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ASSESSMENT OF PUBLIC AWARENESS AND KNOWLEDGE ABOUT HERPES ZOSTER DISEASE AND ATTITUDE TOWARDS ITS VACCINATION

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ABSTRACT

Background: Herpes zoster (HZ) is often accompanied by post-herpetic neuralgia (PHN). Vaccination has been shown to decrease the burden of HZ and PHN and minimize the severity of the disease. **Objective:** To explore awareness and knowledge about Herpes Zoster disease and attitude towards its vaccination among general population. **Subjects and methods:** An online population-based cross-sectional study was conducted online in Taif city, Western Region of Saudi Arabia among aduls aged 18 and above, livng in the city. An online validated self-reported questionnaire was utilized for data collection. It is composed of five main sections: Socio-demographic characteristics of the participants, awarness about HZ, its vaccine and source of information, assessment of HZ and its vaccine knowledge, attitude towards HZ and its vaccine, and acceptance rate to have HZ vaccination for those aged 50 years and above. **Results:** A total of 337 adult were included in this study. Nearly half of them (48.7%) aged between 26 and 45 years. Majority of the participants (85.5%) have heard about the HZ disease and their main source of information was family members (30.8%), followed by internet/social media (23.3%). Almost one-third (34.7%) of the participants reported having recommendation to uptake herpes zoster (shingles) vaccine by heath care professionals. Overall, 43.6% of the participants expressed good level of knowledge about HZ disease and its vaccine Only two varibles weresignificantly associated with poor level of knowledge about HZ disease and its vaccine in multivariate analyis; previous history of infection with HZ and knowing anyone among acquaintances who have received the HZ vaccine. Most of the participants believed that HZ can be prevented (67.7%) and treated (74.4%) and amost half (50.2%) of them are willing to take the herpes HZ (shingles) vaccine if asked to do so. **Conclusion:** Majority of adult poopulation were aware of HZ disease and a considerable proportion of them have heard of HZ vaccine and almost half of them were willing to receive the vaccine, if recommeded by healthcare professionals. However, their level of knowledge about HZ disease and its vaccine was overall suboptimal

KEYWORDS: Herpes zoster, Shingles vaccine, Knowledge, General public, Saudi Arabia.

INTRODUCTION

Herpes zoster (HZ) is a viral disease caused by the reactivation of the varicella zoster virus (VZV), which is responsible for chickenpox during childhood.[1] It is a painful disease which often associated with distressing and dangerous painful and debilitating complications.[1,2]

HZ is often accompanied by post-herpetic neuralgia (PHN), encephalitis, and meningitis.[3] Adults who are VZV seropositive are at risk for HZ,[2] and this risk increases with age, with a sharp increase at the age of 50 years and above.[2]

HZ deteriorates the quality of life (QoL) of affected patients[3-5] and impacts seriously patients, their caregivers, and healthcare system`s enonomy.[6,7]

Vaccination has been shown to decrease the burden of HZ and PHN and minimize the severity of the disease. Live, attenuated HZ vaccine (Zostavax®) has been recommended for adults aged ≥ 50 years since 2006, except for immunocompromised patients.[8,9] The Center for Disease Control and Prevention (CDC) has approved in 2017 HZ vaccine (Shingrix®); given in two doses for adults aged ≥50 years. Also, it can be given to immunocompromised adults aged over 18 years with a high success rate reaching up to 90%.[10,11]

It has been estimated that , 20-30% of the population; furthermore 50% of those aged up to 85 years will have HZ; if HZ vaccine was not given.[12]

\Majority of people (over 95%) aged over 50 years old are more likely to have HZ due to immunosenescence; thus, more susceptible to PHN following an HZ.[13,14]

A recent systematic review included 13 studies revealed a pooled HZ vaccine acceptance rate of 55.74%.[15]

As a result of economic and health-related advancement observed in Saudi Arabia in last decades, the number of geriatric people increase and consequently the number of HZ cases, which represent a public health concern.[16] Although HZ vaccine is provided for free in Saudi Arabia at governmental healthcare centers and it is recommended for persons aged ≥ 50 years, its uptake in our region remains unknown and mostly low. Thus identification of that rate and barriers to uptakee the vaccine are very essential to ovoid HZ complications, particulalry painful PHN. Accordingly, this study was conducted to explore awareness and knowledge about Herpes Zoster disease and attitude towards its vaccination among general population.

