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Research Article

**KNOWLEDGE AND ATTITUDES ABOUT MENINGOCOCCAL
VACCINATION AMONG HAJJ PILGRIMS FROM EGYPT**Wahhaj Hani Rajab ^{1*}, Alhussein Abdullah Alsharif ²¹College of Medicine, Umm Al-Qura University; Mecca, KSA²College of Medicine, King Abdulaziz University; Jeddah, KSA**Abstract :**

Background: Hajj is a unique mass gathering event that is associated with a high risk of transmission of infectious diseases particularly meningococcal meningitis. The aim of this research was to assess the knowledge, attitude, and practice of Egyptian pilgrims towards meningococcal meningitis.

Methods: This was a cross-sectional descriptive study carried out via distributing a questionnaire to 442 Egyptian pilgrims attending the Hajj in 2017. The questionnaire included demographic data and questions about the meningococcal vaccines.

Results: Among 442 participants, 72% were males, 94% were married, and 40% had a college level education. About 88% and 82% were aware of the necessity to receive the meningococcal vaccine when required and when just recommended, respectively. However, only 48% and 55% had heard of the disease and vaccine, respectively. Awareness of the disease details (epidemiology, symptoms, vaccination timing, schedule, and management) was present among less than one third of the participants. Educational level had a significant impact on knowledge of all the details ($p < 0.001$), whilst other demographic data had an impact on only few questions.

Conclusions: Despite the good attitudes of the Egyptian pilgrims towards receiving the meningococcal vaccine before the Hajj, knowledge and awareness about the disease and its vaccine remain defective. Education is a strong determinant of awareness. Therefore, health authorities are highly recommended to

Keywords: Attitudes, Egyptian pilgrims, Hajj, Knowledge, meningococcal vaccination, vaccine.

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INTRODUCTION:

Hajj is a unique mass gathering event that is carried out once yearly at Mecca in Saudi Arabia annually. This mass gathering is associated with high risk of exposure to and transmission of various types of infections (such as zoonotic infections, food-borne diseases, and air-borne infections) among the population within Saudi Arabia and on a global scale.[1,2] Over the years, the Hajj pilgrimage has been linked to major outbreaks of communicable infections such as *Neisseria meningitidis* bacterial infection. [3,4] Therefore, the Saudi Arabia Ministry of Health established a vaccination policy to prevent such outbreaks of infection during the Hajj pilgrimage. [5] The vaccination policy was changed over the years in response to the major outbreaks of infection with different pathogens, and the current policy implies using a compulsory quadrivalent vaccine against meningococcal infections (ACYW135) for all pilgrims 10 days before attending the Hajj. In addition, pilgrims coming from endemic areas should also receive vaccines against polio and yellow fever viruses. [5,6] The polysaccharide pneumococcal vaccine is not mandatory, but is highly recommended for pilgrims above the age of 65 years. [7]

The aim of this research was to assess the knowledge and attitude among pilgrims from Egypt towards the meningococcal vaccination before the Hajj. Assessment of such issues is fundamental to ensure that the vaccination initiatives are efficient. More specifically, the research aimed to outline the implications of vaccination programs and strategies at the Hajj and to explore the level of awareness of the Egyptian pilgrims on the significance of meningococcal vaccination.

METHODS:

This was a descriptive cross-sectional study carried in Mecca in Saudi Arabia during the period from the 21st of August 2017 to the 20th of September 2017 during the Hajj pilgrimage. The study was carried out through distributing a written questionnaire to 442 Egyptian pilgrims attending the Hajj at this year. All Egyptian pilgrims above the age of 18 years who gave an oral acceptance consent to take the questionnaire were candidates for recruitment to this study. Non-probability convenience sampling technique was utilized in this research. Annually, approximately 5,000 Egyptians visit Saudi Arabia for the Hajj pilgrimage, and because 10-20% of the accessible population is an adequate sample in descriptive researches, a sample of 442 Egyptian pilgrims was used in this study.

