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Assessment of Awareness and Attitude toward Prevention of Pneumococcal Infection and Vaccination among Hajj and Umrah Pilgrims from in Makah Al-Mokarramah at Saudi Arabia 2021

Emad Abdulaziz Almoalem[1], Sultan Hymid Al-Hazmi[2], Ibraheem Ahmed Alzahrani[2], Zahid Mohammed Zahid Serdar[3], Turki Ammar Omair Alhazmi[2], Waleed Ateeq Alsubhi[2], Mohammed Ateeq Alsubhi[4], Emran Hasan Fallatah[4], WisalMohamadnoor Sinbawa[5], Ayman Salem Ajyeeb[6], Rawiyah Saleh Alansari[7], Abdulrahman Hassan Sahli[8]

[1]Physician, Department of Infectious Diseases Control in Makkah Health Cluster
[2]Epidemiology Monitor, Infectious disease department, Makkah, Saudi Arabia.
[3]Specialist of medical laboratory, ALHAJJ STREET PHC, Makkah, Saudi Arabia.
[4]Nursing Technician, Operations and facilities management in public health, Makkah, Saudi Arabia.
[5]Nursing Technician, Azizia Health Center Makkah, Saudi Arabia.
[6]Nursing Technician, Sulaymaniyah health center, Makkah Healthcare Cluster, Saudi Arabia.
[7]Nursing Technician, Patient experience (937) MAKKAH, Saudi Arabia.
[8]Pharmacy technician, King Abdullah Medical City, Makkah, Saudi Arabia.

Abstract:

Background

Hajj is a unique religious mass gathering among Muslims hosted by Kingdom of Saudi Arabia (KSA) annually. It is a fifth pillar that is compulsory to be carried among muslim. Infections due to Neisseria meningitides, Streptococcus Pneumonia and Influenza virus are very high among Hajj pilgrims in KSA. Severe diseases such as pneumonia , therefore pneumococcal vaccination is recommended. Pneumococcal vaccines are available and recommended in many countries for at-risk populations including young children, the elderly and those with underlying medical conditions. The Hajj and Umrah mass gatherings attract millions of Muslim pilgrims to the Kingdom of Saudi Arabia each year. These events increase the risk of pneumococcal disease especially among the large number of elderly pilgrims with co-morbidities. However, there is no unified official policy for vaccination against pneumococcal disease for pilgrims attending. Hajj and Umrah, largely due to the lack

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of a strong evidence-base in the context of these events . This study aimed:To assess the awareness and attitude toward prevention of pneumococcal infection and vaccination among Hajj and Umrah pilgrims Makkah Al-mukarramhSaudi Arabia 2021. Methods:A cross - sectional research design was carried out between Feb 2021 to May 2021 included 300 patients who were randomly selected from visiting to the primary health centers a structured questionnaire and observation checklist was used for data collection. Using 3part Questionnaire and analyzed via SPSS v24 software. Chi-square test was run to analyses associations between socio-demographic data. Results: shows that most of the participants (37.0%) were in the age group >60 years follow by the (35.0%) were in the age 50-60 years, the majority of them were males (58.0%) while female(42.0%), Hajj for the first time (39.0%), has non chronic diseases (51.0%), follow by Renal failure were (35.%)Conclusion:There is a lack of knowledge among the hajj pilgrims about these vaccine preventable diseases and vaccination, especially those who have lower education level and also unemployed. pilgrims will be protected are highly advised to focus on these group and prepare a special course that focused on these vaccine preventable diseases so that Hajj pilgrims will be protected.

Keywords: Awareness, attitude, prevention, pneumococcal infection, vaccination Hajj Umrah, pilgrims, in Makah Al-Mokarramah.

