British Journal of Healthcare and Medical Research - Vol. 9, No. 3
Publication Date: June, 25, 2022
DOI:10.14738/jbemi.93.12414.
Ioannis, P., & Michel, A. (2022). Quality of Life, Lifestyle Behaviors, and Well-Being in Patients with Cancer: The Impact of Demographic Variables. British Journal of Healthcare and Medical Research, 9(3). 165-180.

Quality of Life, Lifestyle Behaviors, and Well-Being in Patients with Cancer: The Impact of Demographic Variables

Paxinos Ioannis, PhD.
University of Nicosia, Adjunct faculty position
Child Hospital P&A Kyriakou, Athens, Greece

Ammari Michel
ex Director of Unit Pain, Oncological
Hospital Agioi Anargyroi, Athens, Greece

ABSTRACT

Background: Cancer can challenge all aspects of a person's quality of life (QoL) and well-being, including physical, psychological, social and spiritual. QoL has long been a central question in cancer research. Optimal QoL has become a goal in health care. It can be argued that the improvement of QoL should be a primary goal of cancer care. Lifestyle factors have been repeatedly identified as cancer risk factors. Unhealthy lifestyle behaviors are associated with serious illnesses such as cancer. How lifestyle behaviors affect the cancer control continuum have not been well-studied. Objective: This study evaluates the relation between lifestyle behaviors, perceived quality of life, well-being and tries to expand knowledge regarding the correlation between them. Methodology: 105 oncology outpatients who have been submitted in pain therapy in the Pain Unit of an Ongological Hospital in Greece in 2021, were administrated the World Health Organization OoL instrument (WHOQOL-BREF) the WHO (10 items) Well-Being Index and an improvised questionnaire with Lifestyle indices. The present study is a cross-sectional, descriptive, correlational research design. Results: This study suggests that male patients' well-being scores were significantly higher. The patients also reported higher scores in the psychological and environmental domain of QoL but they scored significantly lower in the dimensions of physical health, smoking and alcohol use of Lifestyle. Older cancer patients reported lower levels on the well-being and also lower scores on the QoL in the physical, psychological and social relationships domains. They also reported less on the lifestyle variables, particularly on physical health(p=>.05),food consumption(p=>.05), observing weight control (p=.04)and exercise and well-being(p=0.02). More educated patients reported significantly higher scores in the psychological and environment domains of QoL and presented a significantly higher scores in physical health, smoking and alcohol use of lifestyle indices indicating more healthy lifestyle patterns. Conclusions: Findings provide evidence that demographic variables such as being male, younger more educated relate to a more preserved QoL. Regarding lifestyle patterns being female, younger and more educated relate to a more healthy behaviors.

Keywords: quality of life, lifestyle, cancer, well-being, healthy behaviors.

INTRODUCTION

Cancer is the second-leading cause of death worldwide[1]. It has been estimated by the WHO that 30% to 50% of all cancer cases are related to modifiable factors[2]. In recent years, there has been an increasing interest on understanding how cancer lifestyle patterns affects individuals' Quality of life (QoL). Health behaviors such as diet, physical activity, have been studied in relation to cancer development[3-5]. Healthy lifestyle derived by smoking, drinking alcohol, diet and physical activity presented a strong protective effect on cancer risk. Last years cancer percentage has increased considerably. Cancer diagnosis may cause changes in health-related lifestyle. There are a number of individual modifiable lifestyle factors that are related to risk of developing cancer. There are not many studies that have been focused on health behaviors after cancer diagnosis, except from cancers in which poor health behaviors were a primary contributing factor[6-7] LS. Higher levels of physical activity have been associated with longer survival for patients[8-9] and is a predictor of all- cause mortality and a42% increase in recurrence for breast cancer[10] . Studies have pointed out that many diseases are somehow related to individuals' lifestyle or at least lifestyle is involved in the exacerbation or durability of them. Research regarding the association between health behaviors and survival has advanced our understanding of the importance of of lifestyle choices after a diagnosis of cancer[11]. Health behaviors are modifiable. As such, understanding what factors may predict these behaviors may further facilitate effective interventions. In the general optimism and depressive symptoms have been shown to consistently predict health behaviors, but these predictors have not been studied in the context of cancer[11]. Changes in health behaviors may also occur more frequently after a diagnosis of cancer[12,13]. A large proportion of cancers can be prevented through the adoption of a healthier lifestyle and decreasing the future cancer burden. While early diagnosis and treatment for the most common cancers have been improving, they remain a challenge, highlighting the importance of preventive strategies. Epidemiological studies aim to isolate the relationship between lifestyle factors and cancer risk. These analyses cannot assess the combined impact of several healthy or non-healthy behaviors[1]. Other studies have focused additive exposure scores referred to as healthy lifestyle index.

Quality of life (QoL) is a complex concept that encompasses objective and subjective dimensions and incorporates all aspects of an individual existence such as physical, psychological, and emotional. The term references the general well-being of individuals and societies. Measurement of a person's QoL assessed variables across a broad spectrum of life experiences relevant to the person. QoL issues have become important concerns in planning, choosing, implementing and evaluating policies in both the health care and social arenas[14]. The past decade has been increasing recognition of the importance of QoL as a crucial measure for describing subjective well-being in population studies as well as being an outcome measure in clinical trials[15]. QoL is subjective and therefore must be evaluated from the patient's perspective and is associated with cultural, political, economical and social environments of the individual.

