

# Uncertainty, anxiety, depression and the quality of life in patients with cancer

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SUMMARY

Background: Cancer diagnosis is a potentially fatal alteration in life that could be related to the uncertainty resulting in anxiety and depression, decreasing the quality of life even death thoughts and suicide. This study aimed at assessing the relationship between uncertainty, anxiety, depression and the quality of life among patients with cancer.

Methods: In this cross-sectional study, the research population was 163 patients suffering from cancer, referred to the chemotherapeutic center of Shahid Rahimi educational hospital. They were entered to study in categorized random sampling based on a determined share of type of cancers and gender in a pilot study. They should be aware of their diagnosis, age of 21 or higher, and with no psychotic diseases. By considering ethical considerations included anonymity and confidentiality of participants and taking informant consent, data gathered by fulfilling some questionnaire consisted of demographic information, Michel's uncertainty in illness scale, WHOQOL-BREF questionnaire and HADS scale. The data were analyzed by SPSS software version 24, by using descriptive and inferential statistics. ( $p=0.05$ )

Results: According to the results, patients had a high level of uncertainty in illness and their quality of life was at a medium level. Also, a limited number of patients had severe anxiety and depression but the majority of them had moderate and mild anxiety and depression respectively. Besides, there was a positive significant relationship between uncertainty in illness and anxiety and a reverse significant relation between uncertainty in illness and the quality of life ( $p<0.001$ ). Although, there wasn't a relation between uncertainty and depression.

Conclusions: By considering the high level of uncertainty in patients with cancer as an inappropriate and disturbing experience, applying effective strategies by caregivers to decrease uncertainty in illness can decline psychological distress and promote the quality of life in them.

Key words: anxiety, cancer, depression, patient, quality of life, uncertainty

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## INTRODUCTION

As a non-communicable and chronic disease, cancer not only imposes its burden on society's shoulders but is also considered as a serious crisis in everyday life-threatening the future of the patient and his/her family [1, 2]. On the other hand, this illness has increased in recent decades due to reasons such as the increasing life expectancy, population changes and society's experiencing elderliness [1, 3, 4]. So, it is predicted that cancer will have been the first and most important cause of death by 2030 [5]. Also, in Iran, its incidence will reach from 84800 in 2012 to 129700 by 2025 [3].

Patients with cancer face a lot of physical and psychological problems which affect each other and consequently affect the patient's quality of life (QOL) [6-8] among psychological problems, anxiety and chronic depression are major consequences of suffering from cancer experienced by most patients [9]. The studies showed that 15% suffer from severe depression, 20% from slight depression and 10% from anxiety [10, 11]. In Iran, the frequency of anxiety and depression is reported to be 46% and 48%, respectively. In various studies, the decrease in the quality of life has been also reported [12, 13]. In a study by Nayak et al. [12], 82.3% of the patients with cancer in India experienced the low quality of life. Moreover, the findings of a study by Shandiz et al. [13] in Iran, proved the low quality of life due to deep physical disorders and fatigue in women suffering from breast cancer, which definitely affected the quality of their psychological health. As well as, the symptoms experienced by patients, especially pain, decrease the quality of life [12].

Another problem faced by patients with cancer is uncertainty as an expected item in experiencing the illness [14, 15]. Uncertainty means to fail to determine the meaning of cancer-related events, and it happens when the patient and his/her family are unable to assess the events or to predict consequences of the illness [16]. As a result of facing uncertainty as a tense situation, they seek the approaches to decrease the tension due to these challenges [17-19]. Uncertainty is one of the serious experiences in patients with cancer, and it is related to the unknown nature of the disease, unpredictable process, unknown symptoms and issues resulted from the chronic effects of cancer and its therapy on patients' social, cognitive and emotional capabilities [2].

