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Estimating of IL17, TNF Levels and Some Antioxidant Enzymes in Sexual Transmitted Virus Patients in Baghdad City

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Abstract: Sexually transmitted infections (STIs) are an important global public health problem. so this investigation was aimed to estimating of IL17, TNF levels and some antioxidant enzymes in sexual transmitted virus patients in Baghdad city. This study was conducted Between March 2024 and January 2025 in Al-Yarmuk Teaching Hospital, Baghdad, Iraq. 180 individuals are afflicted with sexually transmitted illnesses. The study comprised patients aged 18 to 55 who had or did not exhibit symptoms of a genital tract infection. The results showed the prevalence of human papillomavirus reaching 31(17.2%) and cytomegalovirus reaching 123(68.3%) in patients with sexually transmitted infections. MDA levels in serum of HPV patients (271.55 ± 18.19) CMV patients (229.52 ± 25.82) revealed a significant (P <0.05) rise in contrast with healthy participants (47.01± 13.26). GSH levels in serum of HPV patients (2.41 ± 1.04) CMV patients (2.75 ± 0.93) revealed a significant (P <0.05) reduced in contrast with healthy participants (13.95± 2.48). IL-17 levels in serum of HPV patients (291.35 ±21.62) CMV patients (205.41 ±14.66) revealed a significant (P <0.05) rise in contrast with healthy participants (83.19± 9.04). TNF-α levels in serum of HPV patients (296.41 ±22.85) CMV patients (341.74 ±31.67) revealed a significant (P <0.05) rise in contrast with healthy participants (64.15± 9.37). its concluded that the human papillomavirus (HPV) and cytomegalovirus (CMV) are sexually transmitted and directly affect oxidative stress in the body's cells, reducing antioxidant enzymes.

Keywords: STIs, CMV, IL-17, TNF, HPV, MDA.

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Introduction

Sexual partners can contract sexually transmitted infections (STIs), formerly known as sexually transmitted illnesses, by contacting each other through the mouth, anal, or vaginal channels [1,2]. Many STIs go untreated and can cause major consequences, which makes them a concern and a drain on healthcare systems. In addition to illness prevention, evaluation, diagnosis, and treatment, the natural

history and patterns of transmission of the most prevalent STDs are covered [3,4]. The seven most prevalent STIs include three incurable but treatable diseases (human papillomavirus, HIV, and herpes simplex virus) and five treatable infections (syphilis, gonorrhea, trichomonas, and chlamydia). The double-stranded deoxyribonucleic acid virus known as HPV replicates in the stratified squamous epithelial cells' basal cell layer. Hyperplasia and potential conversion carcinoma are brought on by this replication cycle [5]. In the US, the most common STI is the human papillomavirus, or HPV. 42% of adults between the ages of 18 and 59 are among the estimated 80% of sexually active people who are infected at any given time. With an estimated 14 million new cases reported year, oral HPV is predicted to affect 7% of those infected. Nearly all sexually active people who are not vaccinated will have HPV at some point in their lives, according to CDC estimates. Worldwide, at least 291 million women have been infected with HPV [6,7]. Cytomegalovirus (CMV) belongs to the Herpesviruses family. The characteristic that distinguishes this family of viruses is their capacity to cause both acute lytic infections and persistent latent infections that continue over time [8,9]. Any previously infected person's bodily fluids, including urine, saliva, blood, tears, semen, and breast milk, may contain infectious CMV. It is possible for the virus to shed sporadically, without any obvious symptoms or indications. CMV is spread from one person to another. Close, personal contact with someone who excretes the virus in their urine, saliva, or other bodily fluids is necessary for infection. In addition to being spread through sexual contact, CMV can also spread through breast milk, organ transplants, and in rare cases, blood transfusions [10,11]. Similar to other viruses, HCMV triggers an antiviral host immune response that is regulated by cytokines and mediated by T, B, and NK cells [12]. Small extracellular proteins called cytokines help immune cells communicate with one another, controlling their development, maturation, and reaction to infection [13]. So this investigation was aimed to estimating of IL17, TNF levels and some antioxidant enzymes in sexual transmitted virus patients in Baghdad city.

