A COMPROMISED IMMUNE SYSTEM FOR PATIENTS WITH DIABETES MELLITUS TYPE II ARE MORE SUSCEPTIBLE TO PLANTAR WARTS, HUMAN PAPILLOMAVIRUS (HPV)

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ABSTRACT:
This study aims to find out the relationship between a compromised immune system for patients with diabetes mellitus type II and plantar warts, human papillomavirus (HPV).
This descriptive study was conducted a compromised immune system for patients with diabetes mellitus type II are more susceptible to human papilloma virus. The data was collected out the period between 1st January 2020 and end of February 2021. The data were collected from the dermatological consultancy based in Baghdad Teaching Hospital. Data were collected from a purposively chosen sample of 100 patients aged between 40 and 75 years.
The results of this study show that the average of age of those patients was (60.8) years. The majority of the patient in sample was male, married live in urban area, and overweight, it was also indicated that those were of middle class of socio-economic status scale, and mostly diagnostic diabetes mellitus type II. The study shows that there is good relationship between a compromised immune system for diabetes mellitus type II patients and planter warts, human papilloma virus (HPV).
KEYWORDS: Diabetes Mellitus, Human Papilloma Virus, Immune System

1. INTRODUCTION:

The planter warts most common skin, often affects the hands, neck, axillary, shoulder, face, skin or scalp, and are especially common on sites of previous skin injury. They are small (about 6 millimeters or one-fourth of an inch), firm, painless, rounded growths that are whitish, pink, beige or brown. The wart surface may be smooth and pearly or rough like a cauliflower, and other type of planter warts are flat, white, beige or brown growths. They do not usually itch. They typically occur on the face, neck, chest, forearms, wrists or hands.
Over 150 distinct human papilloma virus types are currently recognized, that is depended on the identification of new types is based on the degree of DNA hybridization with previously classified types. If there is more than a 10% difference from previously classified types, an isolate is considered to represent a distinct type. Although there are many exceptions, human papilloma virus types tend to cause characteristic clinical lesions, lists the typical clinical lesions seen with human papilloma virus types.
Diabetes and cancer are two common non-communicable chronic diseases that have an enormous impact on worldwide health, and they are a considerable public health problem. Diabetes Mellitus (DM) affects more that 100 million people around the world. Several studies have reported that people with diabetes have a significantly higher risk of many forms of cancer as result of weak immune system and have especially sensitive to HPV. In addition, diabetes is associated with an increased risk of total cancer mortality and with site-specific mortality from cancer. Moreover, an association between abnormal glucose tolerance and the risk of Metabolic Syndrome. Several epidemiologic studies have reported diabetes as a risk factor for human papilloma virus type 1 with glucose concentration, in the United State of America, Canada and Spain Mexico, reported; a direct association between both low-grade cervical lesions and infection with human papilloma virus type 1 with glucose concentration.
Plantar warts are a warts caused by the human papilloma virus (HPV), they are small lesions that appear on the sole of the foot and are typically cauliflower-like in appearance. They may have small black specks within them that ooze blood when the surface is shaved; these are abnormal capillaries. Though plantar wart refers specifically to HPV infection on the sole of the foot, infection by the virus is possible anywhere on the body and common especially on the palm of the hand, where the appearance of the wart is often exactly as described above for plantar warts. Due to pressure on the soles of the feet, a layer of hard skin forms over the warts. A plantar wart may or may not be painful. It can be spread in communal showers, around swimming pools, or by sharing shoes [1].
Human papilloma virus infections are extremely common but the vast majorities of them are asymptomatic and remain that way. Cutaneous Human papilloma virus cause cutaneous warts, a common disease, especially in the school-age population, with a prevalence ranging from about 1 to 20 percent. Three main types of cutaneous warts are recognized: common, plantar, and flat warts, each representing approximately 70%, 25%, and 5% of the lesions. The mode of transmission seems to be through direct contact or fomites, the latter being responsible for plantar warts transmission in communal baths or swimming pools [2].
Warts can pass from person to person, directly and indirectly. Some people are continually susceptible to warts, while others are more resistant to HPV and hardly

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get infected. People who take medications to suppress their immune system or are on long-term steroid use are also prone to a wart viral infection. Warts can be found in any part of the body such as fingers, hands, feet, toes, knees and top scalp.

Through clinical practice, it is often perceived that patients with diabetes are more likely to suffer from severe and recalcitrant warts. This study was set up to investigate if genital warts were more common in patients with diabetes and to determine if patients with diabetes and genital warts required more treatment than those without diabetes. patients with diabetes and genital warts were investigated and were compared to the non-diabetic population because that the diabetes patients who have weak immune system are especially sensitive to HPV and may suffer wart infections.

