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Knowledge and Awareness of Herpes Zoster Among Elderly Patients Attending to Primary Health Centers at Kingdom of Saudi Arabia 2023

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ABSTRACT

Background: Herpes zoster (HZ) is a common disease in adults and older subjects solely related to the reactivation of latent varicella zoster virus in ganglia. The incidence of the disease increases with aging and the decline of varicella zoster virus-specific cell-mediated immunity, herpes zoster have a significant impact on the quality of life of subjects during the acute phase. Besides, pain can persist even for a long time becoming chronic. The chronic pain following herpes zoster is called post herpetic neuralgia, and it is a debilitating long lasting condition, characterized by metameric pain, allodia, and hyperalgesia. Therapeutic options against herpes zoster and post herpetic neuralgia are often suboptimal and the impact of the disease and its complications on daily living activities is significant, especially in older subjects. Population aging is a worldwide phenomenon with significant and manifold on society. In this vulnerable state, the immune response is weakened and a higher susceptibility to infectious diseases is observed, the lifetime risk of developing Herpes zoster.

Aim of the study: To described the Knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia 2023.

Methods: A cross-sectional study was conducted at elderly patients with history among the herpes zoster attending to primary health centers at kingdom of Saudi Arabia, from December to January 2023, 100

patients were included and data were collected by using a written questionnaire.
Results: shows that most of the participants (45.0%) were in the age group(70-79) years, the gender majority of them male was higher compared to female(59.0% and 41.0%) , the marital status most of participants married were(82.0%), patient enrollment sites in health centers the majority of participant are family medicine clinic were (66.0%) while Internal medicine clinic were(19.0%) but the geriatric clinic were(15.0%), educational background the majority of participant secondary school were(56.0%).
Conclusion: This study highlights the need for increased awareness and education among elderly patients and the public in Saudi Arabia regarding shingles and its vaccine, the findings suggest a need for targeted educational campaigns to address misconceptions and promote vaccination, particularly among elderly patients.

Keywords: Knowledge, awareness, herpes zoster, elderly patients, attending, primary health centers, Saudi Arabia .

Introduction

The population over 65 years of age has been increasing all over the world, as the average life expectancy has increased. In 2015, there are 900 million people aged 60 and above in the world and this number are expected to reach two billion by 2050 [1]. According to data from the Turkish Statistical Institute, 8.5% of the Turkish population consisted of people aged 65 and above in 2017 [2]. The increase in the elderly population causes geriatric diseases and infections to become increasingly important. Worldwide, 3.5 million people suffer from influenza infection every year and about 250,000–300,000 of the cases results in death [3]. Influenza infection mortality is between 51.3 and 99.4/100,000 in the population over 75 years of age; between 13.3 and 27.8/100,000 in the population aged 65–75; and between 1.0 and 5.1/100,000 in the population under 65 years of age [4]. Population over 65 years of age is more susceptible to infections and complications due to changes in the immune system with advancing age and comorbidities [5]. The World Health Organization [WHO] recommends herpes zoster vaccination for all individuals aged ≥ 50 years of age [6].

The prevalence of herpes zoster in Saudi Arabia is unclear; however, its incidence is increasing globally, particularly in the elderly population [7]. Shingles can lead to serious complications, including post-herpetic neuralgia, vision loss, and neurological problems [8].Herpes zoster vaccine is a safe and effective way to prevent shingles and vaccine is recommended for individuals aged ≥ 50 years, and a two-dose schedule is recommended for optimal protection [9]. In Saudi Arabia, the herpes zoster vaccine is available free of charge for individuals aged 50 years and above.[10]

One out of every three people has shingles throughout their lives [11]. Shingles have a significant effect on the quality of life, particularly in the elderly population, due to severe pain lasting for months and sometimes years that does not respond to strong analgesics [12]. According to the new literature data, there is an increased risk of stroke in patients with a shingles history in the past [12]. Herpes zoster (HZ) vaccine prevents the development of shingles and reduces herpetic neuropathic pain, as well as the risk of stroke [14].

Despite the availability of effective vaccines, herpes zoster vaccination rates remain suboptimal in many countries, including Saudi Arabia [15]. Studies have shown that various factors influence vaccine uptake, including socio demographic factors, such as age, gender, education level, income, and access to healthcare services. [16]

Cultural and religious beliefs may also influence vaccine acceptance. In Saudi Arabia, limited studies have examined the practices related to the herpes zoster vaccine, with one recent study finding that only 4.5% of adults had received the vaccine [17]. Previous studie have focused on specific geographic areas or risk groups [18],

highlighting the need for a more comprehensive understanding of the population's knowledge and attitudes towards shingles and its vaccine in Saudi Arabia. Increasing vaccination rates is crucial for reducing the burden of herpes zoster and its complications, particularly in the elderly population.[19]

It is not surprising to find that the association between infectious agents and frailty has been investigated in several studies. In particular, herpes viruses, with their ability to establish lifelong latent infections with possible reactivations [20], have been studied for possible associations with frailty. Such studies have yielded conflicting results, with associations sometimes found between cytomegalovirus (CMV) antibodies and frailty, whereas antibodies against varicella zoster virus (VZV), Epstein–Barr Virus (EBV), and herpes simplex virus 1 and 2 (HSV-1 and HSV-2) were not associated with risks of incident frailty [21]. Considering the relevance of cell-mediated immunity (CMI) in the immune response to these viruses, measurement of antibodies might not be the most appropriate marker for investigating such associations [22]. The drop in CMI that occurs with advancing age correlates with the incidence/onset of herpes zoster (HZ) and, especially in the over 50 s, with both incidence and severity of HZ [23].

Literature Review

According Wilson et al (2017) that reported to a holistic view of the individual, frailty is "a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, and social), which is caused by the influence of a range of variables and which increases the risk of adverse outcomes" . As previously mentioned the prevalence of frailty increases with age and, according to a recent study, is about 10% in people aged > 65 years, reaching between 25 and 50% in persons aged > 85 years [24].

Data from England from 2004 to 2013 report a yearly average rate of 8.8/100,000 hospital admissions and confirm a high prevalence (71.5%) in individuals ≥ 60 years old (incidence of 28.4/100,000). Overall, 82% of cases occur in immune competent people and hospitalizations are more common in women. The yearly average number of days of hospitalization and the related cost stand at 41,780 days and 13 million £, respectively [25].

According to the World Health Organization (WHO), Saudi Arabia a twenty-year audit study of herpes zoster (HZ) in the Asia-Pacific region identified immune senescence and immunosuppression as the principal risk factors for HZ [21].

The total economic impact of herpes zoster and post herpetic neuralgia in immune competent individuals > 50 years of age in Italy amounted to 41.2 million euros, of which at least a third was attributable to indirect costs related to productivity loss [26].

The duration of HZ pain varies considerably, ranging from no pain or pain that lasts for only a few days after rash onset to pain that lasts for years after rash healing [27]. It is important to note that the frail elderly need careful assessment prior to treatment initiation and those they could be affected to a greater extent than "normal" adults by treatment-related adverse events, both in terms of frequency and in the possible severity of outcomes. More specifically, in the event of renal impairment, which is a frequent occurrence in the frail elderly, dosage has to be adjusted depending on creatinine clearance and adequate hydration needs to be ensured (another common problem in the frail elderly whose thirst reflex is diminished). The risk of neurological adverse events (such as headache, dizziness, confusion, tremor, convulsions, etc.) is also increased and their consequences can be serious, leading, for example, to falls with a high risk of fractures potentially leading to a vicious cycle of worsening frailty [20].

Study reported the vaccination rate in was 18.8%. Notably, this rate is significantly higher than the vaccination rates reported in previous studies among general populations in the Western Region of

Saudi Arabia (3.4%) [26], in Qassim region KSA (8.5%) (28), Korea (9%) [23] And the United Arab Emirates (3.3%).One quarter of Saudi diabetic patients were willing to accept the herpes zoster (HZ) vaccine [27]. Furthermore, studies show that healthcare providers play a crucial role in promoting and recommending vaccination to improve vaccination rates [13].

Furthermore, a trend of increasing Herpes Zoster incidence has been observed over the last few decades, irrespective of region [27]; incidence data in the C 65 year's age cohort from the USA, Japan, and Australia demonstrated an average annual increase in Herpes Zoster ofbetween 2.35% and 3.74% [28]. The global increase in Herpes Zoster incidence is expected to be exacerbated by the world's ageing population and greater life expectancy, as older individuals increasingly constitute a larger proportion of the total population of nearly every country. An estimated increase of between 83% and 376% by 2030 is expected in the number of annual incident cases of Herpes Zoster .[29]

Rationale:

Varicella-Zoster Virus Reactivation causes Herpes Zosters (HZ) an infectious disease, also known as shingles. The virus stays dormant in the dorsal root ganglia and is characterized by the cluster appearance of herpes along the peripheral nerves on one side of the body . HZ is more common among the elderly and people with immunodeficiency, among which approximately 22% of cases might progress to post-herpetic neuralgia (PHN), among the several avenues of research in this area, one of particular interest is the potential role of age-induced modifications of the immune-endocrine axis in determining frailty nowadays, a preventive approach to the disease is possible; as a matter of fact, a high-antigen content live vaccine is available, this vaccine has a good profile in terms of immunogenicity, efficacy, effectiveness, and safety and its use may prevent both herpes zoster and post herpetic neuralgia. Nevertheless, the evaluation of the issues raised in countries that introduced this immunization show that both elderly patients and patient barriers could have prevented a more robust uptake of herpes zoster vaccination.

Aim of the study:

To described the Knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia 2023.

Objectives :

To described the Knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia 2023 .

Methodology:

Study design :

This study is descriptive type of cross-sectional study was conducted among 100 elderly patients attending to primary health centers at kingdom of Saudi Arabia

Study Area

The study has been carried out in the city of is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad . This study has been conducted in the primary health sector in Saudi Arabia. During the December to January 2023, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in Saudi Arabia population .

Study Population

The study has been conducted regarding knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia 2023.

Selection criteria :

Inclusion criteria

- Attending to health centers in primary health sector complain about herpes zoster in
- All nationalities
- Age between <60 years to ≥80 years
- All gender

Exclusion criteria :

- No specific exclusion criteria .

Sample size

Visitors to health centers in primary health sector complain about herpes zoster in Saudi Arabia, 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 (100) in primary health sector after official communication with the primary health sector in Saudi Arabia and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 100. 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 from primary health sector. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total students by the required sample size; (100).

Data collection tool

The self-administered questionnaire is designed based on previous studies to describe the Knowledge and awareness of herpes zoster among elderly patients attending to primary health centers in Saudi Arabia. The questionnaire has been developed in English. The questions were first pre-tested and were revised and finalized after it has been pilot tested. Before completing the survey, participants were required to indicate their consent using a forced response question followed by the survey questionnaires. The survey is estimated to take 10 min to complete .

To collect the information, a set of questions were constructed and developed. All questions were closed-ended, with tick boxes provided for responses; participants answered the questionnaires from the December to January 2023 the period of study in 2023.

The questionnaire consisted of questions that

First part General and Socio demographic information. These variables included contact or mobile phone number),(age, gender, Sources of information). Other variables were education level, economic level.

A questionnaire has been developed that had Socio demographic data and questions related to knowledge and awareness of herpes zoster among elderly patients attending to primary health centers. The two senior faculty members checked the questionnaire's validity and comprehension, and it was

revised according to their suggestions. A pilot study has been conducted on secondary students to check the questionnaire's understanding and responses further, and its Cronbach's alpha was 0.75. The results of the pilot study were not included in the final analysis .

The assessment the knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia 2023, and also as per each response/answer . Data entry and analysis were carried out using the Statistical Package for the Social Sciences.

Data collection technique:

Researcher has been visits the selected primary health sector after getting the approval from the ministries of health. The researcher has been obtained permission from participants.After the arrival of the participants has been explained the purpose of the study to all participants attending .

Data entry and analysis:

The Statistical Package for Social Sciences (SPSS) software version 24.0 has been used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic

Pilot study

A pilot study has been conducted in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology.

Ethical Approval

This study was approved from regional research center in Saudi Arabia . Each participant gave a verbal consent prior to recruitment and confidentiality was assured for each situation.

Budget: Self-funded

Results

Table 1: Distribution of socio-demographic characteristics of participant . (n-100)

	N	%
Age		
<60-69 y	64	32
70-79 y	90	45
≥80 y	46	23
Gender		
Male	118	59
Female	82	41
Marital status		
Single	36	18
Married	164	82
Patient enrollment sites in health centers		
Internal medicine clinic	38	19
Family medicine clinic	132	66
Geriatric clinic	30	15
Educational background		
Illiterate	42	21
Secondary school	112	56
University	46	23
Income status		
Below minimum wage	64	32
Minimum wage	100	50
Twofold of minimum wage	36	18
Occupation		
Employed	24	12
Unemployed	176	88

Table 1 distribution of socio-demographic characteristics of participant shows that most of the participants (45.0%) were in the age group(70-79) years follow by the age 60-69 were (32.0%) followed by ≥80 years were (23.0%), regarding the gender majority of them male was higher compared to female(59.0% and 41.0%) , regarding the marital status most of participants married were(82.0%) while single were(18.0%), regarding patient enrollment sites in health centers the majority of participant are family medicine clinic were (66.0%) while Internal medicine clinic were(19.0%) but the geriatric clinic were(15.0%), regarding educational background the majority of participant secondary school were(56.0%) while university were (23.0%) while illiterate were (21.0%) , regarding Income status the majority of participant are minimum wage were(50.0%) while below minimum wage were(32.0%) but twofold of minimum wage were (18.0%), regarding occupation the majority of participant are unemployed were(88.0%) while employed practitioner were(12.0%).

Table 2: Distribution of general knowledge of participant about herpes zoster among elderly patients .