There is still no single universally accepted definition, and the distinction, interplay and importance of subjective and objective factors remains debated[16]. In addition, several core issues remain unresolved thereby limiting the practical application of its measurement, and it has also been shown that subjective and objective appraisals of quality of life often bear little relation[17]. This term invites ambiguity, a fact that is reflected in the definitions used, while each author gives his own interpretation of this term. In 1993 The World Health Organization[18] tried

to embrace the complexity of the term "Quality of Life", defining it as "*the perception that an individual has as about their place in their own existence, in the context of culture and their value system in which they live and on relation to their objectives, their expectations, their norms, their concerns, etc. This is a very broad concept which is influenced by complex ways and complex issues than physical health of the individual factors, his psychological state, level of independence, their social relationships and their relationship with the environment*". Well-being is a dynamic concept that includes subjective, social and psychological dimensions as well as health related behaviors. It is an important construct both as an outcome and as a factor that helps individuals realize their true potential. More complex forms of measurements of well-being would be related to internal locus of control. In addition, well-being has been understood as having a purpose in life and pursuing goals, which also coheres with internal locus of control. The tendency to equate well-being with health has sometimes led to the unwarranted conclusion that any health status measure is QoL measure and that conversely, QoL need be measured only by health status measure. In reality this association does not exist[19].

Regarding the effect of demographic variables on cancer patients well-being and QoL there are ambiguous results. Most studies in this area have focused on the QOL of patients and its influencing factors. These factors need to be considered in the management and treatment of culturally diverse cancer patients. Demographic factors are well-described factors that influence life quality[20-24].Various factors have been reported as influencing the QOL of patients, including the patients' socio-demographic characteristics, such as younger age, gender, working status, family income, level of education, symptom distress, a longer postoperative period, time from the disclosure of diagnosis and without any complications would influence QOL[25-30]. According to Ruggeri[17] sociodemographic characteristics play a different role in different life domains. Male patients are reported of having more social activities and interests and better QoL while older patients present lower levels of physical well-being.

In contradiction, other studies performed with cancer patients no relation was found between QoL and demographic variables such as gender, education, age, duration of illness[31-36] Overall, the impact of oncological and demographic factors on QoL in cancer patients is discussed heterogeneously with partly contradicting conclusions. This may be explained by methodological differences between the studies. The variety of measuring instruments and the array of different components of the QoL construct result in difficulties in comparing different studies[37]. Boini[38] found that most affected areas on QoL were those of physical component and general health perception. Women experienced worse physical and social well-being than men. Singles had worse psychological and general well-being while housewives had the worst physical and social well-being . No relationship existed between education level and life quality. Breast cancer and sarcoma patients had the worst social well-being than other cancer patients[39].

Aims of the study

A cross-sectional correlation research design was used to conduct the study. The aim was to describe and examine the outcomes for a number of cancer patients in terms of quality of life, lifestyle and well-being. In particular the relationship between patients perceived quality of life and subjective reporting of lifestyle and the assessments of well- being was explored.

URL: http://dx.doi.org/10.14738/jbemi.93.12414

Method

A. Sample selection

A total of 105 cancer outpatients, 60 men and 45 women, participated in the study. The studied sample included patients undergoing pain treatment in the Pain Unit of Oncological Hospital in Greece. The treatment was systematic twice per week including use of opioid and cognitive approach.

B. Procedure of data collection and data analysis

Each patient was contacted to ensure his participation in the research. After signing a written informed consent form to indicate voluntary participation in the study, patients were asked to complete the scales. Data were collected by using WHOQOLWHO (10 items) Well-Being Index, and a questionnaire with lifestyle indices.

A standardized form was used for the collection of information concerning demographic information including -age, gender, education level, marital status, parental social class and medical history.

Patients' medical history and current medications were collected from case notes and relatives. Data collection lasted two months (November 2021-January 2022).

C. Research design

This study utilized a descriptive, correlational research design. The objective was to examine the relationship between the perceived quality of life of patients, wellbeing and the different types of lifestyle practices. There is no systematic baseline data of the patients before entry to the hospital.

D. Research instruments and data analysis

Data presented in this paper have come outfrom research instruments adapted in the Greek situation. The instruments which were applied are defined below:

Well Being Index

The first questionnaire was the WHO (TEN) Well-being Index of Bech, Gudex and Johansen[40].This well being index includes negative and positive aspects of well- being in a single uni-dimensional scale. Its advantage is the ability to show overall change along the continuum of well- being, thus facilitating comparisons between patient groups and treatments. The questionnaire design was based on Zungs self- rating scales for depression, anxiety and psychological distress with additional new items for positive well-being. The initial questionnaire consisted of 28 items but after psychometric analyses, a 220 item scale was generated, consisting of depression, anxiety, energy and positive well-being subscales. In order to further reduce the number of items in the final scale and to retain comparability with the initial questionnaire, 10 items were identified. The well- being questionnaire was designed to include three subscales of anxiety, depression and well-being. Each item was answered on a numerical scale from 1 (all the time) to 4 (not at all), but in the analysis, these were altered to 0-3 scales to simplify the scoring.

The index measures mental well-being the previous week and includes ten items covering four dimensions: depression, anxiety, energy and positive well-being. Response alternatives to each

item are always, often, sometimes and never. There is a maximum score of 30 points; higher scores indicate better mental well-being. The index was dichotomized into low mental well-being (scores ≤12) and high mental well-being (scores ≥13).

