

THE EFFECT OF PSYCHOLOGICAL STRESS ON THE INCIDENCE OF CANCEROUS TUMORS IN THE SOUTH REGION OF JORDAN.

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Abstract

The aim of this study was to identify the effect of psychological stress on the incidence of cancerous tumors in the south region of Jordan. This retrospective study was conducted in educational governmental hospitals between 2007 and 2014. Around 2909 cancer patients from south region of Jordan were included and data collection sheet was filled with all required information for each patient. The results showed a direct positive correlation between psychological stress and incidence of cancerous tumors. In addition, there were no substantial statistical significance (p value ≤ 0.05) utilize the impact of psychological stress on the incidence of cancerous tumors due to patients' gender, marital status, and place of residence. In conclusion, psychological stress is one of the main risk factors for the incidence of cancer in south Jordan. Therefore, prospective studies would be of interest to investigate the causal relationship between the psychological stress and the incidence of cancer. Moreover, educational programs and social services to help psychotic patients and also to increase the community awareness toward the psychological stress are required to decrease the incidence of cancer in Jordan.

Keywords: Psychological stress, cancerous tumors, Psychosomatic diseases

Introduction

Cancer is one of the most serious health problems around the world. According to statistical data from the American Cancer Society, cancerous tumors are the second cause of death, after cardiovascular disease, as they are the cause of 51% of death per years (Fathi, 2012).

Physiological stress represents the negative perception of the individual life situations. It negatively effects the body homeostasis and leads to incidence of psychosomatic diseases such as diabetes, obesity, hypertension, and cancer. (Majeed,2012).

The psychosocial status of the human has a direct negative impact on his immune system. Internal factors such as emotional stress are responsible of immune system dysfunction as a result of the way that our body deal with stressful condition. In case of chronic stress, the capabilities of the immune system are diminished after frequent activation of the autonomic nervous system. (Delgado, and others, 2009).

Al-Kaabi and others (2013) defined cancer as uncontrolled growth and division of cancer cells, which invade surrounding tissues, causing tissue damage, and in advance stages spread to distant tissues through the blood or lymphatic system, causing a so-called metastasis or malignant tumor.

There are two main types of tumors; Benign tumors and malignant tumors. Benign tumors are noncancerous cellular overgrowth. Unlike cancerous tumors, cells don't spread to other organ of the body. Benign tumors can be found anywhere in the body. This type of cancer is curative as it can be surgically treated by removal of the tumor (Al- Shorafa, 2008).

On the other hand, Malignant tumors are cancerous and made up of cells that grow out of control. Cells of this type of tumors invade nearby tissues and spread to other organ of the body. Sometimes cells move away from the original (primary) cancer site and spread to other organs, especially bones where they can continue to grow and form another tumors at that site (Koren, 2005)

Cancer symptoms are divided into three types; 1) General symptoms; such as weight loss, general fatigue, loss of appetite, and sweating. 2) Localized symptoms; such as changes in the external surface of the skin. 3) Symptoms due to metastasis; such as inflation in different lymph nodes in the body or in the liver, as well as severe bone pain .(Faruk, 2013)

Early cancer diagnosis is very important. Cancer can be diagnosed using different diagnostic procedures, most commonly through investigating tissue sample under microscope. However, biochemical tests on cellular protein levels and ribonucleic acids (DNA and RNA) have been recently widely used in cancer diagnosis. (Al- Dosary,2012).

Ibrahim (2003) pointed out that psychological stress accelerates cancer incidence. The influence of psychosocial factors on the development and progression of cancer has been a longstanding hypothesis since ancient times. There are strong association between chronic stress, depression and social isolation and cancer progression. Studies have shown that chronic stress has a significant effect on the immune system that ultimately manifest an illness.

Clinical studies have investigated the impact of psychological status of cancer patients on progression of cancer, and demonstrated that it negatively affects immune system. However, limited studies has examined the effect of psychological stress on the cancer incidence. Therefore, the aim of this study is to high light the effect of psychological stresses on the incidence of cancer.

