

# Correlation Between Sense of Coherence (SOC) and Quality of Life (QOL) in Cancer Patients; A Systematic Review.

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## Abstract

**Objective:** Quality of life (QOL) in cancer patients is more important than being only alive. In all types of cancers, treatments and complications of treatments affect patients' quality of life directly and indirectly. So finding ways to improve the quality of life in cancer patients is one of the priorities of the health system. One effective way is the improvement of the sense of coherence (SOC) which is one of the components of salutogenic medicine. In this research, we investigated the effect of sense of coherence on quality of life in cancer patients through a systematic review.

**Method:** As the research method was a systematic review, in our search strategy, we searched some databases, such as PubMed, Scopus, Cochrane, web of science, and Embase. At first, we studied all the articles, and based on their title, we chose some of them. Then based on the inclusion and exclusion criteria of the study, appropriate and related articles were selected. CASP (Critical Appraisal Skills Program) checklist was used to evaluate the articles. Finally, eight articles remained for analysis. Then the results were extracted and synthesized.

**Result:** In this review, it was found that in most studies there was a strong association between SOC and QOL, but some variables, such as age and stage of cancer, could impress the degree of this association. The differences between the kinds of questions in different questionnaires might be the result of these differences.

**Conclusion:** Taken together, there is a moderate correlation between SOC and QOL and some other factors can influence both of them, so we should do more research to find the factors that can improve the SOC in cancer patients.

**Keywords:** Quality Of Life, Health-Related Quality Of Life, Cancer, Sense Of Coherence.

## Introduction

Quality of life in cancer patients is more important than only being alive (Rohani, Abedi, Sundberg, et

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al., 2015). The WHO explained health as not only the absence of disease but also a state of physical, mental, social, and spiritual well-being (Eriksson & Lindström, 2007; Tang et al., 2017). Our study used QOL as an indicator of adaptation. The prevalence of cancer in the world, including Iran, has increased recently. Screening the cancers has developed and the diagnosis and treatment methods have improved as well, so the number of people who scrimp with cancer are increased. Nowadays, only living is not important, rather how we live, i.e., quality of life (QOL), is more important (Rohani, Abedi, Sundberg, et al., 2015). The concept of QOL is multidimensional and there is not a universally accepted definition up to now (Allart et al., 2013; Eriksson &

Lindström, 2007). In all types of cancers, because of the type of disease, treatment methods, and also their complications, directly and indirectly, change the patients' QOL. So finding ways to improve QOL of cancer patients is one of the priority of the health system (Boscaglia & M. Clarke, 2007; Eriksson & Lindström, 2007; Azarkolah et al., 2020; Mousavi et al., 2020). Understanding QOL is very important because it has a positive effect on symptom relief, care, and rehabilitation of patients [16]. There are some methods to improve QOL, such as individual and group consultation (Mehdipour et al., 2019), Cognitive Behavioral Therapy (CBT), exercise and the like, but one effective way is the improvement of the sense of coherence (SOC), which is one of the components of salutogenic medicine. Some people are healthy regardless of having many stressful events, while some others are not (Eriksson & Lindström, 2007; Floyd et al., 2011; Rohani, Abedi, Omranipour, et al., 2015). SOC is a personal factor that helps in coping with stressors and diseases (Drabe et al., 2015; Gustavsson-Lilius et al., 2007) and has three dimensions: Comprehensibility, manageability, and meaningfulness (Eriksson & Lindström, 2007; Gerasimčik-Pulko et al., 2009). Comprehensibility means what happens to a person, whether she or he is able to make sense of it, understand it, structure it, or predict it. Manageability means that the resources are available to adapt to stressful events. Meaningfulness means having a sense of meaning in the important areas of one's life. The role of SOC is noted as the ability to find and use resources (Lindblad et al., 2016; Vilela & Allison, 2010). Dimensions of SOC are the resources that are available to take energy and help people to cope with the demands of stressful life events (Khanjari et al., 2012; Shor et al., 2015; Siglen et al., 2007). Does SOC have a strong effect on QOL in cancer patients? So in this research, we want to know how much SOC influence on QOL in cancer patients in a systematic review.

### **Inclusion criteria**

- 1- Papers published in Persian and English languages,
- 2- Papers which published during recent 15 years,
- 3- Papers which were about the cancer survivors,
- 4- Papers which were cohort, cross-sectional, case-control, or clinical trial in methodology,
- 5- Papers whose questionnaires were valid.
- 6- For selecting the articles, we used the CASP (Critical Appraisal Skills Program) checklist that includes items to assess the quality of articles under investigation. Articles that acquire a score of more than 75% of the total score are classified as high quality, scores between 50-75% are considered moderate, and scores lower than 50% are valued as low quality.

### **Exclusion criteria:**

- 1- papers which do not use the Antonovsky's scale,
- 2- papers which were repeated,
- 3- papers which were not published in databases.

## **Method**

### **Literature search strategy**

PEO means: P=CANCER PATIENT E=SENSE OF COHERENCE O=QUALITY OF LIFE

To answer the research questions, we used these keywords: Sense of coherence, quality of life, cancer, neoplasm, salutogenesis, Health-Related Quality of Life (HRQOL), SOC, QOL, and Mesh was used for electronic search in databases including PUBMED, SCOPUS, COCHRANE, EMBASE, and ISI from 2003 to 2018. ('sense of coherence' or 'Coherent or 'Sense of Coherence' [Mesh]), (cancer or neoplasm [mesh]), ('quality of life' or quality of life' mesh]). Synonyms for a sense of coherence were Coherence Sense, Salutogenesis, and Salutogenesis; synonyms for quality of life was Health-Related Quality of Life (HRQOL); synonyms for cancer survivors were: Long-Term Cancer Survivors, Cancer Survivor, Long-Term Cancer Survivors, Long-Term Cancer Survivors-Long-Term Cancer Survivor-Survivor, Long-Term Cancer -Survivors, Long-Term Cancer.