SUBJECTS AND METHODS

An online population-based cross-sectional study was conducted online in Taif city, which located in the Western Region of Saudi Arabia and has an estimated population of approximately 717 thousands as of 2024 estimated census.[17] The target population was adul individuals aged 18 and above, living in Taif city, of both genders and all nationalities. Adults with severe physical and/or cognitive disorders that would prevent them from providing reliable self-administered informtion were excluded from the study. The sample size was calculated using the Cochran's formula for estimating sample size equation[18] as follows:

$$N=\frac{Z_{\alpha/2}^2 x\ p\ (1-p)}{D^2}$$

Where: n=Minimum sample size, $Z_{\alpha/2:}$ was the critical value of the normal distribution at α/2 (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), P was the prevalence of insufficient knowledge regarding HZvaccine: It is estimated as 67.5% according to a recent Saudi study carried out in Jazan,[19] D was the sdegree of precision

So, the calculated minimum sample size was:

$$n = \frac{(1.96)^2 X\ 0.675\ X\ 0.325}{(0.05)^2} = 337$$

The sample was increased by approximately 10% to compensate for possible none or incomplete response, thus it was 370 individuals. Convenient non-propability sampling technique was adapted to select eligible persons till the required sample size has been achieved.

An online self-reported questionnaire was utilized for data collection. It has been validated and utilized in a similar recent study carried out in Jazan.[19] It was available online for free and composed of five main sections: Socio-demographic characteristics of the participants (Age, gender, nationality, educational level, and occupation), awarness about HZ, its vaccine and source of information, assessment of HZ and its vaccine knowledge. Correct answers were assigned a score of 1 whereas incorrect answers were assigned a score of 0. Total score and its percentage were computed. Participants scored below 50% were considered having poor knowledge whereas those who scored 50% or above were considered having good knowledge, attitude towards HZ and its vaccine, and acceptance rate to have HZ vaccination for those aged 50 years and above.

Data entry and analysis were performed using the Statistical Package of Social Science (SPSS), version 28. The descriptive statistics such as frequencies, percentages were calculated to summarize nominal and ordinal data. Chi-squared test was used to evaluate the association between the determinants and the outcome variables. Multivariate logistic regression analysis expressed as adjusted odds ratio (aOR) and 95% confidence interval (CI) was adopted to control for the confounding effect. Any p-value < 0.05 was considered statistically significant. Approval of the Sceintific Research Ethics Committee, Taif University, Taif, audi Arabia was obtained (No. 46-064; date 24/10/2024) and online informed consent was obtained from all participants.

RESULTS

A total of 337 adult were included in this study. Their sociodemographic characteristics are presented in Table 1. Almost two-thirds (63.2%) were females and nearly half of them (48.7%) aged between 26 and 45 years and had Diploma or Bachelor`s degrees (51.4%). About a fifth of the participants (20.5%) were healthcare sectr employees while 27.4% were homemakers. Saudi nationals represented 56.7% of the participants.

Majority of the participants (85.5%) have heard about the herpes zoster (shingles) disease as clear from Figure 1. The main source of information about the disease was family members (30.8%), followed by internet/social media (23.3%) and Ministry of Health (16%). Figure 2.

Previous history of infection with herpes zoster (shingles) was mentioned by 13.1% of the participants as shown in Figure 3 while history of ever knowning someone who was infected with herpes zoster (shingles) was mentioned by 66.2% of them. Figure 4.

History of knowing anyone among acquaintances who have received the herpes zoster (shingles) vaccine was reported by 24.6% of the participants as illustrted in Figure 5. Most of the participants (60.5%) had heard of shingles vaccine as seen in Figure 6. Among them, the main source about the vaccine was healthcare professinals (35.8%). Figure 7.

Almost one-third (34.7%) of the participants reported having recommendation to uptake herpes zoster (shingles) vaccine by heath care professionals. Figure 8.