Warts are usually spread by direct skin-to-skin inoculation of the virus from one person to another, although transmission by fomites also probably occurs. Sometime genital warts cause confusion with sexual abuse, since inoculation of infants from an infected birth canal may not manifest in some cases for over a year. The mechanisms by which virus penetrate the stratum corneum and infect viable keratinocytes is poorly understood.

Cell-mediated immune responses to the virus are probably the most important factor in host resistance. Infiltrating T-cells and the satellite cell necrosis indicative of cell-mediated keratinocyte death observed in regressing warts supports this concept. Humans different in the level of their sensitivity to the HPV. Some people may get warts recurrently, whilst others only get warts in odd occasions. People who have weak immune system are especially sensitive to HPV and may suffer wart infections.

2. Methodology:

Purposive (non-probability) samples of 100 patients, aged 40 to 75 years old, were selected to carry out this study. The patients were treated at the dermatological consultancy in Baghdad Teaching Hospital. All patients were under treatment and diagnosis human papilloma virus with diabetes mellitus type II, by dermatologist. This study indicates that the average of their age was 60.8 year and the majored live in urban area, and are overweight. They are mostly of middle class socio-economic status. Most of them uncontrolled dietary pattern. The study shows that there is relationship between diabetes mellitus type II patients with human papilloma virus and demographic characteristic.

A descriptive study was conducted a compromised immune system for patients with diabetes mellitus type II are more susceptible to human papilloma virus, utilizing a questionnaire assessment approach for the period from 1st January 2020 and end of February 2021.

A questionnaire was specifically constructed for this study. It was composed of II parts. The first Part I, includes the demographic data of age, gender, marital status, residential area, body mass index and socio-economic status scale. The secound Part II, includes the genetic susceptibility and previous disease.

Reliability was determined through a pilot study. The data were analyzed through the application of the descriptive statistical data analysis approach (Frequency and Percentage) and the inferential statistical data analysis approach mean, standard deviation, variance, Chi-square and Person correlation coefficient.

3. RESULTS:

Table (1): Distribution of the studied sample, of 100 patients, according to their demographic characteristics.

No.	Age	Frequency	%	S. D.	V.	X^2 obs.	X^2 crit.	df	P.valu
1-	40-49	14	14	.92829	.862	20.400	7.815	3	< 0.050
2-	50-59	26	26						
3-	60-69	43	43						
4-	70-79	17	17						
Total		100	100.0						
No.	Gender	F	%	.44620	199	21.160	3.841	1	< 0.050
1-	Male	73	73						
2-	Female	27	27						
Total		100	100.0						
No.	Marital status	F	%	.40899	.167	149.780	5.991	2	< 0.050
1-	Married	91	91						
2-	Single	6	6						

Table (1): Distribution of the studied sample, of 100 patients, according to their demographic characteristics.									
3-	Widowed	3	3						
Total		100	100.0						
No.	Residential area	F	%	.42295	.179	29.160	3.841	1	< 0.050
1-	Urban	77	77						
2-	Rural	23	23						
Total		100	100.0						
No.	Body mass index	F	%	.80019	.640	38.960	7.815	3	< 0.050
1-	Normal weight (18.6-25)	19	19						
2-	Over weight (25.1-30)	48	48						
3-	Obese (30.1- 40)	28	28						
4-	Morbidity obese (40.1-70)	5	5						
Total		100	100.0						
No.	Socio-economic status	F	%	.67232	.452	20.420	5.991	2	< 0.050
1-	High score (150 – 121).	38	38						
2-	Middle score (120 – 90).	49	49						
3-	Low score (89 and less).	13	13						
Total		100	100.0						

[S D.= Standard Deviation. S.= Variance. X^2 obs. = Chi-Square Observation. X^2 crit. = Chi-Square crtical. Df. = degrees of Freedom.]* The mean of age is 60.8

The distribution of the matched demographic characteristics out of this table indicates that the majority of the groups is 60-69 years old 43% of the groups. Most of them were males 73%. It is indicated that most of them 91% are married. This table shows that 77% of patients live in the urban areas, majority of the groups were (25.1-30 k/m^2) over weight with frequency 48% and most of the groups were middle score accounted 49% socio-economic status scale and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

The table shows that there was a high significant association between age, gender, marital status, residential area, body mass index and socio-economic status and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