Introduction

Streptococcus pneumoniae is one of the most important causes of morbidity and mortality worldwide, especially being a major cause of pneumonia [1,2]. The organism is part of the commensal flora of the upper respiratory tract colonizing the nasopharyngeal niche. Carriage is not only a source of transmission for the pneumococcus but also is an essential precursor of active infection [3]. In general, colonization rates range from 20%–60% among children under the age of five and 2%–10% among adults, although higher carriage rates have been reported [3,4]. Transmission usually requires frequent or prolonged close contact and is increased by crowding. It is associated with young age, lack of breastfeeding, winter season, and exposure to antibiotics during the previous month [5]. The duration of carriage is serotype specific lasting from about 1 to 17 months and it is generally longer in children than adults [6]. Transmission of pneumococci especially occurs by direct contact with respiratory secretions, such as saliva and mucus, or by droplets coughed up by an infected patient.

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Pneumonia is an infection of the lungs that can cause mild to severe illness in people of all ages. Depending on the cause, it can often be treated with medicine or prevented with vaccines. Common signs of pneumonia include cough, fever, and difficulty breathing". "Pneumonia can be caused by viruses, bacteria, and fungi[7]. In the United States, common causes of viral pneumonia are influenza and respiratory syncytial virus (RSV), and a common cause of bacterial pneumonia is Streptococcus pneumonia (pneumococcus)"[.8,9]

The clinical manifestations of pneumoniae infection are wide ranging from asymptomatic carriage to fulminant disease [10]. In general pneumococcal disease can be classified as invasive or non-invasive [11]. Invasive pneumococcal disease (IPD) occurs in normally sterile sites; it includes bacteremia, meningitis, endocarditis, and septic arthritis and is linked to multiple virulence factors in S. pneumoniae [12]. Non-invasive pneumococcal diseases (NIPD) includes illnesses such as acute otitis media (AOM), sinusitis and bronchitis [13]. Pneumococcal pneumonia may be either invasive (bacteremia) or non-invasive (nonbacteremic) [14]. The risk factors for pneumococcal infection have been well characterized [15], and include: demographic factors such as age and gender, ethnic and socioeconomic factors, living conditions, substance use such as alcohol and smoking, underlying health conditions, viral respiratory infections (especially influenza), immunosuppression, several malignancies, asplenia or splenic dysfunction and certain medications [16].

Risk factors for pneumococcal infection include extremes of age children <2 years old and adults ≥65 years old, diabetes mellitus, cigarettes smoking, alcoholism, congenital immunodeficiency (B or T lymphocyte deficiency, complement C1, C2, C3, and C4 deficiencies), acquired immunodeficiency (HIV, immunosuppressive therapy, long term steroid use, and radiation, malignancy (e.g., leukemia, lymphome, Hodgkins, multiple myeloma, and disseminated malignancies), chronic liver disease (primary biliary cirrhosis, primary sclerosing cholangitis, sarcoid, hepatitis B or C virus, alcoholic cirrhosis, cryptogenic cirrhosis, autoimmune hepatitis, and hemochromatosis), chronic heart disease (congestive heart failure, cardiomyopathy), chronic lung disease (asthma, chronic obstructive airways disease, cystic fibrosis, bronchiectasis, idiopathic pulmonary fibrosis, and pneumoconiosis), chronic renal disease (chronic renal failure from any cause and Nephrotic syndrome), solid organ transplantation (heart, liver, kidney, and other)[18]

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Literature review:

In 2014 a cohort study was conducted to French pilgrims to evaluate the Knowledge, attitudes and practices about pneumococcal infection and vaccination by face-to-face questionnaire their result showed that A "total of 300 participants took part. Their overall knowledge about the severity of pneumonia and the existence of the vaccine was very low. Out of 101 participants who had an indication for pneumococcal vaccination, irrespective of their travel status, only 7% were advised to have the vaccine by their general practitioner". [19].A recent study systematically enrolled cases of CAP among adult pilgrims during the 2016 Hajj season and from hospitals in both the holy cities of Mecca and Medina, giving the best estimate yet of the burden of CAP and pneumococcal CAP associated with Hajj.[20] Mecca is the site of the Hajj rituals and all Hajj pilgrims congregate in the city during the ritual days. Medina on the other hand is visited by many pilgrims before and/or after the Hajj ritual days and hence does not host the same number of pilgrims as Mecca.[21] It was reported that among the 266 CAP cases enrolled, 18% were attributed to S. pneumonia and the overall case fatality rate was 10.1% [22]. Similar studies are warranted to confirm these results.