The World Health Organization Quality of Life questionnaire (WHOQOL-BREF)

The *World Health Organization Quality of Life* questionnaire (WHOQOP-BREF)[41] is a self-report inventory of generic QoL with 26 original items and 4 additional items derived from the validation of the instrument within Greek populations The items fall into four domains: a) *Physical Health*, b) *Psychological Health*, c) *Social Relationships* and d) *Environment*, while two items provide a measurement of an *Overall QoL/Health* facet. The scale has demonstrated good internal consistency with Cronbach's alpha ranging from 0.67 – 0.81 per domain. It is rated on a 5-point Likert scale and the range of scores is between1–20 with higher scores indicating better QoL.

An improvised questionnaire with Lifestyle indices

A selection of lifestyle indices was used to collect data and measure key variables (different dimensions of lifestyle). The total lifestyle score was measured using the mean scores of all dimensions. It consisted of 40 questions and the range of lifestyle in the questionnaire was evaluated in six dimensions: physical health, smoking, alcohol use, consumption of food, observing weight control and exercise and well-being. Answers to the questions were classified based on a Likert scale as: always, usually, sometimes and never, with scores of 1to 4.High score in each dimension showed good lifestyle. We incorporate the beliefs about personal cancer risk-reducing behaviors were assessed by asking respondents to name steps they personally could take to reduce their cancer risk.

E. Statistical analyses

SPSS 24.0 statistical package was used for the analysis. Descriptive analyses and parametric statistical analyses were first performed on total sample. Normality was tested with the *Kolmogorov- Smirnov* test.

Analysis of the well-being rating scales was carried out on the composite indices for each item. The composite indices were compiled by summing the score of the individual items in each item.

The internal reliability of the above scales was examined. The total Cronbach alpha for WHOQOL-BREF α=0,82 while the total Cronbach alpha for WHO (TEN) Well-being Index is α= 0.83.Statistical analyses were performed with the use of Independent-Samples T Test and One-Way ANOVA in order to investigate differences between male and female cancer patients, older (>56) versus younger (<55), less educated versus more educated.

A *p* value 0.05 was considered to signify statistical significance.

RESULTS

Profile of sample: demographic characteristics

The sample of the research consists of 105 Greek patients. 57.1% are males (N=60) and 42.9% are females (N=45), with a mean age of 63.1 years old. The majority of them were not aware for their illness (55.4%). Most of them are married (88.6%), 2.8% are unmarried and 8.6% are

URL: http://dx.doi.org/10.14738/jbemi.93.12414

divorced. A total 6 of them had achieved up to primary education (5.7%), 53 were high school graduate (50.4%) and 46 were college or university graduates (43.9). 64 of them were able to achieve their daily life activities (61%). The majority of participants were experiencing chronic pain. The diagnosis has been established 19.8months before the appointment in Pain Unit (s.d. 12.6). For 36 patients, the tumor was in progression (34.3%) and 69 of them were currently following a cancer treatment (65.7%). Metastatic cancer was observed in 26%

The following types of cancer were represented in the sample: lung 16.2%, bowel 15.1%, prostate 12.3%, breast 11.8%, kidney 11.1%, , stomach 10.7%, pancreas 7.3% and others 15.5%.

Table 1 presents the demographic characteristics of the sample in terms of age, gender and education.

Table 1:Sociodemographic Characteristics of the Sample

	Males (N=60, 57.1%)	Females (N=45, 42.9%)
Age		
40 - 55	17(28.3%)	11 (24.4%)
56 – 70	43(71.7%)	34 (75.6%)
Civil Status, N (%)		
Married	54 (90%)	39(86.7%)
Unmarried	2(3.3%)	1(2.2%)
Divorced	4 (6.7%)	5(11.1%)
Educational Level		
University or College	30(50%)	16(35.5%)
Secondary Education	28 (46.7%)	25 (55.5%)
Up to Primary Education	2(3.3%)	4 (9%)

Results

The results obtained from various subscales are shown in table 2. According to the findings, the lowest and the highest mean scores were reported in social domain and environmental satisfaction domain of **QoL.** In addition patients expressed lower levels in physical health dimension of **lifestyle behaviors** (1.86) while the mean score of well-being is above the midpoint.

Table 2: Means and Standard Deviations, on various subscales

	Mean (SD)
Life style min 1-max 4	
Physical health	1.86(0.23)
Smoking	2.37(1.17)
Alcohol use	3.45(1.08)
Consumption of food	2.56(0,74)
Observing weight control	3.11(1.24)
Exercise and well-being	1.35(1.46)
Total LS	1.49 (0.99)
WHO (10 items)Well-being Index min 0-max30	19.76(3.27)
WHOQOL-BREF Domains **min 1-max 20**	
Physical	12.8(0.78)
Psychological	14.1(0.66)
Social relationships	11.9(0.54)
Environment	15.1(0.34)
Overall QoL	5.8(2.6)

Investigating *gender* differences female patients **Well-being scores** were significantly lower compared to males (table 3). In addition, males scored significantly lower in the dimensions of physical health, smoking and alcohol use of **Lifestyle**. Further, males cancer patients reported significantly higher scores in the psychological and environment domains of **QoL** compared to females (table 3).