The questionnaire included basic demographic questions about age, gender, nationality, marital status, and vaccination, and questions assessing the pilgrims' knowledge and attitudes about the meningococcal vaccination. These questions were: have you heard of meningitis? Have you heard of meningococcal vaccine? Is it important to receive a vaccine if this was required? Is it important to receive the vaccine if this was just recommended? Will you seek more information about this issue? Did you know that meningococcal meningitis is a bacterial disease that may result in dangerous symptoms? Did you know that meningococcal meningitis presents with headache, unconsciousness, and fever? Did you know that the meningococcal disease is transmitted via respiratory droplets? Did you know that the African countries have a high rate of meningococcal infection? Do you know what is the preventive or post-exposure management of meningococcal meningitis? Did you know that the vaccination interval of the meningitis vaccine is 3 to 5 years? Did you know that you should be vaccinated 10 days prior to travel for adequate protection against meningococcal disease? Is there a medication for meningococcal meningitis?

Data from the participants' answers were fed into the computer and analyzed using Statistical Package for Social Sciences (SPSS) version 20 (SPSS Inc., Chicago, Illinois, USA). To compare between categorical variables, Chi-square test was used. P values less than 0.05 were considered statistically significant. Correlations were made between the demographic data and the different questions.

RESULTS:

Among 442 participants recruited to this research, 319 (72%) were males and 407 (94%) were married. More than two thirds were above the age of 35 years: 22.2%, 35.5%, and 36.2% were aged 36-45 years, 46-55 years, and 56-70 years, respectively. As regards the education, 40% of the participants had a college degree, 19% were uneducated, 17% had a high school education, and 17% had an intermediate school education. The details of the demographic data are presented in table 1.

Regarding knowledge and attitudes towards the meningococcal vaccination, about half of the participants were aware of the meningitis (48%) and the meningococcal vaccine (55%). Of interest, the vast majority of the Egyptian pilgrims reported that they believe it is important to receive the vaccine if was required (82%) and even if it was just required (88%). Moreover, 73% stated that they would seek more information about this issue if indicated. On the

contrary, less than one third of the participants knew that meningococcal meningitis is a dangerous bacterial disease (30%), that it presents with headache, fever, and unconsciousness (28%), that it is transmitted via respiratory droplets (28%), or that it has a high prevalence among African countries (23%). Fewer patients knew about the preventive or post-exposure management of the disease, the vaccination interval, timing of vaccination, and the existence of medications for treatment with values of 22%, 21%, 31%, and 35%, respectively (table 2) (figure 1).

On studying the correlation between various demographic data and participants knowledge, it was obvious that various demographic characteristics were significantly correlated to knowledge and awareness about meningococcal meningitis and meningococcal vaccines (tables from 3 to 15). For instance, educational level was significantly correlated with knowledge of all the data included in the questionnaire with the exception of knowledge about the necessity of receiving the vaccine when required ($p < 0.001$). Of note, the higher the educational level, the higher the level of awareness about various aspects of the disease starting from general knowledge and ending with its prevention and management (tables 3-15). Gender was significantly correlated with few points of knowledge such as hearing about meningitis ($p = 0.07$), knowledge that it is necessary to receive the vaccine when required ($p = 0.019$), and awareness of the importance of seeking information about the disease ($p = 0.07$) (tables 3, 5, and 7). Basically, males were significantly more aware than females about those three aspects. Otherwise, no significant gender difference was noted among the remaining questions. Marital status had also affected the participants knowledge significantly. Married participants were more aware about the disease ($p = 0.011$), the vaccine ($p = 0.011$), the necessity of receiving the vaccine when required ($p = 0.019$), and the importance of receiving the vaccine even if it was just recommended ($p = 0.018$). However, single participants were more aware of the disease symptoms ($p = 0.045$) (tables 3-15). Age was also a significant factor impacting the participants knowledge. Of the various studied age groups, participants at the age group between 46-55 years had the best knowledge about the disease ($p = 0.014$), the vaccine ($p = 0.017$), the disease symptoms ($p = 0.002$), the route of infection ($p = 0.014$), the high prevalence of the disease in Africa ($p = 0.02$), the recommended vaccination interval ($p = 0.003$), and the existence of medications to treat the disease ($p = 0.04$).