Mot of the participants (76.3%) could recognize what is HZ and it can not be transmitted from person to person (75.1%). More than half of them knew any of the symptoms of herpes zoster (55.5%) and that individual aged 50 years and older is at higher risk of getting herpes zoster (51.6%). However, only 12.8% could recognize that pain at the site of infection is the most common side effect of the herpes zoster (shingles) vaccine and 23.4% of them believed that nerve pain is the most common complication of herpes zoster. About a quarter of participants (25.5%) could recognize that HZ vaccine can be taken even if the person has had HZ before. Table 2.

Overall, less than half (43.6%) of the participants expressed good level of knowledge about HZ disease and its vaccine as clear from Figure 9.

Males were more knowlegeable about HZ disease and its vaccine than females (53.2% vs. 38%), p=0.007. The highest rate of good knowledge was reported among participants aged between 36 and 45 years (61.7%) while the lowest rate was observed among those aged between 26 and 35 years (30%), p<0.001. Postgraduate participants expressed the highest significant rate of good knnowledge (81.6%) compared to those of lower educational levels, p<0.001. The highest rate of good knowledge was observed among employees in healthcare sector (72.5%) while the lowest rate was observed among students (28.6%), p<0.001. Reharding the main source of information about HZ disease, those who had their information from Ministry of Health (67.4%) or other surces (83.3%0 were more knowlegeable than those who got their information from TV (35.5%), p<0.001. Participants with previous history of infection with HZ were more knowlegeable than those without such history (79.5% vs. 39.4%), p<0.001. Partisipants who reported history of ever knowning someone who was infected with HZ were more knowlegeable than their peers (55.6% vs. 20.2%), p<0.001 and those who reported knowing anyone among acquaintances who have received the HZ vaccine were more knowlegeable than their counterparts (68.7% vs. 41.4%), p<0.001. Table 3.

It is shown from Table 4 that after controlling for the effect of confounding, only two varibles remaind significantly associated with poor level of knowledge about HZ disease and its vaccine; previous history of infection with HZ and knowing anyone among acquaintances who have received the HZ vaccine. Participants with previous history of infection with HZ were less likely than those with out such history to express poor level of knowledge (aOR=0.10; 95% CI: 0.03-0.36), p<0.001. Participants who knew anyone among acquaintances who had received the HZ vaccine were less likely than their peers to express poor level of knowledge (aOR=0.49; 95% CI: 0.24-0.98), p=0.045. Gender, age, educational level, occupation, main source of information, and history of ever knowning someone who was infected with HZ became not statistically significant risk factors for poor knowledge as illustrated in multivariate logistic regression analysis. Table 4.

Less than half (45.2%) of the participants were concerned about getting HZ infection. Most of them believed that HZ can be prevented (67.7%) and treated (74.4%). Amost half (50.2%) of the participants are willing to take the herpes HZ (shingles) vaccine if asked to do so while 34.4% are not sure abut that. Most of them (75.1%) would ask their doctor or any other healthcare practitioner for more information about the HZ (shingles) vaccine, if are asked to take the vaccine. A considerable proportion of the participants think that HZ (shingles) vaccine is safe and effective (42.7%) while 40.7% think that it has side effects.

DISCUSSION

HZ vaccine administration to at-risk populations has been approved in many worldwide studies to reduce the econmic burden of the disease.[20] However, assessment of the awareness, knowledge and acceptability of the vaccine in our Region (Taif) has not been previously investigated, up to our knowledge.

In the present study, majority of the participants (85.5%) were aware of HZ disease. Quite similar results were observed in other Saudi studies; in a recent study carried out by Alleft et al (2023) among adults aged 50 years and olde, 83.2% of them were aware of HZ disease.[21] Also, a recent study conducted by Alhothali et al (2023) among adults aged over 50 years revealed that 83% of the participants have heard about HZ.[22] Additionally in Dammam (2024), 64% of adults aged over 18 years had heard about HZ.[23] Also, similar findings were reported in international studies; in South Korea (2015), majority (85.7%) of the general population have heard of HZ diease.[24] In United Arab of Emirates (2022), 60% of individuals were aware of HZ disease.[25]

Regarding HZ vaccine, this study revealed that 60.5% of the respondents have heard of HZ vaccine. This figure is above those reported by Alleft et al (2023)[21] and Alhothali et al (2023)[22] where they observed that only 51.6% and 55.8% of adults aged 50 years and over, respectively were aware of Hz vaccine. However, it is lower than that reported in Al-Ahsa City (2023) as most of the general population (78.2%) had heard of HZ.[26] In Dammam (2024), 58.8% of adults aged over 18 years have heard of HZ vaccine from different sources.[23] In South Korea(2015), only 43.6% of the general population have heard of HZ vaccine.[24] In UAE, only 15% of surveyed persons have heard of HZ vaccine.[25] Variation between studies is mostly attributed to difference in sociodemographic characteristics of the participants in these studies.