	N	%
Examination by family physician in the last year among the herpes zoster.		
Yes	106	53
No	32	16
Don't know	62	31
HZ vaccination		
Recommended	42	21
Not recommended	60	30
Don't know	98	49
Living with		
Alone	32	16
Spouse	50	25
Spouse/children	46	23
Caregiver	72	36
Smoking		
Yes	84	42
No	116	58
Shingles symptoms duration		
Less than 30 days	46	23
1-3 months	90	45
More than 3 months	64	32
Medication therapy used		
Herbal remedies	42	21
Analgesics + Antivirals	52	26
Analgesics + Antivirals + Herbal remedies	38	19
Antivirals	68	34
What do you do first when you get sick by herpes zoster		
I see a physician	24	12
I use the medicine at home	176	88
Source of information about the shingles of fire		
The internet	62	31
The radio	24	12
Doctor	46	23
Friend	68	34

Table 2 distribution of general knowledge of participant about herpes zoster among elderly patients shows regarding examination by family physician in the last year among the herpes zoster the most of the participants answer Yes (53.0%) were follow by the Don't knowwere (31.0%) followed No were (16.0%), regarding the herpes zoster vaccination most of participants answer Don't know were (49.0%) while Not recommended were(30.0%) butrecommended were (21.0%), regarding living with the majority of participant caregiver were (36.0%) while spouse were (25.0%) but Spouse/children were (23.0%) but alone were (16.0%), regarding smoking the majority of participant answer No were(58.0%) while theanswer Yes were(42.0%), regarding shingles symptoms duration the majority of participant answer 1-3 months were(45.0%) while the answer more than 3 months were(32.0%) but less than 30 days were (23.0%), regarding medication therapy used the majority of participant antivirals were(34.0%) while Analgesics + Antivirals were (26.0%) but analgesics + antivirals + Herbal remedies were (19.0%) while herbal remedies were (21.0%), regarding do you do first when you get sick by herpes zoster the majority of participant I use the medicine at home were(88.0%) while I see a physician were(12.0%), regarding source of information about the shingles of fire the majority of participant from the friend were(34.0%) while the internet were(31.0%) but the doctor were (23.0%) while the radio were (12.0%) .

Table 3: Distribution of knowledge of participant about elderly herpes zoster patients

Knowledge of herpes zoster	N	%
Etiology of the herpes zoster		
Viral	42	21
Bacteria	84	42
I don't know	74	37
Immunity against herpes zoster decreases with elderly age		
Yes	74	37
No	80	40
I don't know	46	23
infected with chickenpox makes a person more susceptible to getting shingles (herpes zoster) later in life		
Yes	104	52
No	62	31
I don't know	34	17
Individuals with a weakened immune system are at a higher risk of developing shingles (herpes zoster).		
Yes	84	42
No	30	15
I don't know	86	43
In your opinion, who is more susceptible to getting shingles		
Less than 40 years	38	19
41-49 years	48	24
50 years and more	114	57
What do you know about signs and symptoms of shingles		
Chronic back pain	38	19
Painless skin rash	52	26
Heart disease	60	30
Painful skin rash	50	25
Is there a vaccine for herpes zoster?		
Yes	124	62
No	54	27
I don't know	22	11

Can herpes zoster transmit through direct contact		
Yes	144	72
No	24	12
I don't know	32	16
Can a person get herpes zoster more than once?		
Yes	112	56
No	36	18
I don't know	52	26
Is taking antiviral medications such as acyclovir an effective treatment for herpes zoster		
Yes	144	72
No	30	15
I don't know	26	13
What are the complications of herpes zoster		
Hearing loss	106	53
UTI	24	12
Meningitis	96	48
Chronic pain	58	29
Visual impairment	86	43

Table 3 distribution of knowledge of participant about herpes zoster patients shows regarding the etiology of the herpes zoster most of the participants answer bacteria were (42.0%) follow by I don't know were (37.0%) while viral were (21.0%), regarding the immunity against herpes zoster decreases with elderly age most of participants answer No were (40.0%) followed by Yes were (37.0%) while I don't know were (23.0%), regarding the infected with chickenpox makes a person more susceptible to getting shingles (herpes zoster) later in life the most of participant answer Yes were (52.0%) while No were(31.0%) but I don't know were (17.0%), regarding individuals with a weakened immune system are at a higher risk of developing shingles (herpes zoster) the majority of participant answer don't know were (43.0%) while Yes were (42.0%) but No were (15.0%), regarding in your opinion, who is more susceptible to getting shingles the majority of participant 50 years and more were(57.0%) while 41-49 years were (24.0%) but Less than 40 years were (19.0%), regarding what do you know about signs and symptoms of shingles the majority of participant heart disease were(30.0%) while Painless skin rash disease were(26.0%) but Painless skin rash were (25.0%) while chronic back pain were (19.0%), regarding there a vaccine for herpes zoster the majority of participant answer Yes were(62.0%) while were(27.0%), but I don't know were (11.0%), regarding can herpes zoster transmit through direct contact the majority of participant answer Yes were(72.0%) while No were(12.0%) but I don't know were (16.0%), regarding the can a person get herpes zoster more than once the majority of participant answer Yes were (56.0%) followed by I don't know were (26.0%) while No were (18.0%), regarding is taking antiviral medications such as acyclovir effective treatment for herpes zoster majority of participant answer Yes were (72.0%) while No were (15.0%) but the I don't know were (13.0%) , regarding the what are the complications of herpes zoster majority of participant answer hearing loss were (53.0%) while answer meningitis were (48.0%) followed by Visual impairment were (43.0%) butChronic pain were (29.0%) but the UTI were (12.0%) .

Table 4: Distribution of knowledge of participant about elderly herpes zoster patients score

	Knowledge	
	N	%
Negative	130	65
Positive	70	35
Total	200	100
X^2	17.405	
P-value	<0.001*	

This table 4 distribution of knowledge of participant about elderly herpes zoster patients score shows the majority of participant have negative knowledge were (65.0%) while have positive of the knowledge about herpes zoster were (35.0%) while total were (100.0%) while a significant relation P=0.001 X^2 17.405 .

Figure (1): Distribution of knowledge of participant about elderly herpes zoster patients

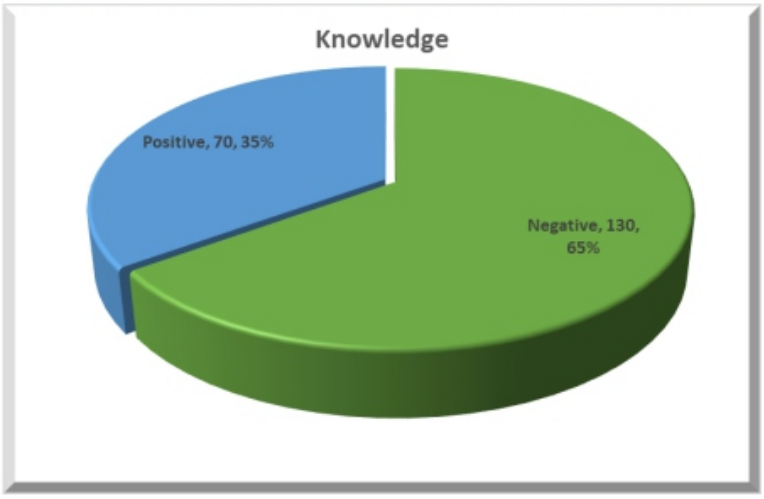

Table 5 Distribution of the relationship of the Socio-demographic characteristics and knowledge of participant about herpes zoster patients

		Knowledge				Total		Chi-square	
		Negative (n=130)		Positive (n=70)					
		N	%	N	%	N	%	X^2	P-value
Age	<60-69 y	13	10.00%	51	72.86%	64	32.00%	82.973	<0.001*
	70-79 y	79	60.77%	11	15.71%	90	45.00%		
	≥80 y	38	29.23%	8	11.43%	46	23.00%		
Gender	Male	51	39.23%	67	95.71%	118	59.00%	60.009	<0.001*
	Female	79	60.77%	3	4.29%	82	41.00%		
Marital status	Single	24	18.46%	12	17.14%	36	18.00%	0.054	0.817
	Married	106	81.54%	58	82.86%	164	82.00%		
Patient enrollment sites in health centers	Internal medicine clinic	22	16.92%	16	22.86%	38	19.00%	7.515	0.023*
	Family medicine clinic	82	63.08%	50	71.43%	132	66.00%		
	Geriatric clinic	26	20.00%	4	5.71%	30	15.00%		
Educational background	Illiterate	40	30.77%	2	2.86%	42	21.00%	93.940	<0.001*
	Secondary school	87	66.92%	25	35.71%	112	56.00%		

	University	3	2.31%	43	61.43%	46	23.00%		
Income status	Below minimum wage	47	36.15%	17	24.29%	64	32.00%	56.572	<0.001*
	Minimum wage	79	60.77%	21	30.00%	100	50.00%		
	Twofold of minimum wage	4	3.08%	32	45.71%	36	18.00%		
Occupation	Employed	3	2.31%	21	30.00%	24	12.00%	33.042	<0.001*
	Unemployed	127	97.69%	49	70.00%	176	88.00%		

Table (5) distribution of the relationship of the Socio-demographic characteristics and knowledge of participant about herpes zoster patients show regarding age increase negative in while in positive knowledge increase in age <60-69 years were (72.86%) followed by age 70-79 years were (15.71%) in total number(70) while heave a significant relation were Pvalue=0.001and X282.973, regarding gender increase negative in female were (60.77%) followed by male were (39.0%) while in positive knowledge increase in male were (95.71%)followed by female were (4.29%) while heave a significant relation were P-value=0.001and X260.009, regarding marital status increase negative in married were (81.54%) followed by single were (18.46%) while in positive knowledge increase in married were (82.86%)followed by single were (17.14%) while heave no significant relation were P-value=0.817and X20.054 , regarding Patient enrollment sites in health centers the most of participant increase negative in family medicine clinic were (63.08%) followed by geriatric clinic were (20.0%) but internal medicine clinic were (16.92%), while in positive knowledge increase in family medicine clinic were (71.43%) followed by internal medicine clinic were (17.14%) while heave a significant relation were P-value=0.023and 27.515, regarding educational background the most of participant increase negative in secondary school were (66.92%) in total were (56.0%) followed by illiterate were (30.77%) but University were (2.31%) in total (21.0%) while in positive knowledge increase in University were (61.43%) followed by in secondary school were (35.71%) while heave a significant relation were P-value=0.001 and 293.940, regarding income status the most of participant increase negative in minimum wage were (60.77%) in total (50.0%)followed by below minimum wage were (36.15%) in total (32.0%) but twofold of minimum wage were (3.08%) in total (18.0%), while in positive knowledge increase in twofold of minimum wage were (45.71%) followed by minimum wage were (30.0%) but below minimum wage were (24.0%), while heave a significant relation were P-value=0.001and X256.272, regarding Occupation the most of participant increase negative in Unemployed were (97.69%) in total (88.0%) followed by employed (2.31%) in total (12.0%) while in positive knowledge increase in Unemployed were (70.0%) in total (88.0%) followed by employed were (30.0%) in total (12.0%) while heave a significant relation were P-value=0.001and X233.042 .

Discussion

This study to described Knowledge and awareness of herpes zoster among elderly patients attending to primary health centers at kingdom of Saudi Arabia, the main findings of the present study are that (1) the vaccination rate for vaccines is low in the elderly population, (2) not recommendation by vaccination and low rates, and (3) examination by family physician in the last year among the herpes zoster, are higher and found that the level of knowledge rate overall was weak. [25]

In our study found that distribution of socio-demographic characteristics of participant shows that most of the participants (45.0%) were in the age group(70-79) years, the gender majority of them male was higher compared to female(59.0% and 41.0%) , the marital status most of participants married were(82.0%), patient enrollment sites in health centers the majority of participant are family medicine

clinic were (66.0%) while Internal medicine clinic were(19.0%) but the geriatric clinic were(15.0%), educational background the majority of participant secondary school were(56.0%) . (See table 1).

Regarding the distribution of general knowledge of participant about herpes zoster among elderly patients , furthermore, we found a racial disparity in the percentage of patients knowledge that persisted in analyses, we postulate that the lower herpes zoster knowledge rate among elderly patients attending to primary health centers is partially the result of the lower self-reported prevalence of herpes zoster and the lower rate of witnessing friends/family with herpes zoster —all of which may influence perceived risk and therefore interest in herpes zoster. Similar study showed whites were more than twice as likely as report having had herpes zoster and more than 4 times more likely of having seen someone else with herpes zoster. [30]

In our study shows regarding examination by family physician in the last year among the herpes zoster the most of the participants answer Yes (53.0%), the herpes zoster vaccination most of participants answer Don't know were (49.0%), regarding living with the majority of participant caregiver were (36.0%), regarding smoking the majority of participant answer No were(58.0%), source of information about the shingles of fire the majority of participant from the friend were(34.0%) while the internet were(31.0%) but the doctor were (23.0%) while the radio were (12.0%). (See table 2)

Regarding the distribution of knowledge of participant about elderly herpes zoster patients in the present study, only small number of participants were knowledge of herpes zoster of the signs and symptoms . This is lower than the rates of awareness in previous studies in Hong Kong (85.7%) [23] and the United Arab Emirates (58.7%) [31]. In a study of 12,235 participants who were admitted to internal medicine outpatient clinics in Aegean Region, 4.5% of the participants had received influenza vaccination and 1% had received pneumococcal vaccination. In this study, influenza and pneumococcal vaccination rates in patients aged 65 years and above were found to be 5.9% and 2.2%, respectively [17]. In Japan, the pneumococcal vaccination rate in people aged 65 years and above has been shown to reach 40.6% from 20.9% 2 years after the vaccine enters the national vaccination program [18] , shows regarding the etiology of the herpes zoster most of the participants answer bacteria were (42.0%), the infected with chickenpox makes a person more susceptible to getting shingles (herpes zoster) later in life the most of participant answer Yes were (52.0%),regarding in your opinion, who is more susceptible to getting shingles the majority of participant 50 years and more were(57.0%), regarding there a vaccine for herpes zoster the majority of participant answer Yes were(62.0%), regarding the can a person get herpes zoster more than once the majority of participant answer Yes were (56.0%), regarding the what are the complications of herpes zoster majority of participant answer hearing loss were (53.0%) while answer meningitis were (48.0%).(See table 3 and Figure 1)

Regarding the distribution of the relationship of the Socio-demographic characteristics and knowledge of participant about herpes zoster patients show regarding age increase negative in while in positive knowledge increase in age <60-69 years were (72.86%) followed by age 70-79 years were (15.71%) in total number (70) while heave a significant relation were P-value=0.001and X2 82.973, regarding gender increase negative in female were (60.77%), regarding marital status increase negative in married were (81.54%) while heave no significant relation were P-value=0.817and X2 0.054 , regarding Patient enrollment sites in health centers the most of participant heave a significant relation were P value=0.023and X2 7.515, regarding educational background heave a significant relation were P-value=0.001 and X2 93.940, regarding income status the heave a significant relation were P-value=0.001and X2 56.272, regarding Occupation the most of participant increase negative in Unemployed were (97.69%) while heave a significant relation were Pvalue=0.001and X2 33.042 (See table 5) It is also hypothesized that physiological stressors and hormonal changes among females may also have an effect on herpes zoster prevalence [22].