As mentioned before, anxiety, depression, the QOL, and uncertainty are major factors in the life of patients with cancer

that are reported to be interconnected in some studies [9, 20, 21]. By the same token, Baktas and Demir found out that the increasing longevity increases anxiety and depression which can lead to the decrease of the QOL, while amelioration is, to a great extent, affected by patients' QOL [22]. Besides, a study on women suffering from breast cancer in Malaysia and China showed that the lower level of anxiety and depression leads to a better QOL. On the other hand, anxiety and depression can have destructive effects on the whole QOL and its dimensions [21, 23]. As a matter of fact, diagnosis of cancer is an alteration and a potentially fatal occurrence in life which could be related to the uncertainty resulting in anxiety and depression, low adherence, long hospitalization, death thoughts, suicide and even decreasing the QOL [9]. In along with this study, Ahadzadeh and Sharif [20] in assessing the relationship between uncertainty and the QOL among patients suffering from breast cancer found the adverse relationship between them. That is, patients with higher uncertainty experienced a lower QOL. Moreover, in a study aimed at evaluating the relationship among uncertainty, anxiety, fear, and the QOL with the risk of cancer among those surviving prostate cancer, Parker et al. found out that uncertainty concerning the illness and anxiety are brilliant predictors regarding the QOL and the fear of illness development in men with the risk of prostate cancer [24]. Based on the proposed studies, the relation between the above-mentioned variables is separately evaluated, but for assessing them with each other and determining their effect on each other, more studies require to be conducted. Therefore, the present study is conducted to assess the relationship between uncertainty, anxiety, depression and the QOL among patients with cancer.

## METHODS

### Design and participants

In this cross-sectional study, the research population includes 163 patients suffering from cancer, referred to the chemotherapeutic center of Shahid Rahimi educational hospital, related to Lorestan University of Medical Sciences. Based on the following formula, the sample size was calculated to be 81, but due to the scheme effect, the above number was multiplied by two, and the total number reached 163.

$$Z_{(1-\alpha/2)} + Z_{(1-\beta)}^2 / +3 = n$$

$$C = \frac{1}{2} \ln \frac{1+r}{1-r}$$

$$Z_{1-\alpha/2} = 1.96$$

$$Z_{1-\beta} = 1.28$$

$$R \cong 0.2$$

Categorized random sampling appropriate to the population volume was conducted in which cancer was considered as a category and gender as a sub-category. To specify samples in categories and sub-categories, a pilot study was performed to determine the share of each category and sub-category. In so doing, the share of cancer from the population volume and the

share of each type of cancer were determined. In pilot study, a list of patients with cancer referred to research environment during one month (2018 January) were prepared which from the total of 433 admitted patients in that month, 117 patients suffered from breast cancer (all were female), 66 patients suffered from colon and rectal cancer (32 female and 34 male), 58 patients suffered from esophagus and stomach cancer (18 female and 40 male), 58 patients suffered from leukemia (47 female and 11 male) and 134 patients suffered from other cancer (73 female and 61 male). At last, based on the findings of the pilot study, based on the type of cancer and gender share of each sample from the total sample size (n=163) determined and entered the study in the convenience sampling method.

### Data collection

**Participants' characteristics:** The inclusion criteria to enter the study involved definitive diagnosis of cancer, patients' awareness of cancer, being 21 years old and above, being Iranian citizenship, understanding speaking Persian or local dialects, not suffering from other chronic psychotic illnesses (such as major depression, schizophrenia, etc), not participating in similar studies, not confronting with situations causing anxiety or depression (such as the death of the beloveds, familial problems, divorce, accident, etc) in last two months, not taking anti-depressant and anxiety medications, no metastasis to other organs, and not being in the last phase of life. The samples could exit the study at any stage. Also, by explaining the goals of the study to participants, ensuring them about their confidentiality and anonymity and taking written consent, they were entered into the study. To gather data, the participants were given demographic and background information questionnaire (age, gender, educational level, marital status, job, inhabitation, cancer type, the time after cancer diagnosis, the presence or absence of metastasis and the therapy type), moreover, questionnaires of uncertainty in illness, anxiety and depression and the QOL. In cases the patients came for chemotherapy, the questionnaires were completed before starting chemotherapy.