Materials and Methods

This study was carried out in the Al-Yarmuk Teaching Hospital in Baghdad, Iraq, between March 2024 and January 2025. 180 individuals are afflicted with sexually transmitted illnesses. The study comprised patients aged 18 to 55 who had or did not exhibit symptoms of a genital tract infection. The general information about the willing participant was included in the questionnaire forms made for the study. Following a clinical examination and sample collection, a dermatologist and gynecologist used laboratory tests and sexually transmitted disease screening. The participants in this study were divided into two groups as follows:

- 100 healthy volunteers as control group.
- 180 STI patients as a second group.

Ethical approval

The Native Ethics Group claims that these research were authorized and that all participating patients supplied information about the study's goals and their parents' informed consent.

Measurements

- Human papillomavirus antibody IgG (HPV6-IgG): Sandwich-ELISA, an ELISA method, is used in the HPV6-IgG ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for HPV6-IgG in serum and plasma.
- Human cytomegalovirus antibody IgG (CMV-IgG): Sandwich-ELISA, an ELISA method, is used in the CMV-IgG ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for CMV-IgG in serum and plasma.
- Human Malondialdehyde (MDA): Sandwich-ELISA, an ELISA method, is used in the MDA ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for MDA in serum and plasma.

- Human Glutathione (GSH): Sandwich-ELISA, an ELISA method, is used in the GSH ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for GSH in serum and plasma.
- Human Interleukin 17 (IL-17): Sandwich-ELISA, an ELISA method, is used in the IL-17 ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for IL-17 in serum and plasma.
- Human Tumor necrosis factor (TNF-α): Sandwich-ELISA, an ELISA method, is used in the TNF-α ELISA Kit (Cat. No.: SL2795Hu, SUNLONG, China) to test for TNF-α in serum and plasma.

Statistical analysis

Every data point was sorted, and the sum was presented as both a number and a percentage. A P-value of less than 0.05 was deemed statistically significant. The student t-test was used to compare the mean values of any two chosen groups in order to determine the significance of the difference. To describe the relationship between the various factors being studied, the Pearson correlation coefficient (R) test is utilized; a result is considered statistically significant if $P<0.05$ [14].

Results & Discussion

Table (1) shows the prevalence of human papillomavirus and cytomegalovirus in patients with sexually transmitted infections, with HPV reaching 31(17.2%) and CMV reaching 123(68.3%).

Table (1): prevalence of human papillomavirus and cytomegalovirus in patients

Parameter / Group	HPV-IgG	CMV-IgG	Total
Patients	31(17.2%)	123(68.3%)	180(100.0%)

The present investigation revealed that 17.2% of patients with STDs had human papillomavirus, which is in line with the findings of Hussein et al. [15]. Subjects with vaginal discharge and lower abdomen pain provided a total of 104 samples. Every patient was married and refused to engage in illegitimate sexual relations. High risk HPV genotypes were detected in 8 out of 54 samples (14.8%). This result was also consistent with an earlier report from Iraq that revealed that approximately 17% of the samples tested positive for HPV [16]. A study in Saudi Arabia that included 485 patients revealed that 5.6% of the samples had high risk HPV. The HPV genotypes in the same study were not identified [17]. Nonetheless, a different study carried out in Saudi Arabia revealed that genotype 68 was the most common, followed by 18 and 16 [18]. Regarding the spread of cytomegalovirus, the study showed that the prevalence rate reached 68.3%, and the results were consistent with several studies, that ranged from 14.2% in Iran to 91.05% in India. Seroprevalence ranges from 4.8% in Iraq to 95% in Jordan among pregnant Arab women with a negative medical history [19,20].

