46410.447	0.000	1	1.000	0.493
	High School	-19.381	23204.630	0.000	1	0.999	0.000
	Bachelor's	-19.794	23204.630	0.000	1	0.999	0.000
	Master/PhD	-20.593	23204.630	0.000	1	0.999	0.000
Nationality	Non-Saudi (Saudi)	0.147	0.698	0.044	1	0.833	1.158
Constant		22.621	23204.630	0.000	1	0.999	>1.0e9
Model $\chi^2(11) = 27.235$, $p = 0.004$. Cox & Snell $R^2 = 0.069$, Nagelkerke $R^2 = 0.126$.							

Appendix D: Detailed Data on Sources of Information and Information Needs

Table D1. Frequency of Information Sources about Meningitis (D1)*

Source	Frequency Selected (n)	Percentage of Total Sample (N=382)
Healthcare Provider	214	56.0%
Internet	89	23.3%
Friend	46	12.0%
Formal Studying/Education	33	8.6%
Mass Media (TV/Newspaper)	21	5.5%
Family	18	4.7%
Don't Know Source	2	0.5%
*Participants could select more than one source.		

Table D2. Preferred Sources for Additional Information (D2)*

Preferred Source	Frequency Selected (n)	Percentage of Total Sample (N=382)
Healthcare Provider	236	61.8%
Internet	164	42.9%
Friend	62	16.2%
Mass Media (TV/Newspaper)	51	13.4%
Family	48	12.6%
Faculty Member (Medical College)	1	0.3%
*Participants could select more than one source. N=318 participants expressed a need for more information.		

Appendix E: Sample Size Calculation

The minimum sample size was calculated using the OpenEpi version 3.0 online calculator for an infinite population ($N > 1,000,000$), using the formula for a descriptive cross-sectional study:

$$n = [Z^2 * p(1-p)] / d^2$$

Where:

- **Z** = Z statistic for 95% confidence level (1.96)
- **p** = Expected prevalence/proportion of good knowledge. Lacking prior data, a conservative estimate of 50% (0.5) was used to maximize sample size.
- **d** = Absolute precision/ margin of error (5% or 0.05)

Calculation:

$$n = [(1.96)^2 * 0.5 * (1-0.5)] / (0.05)^2$$

$$n = [3.8416 * 0.25] / 0.0025$$

$$n = 0.9604 / 0.0025$$

$$n = \mathbf{384.16}$$

Therefore, the minimum required sample size was **385** participants.

Appendix F: Study Duration/ Study Timeline:

Task	month						
	1	2	3	4	5	6	7
Literature review							
Writing proposal							
Proposal approval							
Data collection							

Data analysis							
Progress report							
Writing the manuscript							