DISCUSSION:

One of the fundamental steps to reduce the outbreaks of the Hajj-associated infections is to ensure the pilgrims are adequately aware of the importance of preventive policies to protect against such outbreaks. Because meningococcal meningitis had previously occurred in outbreaks among pilgrims particularly those from African countries, [4,8-10] the aim of this study was to assess the knowledge, awareness and attitudes of pilgrims from one of the African countries (Egypt) towards the meningococcal vaccine and meningococcal meningitis. Many studies have assessed the pilgrims' awareness of the vaccination procedure on departure to the Hajj and evaluated the effectiveness of the vaccines used. [9,11,12] Recent studies to assess the practices, attitudes and knowledge of pilgrims on pre-Hajj vaccination indicated a lack of awareness among most pilgrims [5,13-15]. However, to the best of our knowledge, no previous research was conducted on pilgrims from Egypt and it is well-known that the Egyptian pilgrims constitute a significant proportion of the Hajj pilgrimage every year. Therefore, this study was carried out to explore the Egyptian pilgrims' awareness about the disease and vaccine.

The results of this survey demonstrated a significant lack of knowledge and awareness about meningococcal meningitis and its vaccines. Of more than 400 Egyptian pilgrims, less than half of them had ever heard of meningitis and only 55% had heard of the meningococcal vaccine. Moreover, only one fourth to less than one thirds of the participants knew about the symptoms of the disease, its epidemiology or widespread in African countries, its route of transmission, its preventive or post-exposure management measures, or the details of vaccination e.g. vaccination timing and recommended intervals. In agreement with these results, a survey conducted during the Hajj season in 2014 among 300 French pilgrims reported that only 24% of them were aware of the existence of meningococcal vaccine [16].

Despite the notable lack of awareness of the Egyptian pilgrims about the meningitis and the meningococcal vaccine, the vast majority of the participants (more than 80%) stated that they would receive the vaccine if it is required or even if it was just recommended. Furthermore, about three-fourths (73%) of them stated that they would seek information about that issue elsewhere. This is promising as it would probably reflect the importance and the potential effectiveness of health education about the importance of vaccines. This is particularly important because the overall risk

of contracting meningococcal infection among the general traveler is 0.4/100,000 travelers every month. [17] The risk is higher for Hajj up to 200/100,000. [3,4] The Kingdom of Saudi Arabia (KSA) has significant experience in the provision of public healthcare for gathered masses attained through years of managing large numbers of Hajj pilgrims. Religious festivals tend to attract huge numbers of pilgrims from every part of the globe posing potential risk to the spread of communicable diseases among the indigenous population and the pilgrims, and Egyptian pilgrims, as aforementioned, form a significant proportion of Hajj pilgrimage.

Upon studying the impact of demographic variables on Egyptian pilgrims' awareness, it was notable that education had a considerable positive effect with detailed knowledge about the meningococcal disease and meningococcal vaccine ($p < 0.001$). In agreement with several previous literature studies, education seems to be an essential strategy to improve awareness and reduce negative attitudes about healthy practices. [18-22] Other demographic characteristics had also influenced, to a lesser degree, the knowledge and awareness about meningitis and meningococcal vaccine. Married participants, males, and older individuals tended to be more aware than their counterparts. Therefore, the healthcare authorities are highly recommended to exert more efforts to educate pilgrims about the vaccine and its important particularly low-educated, single or divorced, young, and female pilgrims coming from Egypt to minimize the risk of meningococcal infection.