**Michel's uncertainty in illness scale:** To measure the uncertainty in illness, Michel's Uncertainty in illness scale (MUIS-A) was used. In a study by Sajjadi et al. [2] the consistency of this tool was  $r = 0.91$ ; Cronbach's coefficient for the whole scale was  $\alpha = 89\%$ ; and, for its four factors was between  $\alpha = 86\%$  and  $\alpha = 56\%$ . This scale involves 31 items and four dimensions of ambiguity, complexity, inconsistency, and unpredictability in a Likert scale from 1 (totally agreed) to 5 (totally disagreed). The scoring range was between 31 to 155. The higher the score is, the higher the uncertainty will be by Sajjadi et al. [2].

**WHOQOL-BREF questionnaire:** WHOQOL-BREF questionnaire was used for measuring the QOL. This tool has 26 questions and four dimensions of the whole health of QOL including physical health, psychological health, social relationships, environmental health and two overall QOL and general health items. Based on the Likert scale, each question is scored from 1 to 5. Score 1 is allocated to the worst condition, and 5 is allocated to the best condition except for questions number 3, 4 and 26. The score range was between 26 and 130. The reliability and validity of the Persian version of the questionnaire

was confirmed in a study by Nedjat et al. Cronbach's coefficient was reported to be about 0.7 for all dimensions except the social one. Cronbach's coefficient of social dimension was 0.59 because it had only 3 questions [25].

**Hospital anxiety and the depression scale:** The Hospital Anxiety and the Depression Scale (HADS) was used to screen the existence and intensity of anxiety and depression symptoms during the last week. Cronbach's coefficient for sub-scale of anxiety and depression of HADS scale in a study by Montazeri et al. [26] were 0.78 and 0.86, respectively. This tool has two sub-scales and each sub-scale has 7 questions. Each question is scored from 0 to 3, and the total score ranged from 0 to 21. Scores from 0 to 7 consider normal; 8 to 10 are slight; 11 to 14 are medium, and 15 to 21 are intense in terms of anxiety and depression [26, 27].

**Data analysis**

The data were analyzed by SPSS software, version 24, by using descriptive (mean, standard deviation, frequency, and percentage) and inferential (Pearson correlation coefficient, independent T, and one-way variance analysis) statistics in the significant level of 0.05.

**RESULTS**

**Participants' characteristics**

The demographic and clinical characteristics of the samples are mentioned in Table 1. The subjects with mean age of 52.41 (SD=13.3) were mostly female (66.3%), under diploma (63.8%), married (87.7%), unemployed (45.4%), city inhabitant (73%), having 6 to 24 months time span after definitive cancer diagnosis (46.6%), without metastasis (91.4%), and undergoing chemotherapy (58.9%).

**Participants' situation in terms of uncertainty in illness, QOL, anxiety and depression**

The findings showed that the mean of uncertainty in illness and QOL were 94.69 (SD=10.37) and 81.96 (SD=13.33) in participants, respectively. That is, they had high uncertainty and medium quality of life. Also, the samples, average of anxiety and depression was 10.58 (SD=1.95) and 9.95 (SD=1.92), respectively. Besides, the frequency of participants in terms of intensity of anxiety in levels of slight, medium and severe were 31.3, 58.3 and 3.1 percent, respectively. For depression levels including slight, medium and intense, the participants' frequency was 45.4, 38.7 and 1.2 percent. In other words, a few numbers of patients had intense anxiety and depression, and the highest relative frequency belonged to medium anxiety and slight depression.

**Association between uncertainty in illness and participant's characteristics**

The generalized linear model along with identity link function showed that the effect of independent variables are constant, the effect of age, educational level, inhabitation and therapy type on the average scores is significant on uncertainty in illness in such a way that the average score of uncertainty in lower-diploma patients is 4.103 units more than those with diploma or above