Statement of the study problems

The results of this study will be answering the following questions:

1. To what extent dose the psychological patient status directly affect the incidence of cancerous tumors?

2. Is there any influence of patient's demographic characteristics on the association between patient psychological status and the incidence of cancerous tumors?

The significance of the study

This retrospective study will provide direct evidence about the effect Psychological stress on the incidence of cancerous tumors and point the light on the impotence of considering patient psychological status as a potential risk for both cancer incidence and progression.

In addition, it will address the significant of psychological stress as therapeutic strategy for cancer.

The aims of the study

The main aims of this study are to investigate the impact of psychological stress on the incidence of cancer tumors, and also to determine the effect of patient's demographic characteristics such as; gender, marital status, and place of residence on the association between psychological stress and the incidence of cancerous tumors

Term definitions

- Psychological stress: any stimuli or changes in the internal or external environment affect the adaptive capacity of person , which in some circumstances can lead to the disruption of behavior or incompatibility that leads to the disease (Faruk, 2012).

- Cancerous tumors: Uncontrolled growth of abnormal cells anywhere in the body. These abnormal cells termed cancer cells, malignant cells, or tumor cells (Hijazi, 2013).

- Psychosomatic diseases: Psychosomatic means: mind (psyche) and body (soma). A psychosomatic disorder is a disease which include both mind and body. Some physical diseases are negatively affected by mental factors such as stress and anxiety (Salem, 2005).

Limitations of the study

Limitation of this study is the homogeneity of the population, as all included subjects are cancer patient attending governmental hospital in the south of Jordan.

Previous published studies

After referring to previous research, it was observed that the attention to psychological stress, as a factor for cancer, was very modest. Therefore, some similar studies were presented in chronological order from oldest to newest.

Khawaja (2000) investigated the impact of psychological factors on the patients of cancer. They used stressful events scale, and the measure of coexistence with the pressures of life strategies as metrics procedure. After recruiting 195 patients, authors concluded that Stressful life increases the incidence of cancer. In addition, strategies for coexistence with life stress the stress reduce the incidence of cancer.

Vickburg (2003) conducted a study entitled with "The Concerns about Recurrence Scale (CARS) systematically assesses the extent and nature of women's fears about the possibility of breast cancer recurrence". This study included 169 breast cancer patients and indicates that women's fears of cancer recurrence are related to the possibility of death and threats to health more than any other issues related to roles, femininity, sexuality, or body image. Younger women and those who have had chemotherapy had great fears about cancer recurrence. There was little evidence regarding the association between cancer stage, time since diagnosis, or type of surgery and fears.

Al-Saed (2006) studied the impact of some psychological and social variables on the meaning of life on a university student population. The study population was consisted of 30cancer patients, and 30 healthy control subjects. Authors used the following tools: the meaning of life scale, the measure of psychological stress, the depression scale, the scale of death anxiety, and the measure of optimism and pessimism. Cancer patients had higher significant level of psychological stress, depression and anxiety of death compared to healthy control.

Sellick and Edwardson (2007), investigated the effect of the life-threatening illness on the incidence of immediate psychosocial distress in patients' families. The threat is real and the rational response is significant. It is the general healthcare and psychosocial healthcare professionals' responsibility to identify and specially deal with those who are in most need. Psychological distress is something that can be relatively easily measured and responded to when psychosocial oncology healthcare professionals are immediately available to address those needs. The study found that females

are more anxious and depressed than males. In addition, the rate of anxiety and depression are higher in younger patients than older patients. Finally, divorced and widowed patients suffer from anxiety and depression more than married couples.

Hinduan (2007) conducted a study entitled with "Psychological pressure and hormones relationship with breast cancer". Author found that there is a direct relationship between breast cancer and stress (mainly depression). Moreover, they found that high levels some hormones such as cortisol and estradiol increase uncontrolled cell division and thus increase the incidence of breast cancer.