Furthermore, in 2017 a cross-sectional study was done on hajj pilgrims to evaluate the knowledge and attitude of acute respiratory infection showed that the knowledge and attitude of preventable method was variable. It indicates that most of the participant agreed that face mask is a preventable method and only 10% choose hand washing as preventable method.[23]

According to the study conducted by Ridda and his collaborators 2014, they concluded that at least one third of Hajj pilgrims are 'at risk' of pneumococcal disease either by virtue of age or pre-existing medical conditions, consideration should be given to vaccinating high risk pilgrims against pneumococcal disease.[24] Other preventive measures such as smoking cessation, pollution reduction and vaccinations against influenza and pertussis should also be considered. Precisely defining the epidemiology of pneumococcal disease to identify an optimum vaccination schedule for Hajj pilgrims is a current research priority.[25]

Study conducted on Malaysian Hajj pilgrims' poor knowledge among towards vaccine preventable diseases and vaccination. On knowledge of Hajj pilgrims towards infectious diseases and vaccination demonstrated a significant lack of knowledge [25,26]. However, it can be improved after educational intervention as shown in the study conducted in the year 2011 in which they used health educator to improve knowledge of healthy behavior among

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Hajj pilgrims[27]. There was a similar finding regarding the non-significant result between gender and level of knowledge in the research reported in the study towards pneumococcal infection at Makkah hospital [28].

Rationale:

Hajj is a unique religious mass gathering among Muslims hosted by Kingdom of Saudi Arabia (KSA) annually. It is a fifth pillar that is compulsory to be carried among muslim. Infections due to Neisseria meningitides, Streptococcus Pneumonia and Influenza virus are very high among Hajj pilgrims in KSA. Severe diseases such as pneumonia . Pneumonia is one of the leading causes of hospitalization and intensive care unit among , therefore pneumococcal vaccination is recommended pneumococcal infection are a common cause of increased patient's morbidity, hospital and ICU length of stay, treatment costs, and mortality, as pneumococcal disease may only be apparent few days after colonization and infection, investigations into pneumococcal disease after Hajj, especially in the country of origin of pilgrims, are crucial to defining the overall burden of the disease. Currently there are limited data on what illnesses pilgrims or their contacts develop after returning to their countries, or returning to cities within KSA after Hajj.

Aim of the study:

To assess the awareness and attitude toward prevention of pneumococcal infection and vaccination among Hajj and Umrah pilgrims Makkah Al-mukarramhSaudi Arabia.

Objectives -:

- To assess the awareness and attitude toward prevention of pneumococcal infection and vaccination among Hajj and Umrah pilgrims Makkah Al-mukarramh Saudi Arabia.
- To asses if there is relation between level of education and awareness towards pneumococcal infection and vaccination

Methodology -:

-A cross sectional survey will conduct to pilgrims who resident in Makkah city during 25 of august 2021 till 6 of December, Hajj 2021. The survey will conduct on a convenience sample of 300 pilgrims' residents in Makkah city matching the inclusion criteria and exclusion criteria:

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Inclusion criteria:

-hajj pilgrims .

-Residency in In Makkah city .

-over 18 years of age

-able and willing to participate in the study.

Exclusion criteria:

-Residency outside Makkah city .

18 > -

- Pilgrims that refusing sign Informed consent.

Sample size

pneumococcus inflections among patients in ventilator in a PHC at Makkah Al-mukarramh. Saudi Arabia in 2021. The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is (300) patients of pneumococcal infection inflections among patients in PHC at Makkah Al-mukarramh. Saudi Arabia in 2021 (male and female) after official communication with PHC Makkah City, and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants

Sampling technique:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique has been applied to select the participant. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total patients by the required sample size; (300).

Data collection tool:

To collect data knowledge, attitude and practice (KAP) structured questionnaire was used. It was developed by the researcher after reviewing of current national and international related literature. It composed of 33 questions. This included the following parts:

Part one: biosociodemographic characteristics: as name, pilgrim number, age, sex, phone

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number, leader name, frequency of hajj, years of education, area of residence, and presence of chronic diseases as diabetic mellitus.