Tab. 1. Frequency distribution of participants based on demographic and clinical characteristics	Percentage	Frequency	Variable	
	33.7	55	Male	Gender
	66.3	108	Female	
	17.2	28	Under 40	Age
	52.1	85	Between 40 to 59	
	30.7	50	60 or above	
	68.3	104	Under diploma	Educational level
	36.2	59	Diploma or above	
	12.3	20	Divorced/ single	Marital status
	87.7	143	Married	
	36.8	60	Householder	Job
	17.8	29	Employee	
	45.4	74	Other	
	73.0	119	Urban	Inhabitation
	27.0	44	Rural	
	26.4	43	Breast	Cancer type
	15.3	25	Colon	
	13.5	22	Stomach	
	13.5	22	Leukemia	
	31.3	51	Other	
	31.3	51	Less than 6 months	Diagnosis time
	46.6	76	Between 6 to 24 months	
	22.1	36	More than 24 months	
	8.6	14	Yes	Metastasis
	91.4	149	No	
	58.9	96	Chemotherapy	Therapy type
	27.6	45	Chemotherapy and Surgery	
	13.5	22	Other	

(p=0.018), and the average score of uncertainty in city inhabitants is 3.838 units lower than rural inhabitant patients (p=0.025). Moreover, the effect of patient's age on uncertainty average score was significant (p=0.007) in such a way that uncertainty average score of patients who are 60 or above is almost 7.082 units less than patients almost 40 (p=0.002); and in patients who are 40 to 59, it is 5.375 units fewer than patients who are 40 (p=0.011). Besides, uncertainty average score in employed patients is 5.207 units lower than householders (p=0.018) and compared with other jobs (except governmental employees and householding) it was 4.361 units lower (p=0.009). In addition, the effect of therapy type on uncertainty average score was significant (p=0.003) in such a way that uncertainty average score in patients undergoing other therapies was 5.011 units fewer than those undergoing chemotherapy (p=0.027). Those undergoing chemotherapy and surgery experienced 3.563 units fewer than those undergoing only chemotherapy (p=0.049). Finally, the effect of job position on uncertainty average score was significant (p=0.011) (Table 2).

**Association between anxiety, uncertainty in illness and participant's characteristics**

The generalized linear model along with cumulative logit function showed that the effect of gender, marital status, job level, inhabitation and the type of cancer on anxiety average score was

Tab. 2. Multi-variable modeling of uncertainty in illness total score using generalized linear models	Variable's name	Category	Beta	Standard error	Confidence interval 95%		p-value
					Lower bound	Upper bound	
	Age range	≤60	-7.082	2.307	-11.605	-2.560	0.007
		40-59	-5.375	2.110	-9.512	-1.238	0.011
		<40	Reference	-	-	-	-
	Educational level	Under Diploma	4.103	1.714	0.689	7.516	0.018
		Diploma or above	-	-	-	-	-
	Job type	Other	-4.361	1.669	-7.634	-1.088	0.011
		Employee	-5.207	2.208	-9.535	-0.879	0.009
		Householder	Reference	-	-	-	-
	Inhabitance	Civic	-3.838	1.717	-7.204	-0.472	0.025
		Rural	Reference	-	-	-	-
	Therapy type	Other Therapies	-5.011	2.259	-9.439	-0.582	0.003
		Chemotherapy and Surgery	3.563	1.806	0.022	7.104	0.027
		Chemotherapy	Reference	-	-	-	0.049

Tab. 3. Multi-variable modeling of anxiety total score using a generalized linear model	Variable's name	Category	Odds ratio	95% Confidence interval for odds ratio		p-value
				Lower bound	Upper bound	
	Gender	Female	0.664	0.255	10.626	0.352
		Male	Reference	-	-	-
	Marital status	Married	1.262	0.472	3.375	0.642
		Single/Divorced	-	-	-	-
	Job type	Employee	0.499	0.191	1.304	0.365
		Other	0.735	0.288	1.871	0.156
		Householder	Reference	-	-	-
	Inhabitance	Rural	0.573	0.264	1.242	0.158
		civic	Reference	-	-	-
	Cancer type	Other	1.128	0.440	2.892	0.623
		Leukemia	1.120	0.330	3.803	0.802
		Stomach	1.478	0.438	4.984	0.856
		Colon	2.370	0.736	7.627	0.529
		Breast	Reference	-	-	-
	Uncertainty	-	1.088	1.050	1.128	<0.001

not significant, but for each added unit in the score of uncertainty, the odds ratio of anxiety increases by 8.8% (p<0.001) (Table 3).