Table (2) show the levels of MDA and GSH in patients and healthy subjects, where MDA levels in serum of HPV patients (271.55 ± 18.19) CMV patients (229.52 ± 25.82) revealed a significant ($P <0.05$) rise in contrast with healthy participants (47.01± 13.26), as shown in figure (1). GSH levels in serum of HPV patients (2.41 ± 1.04) CMV patients (2.75 ± 0.93) revealed a significant ($P <0.05$) reduced in contrast with healthy participants (13.95± 2.48), as shown in figure (2).

Table (2): the levels of MDA **and** GSH **in studied groups**

Groups / Parameter	Control (100)	HPV (31)	CMV (123)	P-Value
MDA (ng/ml)	47.01± 13.26	271.55 ± 18.19*	229.52 ± 25.82*	0.001
GSH (ug/mL)	13.95± 2.48	2.41 ± 1.04*	2.75 ± 0.93*	0.001

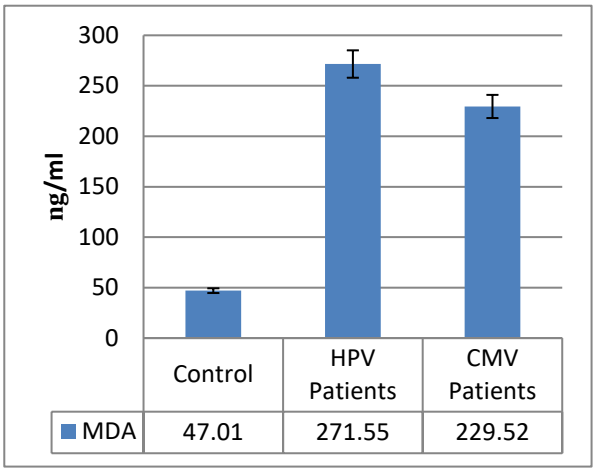


Figure (1): MDA levels in patients and control.

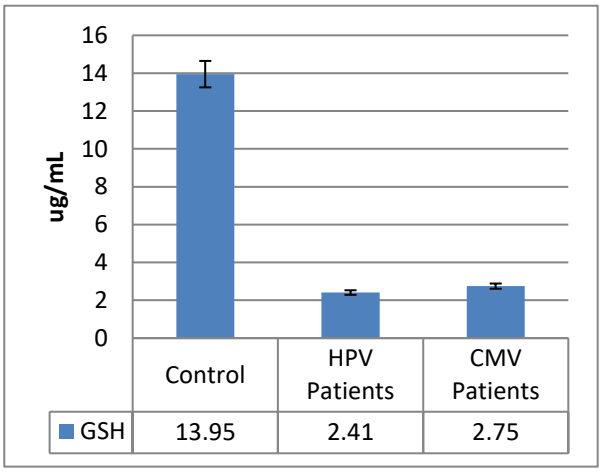


Figure (2): GSH levels in patients and control.

All of the human body's cells and tissues must have their integrity and functionality maintained by a precisely controlled balance between the generation of reactive oxygen species (ROS) and the action of antioxidant defense components [21]. According to Table (2), patients with HPV and CMV infections experienced oxidative stress and decreased glutathione. This is in line with a study by Pérez-Soto et al. [22], which found that sperm dysfunction in men caused a decrease in sperm count and deformity with reduced motility because of the effect on the mitochondria in the sperm middle piece. As the concentrations of malondialdehyde rose, they suggested that the damage was brought on by an increase in free radicals. According to the study, oxidative stress and a reduction in antioxidant enzymes are mostly caused by the human papillomavirus.

Table (2) show the levels of IL-17 and TNF-α in patients and healthy subjects, where IL-17 levels in serum of HPV patients (291.35 ±21.62) CMV patients (205.41 ±14.66) revealed a significant (P <0.05) rise in contrast with healthy participants (83.19± 9.04), as shown in figure (1). TNF-α levels in serum of HPV patients (296.41 ±22.85) CMV patients (341.74 ±31.67) revealed a significant (P <0.05) rise in contrast with healthy participants (64.15± 9.37), as shown in figure (2).