In the current survey, only 43.6% of adults aged over 18 years expressed good level of knowledge about HZ disease and its vaccine. Comparable figures were observed in another Saudi study conducted in Jazan wgere 58% and 67.5% of adults aged 50 years and over had low level of knowledge regarding HZ and its vaccine, respectively.[19] AlKhowailed et al (2024) carried out an online nationwide cross-sectional study in Saudi Arabian adults and observed that over 50% of them were not aware that the vaccine is provided by the Ministry of Health (MOH) for high risk group;[27] althugh the Saudi Ministry of Health has announced recently (2022) that the HZ shingles vaccine for the population ≥50 years is available.[28] However, in a study performed in Al-Ahsa City, 87% of the participants could recognize availability of HZ vaccine in Saudi Arabia.[26] Suboptimal level of knowledge regarding the HZ disease and its vaccines could be a common barrier of uptaking the vaccine as documented by Harbecke et al (2021).[29]

After controlling for the counfouding effect, the results of the present study revealed that sociodemographic characteristics of the participants were not associated with their knowledge of HZ and its vaccine while previous history of infection with HZ and knowing anyone among acquaintances who have received the HZ vaccine were the only significant determinants for having good knowledge about HZ disease and its vaccine. Different factors were observed in various studies; in South Korea (2015), females, younger subjects, those with higher income or higher education levels were more likely to be knowlegeable of HZ.[24]

In Jazan (2024), significant determinants for the level of knowledge about HZ were participant`s age, gender, source of information, education, and job status.[19]

In agreement with a study conducted at Al Al-Ahsa City,[26] a small percentage of participants in this study had experienced the HZ disease.

Most of the participants in this study believed that HZ can be prevented and treated and amost half of them are willing to take the herpes HZ (shingles) vaccine if asked to do so and a third expressed vaccine hesitancy. Furthermore, most of them would ask their doctor or any other healthcare practitioner for more information about the HZ (shingles) vaccine, if were asked to take the vaccine. This overall, encaouging attitude towards the vaccine is promising. Thus, healthcare workers should pay mre attention to educate their patients about the dangerous of the disease and importance of vaccination in preventing the disease`s adverse effects. Possitive attitude towards the vaccine was also observed in both local,[19,26] and international studies.[24]

The positive attitude towards the HZ vaccine observed in this study should be ereflected on practice. However, in this study, we did not ask about history of uptaking the vaccine. However, a recent Saudi study reported a rate of 34.2% among adults aged 50 years and above attending primary healthcare centers.[30] This rate is higher than that reported in Italy (2023) after a national campaign (13.5%),[31] and also in Al-Ahsa[26] and Jeddah[16] Saudi cities among adults aged 50 years and above (8% and 7.7%, respectively).

Study Limitations

Collection of data in the present study using an online approach could impact data reliability as well as accuracy and potential biases. Also, following a cross-sectional design in this study is considered a limitation as it investigate both determinants and outcome variables at a single point in time, which does not enable us for assessing the temporal relationships over time. The study was conducted in a particular city in Saudi Arabia (Taif); and due to difference in some cultural and characteristic between Taif and other Saudi cities, generalizability of the findings to other areas is limited. Self-administered nature of the data collection tool increases the possibility of recall social desirability biases. Despite those limitations, the study has a great public health importance and its results could help deicion makers to improve HZ vaccine uptake in our region.

Table 1: Sociodemographic characteristics of the participants (n=337).

Variables	Number	Percent
Gender		
Male	124	36.8
Female	213	63.2
Age in years		
18-25	81	24.0
26-35	70	20.8
36-45	94	27.9
46-55	64	19.0
>55	28	8.3
Educational level		
Below high school	48	14.2
High school	67	19.9
Diploma or Bachelor`s degree	173	51.4

Postgraduate	49	14.5
Occupation		
Healthcare sector employee	69	20.5
Non-healthcare sector employee	59	17.5
Student	49	14.5
Self-employed	47	13.9
Retired	21	6.2
Homemaker	92	27.4
Nationality		
Saudi	191	56.7
Non-Saudi	146	43.3

Table 2: Assessment of knowledge of the participants about herpes zoster disease and its vaccine (n=337).