Table (2): Distribution of the cases by their genetic susceptibility, previous disease and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.						
No.	**Genetic susceptibility (Family history)**	**Yes**		**No**		**Total**
		F	%	F	%	
1-	Planter warts.	20	14.18	80	30.88	100
2-	Diabetes mellitus.	60	42.55	40	15.44	100
3-	Hypertension.	55	39	45	17.37	100
4-	Cancer.	6	4.25	94	36.29	100
Total		141	100	259	100	400
Std. D. = .47937 V. = .230 X^2 obs. = 9.000 df = 3 X^2 crit. = 7.815 P < 0.050						
No.	Previous disease	Yes		No		Total
		F	%	F	%	
1-	Hypertension.	65	78.31	35	11.04	100
2-	Atherosclerosis.	6	7.22	94	29.65	100

3-	Angina pectoris.	7	8.43	93	29.33	100
4-	Myocardial infraction.	5	6.02	95	29.96	100
Total		83	100	317	100	400
Std. D. = .40936 V. = .168 X^2 obs. = 33.640 df = 3 X^2 crit. = 7.815 P < 0.050						

This table shows the finding out of this table presented that the higher number of diabetes mellitus accounts 42.55% for genetic susceptibility, majority of the groups were have hypertention accounts 78.31% for previous disease and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

The table shows that there was significant association with genetic susceptibility, high significant association with previous disease and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

Table (3): Pearson correlation with age, gender, marital status, residual area, body mass index, socio-economic status, genetic susceptibility, previous diseases and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

Variable		Gender	Marital status	Residual area	Body mass index	Socio-economic status	Genetic susceptibility	Previous diseases
Age	Co. Sig. N.	.658** C1 .000 100	.658** C2 .000 100	.656** C3 .000 100	.844** C4 .000 100	.902** C5 .000 100	.818** C6 .001 100	.724** C7 .347 100
Marital status	Co.Sig. N.	.485** C8 .000 100		.540** C9 .014 100	.547** C10 .014 100	.551** C11 .014 100	.216* C12 .031 100	.152 C13 .131 100
Body mass index	Co. Sig. N.	.760** C14 .000 100		.705** C15 .000 100		.666** C16 .000 100	.675** C17 .000 100	.709** C18 .000 100
Socio-economic status	Co. Sig. N.	.665** C19 .014 100		.666** 20 .014 100			.823** C21 .000 100	.578** C22 .000 100
Genetic susceptibility	Co. Sig. N.	446** C23 .000 100		.401** C24 .000 100				.703** C25 .000 100
Previous diseases	Co. Sig. N.	.314** C26 .001 100		.282** C27 .005 100				

C = Cell. Co. = Correlation coefficient. Sig. = Significant (2- tailed). N. = Number of sample.

This table shows that the relationship in the all of the cells.

(C1 It means relationship between age and gender, C18 It means relationship with body mass index and previous diseases …etc.).

[. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed)]**

4. DISCUSSION:

Table (1) indicated the findings of the study which revealed that age range between 40 to 75 years old, and that the age of patients a compromised immune system with diabetes mellitus type II with human papilloma virus. ranged between 60 to 69 years' old who are 49% of the groups. Most of them were male 73%. The table also indicated that most of them are married which 91% of the study, and the category related with residential area, living at urban areas who were 77%, the mean of the age was 60.8 years.

The table also reported that the majority of the groups were (25.1-30 k/m^2) over weight with frequency 48% and most of the groups were middle score accounted 49% Socio-Economic Status Scale

The table indicated that there was a high significant association with age, gender, marital status, residential area, body mass index, socio-economic status scale and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

Patients with diabetes mellitus type 2 (DM2) are more susceptible to infections as hyperglycaemia increases the virulence of different microorganisms. Approximately 415 million people were diagnosed with DM2 in 2015 and there is expected increase to 642 million DM2 patients by the year 2040, therefore, this disease is considered to be the first non-infectious epidemic in the world and major public health concern of the 21st century. Moreover, diabetes may cause many complications and can promote human papilloma virus (planter warts) progression and increase the risk of malignant carcinomas [3].

The warts are getting in all ages (children, young adults and old age) affected between 7 to 10% of the population. There are nearly 60 different kinds of human papilloma virus which can cause warts and each type of HPV prefers a certain part of the human body. There are some human papilloma viruses which will produce warts on a person's skin whilst there are others which will produce warts inside your mouth and others part of human body which will produce warts on the genital and rectal areas of a person's body.

Persistent infections involving various viruses affect the overall immunity of the patient. In our study Epstein–Barr Virus (EBV) Deoxyribonucleic Acid (DNA) was the most prevalent in the group of diabetic patients (35.9%). EBV is widespread in human population and is easily transmitted through direct contact, so people with long-term glycaemia are more likely to become infected than healthy population. Human papilloma virus familiar to all age's groups. Autoimmunity is often caused by a lack of germ development of a target body and as such the immune response acts against its own cells and tissues [4, 5][6].