### Association between depression, uncertainty in illness and participant's characteristics

The generalized linear model along with cumulative logit function showed that the effect of educational level, metastasis and therapy type on depression average score was not significant, but it is related to age range (p=0.038) in a way that depression odds ratio among men who are 60 or more is 32.2 percent higher than those who are under 40 (p=0.566), It was not statistically significant, however. This odds ratio for patients between 40 to 59 was 2.716 times greater than those who are under 40 (p=0.028), and it is statistically significant. The findings also showed that for each added unit in uncertainty in illness, the odds ratio of higher depression decreases approximately 0.9% which is not statistically significant (p=0.531) (Table 4).

### Association between Qol and participant's characteristics

To eliminate the collinearity between independent variables and making uncorrelated factor scores based on primary independent variables, explanatory factor analysis was used. Rotated factor loadings made by varimax rotation method, indicated that the first factor was related to uncertainty and higher anxiety and the second one was related to higher depression.

The generalized linear model along with identity link function showed that the effect of educational level and inhabitance on the QOL average score was significant, while the effect of age, gender, job type, and diagnosis time on the average score of QOL was not significant. It also showed that for each added unit in factor 2 scores (related to higher depression), the QOL average scores decrease 3.615 units (p<0.001) (Table 5).

**Tab. 4.** Multi-variable modeling of depression total Score using generalized linear model

Variable's Name	Category	Odds Ratio	95% Confidence interval for Odds Ratio		p-value
			Lower bound	Upper bound	
Age	≤60	1.322	0.510	3.427	0.038
	40-59	2.716	1.116	6.609	0.566
	<40	Reference	-	-	0.028
Educational Level	Diploma or above	0.933	0.486	1.790	0.834
	Under diploma	Reference	-	-	-
Metastasis	No	0.824	0.257	2.642	0.745
	Yes	Reference	-	-	-
	Other therapies Chemotherapy and Surgery	1.818	0.683	4.844	0.232
Uncertainty	Chemotherapy	0.557	0.275	1.127	0.103
	-	Reference	-	-	-
		0.991	0.962	1.020	0.531

**Tab. 5.** Multi-variable modeling of QOL total score using a generalized linear model

Variable's Name	Category	Beta	Standard error	95% Confidence Interval		P-value
				Lower bound	Upper bound	
Age Range	≤60	-2.890	2.849	-8.476	2.695	0.570
	40-59	-2.365	2.583	-7.428	2.698	0.310
	<40	Reference	-	-	-	0.360
Gender	Female	1.121	2.362	-3.509	5.751	0.635
	male	Reference	-	-	-	-
Educational Level	Diploma or above	4.896	2.058	0.860	8.931	0.017
	Under diploma	Reference	-	-	-	-
Job Type	Employee	2.121	2.810	-3.388	7.630	0.745
	Other	2.441	2.470	-4.401	5.284	0.450
	householder	Reference	-	-	-	0.858
Inhabitation	rural	-8.372	2.141	-12.569	-4.175	<0.001
	civic	Reference	-	-	-	-
Diagnosis Time	More than 24 months	-6.395	2.629	-11.549	-1.240	0.052
	Between 6 to 24 months	-2.836	2.113	-6.979	1.307	0.015
	Less than 6 months	Reference	-	-	-	0.180
Factor 1*	-	1.494	0.950	-0.368	3.357	0.116
Factor 2**	-	-3.615	0.921	-5.420	-1.810	<0.001

\* Higher scores in factor 1 indicates uncertainty and higher anxiety  
 \*\* Higher scores in factor 2 indicates higher depression

## DISCUSSION

Based on the findings, the average score of uncertainty in illness was 94.69 (SD=10.37). These patients experienced high-level uncertainty in illness. Similarly, in a study by Sajjadi et al. [2] in Tehran, uncertainty average (90.1) (SD=16.8) was reported to be high in patients with cancer. Although the findings of this study are close to the present study, the amount of uncertainty in that study is less. The reason perhaps is that Sajjadi's study was performed in Tehran, where it provides the patients with comprehensive information. Therefore, less uncertainty can be expected.