Conclusion

This study aimed to describe the knowledge and awareness of herpes zoster among elderly patients to understand how much people in Saudi Arabia know about shingles (herpes zoster) and the vaccine to prevent it. Shingles is a viral infection caused by the same virus that causes chickenpox. After having chickenpox, the virus can stay in the body and reactivate later in life, causing shingles, among elderly patients aged more than 50 years and above to gather information. Many people had heard about shingles, but their knowledge about it was limited. herpes zoster is a very common disease associated with severe complications and a negative impact on quality of life. Early diagnosis is sometimes missed and therapeutic approach is often suboptimal. Besides, complications can occur, post herpeticneuralgia being the most common and debilitating one. As the rate of frail and elderly people is progressively increasing, a growing impact of herpes zoster and its complication can be estimated. For all these reasons, prevention is essential, the need for more awareness and education to elderly patients. The low vaccine uptake is concerning because shingles can lead to serious health problems, to increase vaccine acceptance, we suggest implementing awareness campaigns

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Morphological and Molecular Confirmation of Bovine Tick Species in Wasit Province, Iraq

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ABSTRACT

Tick is the second largest vector of diseases, which infests many domestic and wild animals resulting in great economic losses due to morbidities and mortalities. This study aims for morphological characterization and molecular confirmation of bovine ticks using respectivelythe traditional microscopy and conventional PCR assay targeting the 18S rRNA gene. Totally, 600 cattle of different ages and sexes were subjected for clinical investigation to identify the presence of ticks in various areas in Al-Kut city (Wasit province, Iraq) during June to July (2023). The findings revealed that 65.17% of study cattle were having the ticks on different bodily parts including udder (43.26%); while, significant lowering was seen in neck (4.93%), forelimb (7.4%) and hind-limb (10.82%) when compared to ear (14.04%) and perineal region(19.55%). Morphologically, the findings revealed that all samples were hard ticks and belong to the genus of Hyalomma; while molecularly, the PCR results confirmed that all collected ticks belonged to genus of Hyalomma anatolicum. In conclusion, this study demonstrated that the great naturally occurring the populations of the ticks in cattle, and that Hyalomma anatolicum remains the almost widespread species of ticks in Iraq. In addition, adult ticks are the easiest to identify and male and female ticks of the same species may look different, while nymphal and larval ticks are very small and may be hard to detect. This study recommended investigating all ticks species found in all Iraqi areas using the morphological and molecular techniques due to the definite role of this external parasite in transmission of various diseases to both animals and humans.

Keywords: Ectoparasite, Cattle, Hyalomma anatolicum, Polymeras chain reaction, 18S rRNA gene

Introduction

Tick is an ectoparasite of marked distribution and considers the second largest vector of diseases in the world as infects many wild and domestic animals in several tropical and subtropical areas resulting in great economic losses due to morbidities and mortalities (BritesNeto et al., 2015; Boulanger et al., 2019). Scientific classification of ticks involved three families are, Argasidae (soft), Ixodidae (hard) and Nuttalliellidae (Monotypic) which belongs to the Ixodida Order that belongs to the Arthropoda phylum (Kelava et al., 2021). named due to presence of scutum on their bodies, represent the most widespread and important transmitters of pathogens as they fed on one, two or three hosts during its life cycle that consists four stages; egg, larva, nymph and adult (Apanaskevich et al., 2014; Kahl, 2018; Okely et al., 2021). Worldwide, the spreading of infectious diseases is increasingly affecting the health of the world's population due to the ever-increasing number of infected people, therefore, the better understanding of interactions, vectors and pathogens, can aid in the development of prevention and control strategies (De la Fuente et al., 2017; Bouchard et al., 2019).

For diagnosis, the using of primary methods such as macroscopic and microscopic examination to identify tick may give unconfirmed results with the absence of the epidemiological history (Kemal et al., 2016). In a study on

differentiation of some of Hyalomma, Apanaskevich and Horak (2006) showed that detection following themorphological characteristics like size and color of the scutum of various tick stages aregreatly difficult and need to great expertise. Additionally, distinguishing of tick species through the morphology could cause a confusion particularly when the method of tick collection result in physical damaging of samples as a result of low expertise and engorging of collected ticks with blood (Estrada-Pena et al., 2017; Nava et al., 2017). Therefore, DNA based methods such as polymerase chain reaction (PCR) assays are accurate diagnostic methods provide a valuable highly sensitive and specific data in particular in studies (Lv et al., 2014 a, b; Amira et al., 2021). In Iraq, although researchers have provided information about characterization and distribution of ticks in different animal species (Algharban and Dhahir, 2015; Mohammad, 2015; Al-Fatlawi and Al-Fatlawi, 2019; Ali et al., 2021), these data remain under expected because ticks and their incriminated diseases remain existed widely. Hence, this study aims for morphological characterization and molecular confirmation of bovine ticks using the traditional microscopy and conventional PCR assay, respectively.

Materials and methods

Samples

Totally, 600 cattle of different sexes and ages were subjected for clinical investigation to identify the presence of ticks in various areas in Al-Kut city (Wasit province, Iraq) during June to July (2023). The tick samples of each infested animal were sprayed by ethanol 70% and collected by rotating manner using of forceps to avoid damaging of their mouthparts, and then, kept into labeled plastic containers that transported cooled using ice-box. In laboratory, ticks of each sample were divided into two parts, one for morphology which saved cooled and the other for molecular assay which saved frozen.

Morphological Identification

Tick samples were identified microscopically in the Iraqi Natural History Research Center and Museum (University of Baghdad, Baghdad, Iraq) based on the reference classification keys of other researchers (Walker et al., 2003; Estrada-Pena et al, 2004)..

Molecular analysis

Following the manufacturer instructions of the AddPrep Genomic DNA Extraction Kit (AddBio, Korea), DNAs were extracted from the ticks, and checked for its concentration and pusrity using the Nanodrop Sysytem (Thermo Fisher, USA). Targeting the 18S rRNA gene, one set of primers [(F: 5′-GGC GAC GTT TCT TTC AAG TG -3′) and (R: 5′- TCT CGAGGC ACA CAA TGA AG -3′)] was designed based on sequence data of the NCBI global Hyalomma anatolicum isolate (JX051051.1) and used to preparing the MasterMix (AddBio, Korea) tubes at a final volume of 20 µl. For PCR reaction, the thermocycler conditions were included 1 cycle (95°C, 5 min) for initial denaturation, 30 cycles for denaturation (95°C, 30 sec), annealing (58°C, 30 sec) and extension (72°C, 1 min), and 1 cycle for final extension (72°C, 5 min). Electrophoresis using the agarose-gel stained with Ethidium Bromide was done at 80Am, 100 volt for 1 hour. The PCR products were visualized using the UVtransilluminator and photographed using the digital camera. The product size of PCR positive samples were detected at 420 bp.

Statistical analysis

The t-test and One-Way ANOVA in the GraphPad Prism (version 6.0.1) Software wereapplied to detect significant variation between values of study groups at $P<0.05$ (*) and$P<0.01$ (**), , (Gharban et al.,

2023, 2023).

Results and discussion

A total of 65.17% (391 / 600) cattle was positively having ticks that existed throughout various bodily parts including udder (43.26%), (Figure 1); while, significant lowering was seen in neck (4.93%), forelimb (7.4%) and hind-limb (10.82%) when compared to ear (14.04%) and perineal region (19.55%), (Figure 2).

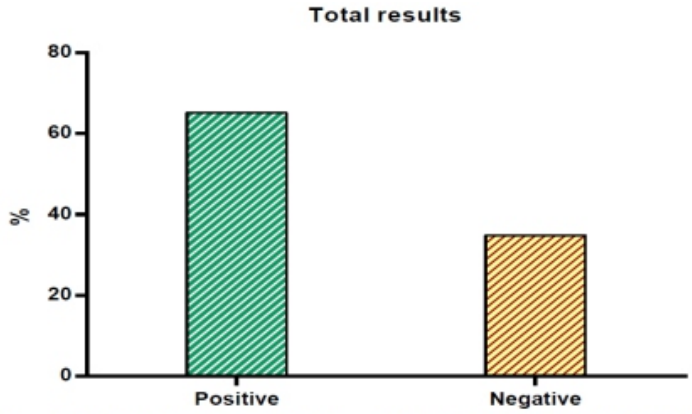

Figure (1): Total infested study cattle with ticks (Total No: 600)

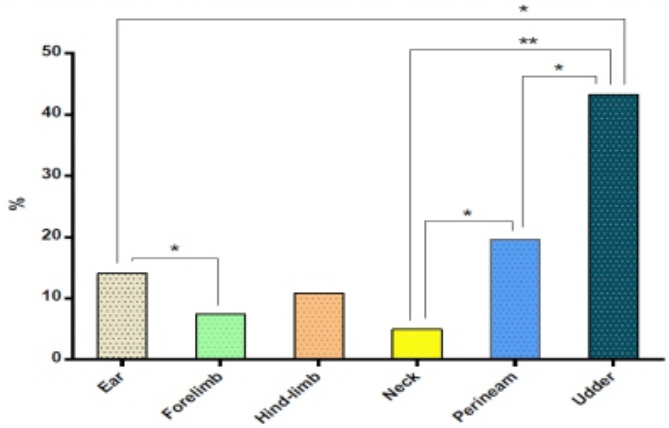

Figure (2): Distribution of ticks on different parts of infested cattle

The findings of this study were in agreement with other local studies such as Suleiman(2018) who recorded 36.77% infested cattle with hard ticks; but higher than those recorded in Sulaimanyia (11.8%) by Kadir et al. (2012); and in Baghdad (8.1%) by Hasson (2012)and 12.9% b y Mallah and Rahif (2016); while were lowered than reported in Basrah (42.5%) by AL-Mayah and Abdul-Karim (2020). In comparison with other global studies, theoverall prevalence of hard ticks in cattle was 85% in Pakistan (Ali et al., 2013), 67.5% in Iran (Ghashghaei et al., 2017), 40.26% in Ethiopia (Yalew et al., 2017) and 41.93% in India (Debbarma et al., 2018).

Morphologically, the findings revealed that all samples were hard ticks and belong to the genus of Hyalomma (Figure 3). Our results were similar with that reported by other researchers (Intirach et al., 2023; Luz et al., 2023).

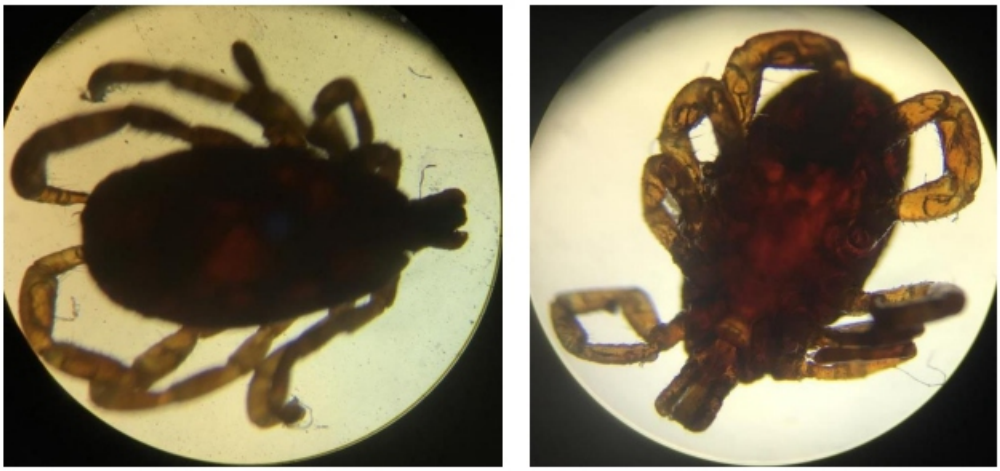

Figure (3): Morphological identification of study ticks based on their body characteristics

Targeting the 18S rRNA gene, the PCR results confirmed that all samples belonged to genus of Hyalomma anatolicum (Figure 4). These results were in agreement with other locally studies carried out in Al-Najaf (Al-Fatlawi et al., 2018) and Babylon (Saadoon and Abid, 2021) provinces. Globally, the findings of this study were similar with that detected in Turkey (Aktas et al., 2006), Tunisia (M'ghirbi et al., 2008), China (Yu et al., 2018), Pakistan (Zeb et al., 2020), Egypt (Amira et al., 2021) and Saudi Arabia (Omer et al., 2021).

Figure (4): Electrophoresis of agarose-gel at 80AM, 100 volt for 1 hour; Lane M: Ladder marker (1500-100 bp); Lanes 1-9: representative positive samples at 452bp; Lane 9: Negative control

Many researchers in Iraq and neighboring countries have studied the epidemiology of persistent ticks and reported that dairy cattle grazing on pastures can become infected with ticks during grazing (Al-gharban and Dhahir, 2015; Desta et al., 2016; Kasaija et al., 2021).In Iraq, six species have been recorded including Rhipicephalus annulatus, R. sanguineus, H. anatolicum, H. impeltatum, H. marginatum and H. excavatum (Omar et al., 2007; Mohammed, 2015; Al-Abidi and Al-Ameri, 2021).
An extensive study of some cattle herds in Basra province showed that H. excavatum can infect cows, calves and donkeys for the first time in Iraq. Hyalomma asiaticum was first recorded in animals in the south Iraq (Awad andAbdul-Hussein, 2006). In northern Iraq, Ismail and Omar (2021) recorded six species in Duhok city which belongs to two major tick genera, three species belonging to Hyalomma and

three species of minor pollinators belonging to the genus Rhipiciphalus. A new species of the subgenus Hyalomma (H. asiatium asiaticum) was reported for the first time in the Duhokregion. In addition,a study was conducted to determine the prevalence of ticks of the family Ixodidae among horses and some domestic animals in Erbil province (Aziz and AL-Barwary, 2020). Another survey was conducted between September and February 2020 to determine the prevalence of the epidemic in the northern region of Basra province using 250 animal samples of different ages and sexes from the same region (Faraj et al., 2021). In other countries, H. anatolicum is well adapted to the dry climates of the Mediterranean and North Africa and other desert climates on both continents (Walker, 2014). In Saudi Arabia, a study on several dairy farms in the Al-Ahsa in the eastern region found H. excavatum (18.33%), H. dromedarii (17.63%), H. anatolicum (14.29%) and R. turanicus (14.04%), H. impeltatum(11.28%), R. Praetexttatus (8.56%); H. turanicum (6.20%), Haemaphysalis sulcata (3.57%), R. kohlsi (2.33%), H. rufipes (2.09%), H. schulzei (1.03%), H. variegatum (0.47%) and A.gemma (0.18%), (Abdally et al., 2020).

Conclusion

This study demonstrated that the great naturally occurring the populations of the ticks in cattle, and that Hyalomma anatolicum remains the almost widespread species of ticks in Iraq. In addition, adult ticks are the easiest to identify and male and female ticks of the same species may look different, while nymphal and larval ticks are very small and may be detect. This study recommended investigating all ticks species found in all Iraqi areas using the morphological and molecular techniques due to the definite role of this external parasite in transmission of various diseases to both animals and humans.