Overweight, one of the most widespread lifestyle-related health problems, was rated third among the most serious disease risk factors in 2013, both for the populations of Central and Western European countries. According to WHO data, over 60% of men and over 50% of women in the European Union were either overweight or obese. Epidemiological studies conducted in the United States revealed a correlation between body weight and the level of anti-HSV-1 antibodies. In our studies, the level of anti-HSV-1 antibodies among diabetic patients was also significantly higher than in the controls. Larsen et al. demonstrated that diabetes mellitus type II is associated with changes in the intestinal microbiota composition, indicating that both overweight and diabetes are associated with different groups of that microbiota. Interesting results were obtained in the analysis of BMI as a factor in the prevalence of HSV-1 DNA. HSV-1 DNA was found in 77.8% of obese subjects, and the level of anti-HSV-1 IgG antibodies was higher among obese and overweight patients compared to those with normal BMI values [6].

The human papillomavirus (HPV) represents the most common sexually transmitted infection in the United States. HPV infection is associated with cancers in women, including cervical, vulvar, anal, oropharyngeal, and vaginal. In the United States, approximately 20,589 HPV-associated cancers are diagnosed each year among females, many of which may be preventable with the current HPV vaccine.

Cervical cancer is the most common HPV-associated cancer found in women, accounting for about 55.5%. Socioeconomic status disparities in HPV-associated cancers have been documented in the United States.

Women have higher rates of vulvar and anal cancers were higher for vaginal cancer. Furthermore, in the United States, incidence rates of each HPV-associated cancer were highest among women living in neighborhoods where 20% or more of the population is living below the poverty line compared with women living in neighborhoods where <5% of the population is living below poverty line [7].

The table (2) shows that the genetic susceptibility for planter warts, most of the groups were relative with diabetes mellitus 41.6%. The table indicated that there was a significant association between genetic factor and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

The table also shows that the category related with previous disease for the patients who have hypertension were accounted 50% for the groups. The table shows that there was significant association between previous disease and a compromised immune system for patients with diabetes mellitus type II with human papilloma virus.

Skin problems linked to complication of diabetes and insulin resistance. This is a skin problem that results in the darkening and thickening of certain areas of the skin especially in the skin folds. Most often the condition, which typically looks like a small wart, appears on the sides or back of the neck, the armpits, under the breast, and groin. Occasionally the top of the knuckles will have particularly unusual appearance treated diabetes, may improve the skin condition. Skin problem usually precede as results of diabetes and is considered to be a marker for the disease and leak of immunity [8].

Human immunodeficiency virus (HIV) infects and destroys crucial components of the immune system, leaving patients susceptible to a number of viral, bacterial and fungal diseases. Viral warts are caused by human papilloma virus infection and are a common skin disease

that afflicts HIV-infected patients. Treatment modalities currently rely on destruction of the infected tissue or interruption of cell division; however, frequent recurrence is a particular challenge in HIV-infected patients.

Papilloma viruses affect a wide variety of animals. They cause tumors that erupt from DNA mutations in humans, monkeys, deer, horses, cattle, dogs, birds, and rabbits. The Los Alamos National Laboratory in the United States maintains a database of papilloma virus genomic sequences and a phylogenic tree, both of which are available at HPV Sequence database [9].

It is appearing frequently in persons often come into contact with a wart virus in a locker room, swimming pool area, or by walking barefooted on dirty areas. The blood vessels feeding them are the black dots, which are visible on the warts. The size of warts can grow or reach to an inch or more in circumference and spread into clusters of several warts [10].

Table (3) indicated that there was strong positive relationship in cells (5, 4, 6, 21, 7, 14, 15, 18, 24, 1,2, 3, 16, 17,19, and 20)

The table also shows a positive relationship in cells (22, 11, 10, 9, 8, 23, 24, 26, 27, 12, 27, 12 and 13).

Common plantar warts were the most frequent (16%) compared with patient's infection by human papilloma virus (6%) and plantar warts (2%). Almost 40% of those found to have plantar warts on examination had indicated on the survey questionnaire that they did not have any of these lesions [11].

Many dermal diseases in developing countries are associated with socioeconomic factors. It is generally agreed that a public health approach to dermatology in this setting is particularly appropriate, epidemiologic research done to examine which particular socioeconomic factors are important to determinants the prevalence of skin disease.

The result agreement with Morgan Jane, which indicates that the people suffering of planter warts are known as owners of a weakened immune system causing a lot of inconveniences.

Planter warts occur on the sole of the foot due to an infection of the HPV. It has been seen that those weakened immune system with diabetes mellitus type II complication are more likely to develop plantar warts and enables the human papilloma virus to attack the human body [24].

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