Part two: this part including questions to assess the knowledge, attitude and practices regarding pneumococcus and vaccination such as signs and symptoms of pneumococcus, mode of transmission, methods of prevention, high risk groups, and line of treatment. Questions concerning attitude and practices included pilgrim's hajj feeling, and community reaction toward people with pneumococcus infection, and sources of information about pneumococcus infection.

Following a short briefing about the study, informed consent will obtain from each participant who agreed to join the survey. Ethics approval will obtain from charity research center. The study tool was developed by the researcher and checked for validity and reliability using Cronbash's alpha (r=0.76). Pilot study was done on 10 pilgrims Hajj to check and ensure the clarity, applicability and feasibity of tools. Pilgrims completed the surveys themselves; however, research team members helped those who were unable to complete the questionnaires themselves.

Data management and statistical analysis:

After data collection, it was coded and entered to the computer. The data was checked for correction of any errors during data entry. SPSS program version 27.0 was used for data presentation (tables, graphs and mathematical presentations) and statistical analysis. Number and percent were used for presenting qualitative variables. Mean and mean percent were carried out for the quantitative variables. The 0.05% level of significance was used. Fissure Exact test was done to determine the correlations. Correlations were calculated as Less than or equal 0.05 was considered significant correlation and Less than or equal 0.01 was considered highly significant correlation .

Scoring system for level of knowledge, attitude and practices:

- satisfactory: 70-99
- fair: 50-69
- Unsatisfactory: less than 50

Ethical considerations:

Ethics approval and consent to participate this study was first approved by the Institutional Review Board of Tertiary Care Hospital, Ministry of Health. All information was kept

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confidential, and results will be submitted to the department as feedback. The researcher described the aim and objectives of the study for the residents. No names were required to assure confidentiality of data, and all information was kept confidential only for this study's purposes.

Budget: Self-funded

Results:

Table 1: Distribution of demographic data(age, gender, Level of education, economic level, smoking) in our study(n=300)

	N	**%**
Age		
<35	39	13
35-50	45	15
50-60	105	35
>60	111	37
Sex		
Male	174	58
Female	126	42
Hajj for		
First time	117	39
Second time	105	35
Third time	57	19
More than three	21	7
Chronic diseases?		
Non	153	51
Diabetes	36	12
HT	69	23
Chronic Infectious diseases (HIV- Hib ….)	99	33
Renal failure	105	35
Cardiovascular diseases	36	12
CNS disorder	9	3

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Mobility disorder	6	2
GIT diseases	12	4
Multible	48	16

Table 1 shows that most of the participants (37.0%) were in the age group >60 years follow by the (35.0%) were in the age 50-60 years, the majority of them were males (58.0%) while female(42.0%), Hajj for the first time (39.0%), has non chronic diseases (51.0%), follow by Renal failure were (35.%)

Table 2: frequency distribution of the participants' knowledge about pneumococcal infection:

	N	**%**
What are the signs and symptoms of pneumococcal virus		
1-Fever and chills	87	29
2-Cough	132	44
3-Cough that lasts longer than 3 weeks	15	5
4-Coughing up blood	12	4
5-Severe headache	39	13
6-Nausea	21	7
7-Weight loss	18	6
8-Fever	66	22
9-Fever without clear cause that lasts more than 7 days	9	3
10-Chest pain	48	16
11-Shortness of breath	57	19
12-Ongoing fatigue	18	6
13-Do not know	105	35
How can a person get pneumococcal virus?		
1. Through handshakes	57	19
2. Through the air when a person with corona virus coughs or sneezes	198	66
3. Through sharing dishes	39	13
4. Through eating from the same plate	24	8

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5. Through touching items in public places (doorknobs, handles in transportation, etc.)	48	16
6. Do not know	66	22
How can a person prevent getting pneumococcal virus?		
1. Vaccination	63	21
2. prophylactic antibiotic	18	6
3. Avoid shaking hands	48	16
4. Covering mouth and nose when coughing or sneezing	147	49
5. Washing hands after touching items in public places	99	33
6. Closing windows at home	12	4
7. Through good nutrition	18	6
8. By praying	9	3
9. Do not know	90	30
In your opinion, who can be infected with pneumococcal virus?		
1. Anybody	150	50
2. Only poor people	45	15
3. Only homeless people	96	32
4. Only alcoholics	6	2
5. Only drug users	9	3
6. Only people living with HIV/AIDS	30	10
7. Only people who have been in prison	6	2
8. Do not know	93	31