	Knowledge about herpes zoster disease/vaccine		
	Correct answer	**Frequency**	**Percentage**
What is herpes zoster (shingles)?	A disease that affects the nerves and skin	257	76.3
Do you think herpes zoster (shingles) is common in Saudi Arabia?	Yes	140	41.5
Do you know any of the symptoms of herpes zoster (shingles)?	Yes	187	55.5
Do you think you can get infected with herpes zoster (shingles) more than once?	Yes	104	30.9
do you think herpes zoster (shingles) can be transmitted from person to person?	No	253	75.1
Which age group do you think is most at risk of getting herpes zoster (shingles)?	50 years and older	174	51.6
What do you think is the most common complication of herpes zoster (shingles)?	Nerve pain	79	23.4
The most common side effect of the herpes zoster (shingles) vaccine?	Pain at the site of infection	43	12.8
The herpes zoster (shingles) vaccine can be taken even if the person has had herpes zoster before?	Yes	86	25.5

Table 3: Factors associated with level of knowledge about herpes zoster disease and its vaccine among the participants.

Independent variables	**Level of knowledge about herpes zoster disease/vaccine**		**p-value***
	Poor N=190 N (%)	**Good N=147 N (%)**	
Gender			
Male (n=124)	58 (46.8)	66 (53.2)	0.007
Female (n=213)	132 (62.0)	81 (38.0)	
Age in years			
18-25 (n=81)	55 (67.9)	26 (32.1)	
26-35 (n=70)	49 (70.0)	21 (30.0)	
36-45 (n=94)	36 (38.3)	58 (61.7)	<0.001
46-55 (n=64)	38 (59.4)	26 (40.6)	
>55 (n=28)	12 (42.9)	16 (57.1)	
Educational level			
Below high school (n=48)	25 (52.1)	23 (47.9)	
High school (n=67)	43 (64.2)	24 (35.8)	
Diploma or Bachelor`s degree (n=173)	113 (65.3)	60 (34.7)	<0.001
Postgraduate (n=49)	9 (18.4)	40 (81.6)	
Occupation	19 (27.5)	50 (72.5)	
Healthcare sector employee (n=69)	41 (69.5)	18 (30.5)	
Non-healthcare sector employee (n=59)	35 (71.4)	14 (28.6)	
Student (n=49)	26 (55.3)	21 (44.7)	
Self-employed (n=47)	10 (47.6)	11 (52.4)	
Retired (n=21)	59 (64.1)	33 (35.9)	

Homemaker (n=92)			<0.001
Nationality Saudi (n=191) Non-Saudi (n=146)	115 (60.2) 75 (51.4)	76 (39.8) 71 (48.6)	0.105
Main source of information (n=288) Family (n=89) Friends (n=37) Television (n=31) Internet/social media (n=67) Ministry of Health (n=46) Others (n=18)	39 (43.8) 22 (59.5) 20 (64.5) 42 (62.7) 15 (32.6) 3 (16.7)	50 (56.2) 15 (40.5) 11 (35.5) 25 (37.3) 31 (67.4) 15 (83.3)	<0.001
Previous history of infection with herpes zoster No (n=277) Yes (n=44) Don`t know (n=16)	168 (60.6) 9 (20.5) 13 (81.2)	109 (39.4) 35 (79.5) 3 (18.8)	<0.001
History of ever knowning someone who was infected with herpes zoster No (n=114) Yes (n=223	91 (79.8) 99 (44.4)	23 (20.2) 124 (55.6)	<0.001
Knowing anyone among acquaintances who have received the herpes zoster vaccine No (n=191) Yes (n=83) Don`t know (n=63)	112 (58.6) 26 (31.3) 52(82.5)	79 (41.4) 57 (68.7) 11 (17.5)	<0.001

*Pearson`s Chi-square test

Table 4: Predictors of poor knowledge about herpes zoster disease and its vaccine among the participants: Multivariate logistic regression analysis.

