Most common risk factors distribution for cervical cancer

Distribución de los factores de riesgo más comunes para el cáncer de cuello uterino

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Abstract

One form of cancer that affects the cells of the cervix is cervical cancer, the lowest portion of the uterus where it joins the vagina. It comes about as a result of cell proliferation that can invade or spread throughout the body. The research is cross-sectional in design. 250 women participated in it, and it took place in Iraq between April and August of 2022. A questionnaire was used to gather the information from National Iraqi Cancer research centre. After that, selection 50 women with cervical cancer for biochemical tests, including lipids profile and sex hormones. According to the degree of education, Women over the age of 20 were asked about their knowledge and screening habits for cervical cancer. The results were presented to the women who took the survey. The percentage of female partners was higher in the age group 50 and above, married women, obese women, family history and use of contraceptive pills for more than 5 years. As for the biochemical parameters, it showed a high significance (p=0.0001) for the profile of lipids and sex hormones when compared with the healthy group. In our study conclusion that the Cervical cancer was associated with most common risk factors, disordered lipid profile and sex hormones (estradiol, progesterone and testosterone).

Keywords: Cervical cancer, risk factors, lipid profile, Estradiol, Progesterone, Testosterone.

Resumen

Una forma de cáncer que afecta las células del cuello uterino es el cáncer de cuello uterino, la porción más baja del útero donde se une a la vagina. Se produce como resultado de la proliferación celular que puede invadir o extenderse por todo el cuerpo. La investigación tiene un diseño transversal. Participaron 250 mujeres y tuvo lugar en Irak entre abril y agosto de 2022. Se utilizó un cuestionario para recopilar información del Centro Nacional de Investigación del Cáncer de Irak. Posteriormente, se seleccionaron 50 mujeres con cáncer de cuello uterino para pruebas bioquímicas, incluido el perfil de lípidos y las hormonas sexuales. Según el grado de escolaridad, se preguntó a las mujeres mayores de 20 años sobre sus conocimientos y hábitos de detección del cáncer de cuello uterino. Los resultados fueron presentados a las mujeres que respondieron la encuesta. El porcentaje de parejas femeninas fue mayor en el grupo de edad de 50 años y más, mujeres casadas, mujeres obesas, antecedentes familiares y uso de píldoras anticonceptivas por más de 5 años. En cuanto a los parámetros bioquímicos, mostró alta significancia (p=0,0001) para el perfil de lípidos y hormonas sexuales en comparación con el grupo sano. En nuestro estudio se concluyó que el cáncer de cuello uterino se asoció con los factores de riesgo más comunes, el perfil lipídico alterado y las hormonas sexuales (estradiol, progesterona y testosterona).

Palabras clave: Cáncer de cuello uterino, factores de riesgo, perfil lipídico, estradiol, progesterona, testosterona.

Introduction

Cancer ranks among the leading global causes of mortality. It is estimated that malignant neoplasms were responsible for 8 million deaths in 2008, and projections indicate that this figure will increase to 11 million by 2030[1].

The most frequent cancer among women worldwide is cervical cancer, where a tumor is created when the cervix's cells develop abnormally. Squamous cell carcinoma and adenocarcinoma are the two histologic forms of cervical cancer that are most common. given statistics showing that 24.6 million people worldwide have cancer[2]. According to estimates, cervical cancer is anticipated to rank fourth in terms of frequency of diagnosis and fourth in terms of incidence of cancer-related fatalities among women. In the year 2020, there were an estimated 604,000 new cases and 342,000 deaths attributed to this disease globally[3].

According to the literature, women who live in low-resource situations are particularly susceptible to developing cervical cancer. In underdeveloped nations, cervical cancer was diagnosed in about 85% of cases and killed women in 88% of instances. The average lifetime risk of cervical cancer is 35% higher for women in low- and middle-income nations than for women in high-income countries[4]. In developing countries, women over 50 are more likely to develop cervical cancer than women under 15, although women between 15 and 49 are also growing more likely to do so. a pop star from Ethiopia The fourth most frequent malignancy is cervical cancer[3].

There is a lot of evidence linking aberrant lipid levels to the development of cancer[5]. Lipids are essential for cell growth and cancer because of their effect on chemical energy storage, Preclinical studies on cell signaling, cell membranes, and cell-cell interactions suggest that adipocytes have the ability to provide energy for cancer development [6].