URL: http://dx.doi.org/10.14738/jbemi.93.12414

Table 3: Means and Standard Deviations on various subscales regarding Gender Differences

	Males	**Females**	
LS	**Mean(SD)**	**Mean(SD)**	
Physical health	1.43(2.93)	2.17(2.76)	.02*
Smoking	1.69(1.45)	2.71(0.87)	. 02*
Alcohol use	1.91(2.93)	2.87(2.76)	.02*
Consumption of food	2.14(1.87)	2.38(1.34)	NS
Observing weight control	3.11(0.57)	3,07(0.65)	NS
Exercise and well-being	1.67(2.13)	1.99(1.31)	NS
Total LS	13.93(1.98)	13.21(1.61)	NS
WHO (10 items)Well-being Index min 0-max30	21.7(5.4)	18.1(6.5)	.001*
WHOQOL-BREF Domains min 1-max 20			
Physical	13.06(2.85)	12.27 (1.87)	>.05*
Psychological	14.77(2.29)	12.03(4.11)	.01*
Social relationships	13.16(3.76)	12.27 (3.03)	>.05*
Environment	14.92(1.89)	12.18(1.44)	**.001***
Overall QoL	3.78(1.21)	3.04(1.54)	>.05*

***Independent Samples t – test**
*** p < 0.05, N=115**
**** NS=Not significant**

Regarding ***age,*** statistically significant differences were found between younger (<55 years) and older patients (>56 years). Specifically, older patients reported a significantly lower level on the **Well-Being Index** and less on **the lifestyle variables,** particularly on physical health(p=>.05),food consumption(p=>.05), observing weight control (p=.04)and exercise and well-being(p=0.02) (table 4). On the other hand, younger cancer patients reported significantly higher scores on the QoL in the physical, psychological and social relationships domains.

Table 4: Means and Standard Deviations, on various subscales regarding Age Group Differences

LS	Age Group< 55 N = 21	Age Group> 56 N = 84	P
Physical health	3.14(1.23)	2.06(1.65)	>.05*
Smoking	2.31(1.75)	2.96(1.44) NS	
Alcohol use	2.54(0.36)	2.42(0.41)	NS
Consumption of food	2.939(1,43)	1.56(1,11)	>.05*
Observing weight control	3.27(1,12)	2.20(1,49)	.04*
Exercise and well-being	2.77(0.68)	1.62(1.26)	.02*
WHO (10 items)Well-being Index	20.85(1,67)	17.76(1.88)	.001*
WHOQOL-BREF Domains			
Physical	15.02(2.33)	13.33(2.01)	.001*
Psychological	15.89(3.12)	12.78(2.71)	.01*
Social relationships	13.21(2.29)	12.82(2.98)	>.05*
Environment	12.23(0.38)	13.34(0.46)	>.05*
Overall QoL	3.56(3.12)	3.21(3.66)	>.05*

***Independent Samples t - test**
*** p < 0.05, N=115**
**** NS=Not significant**

Concerning *education,* more educated patients (>9 years) presented a significantly higher scores in physical health, smoking and alcohol use of **lifestyle** indices indicating more healthy lifestyle. They also presented higher level on the Well-Being Index. On the other hand less educated patients reported significantly lower scores in the psychological and environment domains of QoL.

Table 5: Means and Standard Deviations, on various subscales regarding Group Differences in Education

LS	<9 N = 6	>9 N = 99	P
Physical health	1.13(1.35)	3.76(1.55)	. 001*
Smoking	1.76(1.77)	2.54(1.26)	>.05*
Alcohol use	1.49(2.22)	2.57(2.39)	.01*
Consumption of food	2.75(1.34)	2.36(1.27)	NS
Observing weight control	2.89(1.60)	3.01(1.98)	NS
Exercise and well-being	2.52(2.31)	2.78(2.07)	NS
WHO (10 items)Well-being Index	20.02(3.24)	**17.06(2.89)**	.001*
WHOQOL-BREF Domains			
Physical	15.02(2.25)	13.33(2.04)	.001*
Psychological	15.89(2.70)	12.78(2.21)	.01*
Social relationships	13.21(2.39)	12.82(2.12)	>.05*
Environment	12.23(1.26)	13.34(1.74)	>.05*
Overall QoL	3.56(2.12)	3.21(1.87)	>.05*

URL: http://dx.doi.org/10.14738/jbemi.93.12414

Correlation coefficients were used to evaluate the relations between **quality of life**, dimensions of **lifestyle** behaviors and components of WHO (10- items) Well-being Index.

The correlation coefficients of relations between six dimensions of lifestyle behaviours and wellbeing are listed in Table 6.

Table 6: Pearson's Correlation coefficient between six dimensions of Lifestyle and WHO Well - being

Physical Health	.57**
Smoking	-.61**
Alcohol use	-60**
Consumption of food	-46**
Observing weight control	.54*
Exercise and well-being	.61**

***p<0.05; **p<0.01**

Table 6 outlines the correlations between dimensions of lifestyle behaviors and WHO (10 items) Well-being. The results show a statistically significant correlation between Well-being and lifestyle. It seems that cancer patients who use healthy lifestyle patterns appear to have a better well-being in comparison with those who use unhealthy styles.

Table 7: Pearson's Correlation coefficient between Quality of life and LS

***N* = 105 Physical Health**	**Smoking**	**Alcohol use**	**Consumption of food**	**Observing weight control**	**Exersice and well-beings**
Physical .57**	-.39*	-.38*	-52**	61**	59**
Psychological .46**	–.35*	-.39	-55**	60**	60**
Social relationships 45**	–.34*	-.46**	-51**	52**	51**
Environment 42**	–30*	-.38*	-49**	46**	47**

***p<0.05; **p<0.01**

As we can see (Table 7), there is a statistically significant correlation between the indices of QoL with lifestyle indices. This correlation implied that there is a direct relationship between these components, as one increased, so did the other.

DISCUSSION

The purpose of this study was to explore the impact of demographic variables on the reported lifestyle patterns, QoL, and well-being in cancer patients. This descriptive study addressed the effect of an individual's lifestyle over his health on his perceived quality of life while living with cancer. Research questions addressed relationships among specific types of lifestyle

orientation and quality of life. Based on these results, most patients had moderate **QoL**. The lowest and the highest mean scores among QoL domains were reported in the social and environmental satisfaction domain respectively. The most compromised domains were the social relations and the most preserved were the environmental and psychological domains.