Dorros et al (2010) tested that whether person-partner crossover effects the distress outcomes or not. The sample consisted of 95 dyads with early-stage breast cancer. Using reciprocal dyadic data from women with breast cancer and their partners. Results revealed a pattern of influence whereby the interaction of high levels of depression coupled with high levels of stress in women with breast cancer was associated with lowered physical health and well-being in their partners. Although depression seems to be the key mechanism in predicting distressing outcomes, when depression is combined with any additional stress, the level of physical distress is significantly high.

Howaish (2012), in her study, aimed to know the level of anxiety and self-confidence in cancer patients and healthy people. The study tools were applied to a sample of (392) individuals, (86) of them were of cancer patients and (332) were healthy. The results of the study revealed that cancer patients suffer from a rise in the level of anxiety and a decrease in the level of self-confidence.

Fatehi (2012) conducted an analytical social study entitled with "Cancer is a disease of medical and social perspective". It aimed to define cancer and its risks on human society, and to investigate the factors which affect cancer, such as the global geographic distribution of the disease. In addition, this study emphasized the role of the social environment surrounding human beings in spreading the disease.

In order to shed the light on the pattern of phobias, a fear of cancer, Abdul-Halim (2013) conducted a study entitled with "the fear of cancer and its relationship to feel the quality of life in a sample of university students." This study examined the relationship between fear of cancer and a sense of quality of life. The study included 113 university students from the Faculty of Education, Ain Shams University. Authors prepared their measurement tool to measure the fear of cancer. The results showed that fear of cancer decreases sense of quality of life, and has negative effect on the mental health of the individual.

Comment on previous studies

It is worth noticing that the previous studies did not investigate the impact of psychological stress on the incidence of cancerous tumors. Some studies examined psychological status of cancer patients, such as Vickburg (2003). Others investigated psychological status of both cancer patients and healthy people, such as Al- Saed(2006). Some previous studies aimed to investigate the level of anxiety and self confidence in cancer patient, and the fear of cancer such as (Howaish, 2013) and (Abdul halim ,2013). Therefore, this study designed to compensate the shortage of studies in this area. Moreover it includes patients from large governmental hospitals where are many cancer patients.

Research Methodology

The study aimed to investigate the relationship between psychological stress and the incidence of cancer tumors. The approach used in this study was descriptive analytical methods.

The population of the study

The population of the study include cancer patients attending hospitals in the southern region of Jordan in the period 2007-2014.

The sample of the study sample

The sample of the study sample was selected by random intentionally way, It consisted of all cancer patients attending AlKarak government hospital (1016) suffering from various types of cancer tumors.

The demographic characteristics of patients who were included in this study has been shown in table 1

Table 1: The demographic characteristics of patients who were included in this study.

Variables	Categories	Number
Gender	Male	456
	Female	560
Place of residence	City	622
	Village	394
Marital status	Married	654
	Single	362

Variables

The study includes the following variables:

A- Independence variables includes:

- Gender: male , female
- Place of residence: city , village
- Marital status: married , single

B- Dependent variables includes:

- Family life represented in paragraphs (1- 13)
- Work represented in paragraphs (14 - 19)
- Personality represented in paragraphs (25 - 30)
- Community represented in paragraphs (20 – 24)

Instrument of the study

Prepared questionnaire was used to collect the required data. It consisted of two parts; the first regarding the personal information such as (gender, place of residence, marital status) and the second part which is consisted of 30 paragraphs, each paragraph was given five weights by Likert scale, (very high; five degrees),(high; four degrees), (medium; three degrees), (weak; two degrees), and (very weak; one degree). The paragraphs were distributed in the four domains, which are the independent variables of the study, as follows: 13 measure family life field, 6 paragraphs measure work field , 5 paragraphs measure personal related information, and finally 6 paragraphs measure community related issues.