Table (2): the levels of IL-17 **and** TNF-α **in studied groups**

Groups / Parameter	Control (100)	HPV (31)	CMV (123)	P-Value
IL-17 (pg/ml)	83.19± 9.04	291.35 ±21.62*	205.41 ±14.66*	0.001
TNF-α (pg/mL)	64.15± 9.37	296.41 ±22.85*	341.74 ±31.67*	0.001

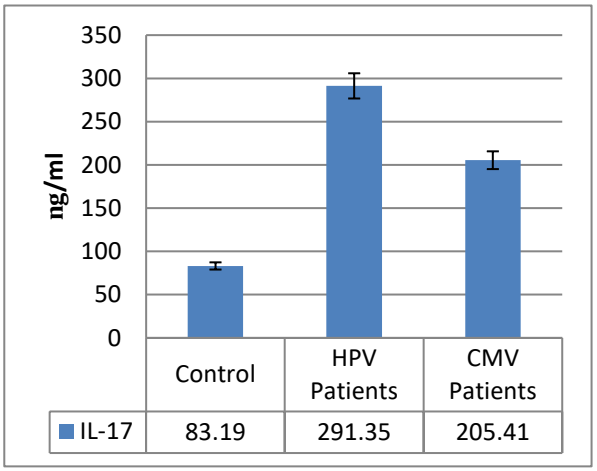


Figure (3): IL-17 levels in patients and control.

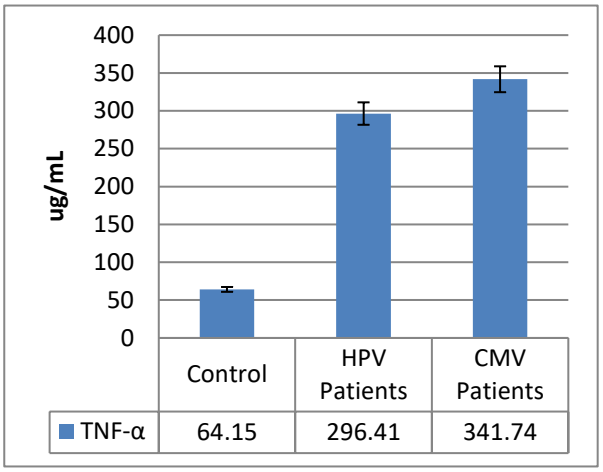


Figure (4): TNF-α levels in patients and control.

Our results showed that patients with a positive HPV and CMV infection had considerably greater serum levels of IL-17 than those without a positive HPV and CMV infection ($p<0.001$). There is ongoing debate over the preventive or pathogenic functions of interleukin-17 during viral infections [232]. According to recent research, IL-17 plays a role in the propagation of virus-mediated diseases as well as the antiviral immune response [24]. IL-17 levels were higher in mice infected with murine CMV than in controls, according to a study [25]. Furthermore, the findings are consistent with research showing enhanced Th17 cell activity during acute rejection after kidney transplant recipients' CMV infection, which raises blood levels of IL-17A production [26]. In individuals with persistent heart failure, a research also found a connection between IL-17 and CMV [27]. An example of a pro-inflammatory cytokine is TNF-α, which can activate inflammatory leukocytes, alter vascular permeability, and cause bone resorption [28]. According to the current study, sick groups had higher levels of TNF-α than the control group. Additionally, a different study measured TNF-α and found that patients had higher levels of this cytokine than healthy people. It also suggested that TNF-α levels may be utilized as biomarkers to diagnose diseases [29].

Conclusions

The current study showed that both human papillomavirus (HPV) and cytomegalovirus (CMV) are sexually transmitted and directly affect oxidative stress in the body's cells, reducing antioxidant enzymes. Each virus was also found to affect the concentrations of certain cytokines, which can be considered tools for detecting viral infections. Therefore, these viruses may be a cause of infertility in patients due to the expected changes, particularly in males, related to the direct impact on sperm count, shape, and motility [22].

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