The low QoL in the social domain may be attributed to low or inappropriate social support from family members or restricted personal relations and sexual activity. Social isolation may to some extent be seen as a consequence of cancer that may potentially affect patients' daily life, including social life. Also the low score in physical health implying few activities of daily living, more dependence on medicine substances and medical aids, lack of enough energy and mobility, pain and discomfort and insufficient sleep. High score in the environmental domain indicating good enough financial resources and opportunity for acquiring new information and skills, physical safety and security, social care, transportation and quality of responsible institutions and hospitals where they were treated. Patients, even after they have been in hospital, may have any meaningful contacts with services. Our study population expresses satisfaction on psychological domain. It seems that illness does not affect enough appearance, bodily image, negative feelings, memory and concentration. Several explanations were possible. Further a majority of the sample had been diagnosed with cancer within almost 2 years. Maybe the chronicity of living with cancer had not yet made significant impact on their lives. A second explanation is that all patients were received pain therapy treatment as outpatients.

In regarding with **Lifestyle**, being physically active and better consumption of food was associated with higher QoL whereas current cigarette smoking and obesity were associated with lower. In addition, absence of alcohol use was also related with higher physical health. In our sample, women used modifiable lifestyle factors in the dimensions of physical health, smoking and alcohol use. Kvaavik et al[42] found that those participants with all positive health lifestyle behaviors and those taking more physical activity versus those with no positive lifestyle health behaviors and reporting no physical activity had a ratio of 0.29. In other research McKenzie[43] women physical activity and consumption of food, were not associated with smoking and among men, physical activity was not related with any of the risk factors. Research[44] found that greater exercise and better food consumption were related with better physical QoL (better vitality and physical functioning) in cancer patients.

These findings are in keeping with previous findings that indicated that cancer patients who are men, those who are less educated and those aged > 65 years are even less likely to make healthy lifestyle changes or to maintain those changes[45]. Although a majority of cancer survivors are aged>65 years, little research has been conducted specifically among older patients to examine their lifestyle behaviors and QoL. Older cancer patients reported being less aware of the impact of smoking, alcohol and exercise, compared with younger patients. Usually, older patients not recognize the need for lifestyle behavior modification[46].Several demographic variables were associated significantly with health behaviors. Older age, less education and males were associated with reduced physical functioning, observing weight control and alcohol use. Differences by age groups on perceptions of benefits of lifestyle modification are likely multifactorial. Research[47] of cancer patients reported lower levels of alcohol, smoking and drug use, while in other study[48] found that women had a statistically significant higher mean score compared with men. Participants who received a higher score were older and more educated.

URL: http://dx.doi.org/10.14738/jbemi.93.12414

The relationship of demographic variables with QoL, significant **gender differences** were found. More specific the psychological and environment domain were the most preserved domains by men. In addition males reported higher scores on **well-being**. The finding of this study is also in keeping with previous literature in showing that women experienced poorer life quality in comparison with men [49-52]. In contradiction, Buhmeyer [53] in a recent study, did not find significant differences between the four dimensions of QoL for male and females cancer patients and their pain management therapy, while Wan et al[54] found that women reported higher wellbeing scores than men after adjusting for diagnosis.

Parker[55] suggested that demographic variables such as gender, age and education were associated with measurements of adjustment and QoL whereas medical variables (time since diagnosis, stage of disease) were not.

Regarding the measurements of attributions about lifestyle, females scored higher on the lifestyle variables, particularly on physical health, diet and observing weight control.

The low level **of schooling** may be a predictor for poorer QoL. More educated patients reported significantly higher scores in the psychological and environment domains of QoL. This study finding is supported by another study[56]. In a study of Munasinghe et al[57] was found that the level of education showed a statistically significant with the environment score. Less education was associated with reduced physical functioning. In addition, higher levels of education were associated with greater weekly minutes of exercise, better diet quality, and lower BMI[44].

Regarding differences in relation to education, less educated cancer patients tended higher levels in WHO (10 items) **Well-being Index**. In other studies no relationship existed between education level and life quality[39].

Regarding **age,** it seems in our study that that QoL is age related. Younger cancer patients reported significantly higher scores on the QoL in the physical, psychological and social relations domains. Being older was associated with lower QoL mostly in physical functioning[58-61] suggest that age, educational status, stage of disease are few factors which significantly affects QoL in carcinoma. Research of Hampson et al[62] with prostate cancer give support that older patients had lower mean QoL scores for nearly all domains. Previous studies[63-64] have found that older age groups (particularly 75 and older) show lower scores on QoL. Other studies point out that younger cancer patients reported significantly greater QoL disturbance[65-68].

In addition older patients reported a significantly lower level on the **WHO (10 items)Well-being Index.**

Finally, we examined the correlations between dimensions of Lifestyle behaviors and WHO (10 items)Well-being. The results show a statistically significant correlation between Well-being and Lifestyle. It seems that cancer patients who use healthy lifestyle patterns appear to have a better well-being in comparison with those who use unhealthy lifestyle patterns. Making positive lifestyle choices can also be psychologically beneficial to patients by empowering them.

It is important to highlight that each patient has a particular way to operationalizing his evaluation on QoL and this evaluation can vary from time to time, depending on circumstances that may change as well.