Instrument validity and stability

The questionnaire validity was assessed by a group of arbitrators (professors and experts in medical and educational institutions) who validate its suitability to measure the variables of the study. Based the arbitrators recommendations, the questionnaire has been modified. In addition questionnaire stability was ascertained using the method of test-retest for exploratory sample consists of 13 patients. Pearson correlation coefficient ($r= 0.88$). Cronbach Alpha has been extracted to identify the degree of internal consistency of answers reported by study population, which was worth 86%, higher than the standard percentage.

Statistical Analysis

To answer the first question (mentioned above in Statement of the study Problems), averages were extracted and arranged in descending order. To answer the second question, multiple analysis of variance (One Way Manova) was used .

The Results of the study

Results related to the first question

In regards to the first question which is; To what extent dose the psychological patient status directly affect the incidence of cancerous tumors ? The mean and the standard deviation of all fields of the study have been extracted, considering that it is measured as follows:

High (3.5 or higher), medium (2.6-3.49), and low (2.5).

Table (2) shows the averages and standard deviations of patient's answers .

Table (2): Averages and standard deviations of subjects' answers.

Sequence of paragraphs from the questionnaire	The Field (Dependent Variables)	The arithmetic average	Standard deviation	Field level according to the mean of the field
1-13	family life	4.29	0.48	High
25-30	Personality	3.82	0.54	High
20-24	community	3.38	0.46	Medium
14-19	work	3.36	0.43	Medium
Total average		3.71	0.45	High

As shown in table 2 above, the arithmetic means of the domains “Family life”, and “Personality” were high, while the arithmetic mean of domains “society” and “ Work” were medium. The highest average (4.29) was accounted for domain “family life”. While the lowest arithmetic average (3.36) was for “work”.

First: Family life field

Results indicated that the majority of the paragraphs of “Family life” filed showed high average. Paragraph number 1 (the lack of intimate relationship with others) has ranked first with a mean (4.83), followed by paragraph 3 (suffering from conflict in marital life) with a mean (4.80) and then by paragraphs 6 and 11 (concerning with the lack of ability to adjust the behavior of children, besides the domination and suppression of couples) with means (4.75 and 4.74, respectively). The rest of the paragraphs showed high average ranging between (4.71–3.76). Only paragraph 10 (my husband doesn't allow me to participate in decisions of our marital life) showed the lowest arithmetic average (3.17).

Second: Personality field

Results indicated that all personality field the paragraphs showed high averages. Paragraph 26 (I feel lonely in my life) was ranked first, with an arithmetic average (4.23), followed by paragraphs 25, 28, and 27 (relating to suffer from chronic diseases, suffer from depression, and suffer from death anxiety) with means (3.93, 3.83, and 3.62, respectively). Paragraphs 29 and 30 (lacking the ability to express emotion and feeling despair) ranked the last, with arithmetic average (3.58 and 3.55, respectively).

Third: community field

Results indicated that paragraphs 20, 23 (deal with suffering from great social responsibility and facing impact of social customs) showed the highest average with the values (4.01 and 3.60, respectively). It has been

noticed that most of the paragraphs had arithmetic averages ranging between (3.05-3.02).

Fourth: Work field

Results showed that paragraphs 14 and 19 (facing very great pressure of work and business requirements are higher than my abilities) had the highest average with values (4.21 and 4.05). The paragraphs 15, 17, 16, 18 (suffering from the suppression of feelings, persecution at work, lack of justice in work) had had the lowest arithmetic average ranged between (3.02-2.89).

Results related to the second question

In regard to the second question which is; Is there any influence of patient's demographic characteristics on the association between patient psychological status and the incidence of cancerous tumors?

To answer the second question, MANOVA multivariate (Hotelling T2) and Oalex Lambada (Wilks' Lambda) were used. Table (3) shows the results of the MANOVA test (One Way Manova).

Table (3): Results of MANOVA test (One Way Manova).