Zhang et al. in China reported 76.70 for uncertainty in illness average score for patients suffering from breast cancer [28] which shows less uncertainty compared with the present study or other studies conducted in Iran. The reason for such a difference

could be social and cultural differences, Iranian patients' lack of information, personnel's ineffective relationship with patients and the lack of appropriate education for patients with cancer in Iran.

Depression and anxiety average scores in this study were 9.95 (SD=1.92) and 10.58 (SD=1.95), respectively. In a study on breast cancer patients, the average score for depression and anxiety were 8.56 (SD=4.04) and 10.81 (SD=3.46), respectively. The result of their study is close to the present one, and since it is above the cut point, it is clinically significant. Along with this study, studies have also shown that one-third of patients with cancer suffer from psychological disorders and require treatment [29].

It also showed that the QOL average score in Iran is 81.96 (SD=13.33), and patients experience a medium level of QOL. Monfared et al. [30] studying the QOL of women with breast cancer by the tools used in the present study, found out that QOL

average score for such patients is 48.65 (SD=9.07), and women with breast cancer experience low QOL. In researcher's viewpoint, this difference is related to the type of cancer, and because of the increasing number of the survivors, the role and position of women in the structure and coherence of the family, breast cancer seriously affects their lives [26, 31] analyzing the QOL of 150 women with breast cancer and issues related to it, reported a medium QOL for them, being consistent with the findings of the present study [32].

The findings of the present study concerning the relationship between uncertainty with anxiety and depression are supported by previous studies, in such a way that uncertainty in illness can lead to a lower QOL and higher depression in such patients [28, 33-36]. Despite previous studies [35, 37] the present study reported no significant relationship between uncertainty and depression. In this study, 1.2% of participants experienced severe depression, and the majority of them (45.4%) suffered from slight depression. It is likely that low numbers of patients with severe depression conceal the relationship between uncertainty and depression. The study also shows that anxiety is a special predictor for experiencing uncertainty in the patients [37].

The findings showed that age and uncertainty are reversely related, in such a way that the higher the age, the less the uncertainty. Studies conducted by Bailey et al. and Haisfield-Wolfe et al., [38, 39] showed a special relation between age and uncertainty which are consistent with the findings of the present study. However, Kazer et al., [40] showed younger patients experience less uncertainty. Sajjadi et al., [41] in a study to find issues related to uncertainty, achieved findings consistent with the present study. In another study on patients with immunodeficiency and AIDS, they, however, reported no significant relationship between age and uncertainty [42] Since people's cognitive capacity in crisis with age increases, the relationship between age and understanding uncertainty seems to be logical.

The findings of the study showed patients with lower diploma educational level experience higher uncertainty than patients with diploma degree and above, and there was a reverse relation between these two factors which are consistent with the findings of other studies [39, 40, 41, 43, 44]. It is difficult to determine the role of educational level in understanding uncertainty. Most studies in this field, as well as the theory of uncertainty in illness, confirm the reverse relationship between uncertainty and educational level [18]. The probable reason could be patients with higher education have more access to educational material related to their illness and, consequently, have a better ability to understand and resist their conditions [41, 42] but there was no relationship between these two variables in some studies [34, 42, 43] the reason for which could be the limited samples size or low educational level dispersal among the participants in the study.

The findings showed a special relationship between uncertainty and job in such a way that employed patients experience lower uncertainty than householders or patients with other jobs. However, there was no relationship between these two variables in Sajjadi's study in Iran [41, 42]. The reason could be the various divisions of job types and consequently the decrease of sample numbers in each job. On the other hand, the findings

of the studies show there is a significant relationship between economic pressure and uncertainty in illness, and the family's low income is related to high uncertainty [3, 44]. Yin's study showed that patients with better economical position have better ability to stand against stroke and its consequent disabilities [9] and those patients who are under economic pressure experience severe physiological and psychological pressure and lose their faith in the treatment and rehabilitation. As a result, it is probable for them to have uncertainty increased [44]. Perhaps, the probable reason for a relationship between job and uncertainty goes back to the income gained from the job, and it would be better if patients' monthly income were gathered.