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Assessment of Awareness, Knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia 2022

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ABSTRACT

Background: Herpes Zoster is a viral infection that occurs due to reactivation of the Varicella Zoster virus. A vaccine has been approved for adults aged 50 and above for the prevention of Herpes Zoster and its complications, despite the recommended herpes zoster vaccine for individuals aged ≥ 50 years, its uptake remains low in Saudi Arabia. Herpes zoster infection can significantly impair the quality of life of the affected individuals, and its treatment imposes a considerable cost burden on the health-care system and on society at large. However, there is little information on the perception of this disease and the acceptability of vaccines in Saudi Arabia. Herpes Zoster, also known as shingles, is a skin condition caused by the reactivation of a latent varicella zoster virus, which is the virus that also causes chickenpox. Herpes Zoster is most commonly seen in patients who are older than age 50, immune compromised or receiving immunosuppressive therapy, Zostavax reduced the incidence of Herpes Zoster infection in those aged 60 years and older and in those aged 70 years and older by 51.3% and 38% respectively, and the incidence of post herpetic neuralgia (PHN) by 66.5% and 66.8% respectively.

Aim of the study: To assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia 2022.

Methods: A cross-sectional study was conducted at patients with history among the herpes zoster visiting the primary health sector in Saudi Arabia, from April to May 2022, 200 patients were included and data

were collected by using a written questionnaire also online questionnaire and telephone interviews, was developed based on a literature review.

Results: shows that most of the participants (41.0%) were in the age group (40-49) years regarding educational attainment the majority of participant are Undergraduate were(40.0%) regarding employment status the majority of participant are employed were(69.0%) regarding history of chronic diseases the majority of participant answer Yes were(66.0%).

Conclusion: There is a large difference in self-reported Herpes zoster and vaccination rates among races. The Herpes zoster vaccination rate was low overall, but most patients were interested in receiving the vaccine after the education. More public awareness and education is needed to improve rates of Herpes zoster vaccination .

Keywords: assessment, awareness, knowledge, Vaccine, Herpes Zoster, Saudi Arabia .

Introduction

Herpes zoster, commonly known as shingles, is a viral infection caused by reactivation of the varicella-zoster virus, which also causes chickenpox. After a person recovers from chickenpox, the virus can remain dormant in the body and reactivate later in life, leading to shingles [1]. The prevalence of herpes zoster in Saudi Arabia is unclear; however, its incidence is increasing globally, particularly in the elderly population [2]. Shingles can lead to serious complications, including post-herpetic neuralgia, vision loss, and neurological problems [3]. Herpes zoster vaccine is a safe and effective way to prevent shingles and complications. The vaccine is recommended for individuals aged ≥ 50 years, and a two-dose schedule is recommended for optimal protection [4]. In Saudi Arabia, the herpes zoster vaccine is available free of charge for individuals aged 50 years and above. Henceforth, HZ exclusively affects those with a history chickenpox infection.[5] HZ commonly presents as a vesicular dermatological rash that does not cross the midline that crusts within 10 days.[6] The pain associated with the rash can be highly variable; patients might experience hypersensitivity, tingling, aching, or burning pain.[7]

Furthermore, the vaccine reduces the burden of illness due to HZ by 61% (defined in a double-blind, placebo-controlled trial, the shingles prevention study, by using a composite measure of incidence, severity, and duration of pain) [8]. In addition, vaccine protection may persist for at least 7~10 years, as observed in the long-term persistence sub study [9]. Finally, the US Food and Drug Administration approved herpes zoster vaccination in 2011 for immune competent patients aged 50 years or older [10]. Despite the availability of a vaccine, HZ is still seen frequently in clinical practice.

Complications associated with Herpes zoster occur in almost half of all elderly patients [11]. The most common of these complications is post herpetic neuralgia (PHN), which is defined as pain in HZ lesions that lasts longer than 3 months [12]. There is no universally accepted treatment for PHN, and the available treatments are accompanied by considerable adverse effects. Elderly patients with PHN often need to make multiple visits to medical offices for prescription analgesics in attempts to resolve the pain [13]. An effective vaccine against Herpes zoster has been developed and can reduce the incidence and severity of both HZ and PHN by 51% and 67%, respectively. [14]

In 2008, the Advisory Committee on Immunization Practices recommended that all people older than age 60 receive the zoster vaccination.[15] the vaccine is recommended without serologic testing and regardless of race or medical history of varicella virus infection or HZ.When vaccinated, the risk of having HZ, the burden of disease, and the incidence of post herpetic neuralgia decrease by 51%, 61%, and 66%, respectively, over 3 years.[16] In 2011, the US Food and Drug Administration approved HZ vaccination for immune competent people older than age 50.[17] However, despite the recommendation of the Advisory Committee on Immunization Practices the

rate of zoster vaccination is low.

Despite the availability of effective vaccines, herpes zoster vaccination rates remain suboptimal in many countries, including Saudi Arabia [18]. Several socio demographic factors may influence the awareness and uptake of the herpes zoster vaccine, including age, sex, education level, income, and access to healthcare services. Older individuals and those with limited access to healthcare services may have lower awareness and uptake [19]. Cultural and religious beliefs may also influence vaccine acceptance in some populations, highlighting the need for culturally sensitive interventions to increase vaccination coverage [20].

Literature Review

A recent study that evaluated the healthcare economic burden of skin disease has shown that herpes (including HZ) is one of the top 10 most costly causes of skin conditions.[21] The incidence of HZ in the general population is estimated to be 4.47 cases per 1000 people in the United States (US) annually and rises to 10.46 per 1000 in those aged above 60.[22] Multiple predisposing factors have been linked to developing HZ, including diabetes mellitus, malignancy, immunosuppressive medications, HIV infection, radiotherapy, and TB.[23]

Several studies have examined the rate of use of the HZ vaccine in a population. In 2007, approximately 3500 adults older than age 60 in the United States were surveyed, and 1.9% of those surveyed reported having had the HZ vaccine.[24] Of those surveyed who had not been vaccinated, approximately 80% reported that they would receive the vaccine if their doctor recommended it. The 2 most common reasons for declining to be vaccinated were that the patients did not feel it was needed, and many did not think they were at risk.

In 2009, the rate of zoster vaccination among a group of rheumatologic patients was still relatively low (9.1%).[25] One study reported that the major barrier to receiving the HZ vaccine was the cost.[15] Of the vaccines recommended for the older population, the HZ vaccine is among the most expensive. [26]

Studies have shown that various factors influence vaccine uptake, including socio demographic factors, such as age, gender, education level, income, and access to healthcare services.Cultural and religious beliefs may also influence vaccine acceptance. In Saudi Arabia, limited studies have examined the practices related to the herpes zoster vaccine, with one recent study finding that only 4.5% of adults had received the vaccine [27].

Previous studies have focused on specific geographic areas or risk groups [28] , highlighting the need for a more comprehensive understanding of the population's knowledge and attitudes towards shingles and its vaccine in Saudi Arabia. Increasing vaccination rates is crucial for reducing the burden of herpes zoster and its complications, particularly in the elderly population. According to the World Health Organization (WHO), Saudi Arabia a twenty-year audit study of herpes zoster (HZ) in the Asia-Pacific region identified immune senescence and immunosuppression as the principal risk factors for HZ [29] .

Study reported that only 6.7% of diabetic patients were diagnosed with herpes zoster. Additionally, 23.7% of them knew someone who had been diagnosed with herpes zoster, whether diabetic or non-diabetic. [30] This rate is lower than the rates in previous studies in Korea, where 14.7% of respondents had a history of herpes zoster and 26.1% among COPD patients in the USA [31].

Rationale:

This study aimed to awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia . Shingles is a viral infection caused by the same virus that causes chickenpox. After having chickenpox, the virus can stay in the body and reactivate later in life, causing shingles. We conducted a survey among patient aged 35 years and above to gather information vaccine acceptability of Herpes Zoster. Many

people had heard about shingles, but their knowledge about it and vaccine acceptability was limited. Healthcare providers were not a significant source of information for most participants, showing the need for more awareness and education from healthcare professionals. We also looked at people's attitudes towards the shingles vaccine. Only a small percentage of participants had received the vaccine, but many expressed willingness to get vaccinated. However, certain factors like age, gender, and education level influenced people's willingness to take the vaccine. The low vaccine uptake is because shingles can lead to serious health problems. To increase vaccine acceptance, we suggest implementing awareness campaigns .

Aim of the study:

To assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia 2022 .

Objectives :

To assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia 2022 .

Methodology:

Study design :

This study is descriptive type of cross-sectional study was conducted among 100 candidates this study included visitors to health centers, in primary health sector in Saudi Arabia

Study Area

The study has been carried out in the Saudi Arabia of is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 3 million. This study has been conducted in Saudi Arabiain the primary health sector in Saudi Arabia. During the April to May 2022, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in Saudi Arabia population .

Study Population

The study has been conducted regarding visitors to health centers, in April to May 2022 in primary health sector in Saudi Arabia .

Selection criteria :

Inclusion criteria

- Visitors to health centers in primary health sector complain about herpes zoster in Saudi Arabia .
- All nationalities

Exclusion criteria :

- No specific exclusion criteria .

Sample size

Visitors to health centers in primary health sector complain about herpes zoster in Saudi Arabia, 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 (200) in primary health sector after official communication with the primary health sector in the Saudi Arabia 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 from primary health sector. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total students by the required sample size; (200).

Data collection tool

The self-administered questionnaire is designed based on previous studies to assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia. The questionnaire has been developed in English. The questions were first pre-tested and were revised and finalized after it has been pilot tested. Before completing the survey, participants were required to indicate their consent using a forced response question followed by the survey questionnaires. The survey is estimated to take 10 min to complete .

To collect the information, a set of questions were constructed and developed. All questions were closed-ended, with tick boxes provided for responses; participants answered the questionnaires from the April to May 2022 the period of study in 2022.The questionnaire consisted of questions that

First part General and Socio demographic information. These variables included contact data (email or mobile phone number),(age, gender, Sources of information). Other variables were education level, economic level .

A questionnaire has been developed that had Socio demographic data and questions related to knowledge. The two senior faculty members checked the questionnaire's validity and comprehension, and it was revised according to their suggestions. A pilot study has been conducted on secondary students to check the questionnaire's understanding and responses further, and its Cronbach's alpha was 0.75. The results of the pilot study were not included in the final analysis.

The assessment to assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia among visitors to health centers as per each topic/question, and also as per each response/answer . Data entry and analysis were carried out using the Statistical Package for the Social Sciences.

Data collection technique:

Researcher has been visits the selected primary health sector after getting the approval from the ministries of health. The researcher has been obtained permission from participants. After the arrival of the participants has been explained the purpose of the study to all participants attending .

Data entry and analysis:

The Statistical Package for Social Sciences (SPSS) software version 24.0 has been used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic

Pilot study

A pilot study has been conducted in the same sector due to the similarity to the target group using the

same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology

Ethical Approval

This study was approved from regional research center in Saudi Arabia. Each participant gave a verbal consent prior to recruitment and confidentiality was assured for each situation.

Budget: Self-funded

Results

Table 1: Distribution of socio-demographic characteristics of participant . (n-200)

	N	%
Age		
30-39 y	64	32
40-49 y	82	41
≥50 y	54	27
Gender		
Male	134	67
Female	66	33
Nationality		
Saudi	170	85
Non -Saudi	30	15
Educational attainment		
High school or below	50	25
Undergraduate	80	40
Postgraduate	70	35
Employment status		
Employed	138	69
Unemployed	62	31
History of chronic diseases		
Yes	132	66
No	68	34
Chronic disease		
Hypercholesterolemia	99	75.00
Hypertension	65	49.24
Diabetes mellitus	85	64.39
Respiratory disease	27	20.45
Marital status		
Single	42	21
Married	158	79
Patient enrollment sites in health centers		
Internal medicine clinic	52	26
Family medicine clinic	128	64
Geriatric clinic	20	10
Income status		
Less than 10000RS	64	32
10000-20000 RS	110	55
More than 20000 RS	26	13

Table 1 shows that most of the participants (41.0%) were in the age group (40-49) years follow by the age 30-39 were (32.0%) followed by ≥ 50 years were (27.0%), the majority of them male was higher compared to female(67.0% and 33.0%) , regarding nationality the majority of participant are Saudi were(85.0%) while non-Saudi practitioner were(15.0%), regarding educational attainment the majority of participant are Undergraduate were(40.0%) while postgraduate practitioner were(35.0%) but the High school or below were (25.0%), regarding employment status the majority of participant are employed were(69.0%) while unemployedwere(31.0%), regarding history of chronic diseases the majority of participant answer Yes were(66.0%) while No were(34.0%), regarding chronic disease the majority of participant hypercholesterolemia were (75.0%) while Diabetes mellitus were (64.39%) but Hypertension were (49.24%) while Respiratory disease were (20.45%), regarding the marital status most of participants married were(79.0%) while single were(21.0%), regarding patient enrollment sites in health centers the majority of participant Family medicine clinic were (64.0%) while Internal medicine clinic were (26.0%) but Geriatric clinic were (10.0%) , regarding Income status the majority of participant are between 10000 to 20000 were(55.0%) while less than 10000 were(32.0%) but more than 20000 were (13.0%) .

Table 2: Distribution of the awareness, knowledge and intention to receive (HZ) vaccination and sources of Information about its Vaccine

	N	%
How did you learn about the herpes zoster?		
Healthcare provider	114	57
Family or friends	24	12
The internet (e.g., social media, websites)	40	20
Personal experience of having herpes zoster	12	6
Knowing someone who had herpes zoster	10	5
How did you learn about the herpes zoster vaccine?		
Healthcare provider	60	30
Family or friends	44	22
Someone who had herpes zoster	72	36
The internet (e.g., social media, websites)	24	12
Awareness and knowledge of herpes zoster		
Yes	118	59
No	82	41
Awareness and knowledge of herpes zoster vaccination		
Yes	76	38
No	124	62
Awareness and knowledge of Intention to vaccination		
Yes	42	21
No	158	79

Table 2 distribution of the awareness, knowledge and intention to receive (HZ) vaccination and sources of Information about its Vaccine shows regarding did you learn about the herpes zoster the most of the participants healthcare provider were (57.0%) followed by the internet (e.g., social media, websites) were (20.0%) followed by family or friends were (12.0%) while Personal experience of having herpes

zoster were (6.0%) but the Knowing someone who had herpes zoster were (5.0%) , regarding the did you learn about the herpes zoster vaccine the majority of participant someone who had herpes zoster were (36.0%) followed by healthcare provider were (30.0%) but family or friends were (22.0%) while The internet (e.g., social media, websites) were (12.0%) , regarding awareness and knowledge of herpes zoster the majority of participant answer Yes were(59.0%) while No were(41.0%), regarding awareness and knowledge of herpes zoster vaccination the majority of participant answer No were(79.0%) while Yes were(21.0%)

Figure (1): Distribution of the awareness, knowledge of (HZ) .