	aOR	95% CI	p-value
Previous history of infection with herpes zoster			
No	1.0	---	---
Yes	0.10	0.03-0.36	<0.001
Don`t know	0.35	0.04-2.77	0.317
Knowing anyone among acquaintances who have received the herpes zoster vaccine			
No (n=191)	1.0	---	---
Yes (n=83)	0.49	0.24-0.98	0.045
Don`t know (n=63)	2.07	0.80-5.38	0.134

[a]: Reference category, aOR: Adjusted odds ratio, CI: Confidence interval

Terms of patient`s gender, age, educational level, occupation, main source of information, and history of ever knowning someone who was infected with herpes zoster were not statistically significant.

Table 5: Attitude of the participants towards herpes zoster infection and its vaccine.

Statements and questions	Frequency	Percentage
You concerned about getting herpes zoster (shingles)?		
No	142	42.1
Yes	152	45.1
Don`t know	43	12.8
Herpes zoster (shingles) can be treated		
No	12	3.6
Yes	251	74.4
Don`t know	74	22.0
Herpes zoster (shingles) can be prevented		
No	21	6.2
Yes	228	67.7

Don`t know	88	26.1
Are you willing to take the herpes zoster (shingles) vaccine if asked to do so?		
No	52	15.4
Yes	169	50.2
Not sure	116	34.4
If asked to take the vaccine, would you ask your doctor or any other healthcare practitioner for more information about the herpes zoster (shingles) vaccine?		
No	36	10.7
Yes	253	75.1
Don`t know	48	14.2
Do you think the herpes zoster (shingles) vaccine is safe and effective?		
No	21	6.2
Yes	144	42.7
Don`t know	172	51.1
Do you think the herpes zoster (shingles) vaccine has side effects?		
No	29	8.6
Yes	137	40.7
Don`t know	171	50.7

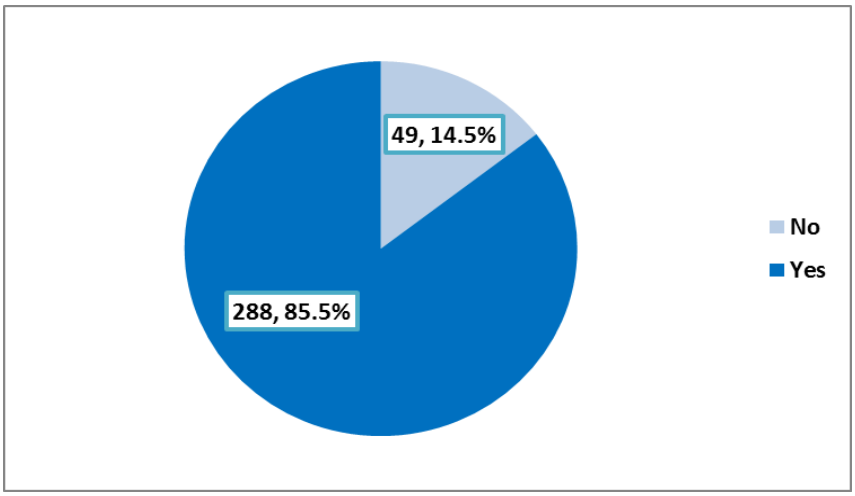

Figure 1: History of hearing about the herpes zoster (shingles) disease among the participants.