CONCLUSION:

There is a considerable lack of knowledge about the meningococcal meningitis and meningococcal vaccines among Egyptian pilgrims. Knowledge is even worse among pilgrims who have lower levels of education, females, young pilgrims, and unmarried ones. Thus, healthcare authorities are highly recommended to target those population with health education programs to minimize the risk for meningococcal infection among Egyptian pilgrims.

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Tables

Table 1: Distribution of participants according to demographic data (n=442)

Demographic data	Distribution of participants	
	n	%
Gender		
▪ Male	319	72
▪ Female	123	28
Age group		
▪ 18 - 25	2	0.5
▪ 26 - 35	25	5.7
▪ 36 - 45	98	22.2
▪ 46 - 55	157	35.5
▪ 56 - 70	160	36.2
Marital status		
▪ Married	407	94
▪ Single	10	2
▪ Other	17	4
Educational level		
Uneducated	86	19
Primary	18	4
Intermediate	76	17
High school	75	17
College	178	40
Master's degree	6	1
Doctorate degree	3	1
Total	442	100

Table 2: Distribution of participants according to their knowledge and attitudes towards meningococcal meningitis and meningococcal vaccines (n=442)

	Yes n (%)	No n (%)	Total
Have you heard of meningitis?	210 (48)	232 (52)	442
Have you heard of meningococcal vaccines?	241 (55)	201 (45)	
Is it important to receive vaccines if it was required?	364 (82)	78 (18)	
Is it important to receive vaccines if it is just recommended?	387 (88)	55 (12)	
Will you seek more information on this issue?	322 (73)	120 (27)	
Did you know that meningitis is a disease that is widespread due to bacteria and lead to dangerous symptoms?	131 (30)	311 (70)	
Have you heard of common symptoms of meningococcal meningitis: headache, unconsciousness, fever?	114 (26)	328 (74)	
Did you know the meningococcal disease is transmitted by respiratory droplets?	103 (23)	339 (77)	
Did you know that African countries have a high rate of infection?	124 (28)	318 (72)	
Preventive or post exposure management knowledge survey?	96 (22)	346 (78)	
Did you know the meningococcal vaccine revaccination interval 3 to 5 years?	92 (21)	350 (79)	
Did you know that you should be vaccinated before travel for enough meningococcal disease protection at least 10 days prior to travel?	136 (31)	306 (69)	
Is there a medication for treatment of meningococcal meningitis?	153 (35)	289 (65)	

Table 3: Correlation between demographic data and participants knowledge about meningitis

Demographic data	Has heard of meningitis?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	12(14)	74(86)	86	
Primary	3(17)	15(83)	18	
Intermediate	35(46)	41(54)	76	
High school	39(52)	36(48)	75	
College	113(63)	65(37)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0	3	
Marital Status				0.011*
Married	199(49)	208(51)	407	
Single	5(50)	5(50)	10	
Other	2(12)	15(88)	17	
Age groups				0.014*
18-25 years	1(1)	1(1)	2	
26-35 years	8(17)	17(7)	25	
36-45 years	55(26)	43(16)	98	
46-55 years	84(39)	73(31)	157	
56-70 years	62(30)	98(41)	160	
Gender				0.07*
Male	160 (50)	159 (51)	319	
Female	50 (41)	73 (59)	123	

*Chi-square test is statistically significant.

Table 4: Correlation between demographic data and participants knowledge about meningococcal vaccines (n=442)

Demographic data	Has heard of meningococcal vaccines		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	16(19)	70(81)	86	
Primary	5(28)	13(72)	18	
Intermediate	41(54)	35(46)	76	
High school	46(61)	29(39)	75	
College	125(70)	53(30)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0(0)	3(0)	
Marital Status				0.011*
Married	229(56)	178(44)	407	
Single	4(40)	6(60)	10	
Other	4(24)	13(76)	17	
Age groups				0.017*
18-25 years	1(1)	1(1)	2	
26-35 years	9(4)	16(8)	25	
36-45 years	62(26)	36(18)	98	
46-55 years	94(38)	63(31)	157	
56-70 years	75(31)	85(41)	160	
Gender				0.20
Male	180(56)	139(44)	319	
Female	61(50)	62(50)	123	

*Chi-square test is statistically significant.