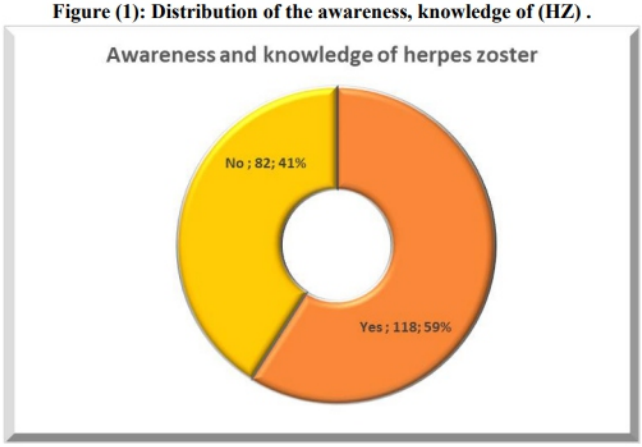

Figure (2): Distribution of the awareness, knowledge of (HZ) vaccination

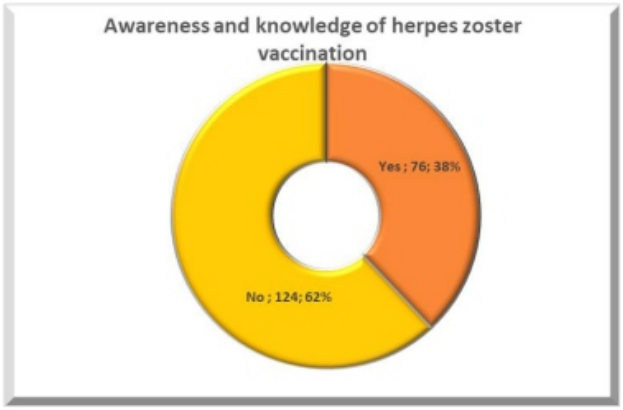

Figure (3): Distribution of the awareness, knowledge of intention to receive (HZ) vaccination .

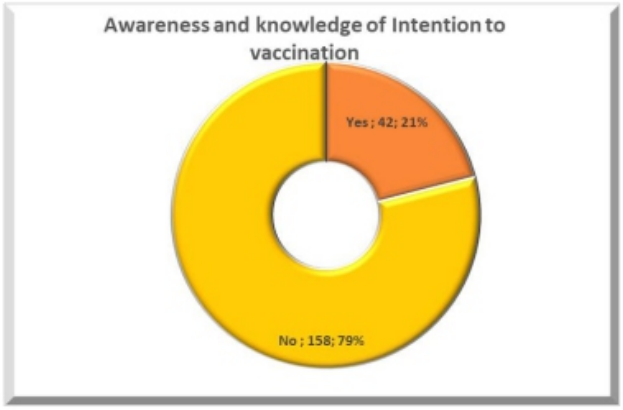

Table 3 . Distribution of the factors Impacting Decisions For or Against Receiving the Herpes Zoster (HZ) Vaccine

	N	%
Reasons cited for getting the HZ vaccine		
Recommended by health care provider	118	59
Recommended by media/ads	32	16
Recommended by friends	40	20
Recommended by family	10	5
Reasons cited for not getting the Herpes Zoster vaccine		
Have not heard about it	42	21
Do not think I will develop shingles	86	43
The physician did not recommend it	92	46
Afraid of the side effects	118	59
Financial reasons	42	21
Do not believe in vaccines in general	14	7
Have a weak immune system and cannot receive live virus vaccines	24	12
Allergic to the zoster vaccine	44	22
Do not think zoster will cause significant or lasting illness	30	15
Do not think the vaccine works	60	30
Someone told me not to get the vaccine	90	45

Table 3 distribution of the factors Impacting Decisions For or Against Receiving the Herpes Zoster (HZ) Vaccine shows regarding reasons cited for getting the HZ vaccine the most of the participants recommended by health care provider were (59.0%) followed by recommended by friends were (20.0%) followed by recommended by media/ads were (16.0%) while Recommended by family were (5.0%) , regarding the reasons cited for not getting the Herpes Zoster vaccine the majority of participant afraid of the side effects were (59.0%) followed by physician did not recommend it were (46.0%) but someone told me not to get the vaccine were (45.0%) while do not think I will develop shingles were (43.0%) , while do not think the vaccine works were (30.0%) but Allergic to the zoster vaccine were (22.0%) while financial reasons and have not heard about it were (21.0%) while do not think zoster will cause significant or lasting illness were (15,0%) but have a weak immune system and cannot receive live virus vaccineswere (12.0%) while do not believe in vaccines in general were (7.0%)

Table 4 Distribution of the relationship of the Socio-demographic characteristics and awareness and knowledge of herpes zoster

		Awareness and knowledge of herpes zoster						Chi-square	
		Yes (n=118)		No (n=82)		Total			
		N	%	N	%	N	%	X^2	P-value
Age	30-39 y	55	46.61	9	10.98	64	32.00	69.303	<0.001*
	40-49 y	20	16.95	62	75.61	82	41.00		
	≥50 y	43	36.44	11	13.41	54	27.00		
Gender	Male	85	72.03	49	59.76	134	67.00	3.299	0.069
	Female	33	27.97	33	40.24	66	33.00		
Nationality	Saudi	95	80.51	75	91.46	170	85.00	4.554	0.033*
	Non -Saudi	23	19.49	7	8.54	30	15.00		
Educational attainment	High school or below	10	8.47	40	48.78	50	25.00	76.218	<0.001*
	Undergraduate	40	33.90	40	48.78	80	40.00		
	Postgraduate	68	57.63	2	2.44	70	35.00		
Employment status	Employed	88	74.58	50	60.98	138	69.00	4.184	0.041*
	Unemployed	30	25.42	32	39.02	62	31.00		
History of chronic diseases	Yes	86	72.88	46	56.10	132	66.00	6.073	0.014*
	No	32	27.12	36	43.90	68	34.00		
Marital status	Single	22	18.64	20	24.39	42	21.00	0.963	0.326
	Married	96	81.36	62	75.61	158	79.00		
Patient enrollment sites in health centers	Internal medicine clinic	25	21.19	27	32.93	52	26.00	4.880	0.087
	Family medicine clinic	78	66.10	50	60.98	128	64.00		
	Geriatric clinic	15	12.71	5	6.10	20	10.00		
Income status	Less than 10000RS	10	8.47	54	65.85	64	32.00	74.578	<0.001*
	10000-20000 RS	90	76.27	20	24.39	110	55.00		
	More than 20000 RS	18	15.25	8	9.76	26	13.00		

Table (4) distribution of the relationship of the Socio-demographic characteristics and awareness and knowledge of herpes zoster show regarding age heave a significant relation were P-value=0.001, X 2 were (69.303) increase in Yes in age 30-39 years were (46.61%) in total (32.0%) followed by ≥50 years were (36.44) in total (27.0%) while regarding No increase in 40-49 years were (75.61) in total (41.0%) , regarding gender heave a significant relation were P value=0.069, X2 were (3.299) increase in Yes in male were (72.03%) in total (67.0%) followed by female were (27.97%) in total (33.0%) while regarding No increase in male were (59.76%) followed by female were (40.24%), regarding nationality heave a significant relation were Pvalue=0.033, X2 were (4.554) increase in Yes in Saudi were (80.51%) in total (85.0%) followed non-Saudi were (19.49%) in total (15.0%) while regarding No increase in Saudi were (91.46%) , regarding educational attainment heave a significant relation were P-value=0.001, X2 were (76.218) increase in Yes in Postgraduate were (57.63%) in total (35.0%) followed Undergraduatein No were (48.78%) followed by High school or below were (48.78%) in total (25.0%) , regarding employment status heave a significant relation were P-value=0.041, X2 were (4.184) increase in Yes in employed were (74.58%) in total (69.0%) followed by employed in No were (60.98%) , regarding patient enrollment sites in health centers heave no significant relation were P-value=0.087, X2 were (4.880) increase in Yes in family medicine clinic were (66.10%) in total (64.0%) followed by No in family medicine clinic were (60.98%) in total (64.0%), Income status heave a significant relation were P-value=0.001, X2 were (74.578) increase in Yes in 10000-20000 RS were (76.27%) in total (55.0%) followed by Less than 10000RS in No were (65.85%) in total (32.0%) .

Discussion

In the present study, we assessment of awareness, knowledge, and Vaccine Acceptability of Herpes Zoster in Saudi Arabia 2022, and analyzed the predictors of HZ vaccination. Additionally, a study conducted in the US found that gaining a better understanding of HZ and its vaccine was a leading factor in participants' willingness to take the vaccine. [24] Hence, public health awareness campaigns that underscore the importance of vaccination as well as HZ vaccine recommendations, while underlining the HZ associated sequalae, could essentially improve the willingness to take the HZ vaccine. In our study that most of the participants (41.0%) were in the age group (40-49) years , the majority of them male was higher compared to female(67.0% and 33.0%) , regarding employment status the majority of participant are employed were(69.0%) while unemployed were(31.0%), regarding history of chronic diseases the majority of participant answer Yes were(66.0%) while No were(34.0%), regarding chronic disease the majority of participant hypercholesterolemia were (75.0%) while Diabetes mellitus were (64.39%) but Hypertension were (49.24%) while Respiratory disease were (20.45%) (See table 1).

Among those who had not been vaccinated, expressed willingness to receive HZ vaccination in the future . The most frequent reason was "severe sequelae," followed by "knowing someone who has HZ" and "recommendation from a doctor or other health-care professionals." Overall, this indicates that education about the disease and its sequelae by health professionals including doctors can help motivate patients to accept HZ vaccination. The key reason cited by most of the respondents who did not want to receive HZ vaccination was the high cost. The cost of the HZ vaccine has been reported previously to be a major obstacle to vaccination efforts [21]. However, most studies have shown that vaccination against HZ is likely to be cost-effective [22]. conducted a review of 15 cost-effectiveness studies in North America and Europe and concluded that most studies showed that vaccination against HZ is cost-effective. In our study (See Figure 1,2,3)

Although not specifically studied in our study, additional potential barriers to HZ vaccination exist. One example is the complexity of the vaccine administration. [14] The vaccine must be stored at 15°C(5°F), and it must be administered within 30 minutes of thawing.[20] This makes it inconvenient to administer in practices that do not have the vaccine in the building. When this is the case, systems-based plans need to be implemented to simplify the acquisition and administration of the vaccine. Patients picked up the vaccine and had to bring it back to their respective clinic within 30 minutes for administration. As an alternative, they took their zoster vaccine prescription to private pharmacies off-site for dispensing and administration [30] , in our study the factors Impacting Decisions For or Against Receiving the Herpes Zoster (HZ) Vaccine shows regarding reasons cited for getting the HZ vaccine the most of the participants recommended by health care provider were (59.0%) followed by recommended by friends were (20.0%) followed by recommended by media/ads were (16.0%) while Recommended by family were (5.0%) , regarding the reasons cited for not getting the Herpes Zoster vaccine the majority of participant afraid of the side effects were (59.0%) followed by physician did not recommend it were (46.0%) (See table 3)

The unexpected finding that participants with education were more willing to take the shingles vaccine than those with higher education raises questions about the role of health literacy and vaccine hesitancy in vaccine uptake. Previous studies have found that individuals with lower educational levels are often at a disadvantage in terms of health literacy, which may impact their ability to understand and act on health-related information, including recommendations for vaccination [14].

However, some studies have reported that higher education levels may be associated with increased vaccine hesitancy, which is defined as a delay or refusal of vaccination despite the availability of vaccine services [15]. However, other studies have found no association between education level and vaccine hesitancy education level and vaccine hesitancy [26]. One possible explanation for the observed association between education and willingness to receive the shingle vaccine is that individuals with

lower education levels may have less access to healthcare services and, therefore, may be more motivated to take advantage of preventive health measureswhen they become available. Additionally, people with lower educational levels may have higher levels of trust in healthcare providers and are more likely to follow their recommendations [27].

In our study show regarding age heave a significant relation were P-value=0.001, X2 were (69.303) increase in Yes in age 30-39 years were (46.61%) in total (32.0%) followed by ≥50 years were (36.44) in total (27.0%) while regarding nationality heave a significant relation were P-value=0.033, X2 were (4.554) increase in Yes in Saudi were (80.51%) regarding employment status heave a significant relation were P-value=0.041, X2 were (4.184) increase in Yes in employed were (74.58%) in total (69.0%) followed by employed in No were (60.98%) , regarding patient enrollment sites in health centers heave no significant relation were P value=0.087, X2 were (4.880) increase in Yes in family medicine clinic were (66.10%) in total (64.0%)(See table 4)

Conclusion

Herpes Zoster vaccination rates are low, as is patients' awareness that the Herpes Zoster vaccine is recommended for all people older than age 50. Large differences in the vaccination rates exist and potential reasons for the differences are likely multifactorial. Witnessing someone having Herpes Zoster and having a higher educational level are strongly related to Herpes Zoster vaccination status. A physician's recommendation is the reason to get vaccinated that is most commonly cited by patients, not being aware of the vaccine and the recommendation was reason most commonly cited by patients who had not received the vaccine, and most of these people wanted the vaccine once they knew about it. Future research should explore the incidence of shingles and the efficacy of vaccination and other, minority races because some populations have a lower incidence of the disease and the cost-effectiveness of the vaccine in these groups is not known. To achieve higher HZ vaccination rates, public awareness, education, and redesign of the health care delivery system should be explored.

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Molecular Incidence of Theileriosis in Morphologically Identified Hard Ticks

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ABSTRACT

The current study aims for molecular detection of theileriosis caused by Theileriaannulata in hard ticks (Hyalomma anatolicum) using the conventional PCR. A total of 200 buffaloes existed in different areas in Wasit province (Iraq) were subjected to collection the tick samples during April to July (2023) to be examined morphologically and molecularly. Among study cattle examined grossly, 74% were found positives for presence of tick infestation. Regarding distribution of ticks on different bodily parts of study buffaloes, significant higher infestation of ticks was seen in udder (26.9%) and perineal region (23.1%); while, significant lowering was seen in forelimb (9.76%) and neck (9.76%); when compared to ear (15.48%) and hindlimb (18.57%). Concerning the month of samples collection, the findings showed a significant increase (P 0.0436) in prevalence of ticks in June (80%) and July (86%) and significant decrease in April (58%) when compared to May (72%). Based on their morphological characteristics, microscopic examination of collected ticks referred that all samples were hard ticks belongs to Hyalomma genus in particular H. anatolicum species. Targeting 18S rRNA gene, molecular examination of 148 samples of ticks by the conventional PCR assay revealed that 10.14% were positively infected with T. annulata. Distribution of PCR results reported a significant elevation (P 0.0467) in positive Theileria annulata infections in July (20.93%) but significant reduction in April (3.45%) and May (2.78%) in comparison with June (10%). In conclusion, this study demonstrated the highly prevalence of ticks in buffaloes especially with increasing of environmental temperature in summer months. Hard ticks of Hyalomma genus in particular H. anatolicum remain the most incidence ticks among buffaloes population. Molecular detection of Theileria annulata in study ticks demonstrated their roles in transmission of infection to other healthy buffaloes. Moreover studies on ticks of infested buffaloes or other field animals using the molecular assays appear of great importance to estimate its role in transmission of other pathogens.