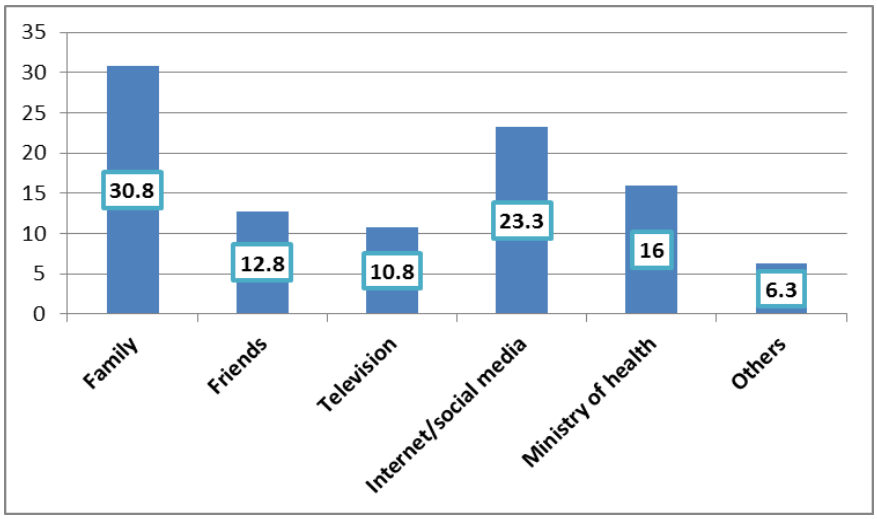

Figure 2: Main source f information about herpes zoster (shingles) disease among the participants (n=288).

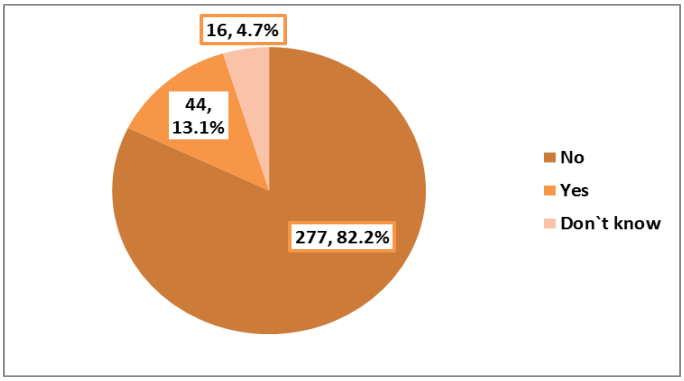

Figure 3: Previous history of infection with herpes zoster (shingles) among the participants.

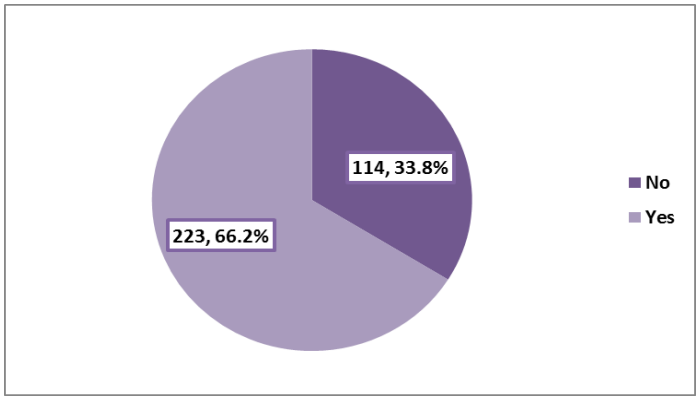

Figure 4: History of ever knowning someone who was infected with herpes zoster (shingles) among the participants.

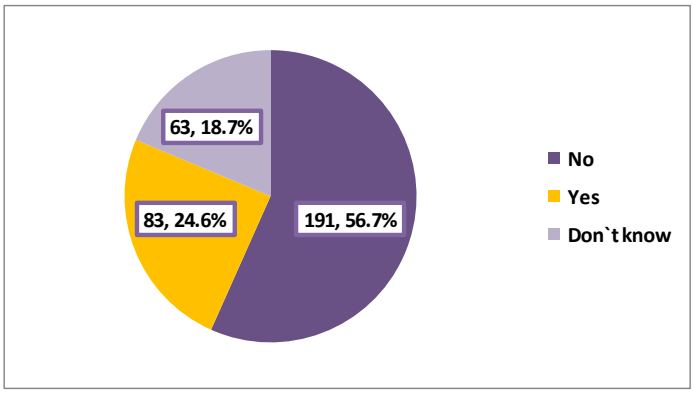

Figure 5: Participants` history of knowning anyone among acquaintances who have received the herpes zoster (shingles) vaccine.