Source of variation	Hotelling T2 value	Wilks' Lambda value	Significance level	Degrees of freedom	Degrees of freedom error
Gender	0.015	-	0.632	5	185
marital status	-	0.90	0.602	4	190
place of residence	-	0.98	0.543	7	188

As shown in table (3), there were no significant differences at the significance level ($p\text{-value} \leq 0.05$) attributable to gender, marital status , place of residence.

Discussion of the findings

The most main findings of this study are:

- 1- Psychological stress caused by family life, and personality showed a significant impact on cancerous tumor incidence, and these fields showed the highest averages.
- 2- The psychological stress related to work and society is medium.
- 3- In general, the extent of psychological stress effect on the incidence of cancerous tumor is high.
- 4- There were no significant differences at the level of significance ($p\text{-value} \leq 0.05$) in subjects estimations attributed to demographic characteristics (gender, marital status, and place of residence).

Discussion of the results of the first question

The statistical analysis showed that the psychological stress has a high extent of effect on the incidence of cancerous tumors, with an arithmetic average of (3.71). The results of this study are consistent with previous studies, such as Howash's study (2012), Saed's study (2006), and Sellick and Edwardson's study (2007) , which showed that psychological factor contributes to the growth of cancerous tumors, and negatively affects patients resistance to infection. In addition, the results of this study are in line with the concerns of psychologists emanating from the vital role of psychological factor in the progression of psychosomatic disorders. As psychological stress leads to the weakness of the body's immunity, it increase the emergence of psychosomatic diseases. This fact is indicated in previous studies such as Dorros's study (2010), and Vickberg's study (2003) which were interested in the psychological immunity, and in particular the effect of psychological factors on the immune system. Depending on the collected data, it was found that the majority of cancer patients, before the incidence of tumors, suffered from psychological stress. In addition, they faced social and psychological problems, such as the serious and hard life issues, frustration, as well as depression and chronic anxiety.

The psychological stress related to the family life field showed the highest arithmetic average (4.29), this might be attributed to the importance of family for the individual. Family is the first and the main interest to individuals, therefore, any problems and obstacles affecting family association might end up with psychosomatic diseases.

The field related to the patients' personality showed high arithmetic average (3.82), this can be explained by the fact that many individuals suffer from chronic diseases, loneliness, despair, and depression. Also, we can't deny the challenges and crises in all aspects of life such as; social, economic, and political circumstances. People vary in their response to the life challenges and crises.

The psychological stress related to the work and community fields had medium arithmetic averages (3.34 and 3.36), this might be due to the fact that individuals deal with different people at work who can help them in facing work difficulties. One of the possible approaches to overcome work difficulties is to improve individual skills and knowledge and to acquire good position work.

Discussion of the results of the second question

The results indicated that there were no statistically significant differences in the extent of psychological status effect on the incidence of tumors, at the level of significance ($p\text{-value}\leq 0.05$), attributed to gender, place of residence, and marital status. These finding might be due to that

both men and women are facing the same level of social and family stress and life challenges. Both of them share the responsibility of the family and work in the same circumstances.

In regard to the marital status, the results showed that there were no statistically significant differences. This might be explained by the fact that both married and bachelor individuals are suffering from stress, problems, life challenges at the same level. Married people are suffering from problems, and facing challenges relating to their sons and daughters; while bachelors are suffering from loneliness.

Finally, in regard to the place of residence, the results showed that there were no statistically significant differences. This could be as a results of similarity of the living between cities and villages in the south Jordan. Both cities and villages residents of have same circumstances. However, there is an increasing governmental interest to improve villages.

Recommendation

In the light of this study findings, authors recommended the following:

1. Conducting further consecutive prospective studies to investigate the causal relationship between psychological stress and the incidence of cancer.
2. Increasing the community awareness regarding psychological stress through implantation educational programs and social services.
3. Increasing attention about the role of controlling psychological stress in improving cancer patient overall health status

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