The present study has some limitations, the most important being the following. This study is a cross-sectional design, not allowing for definitive conclusions to be made. The systematic evaluation of QoL demands a longitudinal approach, whereas this study was based on the subjective perceptions of patients during a limited period only. The research design was correlational, therefore cause//effect relationships could not be examined. Longitudinal research could shed more light in that direction. Variables such as self-esteem, self efficacy, disease knowledge and religiosity were not examined in this research. Despite these limitations, the results of our study form an important contribution on QoL and HLOC in cancer patients. Future studies should be aware of the limitations of methods of assessing QoL when used as evaluation criteria. There is a need for more research in the area of QoL.

ACKNOWLEDGMENTS

The authors would like to thank the patients for the participation in the study and acknowledge the support given by the health professionals and the administration personnel of the pain unit.

Literature

{1} Chen S, Braaten T ,Borch K ,Ferrari P ,Sandager T. Combined Lifestyle Behaviors and the Incidence of Common Cancer Types in the Norwegian Women and Cancer Study. *Clinical Epidemiology*;2021:721-734.

{2} World Health Organization (WHO). *Cancer.* Available from:https://www.who.int/news-room/fact-sheets/detail/cancer. Accessed October9, 2020.

{3} Tiemersma EW, Kampman E, Bueno de Mesquita HB, et al. Meat consumption, cigarette smoking, and genetic susceptibility in the etiology of colorectal cancer: results from a Dutch prospective study. *Cancer Causes Control;* 2002: 13: 383- 393.

{4} Pinto BM, Trunzo JJ. Health behaviors during and after a cancer diagnosis. *Cancer;* 2005: 104: 2614- 2623.

{5} Stephenson LE, Bebb DG, Reimer RA, Culos-Reed SN. Physical activity and diet behavior in colorectal cancer patients receiving chemotherapy: associations with quality of life. *BMC Gastroenterol;* 2009: 9: 60.

{6} Khur FR, Kim ES, Lee JJ, et al. The impact of smoking status, disease stage, index tumor site on second primary tumor incidence and tumor recurrence in the head and neck retinoid chemoprevention trial. *Cancer Epidemiol Biomarkers Prev;* 2001:10: 823- 829.

{7} Videtic GM, Stitt LW, Dar AR, et al. Continued cigarette smoking by patients receiving concurrent chemoradiotherapy for limited-stage small-cell lung cancer is associated with decreased survival. *J Clin Oncol;* 2003: 21: 1544- 1549.

{8} Lahart IM, Metsios GS, Nevill AM, Carmichael AR. Physical activity, risk of death and recurrence in breast cancer survivors: a systematic review and meta-analysis of epidemiological studies. *Acta Oncol;* 2015: 54: 635-654.

{9} Meyerhardt JA, Giovannucci EL, Holmes MD, et al. Physical activity and survival after colorectal cancer diagnosis. *J Clin Oncol;* 2006: 24: 3527- 3534.

{10} Van Blarigan EL, Meyerhardt JA. Role of physical activity and diet after colorectal cancer diagnosis. *J Clin Oncol;* 2015: 33: 1825- 1834.

{11} Krane A,Terhorst L ,Bovbjerg H,et al. Putting the life in lifestyle: Lifestyle choices after a diagnosis of cancer predicts overall survival. *Cancer*;2018: 1-10

URL: http://dx.doi.org/10.14738/jbemi.93.12414

{12} Cooley ME, Sarna L, Brown JK, et al. Tobacco use in women with lung cancer. *Ann Behav Med;* 2007: 33: 242-250.

{13} Humpel N, Magee C, Jones SC. The impact of a cancer diagnosis on the health behaviors of cancer survivors and their family and friends. *Support Care Cancer;* 2007: 15: 621- 630.

{14} Ferrans CE, Powers MJ. Quality of life Index: Development and psychometric properties. *Advances in Nursing Science; 1985:*8(1), pp. 15-24.

{15} Hawthorne G, Davidson N, McGrate F, Winkler I, Lucas R, Kilian R. Issues in conducting cross-cultural research: implementation of an agreed international protocol designed by the WHOQOL Group for the conduct of focus groups eliciting the quality of life of older adults. *Quality of Life Research; 2006:*Vol. 15(7), pp. 1257-1270.

{16} Paxinos I, Kalantzi-Azizi A. Quality of life of residents of the community hostels of Leros-Greece- Clinical and social functioning profile. *The International Journal of Social Psychiatry*; 2009: Vol 55, No 6, pp. 483-495.

{17} Ruggeri M, Nose M, Bonetto C, Cristofalo D ,Lasalvia, G, Salvi G, Stefani B, Malchiodi F. & Tansella, M. Changes and predictors of change in objective and subjective quality of life: Multiwave follow-up study in community psychiatric practice. *The British Journal of Psychiatry; 2005:*187(2), pp.121-130.

{18} World Health Organization WHOQOL: Study Protocol: Division of Mental Health, Geneva; 1993:*World Health Organization.*

{19} Oliver J, Huxley P, Bridges K. & Mohamad H. *Quality of life and Mental Health Services*; 1996:*Routledge, London*

{20} Montazeri A, Milroy R., Hole, D. et al. Quality of life in lung cancer patients as an important prognostic factor. *Lung cancer*; 2001:31,pp. 233-240.

{21} Tavoli A, Mohagheghi MA., Montazer, A, Roshan,R, Tavoli Z, Omidvari S. Anxiety and depression in patients with gastrointestinal cancer: does knowledge of cancer diagnosis matter?. *BMC Gastroenterol*; 2007: 7, 28.

{22} Kim Y, Given BA. Quality of life of family caregivers of cancer survivors: across the trajectory of the illness*. Cancer*; 2008: 112 (Suppl 11), pp. 2556-2568.