Table 5: Correlation between demographic data and participants knowledge about meningococcal vaccines (n=442)

Demographic data	Important to receive vaccines if required?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	56(65)	30(35)	86	
Primary	14(78)	4(22)	18	
Intermediate	65(86)	11(14)	76	
High school	70(93)	5(7)	75	
College	151(85)	27(15)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0(0)	3	
Marital Status				0.019*
Married	341(84)	66(16)	407	
Single	7(70)	3(30)	10	
Other	10(59)	7(41)	17	
Age groups				0.232
18-25 years	1(1)	1(1)	2	
26-35 years	17(5)	8(10)	25	
36-45 years	81(22)	17(22)	98	
46-55 years	133(36)	24(30)	157	
56-70 years	132(36)	28(36)	160	
Gender				0.93
Male	263(82)	56(18)	319	
Female	101(82)	22(18)	123	

*Chi-square test is statistically significant.

Table 6: Correlation between demographic data and participants knowledge about meningococcal vaccines (n=442)

Demographic data	Is it important to receive the vaccine if just recommended?		Total	P-value
	Yes n (%)	No n (%)		
Marital Status				0.017*
Married	357(88)	50(12)	407	
Single	6(60)	4(40)	10	
Other	16(94)	1(6)	17	
Gender				0.46
Male	227(87)	42(13)	319	
Female	110(8)	13(11)	123	
Educational level				0.82
Uneducated	74(86)	12(14)	86	
Primary	16(89)	2(11)	18	
Intermediate	66(87)	10(13)	76	
High school	63(84)	12(16)	75	
College	159(89)	19(11)	178	
Master's degree	6(100)	0	6	
Doctorate degree	3(100)	0	3	
Age groups				0.333
18-25 years	1(1)	1(1)	2	
26-35 years	23(6)	2(4)	25	
36-45 years	83(21)	15(27)	98	
46-55 years	141(36)	16(29)	157	
56-70 years	139(35)	21(37)	160	

*Chi-square test is statistically significant.

Table 7: Correlation between demographic data and participants willing to seek more information about meningococcal vaccines (n=442)

Demographic data	Will you seek more information on this issue?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	46(53)	40(47)	86	
Primary	10(56)	8(44)	18	
Intermediate	55(72)	21(28)	76	
High school	66(88)	9(12)	75	
College	137(77)	41(23)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0	3	
Marital Status				0.023*
Married	298(73)	109(27)	407	
Single	7(70)	3(30)	10	
Other	9(53)	8(47)	17	
Age groups				0.102
18-25 years	2(1)	0(0)	2	
26-35 years	18(6)	7(6)	25	
36-45 years	74(23)	24(20)	98	
46-55 years	123(38)	34(28)	157	
56-70 years	105(33)	55(46)	160	
Gender				0.07
Male	263(82)	56(18)	319	
Female	101(82)	22(18)	123	

*Chi-square test is statistically significant.

Table 8: Correlation between demographic data and participants knowledge that meningitis is a widespread bacterial disease with dangerous symptoms

Demographic data	Do you know that meningitis is a widespread bacterial disease with dangerous symptoms?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	7(8)	79(92)	86	
Primary	2(11)	16(89)	18	
Intermediate	22(29)	54(71)	76	
High school	28(37)	47(63)	75	
College	66(37)	112(63)	178	
Master's degree	4(67)	2(33)	6	
Doctorate degree	2(67)	1(33)	3	
Marital Status				0.018*
Married	127(31)	280(69)	407	
Single	2(20)	8(80)	10	
Other	0(0)	17(100)	17	
Age groups				0.08
18-25 years	0(0)	2(1)	2	
26-35 years	5(4)	20(6)	25	
36-45 years	37(28)	61(20)	98	
46-55 years	51(39)	106(34)	157	
56-70 years	38(29)	122(39)	160	
Gender				0.21
Male	100(31)	219(69)	319	
Female	31(25)	29(75)	123	

*Chi-square test is statistically significant.