The most hormone-sensitive organ is thought to be the uterus. It is important to specifically discuss how steroids affect endometrial cells since they control how the female reproductive system normally functions[7]. The steroid hormone estrogen, in excess, increases the growth of benign or malignant uterine malignancies and induces hyperplasia in uterine tissue (mainly of myometrium and endometrium). due to the fact that androgens are precursors of estrogens, it is important to also discuss. Increased androgen secretion results in increased uterine estrogenic stimulation[8]. It is imperative to bear in mind that steroid hormones possess the ability to exert an impact on the biosynthesis and excretion of other hormones, such as gonadotropins. The regulation of estrogen and progesterone production in the ovary is commonly known to be controlled by the hypophysis through the use of gonadotropic hormones. In addition, the regulation of gonadotropic hormone secretion is governed by steroid hormones (Estradiol, Progesterone)[9].

It is commonly known that different age groups of women have different levels of hormones in their blood[10]. As a result, the mechanisms behind uterine body tumor formation in women of different ages are not the same. It's also important to consider the propensity for uterine tumor renewal.

Materials and methods

This study is cross-sectional. It was performed in patients and their data was collected from the Iraqi National Center for Cancer Research between April and August 2022, the target number of women were 250 women who applied to the center between these dates, aged 18 years and over, who were not pregnant and agreed to participate. Then 50 infected women were selected and blood was drawn from them for biochemical tests.

Blood volume of five milliliters, each patient individually and the healthy control, were taken from vein. Blood was drawn and put in gel tube to coagulate on bench for 20 minutes, then for 10 minutes, centrifuged at 3000 rpm. For later examination, the collected serum was stored at 20°C.

Researchers gathered data by speaking with patients from the Iraqi National Center for Cancer Research in-person, and they agreed to participate in the study, meeting the requirements for the research, each interview lasted ten to fifteen minutes. After that, 50 patients were identified and blood samples were drawn for biochemical examinations

The Statistical Package for the Social Sciences (SPSS) version 22.0's descriptive statistics and t-test were used to assess each piece of data. The values that were obtained were expressed as mean ± standard error (SE). Statistical tests were highly significant at $p < 0.01$ with a 95% confidence-interval, and data were graphed in Excel 2016.

The participants' ages were examined, educational status and marital status the results showed that the highest ratio of cervical cancer in the age group greater than or equal to 50 of all the participants (71.2%), While the educated and married had the highest percentages (68.4) and (50.4) respectively, and this is shown in Table 1 and Figure 1.

Table 1: Social traits of participating women (n=250).

Variables	Categories	Cervical cancer. N (%)
Age (years)	20-29	10 (4)
	30-39	29 (11.6)
	40-49	33 (13.2)
	50 ≥	178(71.2)
Educational status	Cannot read and write	9 (3.6)
	Read and write	70 (28)
	Education	171 (68.4)
Marital status	Single	23 (9.2)
	Married	126 (50.4)
	Divorced	64 (25.6)
	Widowed	37 (14.8)

Fig 1(A-C): Shows the distribution of age-stages, educational status and marital status ratios in the women participating.

An examination of the factors that put women at risk for developing cervical cancer found that a lack of vegetables (33.2%), menopause at the age of 50 and over (37.2%), being obese or pre-obese (60%), having a family history of the disease (79.2%), using oral contraceptives for more than 5 years (62.8%), having a first child at an age of over 35 (41.2%), and having fewer than two deliveries by the age of 30 (37.2%), first pregnancy at the age of 20 and below (21.6%), presence of untreated vaginal infection (34.3%), Is the breastfeeding period more than a year? (7.2) and Smoking (23.6) respectively, as shown in Table 2.

Table 2: shows the distribution of risk factors for cervical cancer in females.

Questions	Cervical cancer risk factors N (%)
Avoiding fruits and veggies	83 (33.2)
Menopause at the age of 50 and over	93 (37.2)
Obese/pre-obese	150 (60)
Family history	198 (79.2)
Taking birth control pills for over 5 years	157 (62.8)
First childbirth, age over 35	103 (41.2)
Having less than two deliveries at age 30	93 (37.2)
First pregnancy at the age of 20 and below	54 (21.6)
Presence of untreated vaginal infection	86 (34.3)
Is the breastfeeding period more than a year?	18 (7.2)
Smoking	59 (23.6)

The results indicated the presence of a high significant increase in lipid profile serum levels of (cholesterol, triglyceride, HDL, LDL and VLDL) for patients with cervical cancer when compare with control, as shown in the table 3 and figure 2.

Table 3: Levels of Lipid profile in patients with cervical cancer and healthy volunteers.