{23} Van de Poll-France LV, Kwan L, Reiter RE, Lee SP, Litwin MS.The influence of cardiovascular disease on health related quality of life in men with prostate cancer: a 4-year follow up study. *J Urol; 2008:*179(4), pp. 1362–1367.

{24} Gourin CG, Boyce BJ, Vaught CC, Burkhead LM, Podolsky RH. Effect of comorbidity on post-treatment quality of life scores in patients with head and neck squamous cell carcinoma*. Laryngoscope*; 2009: 119(5), pp. 907–914.

{25} Rogerson RJ. Environmental and health-related quality of life: conceptual and methodological similarities. *Soc Sci Med*; 1995: 41, pp. 373-82.

{26} Peuckmann V, Ekholm O, Rasmussen N, Møller S, Groenvold M, Christiansen P, Eriksen J, Sjøgren P. Health-related quality of life in long-term breast cancer survivors: Nationwide survey in Denmark. *Breast Cancer Research Treatment*; 2007: 104, pp. 39-46

{27} Ogce F, Ozkan, S, Baltalarli B. Psychosocial stressors, social support and Socio-demographic Variables as Determinants of Quality of life of Turkish Breast Cancer Patients'. *Asian-Pacific Journal of Cancer prevention*; 2007: Vol 8, pp. 77-82.

{28} Shu-Fen Wu ,Hong-Yi Tong,Yuen-Yee kan. Factors influencing Quality of life in Gynecologic cancer patients. *Clinical Nursing Research*; 2015.

{29} Changqing L, Hongfei R , Jiping L , Xiaoling L, et al. Predictors for quality of life of bladder cancer patients with ileal conduit: A cross-sectional survey. *European journal of Oncology Nursing*; 2016: Vol 21, pp. 168-173.

{30}Shakeri J,Kamangar M ,Ebrahimi E, Aznab M ,Shakeri H ,Arman F. Association of Coping Styles with Quality of Life in Cancer Patients. *Indian Journal of Palliative Care*; 2015:Vol 21(3), pp.298-304.

{31} Vedat I, Perihan G, Seref K, Komurcu A, Ozet F, Apruci B. Improving quality of life in patients with non small lung cancer: research experience with gemeitabine. *Eur J Cancer*; 2001:33, pp. 8–13.

{32} Nematollahi A. Quality of life in Iranian women with breast cancer. Tehran: *Tehran University of Medical Sciences; 2006.*

{33} Lee JH Chen Ch, Yao G., Chung CW, Sheu JC, Lee ph et al. Quality of life in patients with hepatocellular carcinoma received surgical resection. *J. Surg. Oncol*; 2007:Jan 95 (1), pp. 34-39.

{34} Rabin EG, Heidt E, Hirakata VN, Fleck MP, (2008). Quality of life predictors in breast cancer women. *Eur J Oncol Nurs*; 2008: Vol. 12, (1),pp. 53-57.

{35} Heydarneiad MS, Hassanpour D, Solati, K. Factors affecting quality of life in cancer patients undergoing chemotherapy. *African Health Sciences; 2011.*

{36} Kanayamkandi J, Sundera S. Quality of life among breast cancer patients: a cross sectional study. *International Journal of Community Medicine and Public Health; 2017: Vol4.(3).DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20170740*

{37} Härtl K, Janni W, Kästner R, Sommer H ,Strobl B, RackB, Stauber M.(2003).Impact of medical and demographic factors on long-term quality of life and body image of breast cancer patients. *Ann.Oncol*; 2003:14(7),pp. 1064-1071.

{38} Boini S, Briancon, S, Guillemin F, Galan P, Hercberg. Impact of cancer occurrence on health-related quality of life: A longitudinal pre-post assessment*. Health Quality of life outcomes ; 2004.*

{39} Üstündağ S, Zencirci A. Factors affecting the quality of life of cancer patients undergoing chemotherapy: A questionnaire study. *Asia-Pacific journal of Oncology Nursing;* 2015.

{40} Bech et al. The WHO-5 Well-Being Index : A Systematic Review of the Literature. *Psychotherapy and Psychosomatics ;* 1996:65, pp. 183-190.

{41} WHOQL Group. The World Health Organization's WHOQOP-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL Group. *Quality of Life Research*; 2004: 13, pp. 299-310.

{42} Kvaavik E,Batty GD,Ursin G,Huxley R,Gale CR. Influence of individual and combined health behaviors on total and cause-specific mortality in men and women: the United Kingdom health and lifestyle survey. *Arch Intern Med*; 2010: 170:711-8. https://www.ncbi.nlm.nih.gov/pubmed/202421558*.*

{43} McKenzie F,Biessy C,Ferrari P et al. Healty Lifestyle and Risk of Cancer in the European Prospective Investigation Into Cancer and Nutrition Cohort Study.*Journal Logo; 2016:* Vol 95,(16),1-13.

{44} Mosher C,Sloane R,Morey M et al. Associations between lifestyle factors and quality of life among older long-term breast, prostate and colocteral cancer survivors. *Cancer*; 2009: Vol. 115(17) 4001-4009.https://doi.org/10.1002/cncr,24436.

{45} Denmark-Wahnerfried W, Aziz NM,Rowland JH, Pinto BM. Riding the crest of the teachable moment: promoting long-term health after the diagnosis of cancer. 2005: *J Clin Oncol; 2005*: 23:5814-5830.

{46} Chongya N,Lawson Eng, Xin Qiu et al. Lifestyle Behaviors in Eldery Cancer Survivors: A Comparison with Middle-Age Cancer Survivors. 2015: *Journal of Oncology Practice*; 2015: Voll 11(4),1-27.