Keywords: Theileria annulata, Hyalomma anatolicum, Water buffalo, Bubalus bubalis,Tick-borne disease, Ectoparasite

Introduction

Ticks, ectoparasites of worldwide distribution in several tropical and subtropical countries, are the main vector for different viral, bacterial and parasitic infections resulting in variable illnesses in both human and animals (Boulanger et al., 2019; Muhammad et al., 2021). Theileriosis, caused by Theileria spp., is one of most prevalent infectious diseases of bovineand other domestic animals which need two types of hosts to complete its lifecycle (Abdela and Bekele, 2016). Transmission and survival of Theileria might depend on several factors, including different host stages, the ability of sporozoites and merozoites of the mammalian host, and zygotes and kinetochores of the tick vector to sense and enter specific cells (Farhat, 2020; Gubbels et al., 2020). Although, transmission of Theileria occurs mainly through feeding of adult ticks on blood of a host, sporozoites infiltrate

lymphocytes and differentiate into schizonts resulting in lymphocyte degeneration. In lymphocytes, schizonts differentiate into merozoites that infect erythrocytes (Tajeri et al., 2022). Repeated asexual divisions have been shown to occur in erythrocytes and lymphocytes of species such as T. annulata. Inside the infected erythrocytes, merozoites develop into piroplasms, a parasitic stage that infects ticks (Weir et al., 2011; Tirloni et al., 2015; Jalovecka et al., 2018). In ticks, sexual developmental phase of Theileria occurs in gut producing the zygote that invades the gut cells and remains there throughout the moulting cycle and grows into a single kinete. Kinete escapes from the gut cell, invades salivary glands, and remains in the salivary glands until transmitted to another mammalian host post moult nymph or adult feeds (Mans et Kiara et al., 2018; Akhtar et al., 2023). Tick feeding initiates rapid development of sporozoite that released during the final feeding period (Nene et al., 2016; Lakew et al., 2023).

In suspected animals, diagnosis of the parasite can be based on traditional or molecular methods. Traditional methods include detection of preliminary clinical signs, analysis of necropsy results, microscopic and serological examinations (Lempereur et al., 2017; Gebrekidan et al., 2020). In ticks, traditional diagnostic methods could be either not applicable or having several drawbacks and providing low-valuable data. These limitations can be overcome by molecular methods, especially polymerase chain reaction (PCR) that characterized by their highly sensitivity and specificity in identification, characterization, isolation and comparison of different strains (Bogema et al., 2015; Nangru et al., 2022). In Iraq, almost researchers have focused on diagnosis of Theileria in the hosts such as cattle (Ahmed et al., 2021), sheep (Abdullah et al., 2022), goats (Mahmoud et al., 2019) and camels; however, the number of carried out studies in ticks remains very limited and need moreover investigations (Al-Fatlawi and Al-Fatlawi, 2019). Hence, the current study aims for molecular detection of theileriosis caused by Theileria annulata in hard ticks existed on buffaloes using the conventional PCR.

Materials and methods

Samples

A total of 200 buffaloes existed in different areas in Wasit province (Iraq) were subjected for gross examination to detect and collect of tick samples during April to July (2023). Ticks were removed manually using the forceps and chloroform (CHEM-LAB, UK) to ovoid their damages due to mouthparts adhesion to skin of buffaloes, and collected into labeled plastic container. Ticks of each animal were considered as solitary sample during morphological examination of ticks and molecular investigation of T. annulata. Also, data concerned to distribution of ticks on different body parts in addition to month of samples collection were documented as risk factors. According to number of detected and collected ticks from each animal, the study buffaloes were graded into groups as following: A (1-5 ticks), B (6-10ticks), C (11-15 ticks), D (16-20 ticks), E (21-25 ticks), F (26-30 ticks), G (31-35 ticks) and > 35 ticks).

Morphological examination of ticks

Tick samples were identified morphologically based on the key features described by other researchers (Walker et al., 2003; Estrada-Pena et al., 2004).

Molecular detection of T. annulata

Following the manufacturer instructions of the gSYAN DNA Extraction Kit (Geneaid, Taiwan), DNAs were extracted from the ticks, and then evaluated for its purity and concentration using the Nanodrop spectrophotometer (Thermo Fisher Scientific, USA).Targeting 18S rRNA gene, one set of primers [F: (5′- GAC TCA ACA CGG GGA AAC TC 3′) and R: (5′- CAT TCC TCG TTC ACG ATT AAC A-3′)]

was designed based on the GenBank database of NCBI isolate (MK737519.1), and the MasterMix tubes were prepared using the AccuPowerTM PCR PreMix Kit (Bioneer, Korea) at a final volume of 20 µl. For PCR reaction, the MasterMix tubes were transferred into the conventional PCR thermocycler system (BioRad/ USA) and subjected to the following conditions; 1 cycle initial denaturation (95°C / 7 min); 35 cycle denaturation (95°C / 30 sec), annealing (58°C / 30 sec) and extension (72°C / 30 sec); and 1 cycle final extension (72°C / 5 min). Electrophoresis of agarose-gel (1.5%) stained with Ethidium Bromide was carried out for PCR products at 80AM and 100 volt for 90 minutes, and the resultants were visualized using the UV transilluminator to detect the positive samples at a product size of approximately 400 bp.

Statistical analysis

The t-test and One-Way ANOVA in the GraphPad Prism Software were served for detection significant differences between study values at $P<0.05$ (Gharban et al., 2023).

Results

Among totally 200 buffaloes examined grossly, 148 (74%) were found positives for presence of tick infestation (Figure 1).

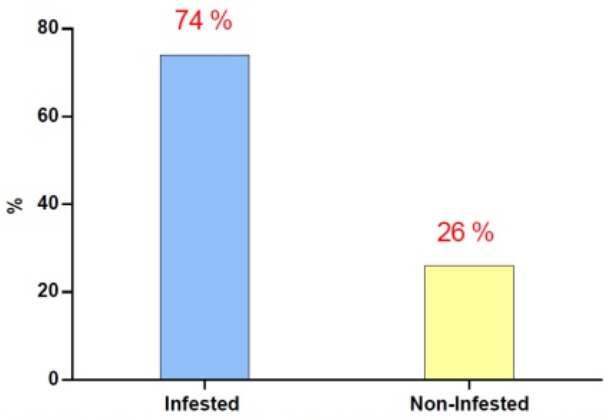

Figure (1): Total results for infested buffaloes with ticks (Total No: 200)

According to number of collected ticks, significant increases ($P<0.0387$) in grade E (24.32%) and B (19.6%) while significant decreases were observed in grades A (9.46%), C (8.11%), F (9.46%), G (7.43%) and H (4.73%) when compared to D (16.89%), (Table 1). Regarding distribution of ticks on different bodily parts of study buffaloes, significant higher infestationof ticks was seen in udder (26.9%) and perineal region (23.1%); while, significant lowering was seen in forelimb (9.76%) and neck (9.76%); when compared to ear (15.48%) and hindlimb (18.57%), (Figure 2).

Table (1): Grades for number of infested ticks on each study buffaloes

Grade	No. of tick infestation	Buffaloes	
		No.	%
A	1-5	14	9.46
B	6-10	29	19.6
C	11-15	12	8.11
D	16-20	25	16.89
E	21-25	36	24.32
F	26-30	14	9.46
G	31-35	11	7.43
H	> 35	7	4.73
Total		148	-
p-value		0.0387	

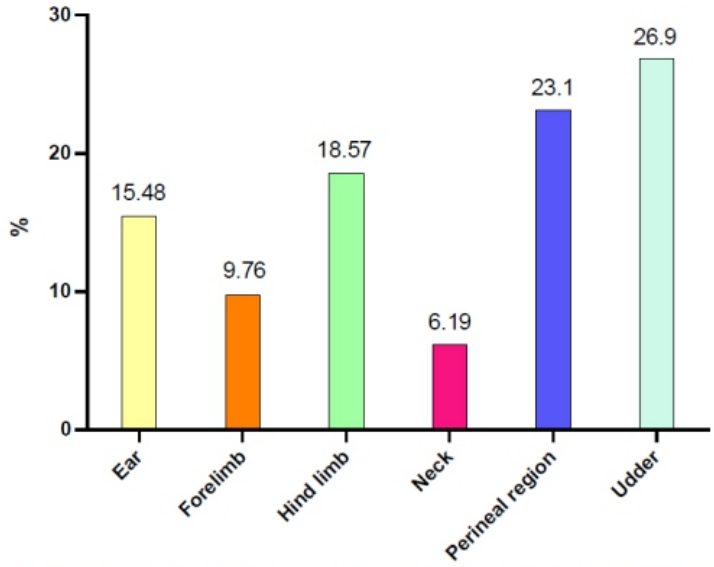

Figure (2): Distribution of ticks on each body part of study infested buffaloes

Concerning the month of samples collection, the findings showed a significant increase (P 0.0436) in prevalence of ticks in June (80%) and July (86%) and significant decrease in April (58%) when compared to May (72%), (Table 2)

Table (2): Association between tick infestation and the month of samples collection

Month	Total No. of buffaloes	Positive infested buffaloes	
		No.	%
April	50	29	58
May	50	36	72
June	50	40	80
July	50	43	86
Total	200	148	-
p-value		0.0436	

Based on their morphological characteristics, microscopic examination of collected ticks referred that all samples were hard ticks belongs to Hyalomma genus in particular H.anatolicum species. The key features were based on the genital aperture and mouth parts as there were Coxa I, Coxa II, and Coxa III in the ventral part of the ticks, and the dorsal surface that has the festoons. In males, characteristics of ventral surface of H. anatolicum represented by the presence of Coxa II, Coxa III, Coxa IV, accessory shield, anus, adanal plates, anal groove, and sub-anal shields (Figure 3).

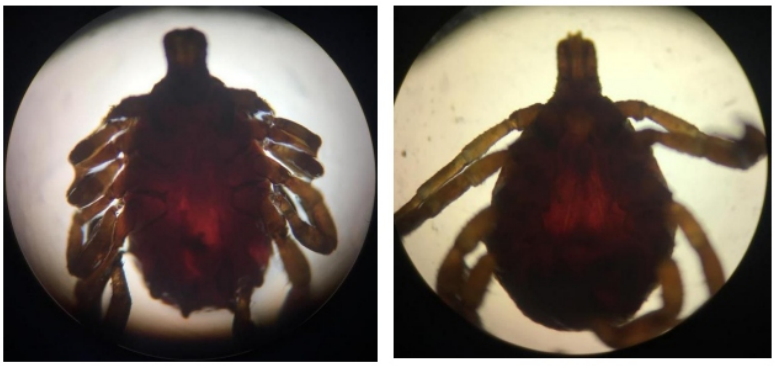

Figure (3): Microscopic examination for morphological appearances of ticks

Targeting 18S rRNA gene, molecular examination of 148 samples of ticks by the conventional PCR assay revealed that 15 (10.14%) were positively infected with Theileria annulata (Table 3, Figure 4).

Table (3): Total molecular results using the conventional PCR (Total No: 148)

Result	No.	%
Positive	15	10.14
Negative	133	89.86
Total	148	-

Figure (4): Agarose-gel electrophoresis of PCR products at 80AM and 100 volt for 90 minutes; in which, Lane M: Ladder marker (2000-100 bp), and Lanes (1-15) represent the positive PCR products for *Theileria annulata* at approximately 400 bp

Distribution of PCR results reported a significant elevation (P<0.0467) in positive Theileria annulata infections in July (20.93%) but significant reduction in April (3.45%) and May (2.78%) in comparison with June (10%), (Table 4).

Table (4): Association between positive PCR results and the month of samples collection

Month	Total No.	Positive	
		No.	%
April	29	1	3.45
May	36	1	2.78
June	40	4	10
July	43	9	20.93
Total	148	15	-
p-value		0.0467	

Discussion

The findings of current study that recorded the significant prevalence of hard ticks among study buffaloes were higher than observed previously by other local studies in bovine as recorded in Sulaimanyia (11.8%) by Kadir et al. (2012), and Baghdad (8.1%) by Hasson(2012) and 12.9% b y Mallah and Rahif (2016); but lowered than reported in Basrah (42.5%) by AL-Mayah and Abdul-Karim (2020). In comparison with other global studies, theoverall prevalence of hard ticks in bovine was 85% in Pakistan (Ali et al., 2013), 67.5% in Iran (Ghashghaei et al., 2017), 40.26% in Ethiopia (Yalew et al., 2017) and 41.93% in India (Debbarma et al., 2018).

Studies have shown that in healthy infected animals, ticks are also found on other parts of the body. According to Monfared et al. (2015), body regions and other researchers recorded the most frequently found types of mites in the breast, mammary glands, scrotum, genitals and perineum (Ndhlova et al., 2009; Hasson, 2012; Ayana et al., 2021). Due to favorable temperatures and conditions in the warmest months of the year, the number of infections in these parts of the animal's body is high (Parola et al.,

2008). Also, differences in the location of ticks on the body may be due to tick feeding triggered by odors coming from different parts of the body, especially the genitals, where there are more ticks that prefer the warm and moist hiding places with good and high blood supply. Also, ticks delicate the skin that is easy to penetrate and allow more nutrition is preferred (Tessema and Gashaw, 2010; Nejash, 2016; Makawi and Hadi, 2023).