Parameters	Mean±S.E	
	Control N.O=50	Patients N.O=50
Cholesterol (mg/dl)	182.70±0.79	244.44±1.83
TG (mg/dl)	100.60±0.69	210.44±0.80
HDL (mg/dl)	53.62±0.65	34.27±0.24
LDL (mg/dl)	108.94±0.59	168.05±0.25
VLDL (mg/dl)	20.21±0.54	42.11±0.50
p.value	0.0001	

Fig 2: Diagram shows serum lipid profile (cholesterol, triglyceride, HDL, LDL and VLDLD) of cervical cancer in comparison with control subjects.

The mean values ± SE of hormones (estradiol, progesterone and testosterone) were derived from the collected data for the two study groups, and the overall results are shown in table 4 and figure 3.

Table 4. Levels of hormones in patients with cervical cancer and healthy volunteers

Parameters	Mean±S.E	
	Control N.O=50	Patients N.O=50
Estradiol (pg/ml)	40.45±0.53	97.18±0.73
Progesterone (ng/ml)	0.97±0.05	0.28±0.17
Testosterone (ng/ml)	0.68±0.23	0.31±0.02
p.value	0.0001	

Fig 3: Diagram shows serum Estradiol Progesterone and Testosterone levels of cervical cancer in comparison with control subjects.

The most prevalent gynecologic malignancy, cervical cancer is expected to cause 341,831 deaths and 604,127 new cases worldwide in 2021[2].

According to a study by Visanuyothin and colleagues, marital, occupation status, sexual activity, number of children, health insurance policy, history of oral contraceptive pills, perceived advantages, perceived barriers and awareness of cervical cancer prevention were all significant determinants of adherence to cervical cancer screening[11].

Despite the fact that most women had good understanding of cervical cancer, a study done in Iraq revealed that most had a low incidence of Pap smear usage. In order to raise awareness among women, screening programs at primary healthcare facilities and teaching hospitals must be implemented[12].

The literature has conflicting information regarding the use of oral contraceptives. For over five years, research has linked the usage of oral contraceptives to an increased risk of cervical cancer[13]. In agreement with our findings, this according to a different study, using oral contraceptives minimally raises the risk of developing cervical cancer, because users are more active, less likely to use condoms, and more likely to get PAP tests in order for a gynecologist to prescribe an effective form of contraception[14].

Cervical cancer development and tobacco use are causally associated. The cause could be the decomposing tobacco products (cocaine, nicotine), which have a direct mutagenic effect and increase the risk in women who smoke by 2-4 times. The prevalence of HPV infection is higher in women aged 45 to 50, and it is approximately 37% in women under 35 who smoke 15 or more cigarettes per day.10% of patients are older female patients[15].

Aimportant tool for identifying any deviation from normal in the human body is laboratory testing on blood[16].

When compared to control participants, the total lipid, cholesterol, triglycerides, and fatty acids in neutrophils of cervical cancer patients considerably increased[17] this is agreement with our study.

Jiang's study, which utilized a big population, compared the serum lipid levels of healthy women and patients with cervical cancer, discovering that the latter had elevated levels of TC/TG/LDL and decreased levels of HDL[18]. These results support our findings that hyperlipidemia was a distinct prognostic factor for cervical cancer patients, indicating a possible link between dyslipidemia and the disease.

The epidemiological data link the sex steroid hormone levels to cervical cancer development. Additionally, in vitro and in vivo laboratory investigations point to the necessity of sex steroid hormones, particularly estrogens, for the beginning of atypical metaplasia in the squamous columnar junction[19], this is agreement with our study.

Estradiol levels had a positive correlation with the risk of cervical cancer, and CC patients had considerably higher serum estradiol levels than either of the control groups[20].

The growth of uterine tissues is influenced by hormonal imbalance, which may lead to benign or malignant uterine malignancies[21]. The etiology of benign or malignant uterine cancers in people at reproductive age has been shown to prioritize changes in the hypophysis-ovary system, while cases of malignant development during and after menopause are significantly impacted by alterations in the hypophysis-adrenal gland system.

Conclusions

Our study's findings indicate that high fertility rates, low socioeconomic status, and a lack of education are the main risk factors for cervical cancer. Therefore, comprehensive public health initiatives should be set up to enhance the health of women. Additionally, it's critical that health professionals deliver education programs in a manner that appeals to women. State regulations may be useful for keeping track of women's health. Patients with cervical cancer in the reproductive and post-menopausal age groups have been found to have a wide range of hormonal imbalances (Estradiol, Progesterone, and Testosterone), as well as an abnormal lipid profile.

CONFLICT OF INTEREST

Authors have no conflict of interest.

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