Table 9: Correlation between demographic data and participants knowledge about symptoms of meningococcal meningitis

Demographic data	Did you know the symptoms of meningitis e.g. headache, unconsciousness and fever?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	2(2)	84(98)	86	
Primary	0(0)	18(100)	18	
Intermediate	17(22)	59(78)	76	
High school	31(41)	44(59)	75	
College	58(33)	120(67)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	1(33)	2(67)	3	
Marital Status				0.045*
Married	109(27)	298(73)	407	
Single	3(30)	7(70)	10	
Other	0(0)	17(100)	17	
Age groups				0.002*
18-25 years	1(1)	1(1)	2	
26-35 years	3(3)	22(7)	25	
36-45 years	32(28)	66(20)	98	
46-55 years	52(46)	105(32)	157	
56-70 years	26(23)	134(40)	160	
Gender				0.10
Male	89(28)	230(72)	319	
Female	25(20)	98(80)	123	

*Chi-square test is statistically significant.

Table 10: Correlation between demographic data and participants knowledge about the route of transmission of meningococcal meningitis

Demographic data	Did you know the meningococcal meningitis is transmitted by respiratory droplets?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	5(6)	81(94)	86	
Primary	1(6)	17(94)	18	
Intermediate	12(16)	64(84)	76	
High school	17(23)	58(77)	75	
College	64(36)	114(64)	178	
Master's degree	3(50)	3(50)	6	
Doctorate degree	1(33)	2(67)	3	
Marital Status				0.062
Married	98(24)	309(76)	407	
Single	3(30)	7(70)	10	
Other	0	17(100)	17	
Age groups				0.014*
18-25 years	0(0)	2(1)	2	
26-35 years	2(2)	23(7)	25	
36-45 years	77(26)	71(21)	98	
46-55 years	47(46)	110(32)	157	
56-70 years	27(26)	133(39)	160	
Gender				0.50
Male	77(24)	242(76)	319	
Female	26(21)	97(79)	123	

*Chi-square test is statistically significant.

Table 11: Correlation between demographic data and participants knowledge that African countries have a high rate of infection

Demographic data	Did you know that the African countries have a high rate of infection?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	4(5)	82(95)	86	
Primary	0(0)	18(100)	18	
Intermediate	20(26)	56(74)	76	
High school	19(25)	56(75)	75	
College	73(41)	105(59)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0	3	
Marital status				0.11
Married	120(29)	287(71)	407	
Single	3(30)	7(70)	10	
Others	1(6)	16(94)	17	
Age groups				0.02*
18-25 years	1(0)	2(1)	2	
26-35 years	6(5)	19(6)	25	
36-45 years	34(27)	64(20)	98	
46-55 years	53(43)	104(33)	157	
56-70 years	31(25)	129(14)	160	
Gender				0.08
Male	97(30)	222(70)	319	
Female	27(22)	96(78)	123	

*Chi-square test is statistically significant.