As mentioned by Al-Fatlawi et al. (2018), the key features were based on the genital aperture and mouth parts. Prevalence of Hyalomma genus in particular H. anatolicum in this study was similar with that reported by other (Al-Abedi and Al-Amery, 2021) and global studies as in Turkey (Aktas et al., 2004), India (Haque et al., 2011), Pakistan (Atif, 2012), Iran (Razmiand Ramoon, 2012) and United Arab Emirates (Perveen et al., 2021). The dominance and spread of Hyalomma is due to the cold resistance of this species and its ability to survive in environments with low humidity and harsh climate (Kettle, 1995). This percentage is lower than the 94.2% recorded by Tarash (1982) for Hyalomma spp. in Al-Dahab Al-Abyad village, Baghdad, but higher than the 46% recorded by Al-Mawla (2001) for Hyalomma spp. in Mosul among others above the level of Abdul Hussain and Awad (2005) in Basra province.In this study, application of conventional PCR assay demonstrates the presence of T.annulata in ticks. Various methods have been used to investigate the level of Theileriainfection in the salivary glands of ticks worldwide (Abdigoudarzi, 2013; Tajeri et al., 2016). A shortcoming of histological and histochemical methods commonly used to detect infections is that they cannot accurately identify the type of parasite infecting a tick (Mallesh et al., 2017 a, b). Methylverdepironin (MGP) is one of the simplest and most sensitive histopathological methods and has traditionally been used to quantify tick-borne diseases (Lempereur et al., 2017). However, this can only be performed on freshly collected ticks and cannot distinguish between closely related Theileria species such as T. lestoquardi and T. equi that can infect the same ticks but not bovine (Kirvar et al., 2000). This can overcome by PCR targeting specific genes in T. annulata. One of the main advantages of the PCR test over traditional diagnostic methods is that it can distinguish between T. annuluta and other genera of Theileria and Babesia in bovine blood and T. annuluta from T. lestoquardi and T. equi in ticks. This work therefore proceeds in a way that addresses questions raised by other workers regarding the accurate assessment of Hyalomma parasites (Saleh et al., 2015; Kumar et al., 2022)

The sensitivity, specificity, and degree of cross-reactivity of a PCR assay will certainly depend on factors such as primer sequence, amplification characteristics, DNA extraction method, sample, and DNA storage. Similar criteria have been proposed for Plasmodiumspecies. However, if we could test and develop a simple and inexpensive DNA extraction method for the detection of striped mites in the blood of animals and ticks, it would be useful for large-scale epidemiological studies (Costa et al., 2021; Yadav et al., 2021). Understanding the prevalence of Theileria infections in adult ticks is essential to the development of appropriate Theileria and tick control programs. In this study, T. annulata was detected in 10.14% of the studied samples. A previous study conducted in Sudan showed that H.

anatolicum had the highest prevalence of Theileria infections, ranging from 38% to 86% (Walker and McKellar, 1983). The prevalence of H. anatolicum and T. annulata is estimated to be 96% among ticks fed on infected calves (Bakheit, 1998) and 80% among ticks collected on farms (El Imam, 1999). This study suggests that the high rate of tick infestation is due to the agricultural system used, consisting of small livestock pens, which create a good microbial habitat for H. anatolicum ticks.

Ali et al. (2013) found T. annulata to be present only in H. anatolicum and H. dromedari, but not in H. anatolicum. These results suggest that H. anatolicum may play an important role in the spread of T. annulata in Iran. The findings are similar to other studies conducted in Ethiopia and Sudan. This is because H. anatolicum is the main causative agent of T.annulata, the main causative agent of tropical disease infections. Therefore, tropical diseases must be monitored within the range of H. anatolicum

(Mossaad et al., 2021; Kaba, 2022).

Conclusion

This study demonstrated the highly prevalence of ticks in buffaloes especially with increasing of environmental temperature in summer months. Hard ticks of Hyalomma genus in particular H. anatolicum remain the most incidence ticks among buffaloes population. Molecular detection of Theileria annulata in study ticks demonstrated their roles in transmission of infection to other healthy buffaloes. Moreover studies on ticks of infested buffaloes or other field animals using the molecular assays appear of great importance to estimate its role in transmission of other pathogens.

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Impact of Knowledge and Attitudes of Health Care Workers towards Seasonal Influenza Vaccination of Patients Attending in Primary Health Care at Saudi

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ABSTRACT

The seasonal influenza vaccine is an important preventive measure against influenza and its associated complications. In Saudi Arabia there is a seasonal influenza vaccination policy, influenza vaccine is from the national immunization program. Data on vaccination coverage remain scarce with no previous surveillance programs or awareness campaigns implemented in the country. The seasonal influenza vaccine is beneficial for both the patients attending in Primary Health Care and infants. It is considered as primary prevention for patients attending in Primary Health Care and it decreases the serious outcomes when infection does occur. Health care workers are associated with immunological and physiological changes in many the Patients. Influenza in Patients attending in Primary Health Care has been associated with higher rates of morbidity and mortality, the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) advocate influenza vaccination, influenza is an acute respiratory disease of global importance due to its pandemic potential.

Aim of the study: study sought to understand Knowledge and attitudes of health care workers towards seasonal influenza vaccination of patients attending in Primary Health Care at Saudi Arabia 2023.

Methods: Knowledge, attitudes (KA) study was administered to 200 patients attending in Primary Health Care aged 18 and older attending public health institutions in Saudi Arabia. This cross-sectional study was conducted among 200 participants from health care centers in Saudi Arabia, during the from

September 2023 to December 2023

Results: shows the majority age most of participants 35-50 were (42.0%) gender majority of participants were(57.0%) were female, regarding the HCWs classification majority of participants health professionals (nurses, midwives) were (45.0%), regarding the level of education the most of participant postgraduate were (49.0%) .

Conclusion: This study of Knowledge and attitudes concerning influenza vaccination among patients attending in Primary Health Care various factors emerged as key determinants influencing the intention of patients to undergo influenza vaccination. They include age, geographic residence, related health conditions or underlying disease(s). Notably, majority of patients who did not believe in vaccine's protection against influenza still expressed a willingness to be vaccinated. Another portion of patients indicated their intention to receive the influenza vaccine.

Keywords: Impact, Knowledge, attitudes, health care, workers, seasonal, influenza vaccination, Patients, attending, Primary Health Care, Saudi Arabia.

Introduction

Influenza is a respiratory illness that affects the respiratory tract. Influenza is recognized as a global public health concern that impacts approximately 5% to 10% of the population and results in fatalities ranging from 250,000 to 500,000 deaths each year.[1]

Annual influenza vaccination is recommended by the CDC's Advisory Committee on Immunization Practices (ACIP) for all persons starting at age 6 months who do not have contraindications.[2] It also recommends that all women who are pregnant or who might be pregnant during the influenza season receive the influenza vaccine, in addition to Healthcare workers (HCWs).[3] , as well as the potential delay or suspension of healthcare services. It lowers the risk of morbidity and death among highly vulnerable patients, such as patients with cancer.[4,5]

Influenza is an acute respiratory illness of global importance due to its potential to result in a pandemic. The 2009 influenza A (H1N1) pandemic illustrated the substantial impact this disease had on the people , as the Primary Health Care rate for this group was high greater than that observed in the general population [6]. The World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE) has recommended pregnant women as one of the risk groups prioritized for seasonal influenza vaccination [7] , also individuals have an increased risk of severe illness and attending the primary Health Care due to influenza [8]. Complications associated with influenza in individuals are primarily related to immunological changes that make them more susceptible to influenza viruses [9]. These related factors combined with the negative effects of influenza on the pulmonary and cardiovascular systems significantly increase the risk of morbidity toward population. [10]. Furthermore, influenza infection can lead to adverse neonatal outcomes [11] Patients attending in Primary Health Care are more susceptible to severe illness also pregnant women are more susceptible to Influenza and adverse outcomes of influenza, and vaccination is the most effective preventive measure for Patients, mother and infant , the coverage rate of influenza immunization in Saudi Arabia is below national targets, despite the World Health Organization's (WHO) recommendation to prioritize patients for vaccination[12]

Seasonal influenza is one of the most common infectious diseases globally. Although it is a preventable infectious disease with mostly acute mild respiratory symptoms like fever, sore throat, rhinorrhea, muscle aches, headache, and cough, however, it can also lead to serious complications like pneumonia, acute respiratory distress syndrome (ARDS), secondary bacterial infection, encephalopathy, and encephalitis.[13,14] The global estimation of seasonal influenza by World Health Organization (WHO) is that 5–10% of adults and 20–30% of children acquire the infection every year.[15] The cumulative incidence in the kingdom of Saudi Arabia from January to December 2018 was 17.52 per 100,000 population. Unfortunately, there is no estimation of seasonal influenza among

pregnant women.[16]

The seasonal influenza vaccine (flu vaccine) is an important preventive measure against influenza and its associated complications [17]. The vaccine protects against 3 or 4 influenza viruses that are expected to circulate in the upcoming flu season [18]. The directors of the WHO centers, laboratories, and academies recommend the composition of the flu vaccine based on surveillance and clinical studies [19]. The Centers for Disease Control and Prevention recommend all individuals aged ≥6 months take the vaccine by the end of October each year [20]. Priority is given to healthcare workers and other high-risk groups [21, 22]. The flu vaccine provides several benefits including protection against flu infection, severity, and hospitalization, especially in high-risk groups [23].

Literature Review

In Jordan, the influenza vaccine is not part of the Ministry of Health (MOH) vaccination program. However, Jordanian citizens are recommended to receive an annual influenza vaccine by many health agencies. Many studies have shown the spread of influenza among HCWs, who are considered a high-risk group. For this reason, the influenza vaccination is recommended for them throughout the autumn and winter seasons. [24]

Peng ZB et al,(2018) reported that The average annual vaccination rate for influenza vaccine in China is only 2–3%. In most areas, influenza vaccinations require paying for themselves. Only a few provinces and cities, such as Beijing, Shanghai, Karamay in Xinjiang Province, Shenzhen in Guangdong province and Xinxiang in Henan province, have implemented free influenza vaccinations for the elderly or children [25]

A study carried out in Lebanon in 2015, the overall vaccination rate was 27.6%. In Arab countries, the vaccination rates are variable. [26]

Because of low vaccination adherence among HCWs and the circulation of influenza and SARS-CoV-2 viruses in the 2020/2021 (autumn/winter season), the circulation of SARSCoV-2 and influenza viruses has posed a public health challenge, according to the Centers for Disease Control and Prevention. SARSCoV-2 and seasonal influenza have been shown to result in more severe disease, and it has been proposed that a flu vaccine may help distinguishing between the two infections. [27,11].

Another study of military personnel in central Saudi Arabia revealed an influenza vaccine coverage rate of 17.8%.12 A person's decision to receive the seasonal influenza vaccine depends on several factors, including beliefs and attitudes about influenza and the influenza vaccine. [28] In Slovenia, unvaccinated people cited 2 main reasons for not getting the seasonal influenza vaccine: the perception that they were in good health and therefore did not need the vaccine, and a fear of side effects. Many of those who did get the vaccine said they felt it was important to be vaccinated by their family physicians since they had confidence in them.[28] In a German study in 2010, 'fear of side effects' and the opinion that 'vaccination was not necessary' were the major reasons cited for receiving a pandemic vaccination.[30]

Rosano et al,(2019) found that Since 2020, Hangzhou has started to provide free influenza vaccines to individuals with a Zhejiang household registration who are 70years old and above. About 250,000 people are vaccinated each year. In addition, about 50,000 elderly people aged 60 and above receive influenza vaccines at their own expense each year in Hangzhou, and the influenza vaccine coverage rate for this age group is about 15%. In Hangzhou and other parts of China [31], influenza vaccination rates among the elderly are still low .

Studies involving the willingness of the elderly to be vaccinated, have shown that multi component interventions, such as reminders and persuasion to vaccinate at a community level, can help increase the vaccination rate and reduce the incidence of influenza in the elderly (29)

Rational.

There are limited studies discussing knowledge, attitudes, concerns, behaviors, and barriers associated with the readiness to receive seasonal influenza vaccine among HCWs during the seasonal influenza pandemic after the emergence of COVID- infection. A study was conducted during the COVID-19 pandemic to assess Primary Health Care at Saudi Arabia HCWs' willingness to get the flu vaccine as well as identify factors that influence this willingness in Italy. As a whole, 68% of the sample indicated a willingness to get the flu vaccine in the 2020–2021 seasons, with 95% of those who had previously received vaccination and 45.8% of individuals who hadn't been vaccinated against influenza in the last six seasons. All of the variables in this study were measured, including the usability of the influenza vaccine in trying to distinguish influenza manifestations from all those prompted by seasonal influenza, worry about the potential of transmitting influenza to admitted primary Health Care at Saudi Arabia 2023 patients, lack of regard for influenza reactions, and the desire to obtain and flu vaccines in the preceding year. A significant rise in demand for influenza vaccine has been reported.

Aim of the study

To understand Knowledge and attitudes of health care workers towards seasonal influenza vaccination of patients attending in Primary Health Care at Saudi Arabia 2023.

Methodology

Study Design

A Cross-sectional descriptive study

Study area

The study was carried out in Saudi Arabia which is located at the center of the Primary Health Care at Saudi Arabia. It has a holy value for all Muslims worldwide who travel to it annually to perform Hajj and to visit the Holy Masjid and Kaaba towards which Muslims turn in prayers. The city has sectors of PHC. Each sector consists of a group of Primary Health Care Centers. The researcher is concerned with one of the inner PHC.

Study Population

The study was conducted among influenza vaccination of patients attending in Primary Health Care at Saudi Arabia in 2023.

Selection criteria:

A- Inclusion criteria:

- All patients attending in Primary Health Care.
- Both males and females.
- All nationalities.

Exclusion criteria:

- Age <35 years

Sampling technique:

The researcher used Multi-stage random sampling technique, giving each sector code number from PHC After that, by using random number generator, the minimum number was one, and the maximum was seven, the generation number. Then simple random sampling technique was applied to select the PHC. Also, convenience sampling technique was to select the participants in the study.

Data collection tool:

A self-administered validated questionnaire was used. The questionnaire was translated to Arabic by forward-backward technique and then was piloted among 20 participants, after permission was taken through email from the researcher, with some modification and preamble letter was issued to explain the aim of the study, request to participate, and appreciation for a response. Then, the questionnaire was validated by three consultants. After that, the first part included questions on socio demographic characteristics such as age, sex, marital status, educational level and history of chronic disease. The second part included questions on influenza vaccination knowledge, attitudes and questions about vaccination status.

Data collection technique:

After the arrival of the patient to the PHCC, they should go to the reception first to register and ensure the presence of the center's card. Then, the receptionist gives a number to every patient who waits until called by the nurse to detect the vital signs. During that period of waiting the researcher will select patient conveniently until the target number achieves and gives the questionnaire for answering after taking the consent.

Data entry and analysis:

The Statistical Package for Social Sciences (SPSS) software version 24.0 was used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using Chi-Square tests ($\chi 2$) to test for the association and the difference between two categorical variables were applied. A p-value ≤ 0.05 was considered statistically significant.

Pilot study:

Was piloted among 20 participants, after permission was taken through from the researcher, with some modification and preamble letter was issued to explain the aim of the study, request to participate, and appreciation for a response. Then, the questionnaire was validated by three consultants. A pilot study was conducted in one PHC in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire was clear and no defect was detected in the methodology.