{47} Zhang F,Hudson M,Huang C,Bhakta N,Kirsten K et al. Lifestyle factors and health-related quality of life in adult survivors of childhood cancer: A report from the St. Jude Lifetime Cohort Study. *Cancer;2018:* Vol 124(6), 3918-3923. https://doi.org/10.1002/cncr.31647.

{48} Li Jiao, Mitrou N,Reedy J,Barry I et al. A combined Healthy Lifestyle Score and Risk of Pancreatic Cancer in a Large Cohort Study. Arch Intern Med; 2009: 169;(8): 764-770.

{49} Schag, C, Ganz, P., Wing D., et al. Quality of life in adult survivors of lung, colon, and prostate cancer. *Quality of Life Research; 1994:*(3), pp. 127-141.

50} Ferrell, BR ,Dow KH, Leigh, S.et al. Quality of life in long-term cancer survivors. *Oncol. Nurs. Forum*; 1995:(22),pp. 915-922.

{51} Al-Fayez G, Ohaeri J. Profile of subjective quality of life and its correlates in a nation-wide sample of high school students in an Arab setting using the WHOQOL-Bref. *BMC Psychiatry;*2011

URL: http://dx.doi.org/10.14738/jbemi.93.12414

{52} Üstündağ S, Zencirci A. Factors affecting the quality of life of cancer patients undergoing chemotherapy: A questionnaire study. *Asia-Pacific journal of Oncology Nursing;* 2015.

{53} } Buhmeyer *Pain management gender and quality of life in cancer patients*. 2017: Walden dissertations and doctoral studies.

{54} Wann G, Counte A, Cella D, Hernadez L, et al. An analysis of the impact of Demographic, Clinical and Social Factors on Health –Related Quality of Life; 2002: Wiley On Line Library https://doi.org/10.1046/j.1524-4733.1999.24006.x

{55} Parker P,Baile W,Moor,C,Cohen L. Psychosocial and demographic predictors of Quality of life in a large sample of cancer patients. Psycho-Oncology;2002: Vol 12(2) https://doi.org/10.1002/pon.635

{56} Peuckmann V, Ekholm O, Rasmussen N, Møller S, Groenvold M., Christiansen P, Eriksen J, Sjøgren P. Health-related quality of life in long-term breast cancer survivors: Nationwide survey in Denmark. *Breast Cancer Research Treatment*; 2007: 104, pp. 39-46

{57} Munasinghe W, Nanayakkara P, Rathnayaka N. Quality Of Life and Satisfaction with Care among Breast Cancer Survivors Receiving Different Treatments Strategies in Sri Lanka. *Cancer therapy& Oncology*; 2016:Vol.2 (1),pp. 001-005.

{58} Rodriguez JL, Hawkins A, Berkowitz Z, Li C. Factors Associated with Health-Related Quality of Life Among Colorectal Cancer Survivors. *Am J Prev Med; 2015: 49*(6 suppl5),pp. 518-527.

{59} Quinten C ,CoensC ,Ghislain I ,Zikos E ,Sprangers M ,Ringash J ,Martinelli F , et al. *The effects of age on health-related quality of life in cancer populations: A pooled analysis of randomized controlled trials using the European Organization for Research and Treatment of Cancer (EORTC)*. 2015

{60} Mols F, Coebergh J ,Van de Poll France L. Health-related quality of life and health-care utilization among older long-term survivors: A population based study. *European Journal of Cancer*; 2007:43, pp. 2211-2221.

{61} Sharma N, Purkayastha A. Factors affecting quality of life in breast cancer patients: A descriptive and cross-sectional study with review of literature. *Journal of Mid-Life Health*; 2017:Vol.8(2),pp. 75-83

{62} Hampson L,Cowan J ,Zhao S ,Carroll P ,Cooperberg M.Impact of age on Quality of life outcomes after treatment for localized prostate cancer. *European Urology; 2015:* 68,pp. 480-486.

{63} Ware JE Jr., Snow KK, Kosinski M, Gandek B. SF-36 health survey manual and interpretation guide. Boston: *The Health Institute Medical Center;1993.*

{64} Baker F , Haffer S ,Denniston M. Health-related quality of life of cancer and noncancer patients in Medicare Managed Care. Presented at the DHHS conference, Partnerships for Health in the New Millenium: Launching Healty People 2010.

{65} Arndt V, Merx H, Sturmer T ,Stegmaier C ,Ziegler C ,Brenner H. Age-specific detriments to quality of life among breast cancer patients one year after diagnosis. *European Journal of Cancer*; 2004:Volume 40, Issue 5, pp. 673–680.

{66}} Avis N , Crawford S , Manuel J. Quality of Life Among Younger Women With Breast Cancer. *Journal of Breast Cancer*; 2005: Vol 23,Nr. 15, pp. 290.

{67} Vrettos I,Kamposioras K ,Kontodimopoulos N ,Pappa E ,GeorgiadouE ,Haritos D ,Papadopoulos A ,Niakas D. Comparing Health-Related Quality of Life of Cancer Patients under Chemotherapy and of Their Caregivers, *The Scientific World Journal; 2012:* Volume 2012, Article ID 135283

{68} Schmidt H ,Nordhausn T ,Boese S ,Vordermark D ,Wheelwright S , Wienke, A ,Johnson C. Factors Influencing Global Health Related Quality of Life in Elderly Cancer Patients: Results of a Secondary Data Analysis. *Geriatrics;2018:* 3(1)5.