Table 12: Correlation between demographic data and participants knowledge about preventive or postexposure management of meningitis

Demographic data	Preventive or post exposure management knowledge survey?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	4(5)	82(95)	86	
Primary	0(0)	18(100)	18	
Intermediate	15(20)	61(80)	76	
High school	14(19)	61(81)	75	
College	57(32)	121(68)	178	
Master's degree	4(67)	2(33)	6	
Doctorate degree	2(67)	1(33)	3	
Marital Status				0.049*
Married	95(23)	312(77)	407	
Single	1(10)	9(90)	10	
Other	0(0)	17(100)	17	
Age groups				0.11
18-25 years	0(0)	2(1)	2	
26-35 years	2(2)	23(7)	25	
36-45 years	22(23)	76(22)	98	
46-55 years	43(23)	114(33)	157	
56-70 years	29(30)	131(38)	160	
Gender				0.48
Male	73(23)	247(77)	319	
Female	24(20)	99(80)	123	

*Chi-square test is statistically significant.

Table 13: Correlation between demographic data and participants knowledge about the vaccination interval.

Demographic data	Did you know the meningococcal vaccine revaccination interval 3 to 5 years?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	5(6)	81(94)	86	
Primary	0(0)	18(100)	18	
Intermediate	11(14)	65(86)	76	
High school	14(19)	61(81)	75	
College	57(32)	121(68)	178	
Master's degree	4(67)	2(33)	6	
Doctorate degree	1(33)	2(67)	3	
Marital Status				0.20
Married	89(22)	318(78)	407	
Single	1(10)	9(90)	10	
Other	1(6)	16(94)	17	
Age groups				0.003*
18-25 years	0(0)	2(1)	2	
26-35 years	1(1)	24(7)	25	
36-45 years	28(30)	70(20)	98	
46-55 years	41(45)	116(33)	157	
56-70 years	22(24)	138(39)	160	
Gender				0.87
Male	67(21)	252(79)	319	
Female	25(20)	98(80)	123	

*Chi-square test is statistically significant.

Table 14: Correlation between demographic data and participants knowledge about the vaccination timing.

Demographic data	Did you know the meningococcal vaccine should be received 10 days prior to travel?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	12(14)	74(86)	86	
Primary	1(6)	17(94)	18	
Intermediate	25(33)	51(67)	76	
High school	20(27)	55(73)	75	
College	72(40)	106(60)	178	
Master's degree	4(67)	2(33)	6	
Doctorate degree	2(67)	1(33)	3	
Marital Status				0.50
Married	132(32)	275(68)	407	
Single	1(10)	9(90)	10	
Other	3(18)	14(82)	17	
Age groups				0.088
18-25 years	0(0)	2(1)	2	
26-35 years	6(4)	19(6)	25	
36-45 years	38(28)	60(20)	98	
46-55 years	53(39)	104(34)	157	
56-70 years	39(29)	121(40)	160	
Gender				0.51
Male	101(32)	218(88)	319	
Female	53(28)	88(72)	123	

*Chi-square test is statistically significant.

Table 15: Correlation between demographic data and participants knowledge about the existence of a treatment for meningococcal meningitis

Demographic data	Is there a medication for treatment of meningococcal meningitis?		Total	P-value
	Yes n (%)	No n (%)		
Educational level				<0.001*
Uneducated	10(12)	76(88)	86	
Primary	0(0)	18(100)	18	
Intermediate	24(32)	52(68)	76	
High school	23(31)	52(69)	75	
College	88(49)	90(51)	178	
Master's degree	5(83)	1(17)	6	
Doctorate degree	3(100)	0	3	
Marital Status				0.30
Married	145(36)	262(64)	407	
Single	4(40)	6(60)	10	
Other	3(18)	14(82)	17	
Age groups				0.004*
18-25 years	0(0)	2(1)	2	
26-35 years	3(2)	22(8)	25	
36-45 years	35(23)	63(28)	98	
46-55 years	69(45)	88(30)	157	
56-70 years	46(30)	114(39)	160	
Gender				0.72
Male	112(35)	207(65)	319	
Female	41(33)	82(67)	123	

*Chi-square test is statistically significant.

Figures

Figure 1: Distribution of participants according to their knowledge and attitudes towards meningococcal meningitis and meningococcal vaccines (n=442).