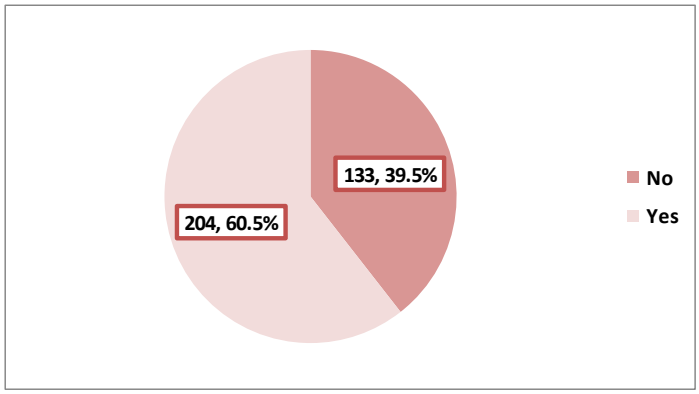

Figure 6: History of hearing about the herpes zoster (shingles) vaccine among the participants.

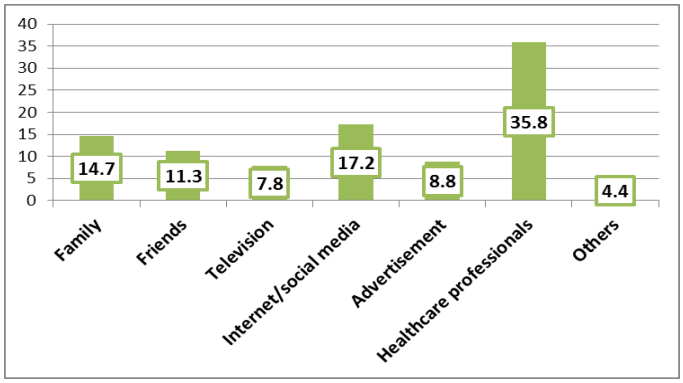

Figure 7: Main source f information about herpes zoster (shingles) vaccine among the participants (n=204).

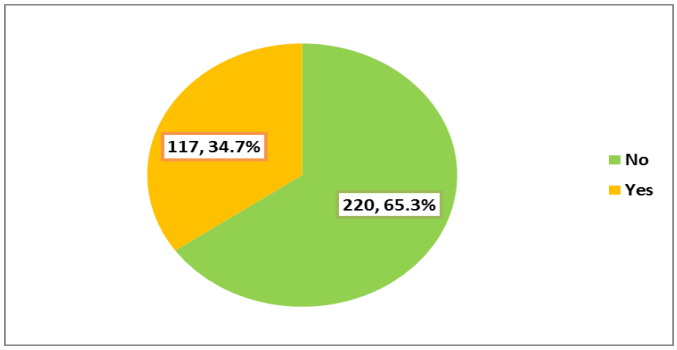

Figure 8: History of recommendation to have herpes zoster(shingles) vaccine by heath care professionals among the participants.

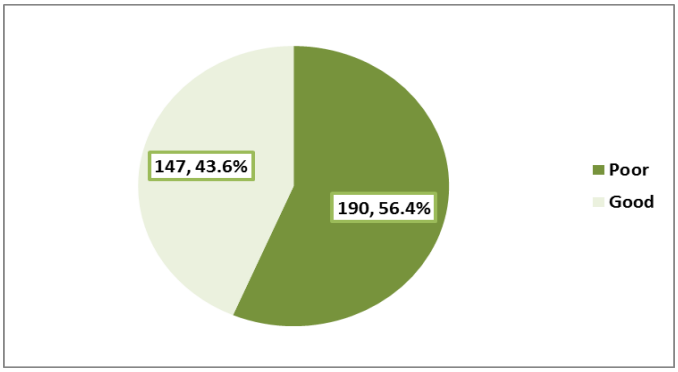

Figure 9: Level of participants` knowledge about herpes zoster (shingles) disease and its vaccine.

CONCLUSION

In conclusion, majority of adult poopulation in Taif were aware of HZ disease and a considerable proportion of them have heard of HZ vaccine and almost half of them were willing to receive the vaccine, if recommeded by healthcare professionals. However, their level of knowledge about HZ disease and its vaccine was overall suboptimal as less than half of them expressed good level of knowledge. Participants with previous history of infection with HZ and knowing anyone among acquaintances who have received the HZ vaccine were more knwlegeable than others. Most of the participants believed that HZ can be prevented and treated and amost half of them were willing to take the herpes HZ (shingles) vaccine if asked to do so.

Baed on the study`s findings, it is recommended to organize educational campaigns to address issues related to HZ diseae and its vaccine targeting those aged 50 years and over to improve the vaccination rates and reduce the effect of HZ.

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