This table shows that the highest proportion of participant reported cough (53.3%), fever and chills (31.6%), shortness of breath (28.2%) as the signs and symptoms of pneumococcal infection, (50.0%) were the participants don't know the pneumococcal infection mode of transmission and approximately half patient reported that the virus can be transmitting through the air when a person with corona virus coughs or sneezes.The highest proportion of participants reported that covering mouth and nose when coughing or sneezing (44.0%), Covering mouth and nose when coughing or sneezing (49.0%) and Washing hands after touching items in public places (33.0%) can prevent exposure to virus. While (50.0%) don’t know how a person can prevent getting pneumococcal virus.

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Table 3frequency distribution of participant's knowledge and attitude regarding Pneumococcus

		Attitude				Total	
		Negative		Positive			
		N	%	N	%	N	%
Knowledge	Weak	136	85.53	80	56.74	216	72
	Average	21	13.21	24	17.02	45	15
	High	2	1.26	37	26.24	39	13
Total		159	100.00	141	100.00	300	100
Chi-square	X^2	45.212					
	P-value	<0.001*					

This table 3shows that the majority of participants (85.53%) have a weak knowledge while more than half of them (56.74%) have a positive attitude about the disease. while P-value<0.001 and $X^2$45.212.

Figure (1) Distribution distribution of participant's knowledge and attitude regarding

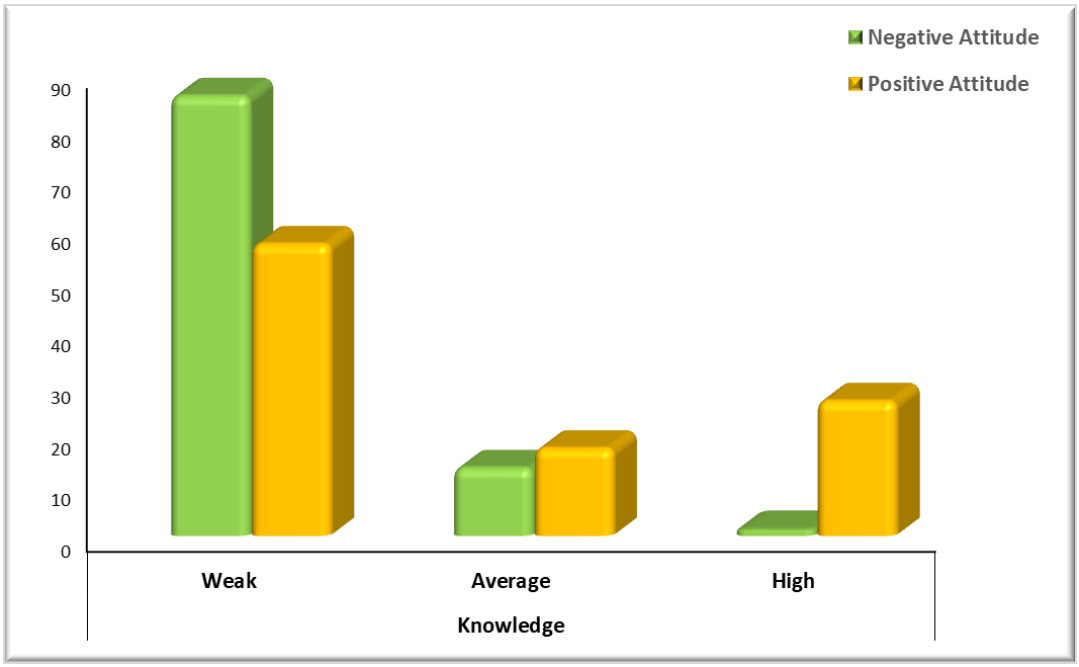


Table 4: frequency distribution of the participants' knowledge about pneumococcal infection:

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	N	%
Can pneumococcal virus be cured?		
Yes	243	81
No	57	19
How can someone with pneumococcal virus be cured?		
1. Herbal remedies	48	16
2. Home rest without medicine	18	6
3. Praying	6	2
4. Specific drugs given by health centre	147	49
5. DOTS	12	4
6. Do not know	90	30
Do you feel well informed about pneumococcus?		
Yes	105	35
No	195	65
Who would you talk to about your illness if you had pneumococcal virus?		
1. Doctor or other medical worker	255	85
2. Spouse	78	26
3. Parent	45	15
4. Child(ren)	60	20
5. Other family member	48	16
6. Close friend	21	7
7. No one	9	3
What would you do if you thought you had symptoms of pneumococcus?		
Go to health facility	258	86
Go to pharmacy	18	6
Got to traditional healer	6	2
Pursue other self-treatment options (herbs, etc.)	18	6

This table 4 shows that the highest Can pneumococcal virus be cured reported yes were (81.0%), regarding Who would you talk to about your illness if you had pneumococcal virus answer Doctor or other medical worker (85.0%), while

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What would you do if you thought you had symptoms of pneumococcus most of the participants Go to health facility were (86.0%)

Table 5: frequency distribution of participants' attitudes regarding pneumococcal infection:

	N	**%**
Which statement is closest to your feeling about people with pneumococcus?		
I feel compassion and desire to help	150	50
I feel compassion but I tend to stay away from these people	90	30
It is their problem and I cannot get TB	9	3
I fear them because they may infect me	33	11
I have no particular feeling	18	6
In your community, how is a person who has pneumococcus virus usually regarded/treated?		
Most people reject him or her	96	32
Most people are friendly, but they generally try to avoid him or her	66	22
The community mostly supports and helps him or her	138	46
Do you think that HIV positive people should be concerned about pneumococcus?		
Yes	228	76
No	72	24
Why YEs?		
Person with HIV is more likely to develop corona virus	255	85
Do not know	45	15
Why not?		
Person with HIV is not more likely than	78	26
Do not know	222	74
Do you wish you could get more information about pneumococcus?		
Yes	258	86
No	42	14

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What would be your reaction if you were found out that you have pneumococcus?		
Fear	141	47
Surprise	36	12
Shame	18	6
Embarrassment	39	13
Sadness or hopelessness	66	22
In your community, how is a person who has pneumococcus usually regarded/treated?		
Most people reject him or her	72	24
Most people are friendly, but they generally try to avoid him or her	87	29
The community mostly supports and helps him or her	141	47

Regarding the participants feeling about people with Pnemocuccusvirus , this table shows that I feel compassion and desire to helpwere (50.o%) but feel compassion but tend to stay away from these people were(30.0%). Do you think that HIV positive people should be concerned about pneumococcus most of them (76 %) reported yes thatthe community mostly supports and helps him or her .three quarters of participants (76.0%) think that that HIV positive people should be concerned about Pnemocuccus virus and majority of them (85.0%) wish to get more information about Pnemocuccus virus. Less than half of them (47.0%) reported that they may feel fear if they were found out that having pneumococcus virus.

Table 6: frequency distribution of participant's knowledge and attitude regarding Pneumococcus:

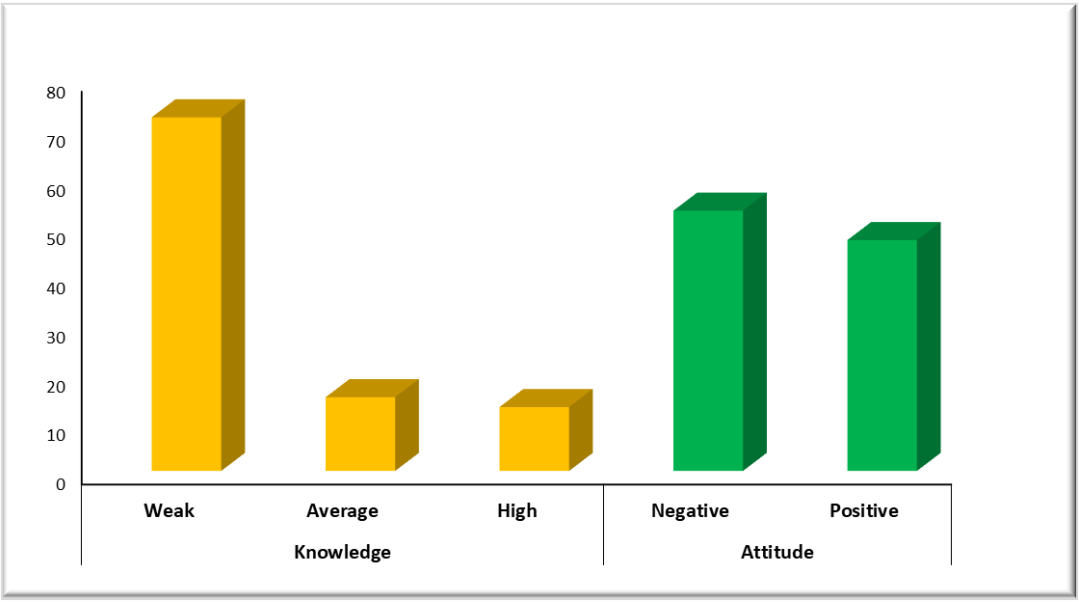
	N	**%**
Knowledge		
Weak	216	72
Average	45	15
High	39	13
Attitude		

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Negative	159	53
Positive	141	47

This table shows that the majority of participants (72.0%) have a weak knowledge while more than half of them (53.0%) have a positive attitude about the disease.

Figure (2) frequency distribution of participant's knowledge and attitude regarding Pneumococcus



Discussion:

Hajj is accompanied with overcrowding. Most of pilgrims are elderly which have a risk for associated medical conditions and compromised immunity. Therefore, performing Hajj rituals is a risk factor for pneumococcal acquisition .Numerous studies have shown a high prevalence of respiratory symptoms among pilgrims. Respiratory viruses, especially influenza virus, rhinovirus and Streptococcus pneumonia infections are the most common cause of acute respiratory infections among pilgrims (29,30)

The lower pneumococcal acquisition might be caused by several reasons. One of the possible reasonsbe lack of pilgrim Hajj about the disease; causes, mode of transmission, clinical manifestation, high risk groups, ways of prevention and line of treatment. In addition to negative attitude toward the disease. Therefore, this study aimed to assess knowledge and attitude of the Egyptian pilgrim Hajj about pneumococcal infection (31,12).

The results of the study revealed weak level of knowledge and positive attitude toward

pneumococcal infection with a significant correlation between knowledge, attitude regarding pneumococcal infection and education.

This results was in line with**[32]** who conduct a study entitled with vaccination knowledge, attitude and practice among Chinese travelers who visit travel clinics in Preparation for international travel and found a low level of knowledge regarding vaccination as a protective measure among participants [32].

The results are also supported by [33] who found that there were unsatisfactory level of knowledge, practice an attitude of Algerian Hajj Pilgrims about Pneumococcal Infection with a correlation between knowledge and education, area of residence. They recommend that before Hajj doctors must teach and inform all the participants about how to deal with any infectious disease, particularly pneumonia [33].study results was consistent with the study finding. They revealed that half of the participants realized the importance of protective measures against respiratory infections such as hand washing, mask use and avoiding contact with sick people [34].

Conclusion:

pneumonia is an important cause of morbidity and mortality worldwide being a major cause of pneumonia. Vaccines to protect against the disease caused by certain serotypes areavailable and are recommended in many countries for childrenand for at-risk populations including the elderly and those underlying health conditions. Latter populations represent an important proportion of the Hajj andUmrah pilgrims. As yet, there is no official policy for vaccinationagainst pneumococcal disease for pilgrims attending these events. Thismay be partly due to the fact that the actual burden of the disease is notwell studied during these mass gatherings. Research agendas highlightedin this paper should provide results that would fill knowledgegaps regarding pneumococcal disease at Hajj and Umrah and wouldconstitute a strong basis for an informed and potentially unified policyregarding pneumococcal vaccination for Hajj and Umrah.

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