Ethical considerations:

The ethical approval for this study was obtained from the ethical committee for health research in Saudi Arabia (2023). The objectives of the study were explained to the participants and confidentiality was assured. Participation was voluntary. A written consent was obtained from the participants. Permission from the joint program of family medicine was obtained; permission from the Directorate of Health Affairs of the Holy Capital Primary Health Care was obtained.

Budget: Self-funded

Results

Table 1: Distribution of socio-demographic characteristics of participants in primary health care center (n-200)

	N	%
Age		
<35	70	35
35-50	84	42
>50	46	23
Gender		
Male	86	43
Female	114	57
HCWs classification		
Medical residents/students/trainees	24	12
Health professionals (nurses, midwives)	90	45
Medical Doctors	62	31
Administrative/logistic services	24	12
Marital status		
Married	152	76
unmarried	48	24
Level of education		
Diploma	44	22
undergraduate	58	29
Postgraduate	98	49
Smoking status		
Non-smoker/ex-smoker	76	38
Current smoker	124	62
Influenza vaccination		
Vaccinated	146	73
Non vaccinated	54	27
Do you have any chronic medical conditions?		
No	126	63
Yes	74	37
Do you have medical insurance?		
No	84	42
Yes	116	58
Have you ever had the seasonal influenza vaccine		
No	112	56
Yes	88	44

The study included 200 participant table 1 show the remaining socio-demographic characteristics of the health care workers, regarding age most of participants 35-50 were (42.0%) followed by <35 years were (35.0%) while >50 years were (23.0%) , regarding the gender majority of participants were(57.0%) were female while male were (43.0%), regarding the HCWs classification majority of participants health professionals (nurses, midwives) were (45.0%) while medical doctors were (31.0%) followed by medical residents/students/trainee and administrative/logistic services were (12.0%), regarding the marital status the most of participant were (76.0%) married while unmarried were (24.0%),regarding the level of education the most of participant postgraduate were (49.0%) while undergraduate were (29.0%) followed by diploma were (22.0%) , regarding the Smoking status the majority of participant current smoker were (62.0%) while Non-smoker/ex-smoker were (38.0%), regarding the Influenza vaccination most of participant vaccinated were (73.0%) while non-vaccinated were (27.0%), regarding you have any chronic medical conditions most of participant answer No were (63.%) while Yes were (58.0%), regarding you have medical insurance most of participant answer Yes were (58.0%) while No were(42.0%), regarding you ever had the seasonal influenza vaccine most of participant answer No were (56.0%) while Yes were (44.0%) .

Figure (1): Distribution of socio-demographic characteristics regarding influenza vaccination

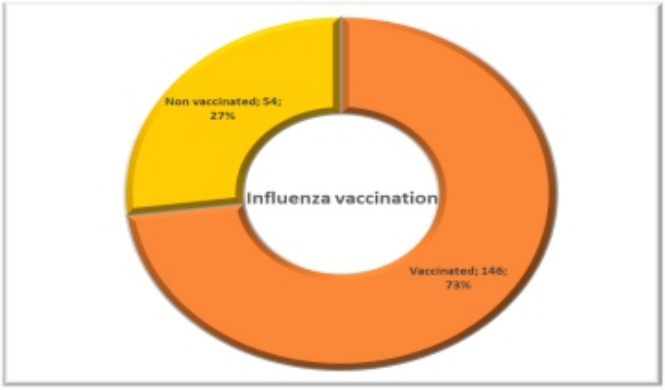


Table 2: Distribution of Knowledge and attitudes of health care workers towards seasonal influenza vaccination recommended among HCWs to patients

	N	%
Vaccination against influenza in the season		
Yes	84	42
No	116	58
Vaccination against influenza in the AH1N1 pandemic season		
Yes	130	65
No/Don't remember	70	35
Adherence to influenza vaccination		
Yes	116	58
No	84	42
Opinion about influenza mandatory vaccination among HCWs		
Favorable	122	61
Not favorable	78	39
Intention to get vaccinated with influenza vaccination		

Yes	154	77
No	46	23
HCWs at higher risk of contracting influenza than general population		
Not at all/Little	164	82
Somewhat/Very much	36	18
Increasing vaccine confidence among HCWs due to influenza pandemic		
Yes	172	86
No	28	14

Regarding the distribution of Knowledge and attitudes of health care workers towards seasonal influenza vaccination recommended among HCWs to patients table 2 show regarding the vaccination against influenza in the season most of participants answer No were (58.0%) followed by Yes were (42.0%), regarding the vaccination against influenza in the AH1N1 pandemic season majority of participants answer Yes were (65.0%) while No/Don't remember were (35.0%), regarding Adherence to influenza vaccination majority of participants answer Yes were (58.0%) while No were (42.0%), regarding Opinion about influenza mandatory vaccination among HCWs most of participant answer Favorable were (61.0%) while not favorable were (39.0%), regarding intention to get vaccinated with influenza vaccination most of participant answer Yes were (77.0%) while No were (23.0%), regarding the HCWs at higher risk of contracting influenza than general population the majority of participant Not at all/Little were (82.0%) while Somewhat/Very much were(18.0%), regarding increasing vaccine confidence among HCWs due to influenza pandemicmost of participant answer Yes were (86.0%) while answer No were (14.0%) .

Table 3: Distribution of the factors affecting participants' practice toward seasonal influenza vaccine

	N	%
Reasons for getting vaccinated reported by participants who had ever received the vaccine (146)		
Compliance with physician's recommendation	90	61.64
Fear from catching H1N1 influenza	109	74.66
Worries about becoming severely ill following influenza infection	82	56.16
To prevent disease transmission to family members	105	71.92
Having a chronic medical condition	27	18.49
Reasons for not getting vaccinated [reported by participants who had never received the vaccine (54)		

Not considering influenza as a threat	30	55.56
Doubts regarding the vaccine's efficacy	39	72.22
Doubts regarding the vaccine's safety	17	31.48
Time constraints	5	9.26
Unaware of vaccine availability	44	81.48

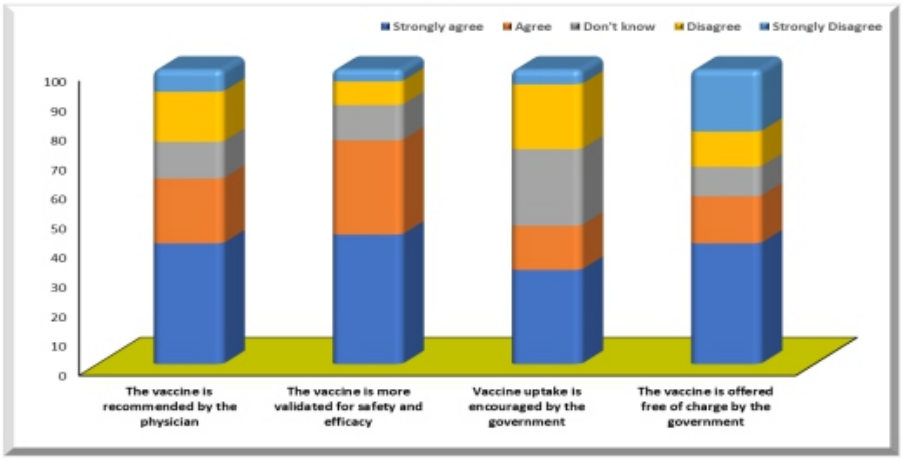
Regarding the Distribution of the factors affecting participants' practice toward seasonal influenza vaccine table 3 show regarding the **Reasons for getting vaccinated reported by participants who had ever received the vaccine (146)** the majority of participants choose fear from catching H1N1 influenza were (74.66%) followed by to prevent disease transmission to family members were (71.92%) while compliance with physician's recommendation were (61.64%) but Worries about becoming severely ill following influenza infection were (56.16%) while having a chronic medical condition were (18.49%) . **Regarding the reasons for not getting vaccinated [reported by participants who had never received the vaccine (54)** the majority of participants choose Unaware of vaccine availability were (81.48%) followed by doubts regarding the vaccine's efficacy (72.22%) while not considering influenza as a threat were (55.56%) but doubts regarding the vaccine's safety were (31.48%) while time constraints were (9.26%)

Table 4: Distribution of Factors that will encourage participants to get vaccinated in future .

	Factors						% of agreement	Chi-square	
		Strongly agree	Agree	Don't know	Disagree	Strongly Disagree		X^2	P-value
The vaccine is recommended by the physician	N	82	44	25	34	15	74.4	66.65	<0.001*
	%	41	22	12.5	17	7.5			
The vaccine is more validated for safety and efficacy	N	88	64	24	16	8	80.8	118.4	<0.001*
	%	44	32	12	8	4			
Vaccine uptake is encouraged by the government	N	64	30	52	44	10	69.4	43.4	<0.001*
	%	32	15	26	22	5			
The vaccine is offered free of charge by the government	N	82	32	20	24	42	68.8	62.2	<0.001*
	%	41	16	10	12	21			

Distribution of Factors that will encourage participants to get vaccinated in future table (4) showed that regarding vaccine is recommended by the physician was a significant relation were P=0.001 and X2 66.65 while % of agreement were 74.4 also showed that (41.0%) of the participant strongly agree while agree were (22.0%) but Don't know were (12.5%) followed by disagree were (17.0%), regarding vaccine is more validated for safety and efficacy was a significant relation were P=0.001 and X2 118.4 while % of agreement were 80.8 also showed that (44.0%) of the participant strongly agree while agree were (32.0%) but Don't know were (12.5%) followed by disagree were (8.0%) , regarding Vaccine uptake is encouraged by the government was a significant relation were P=0.001 and X2 43.4 while % of agreement were 69.4 also showed that (32.0%) of the participant strongly agree while agree were (15.0%) but Don't know were (26.0%) followed by disagree were (22.0%), regarding vaccine is offered free of charge by the government was a significant relation were P=0.001 and X2 62.2 while % of agreement were 68.8 also showed that (41.0%) of the participant strongly agree while agree were (16.0%) but Don't know were (10.0%) followed by disagree were (12.0%) .

Figure (2): Distribution of Factors that will encourage participants to get vaccinated in future .



Discussion

This study has understood Knowledge and attitudes of health care workers towards seasonal influenza vaccination of patients attending in Primary Health Care at Saudi Arabia 2023. Influenza coexists in future winters, this understands in Knowledge and attitudes could help inform actions for the coming influenza seasons. Overall, this study found that the influenza vaccination coverage rate for the patients attending in Primary Health Care in (autumn 2023) regarding the our study found that socio-demographic characteristics of the health care workers, regarding age most of participants 35-50 were (42.0%) regarding the gender majority of participants were(57.0%) were female regarding the HCWs classification majority of participants health professionals (nurses, midwives) were (45.0%) regarding the marital status the most of participant were (76.0%) married regarding the level of education the most of participant postgraduate were (49.0%) regarding the Smoking status the majority of participant current smoker were (62.0%) regarding the Influenza vaccination most of participant vaccinated were (73.0%) (See table 1)

In the context of the Influenza pandemic, the present study showed a relevant increase in the number of participants receiving or intending to receive the influenza vaccination. A case – control study of the 2022 influenza vaccine and increase the incidence of COVID among HCWs and patients attending in Primary Health Care showed significant findings that suggest the 2022 influenza vaccine may have had

a protective association against COVID among HCWs.16 in our study regarding the distribution of Knowledge and attitudes of health care workers towards seasonal influenza vaccination recommended among HCWs to patients show regarding the vaccination against influenza in the season most of participants answer No were (58.0%) regarding the vaccination against influenza in the AH1N1 pandemic season majority of participants answer Yes were (65.0%) regarding Opinion about influenza mandatory vaccination among HCWs most of participant answer Favorable were (61.0%) regarding intention to get vaccinated with influenza vaccination most of participant answer Yes were (77.0%) regarding increasing vaccine confidence among HCWs due to influenza pandemic most of participant answer Yes were (86.0%) . (See table 2)

Assessing knowledge about influenza, its modes of transmission, and its preventive measures revealed an acceptable median knowledge score but with critical knowledge gaps that were mostly related to H1N1-associated infection . The median knowledge score would seem to reflect the education level of the participants as most participants reported receiving a higher education degree. The exaggeration of the H1N1 fatality risk reported by the participants in the current study is in disagreement with a former study from China where only a minority believed that H1N1 has a high fatality rate [31]. On the contrary, although the majority correctly identified all influenza preventive measures, the influenza vaccine was the least recognized preventive strategy. This is similar to other studies from Italy and Jordan, where most participants did not recognize the vaccine as a major preventive measure to control influenza transmission [29]

in our study the distribution of the factors affecting participants' practice toward seasonal influenza vaccine show regarding the Reasons for getting vaccinated reported by participants who had ever received the vaccine (146) the majority of participants choose fear from catching H1N1 influenza were (74.66%) followed by to prevent disease transmission to family members were (71.92%) while compliance with physician's recommendation were (61.64%). Regarding the reasons for not getting vaccinated [reported by participants who had never received the vaccine (54) the majority of participants choose Unaware of vaccine availability were (81.48%) followed by doubts regarding the vaccine's efficacy were (72.22%) while not considering influenza as a threat were (55.56%) (See table 3)

This is different from a study in Saudi Arabia where less than one-fourth of participants reported receiving information from a healthcare provider [25]. In comparison, in a study from Jordan, a country that has the highest literacy rate in the Arab region [20], newspapers were the major source of influenza information [27]. In the United Kingdom, television and the Internet were the leading sources of knowledge about influenza [30]. in our study Distribution of Factors that will encourage participants to get vaccinated in future showed that regarding vaccine is recommended by the physician was a significant relation were P=0.001 and X2 66.65 also showed that (41.0%) of the participant strongly agree regarding vaccine is more validated for safety and efficacy was a significant relation were P=0.001 showed that (44.0%) of the participant strongly agree regarding vaccine is offered free of charge by the government was a significant relation were P=0.001 and X2 62.2 also showed that (41.0%) of the participant strongly agree . (See table 4)

Conclusion

Critical gaps in knowledge of influenza were identified among the public in Saudi Arabia . The study revealed a low vaccine uptake in the country and identified major determinants of vaccine acceptance and rejection. Optimizing vaccine acceptance and coverage can be achieved by collaboration between the healthcare sector and governmental authorities. Efforts ensuring the free-of-charge provision of the

vaccine will assess in establishing equitable vaccine access. In addition, implementing education programs utilizing different audiovisual platforms is recommended to enhance positive attitudes toward influenza vaccine, raise awareness toward vaccine availability, consolidate the public's trust in the safety of the vaccine, and promote the vaccine among high-risk groups in the community who are in critical need of the vaccine.

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