There was a special relationship between perceiving uncertainty and the inhabitation so that patients living in cities have less uncertainty, and it is consistent with the findings of other studies [41]. These findings probably result from more accessibility to health care and health centers in cities and a higher level of awareness and education. Besides, lower monthly incomes of rural patients can probably lead to higher uncertainty.

The findings of the present study showed a relationship between uncertainty and therapy type. Patients undergoing almost all existing treatment methods experienced less uncertainty compared with those who underwent chemotherapy, moreover, it was seen that patients under chemotherapy and surgery together experienced higher uncertainty than those merely underwent chemotherapy. In addition, there was a significant relationship between unpredictability and various therapeutic methods. It is possible to explain such findings to some extent through the relationship between time lapsing from diagnosis and uncertainty. Patients experiencing various therapies pass a long time after the cancer diagnosis and are more informed about their illness which is consistent with the uncertainty theory. Based on the theory of uncertainty in illness, patients being subjected to cancer for a longer span of time adopt their lives in a way that uncertainty becomes a natural part of their lives, and, therefore, its intensity decreases [18].

The multi-variable model of the present study showed that none of the demographical variables are related to anxiety. On the other hand, other findings showed uncertainty is significantly related to patients' anxiety; these findings are supported by the findings of previous studies [9, 32, 34, 35-37] In a one-variable analysis, besides, it is shown that age, educational level, metastasis and therapeutic type have a significant or close relationship to depression. Such demographic variables and uncertainty entered in the multi-variable model. The model showed a significant relationship between age and depression in such a way that patients between the ages of 40 to 59 have 2.5 times lower chance of suffering from depression compared with patients under 40. It is consistent with a study by Heidarirad et al. [45].

The findings of the multi-variable model confirm that educational level and inhabitation are among factors related to patients' QOL. Also, there is a direct relationship between educational level and the quality of life in a way that patients with diploma or above experience a better QOL than those with lower diploma degree which was consistent with the findings of studies [30, 46-48] However, the findings of studies by Sheikhalipour et al.

and Kwan et al. [31, 49] found no relationship between these two variables. It seems logical that higher education affects awareness, accessibility to informational resources about the illness, therapy and health condition, and it improves patients' QOL.

The findings of the study showed that patients living in cities have better life quality than rural ones, but there was no relationship between these two variables.

## LIMITATIONS

In this study, the self-report questionnaire has been used to measure uncertainty, anxiety, depression, and QOL. Therefore, it is possible for patients to respond to questions under the influence of the psychological state, education level and social status bias. Moreover, samples were selected only from the cancer Center in Lorestan, and consequently, the results could not be generalized to patients with cancer in other parts of Iran.

## COCLUSION

According to the findings, patients afflicted with cancer had high uncertainty and a medium quality of life. Besides, a few numbers of patients had intense anxiety and depression, and the highest relative frequency belonged to medium anxiety and slight depression. Moreover, there was a positive significant correlation between uncertainty in illness and anxiety, and there was a reverse significant correlation between uncertainty in illness and the QOL. But, there was no statistically significant relationship between uncertainty in illness and depression. In other word, it may higher anxiety causes higher uncertainty, as well as higher uncertainty, resulting in lower QOL. Since these days QOL,

especially about chronic patients like patients with cancer, is very emphasized so health workers should consider every efficient strategy to reduce the anxiety and uncertainty in the patients, but the best way is presenting enough information and knowledge about the disease like cancer to the patients and improving their self-care and hope to the future. Making more knowable health workers about the concept of uncertainty in illness, its related factors and strategies for declining it by holding some educational sessions can be lucrative that should be noticed by policymakers and administrators. Since this study was just for knowing the related factors with uncertainty, it's suggested conducting some interventional studies about strategies that may alleviate uncertainty in patients with cancer.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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