Systematic literature from published papers that referred to an association of SOC and QOL in cancer patients was conducted with trained librarians, Dr. M. B. and Dr. M. N. Also to find the paper with suitable methodology, we used these keywords: cross sectional, randomized clinical trial, and cohort. We evaluated papers that were published in English or Persian languages in databases (including PUBMED, SCOPUS, COCHRANE, EMBASE, and web of science) where free full texts were acceptable (Fig 1). In order to find extra articles, we did cross-reference. Two of us studied all articles and at first chose some of them based on their title, then summarized them, and after that appropriate studies in title, inclusion, and exclusion criteria were selected. We used the CASP (Critical Appraisal Skills Program) checklist appropriate to the type of article to score the articles, and based on their scores in (CASP) criteria, we graded them. Scores over 75% mean high quality, 50%-75% mean intermediate quality, and lower than 50% mean low quality. We excluded the low-quality papers. Because the age and sex of cancer patients were heterogenic, we did subgroup analysis.

#### Ethical statement

The current study was approved by the Research Committee and the Ethics Committee of Isfahan University of Medical Sciences with the code of

IR.MUI.MED.REC.1398.097.

#### Data extraction and analysis

After choosing the papers with the same PICO/PEO, Dr. M N and Dr. H A evaluated the studies at the concept of containing subjects. Then Dr. Z F and Dr. N T used the CASP checklist to evaluate chosen papers and then excluded the papers with low quality. Scores >75% were ranked as high quality, 50-75% were considered moderate, and scores <50% were rated as low quality. Then Dr. M N and Dr. N T extracted the data from the papers in an excel file. So to continue our research, Dr. Z F, Dr. M N, and Dr. N T discussed and obtained the results. The studies were done in the countries of China, the USA, Australia, Japan, Iran, Lithuania, and Sweden.

#### Data analysis

Because of many heterogeneities in the content of the articles, applying meta-analysis was impossible; therefore, results were summarized in qualitative method and finalized the finding as systematic review.

### Results

In this section, we describe our findings from the reviewed articles. In table 1, we explain the characteristics of the articles included in our study. The studies were from 2008 to 2015, among which 75% were cohort and 25% were cross-sectional.

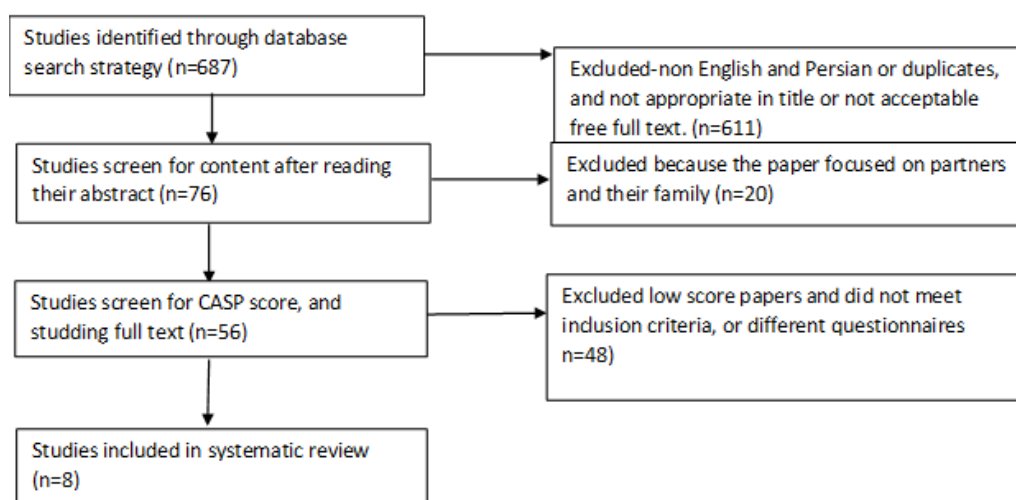


Fig 1. Flowchart of papers selected to be included in this systematic review

**TABLE -1:** Characteristic of included study in this systematic review

Studies	Year	Country	Type of study	Measurement tools	Sample size	Age	Cancer type	Cancer treatment	qualification
Ran Ding et al. (Ding et al., 2013),	2012	China	Cohort	FACT-CX	106	43.51+/-7.27	Cervical cancer	Surgery	Moderate
Andrea Floyd et al. (Floyd et al., 2011),	2010	USA	Cross sectional	SOC -29 item FACT-L	56	64+/-9.12	Lung cancer	Surgery	high
Brindha Pillay et al. (Pillay et al., 2015),	2013	ASTRALIA	Cohort	Questionnaires	60	51.13+/-12.47	Haematological cancer	Stem cell transplant	moderate
Michiyo Mizuno et al. (Mizuno et al., 2009),	2008	Japan	Cross sectional	SOC-29 item , QOL-26	60	66.2+/-10.9	Digestive system cancer	Surgery	moderate
Camelia Rohani et al. (Rohani, Abedi, Omranipour, et al., 2015),	2015	Iran	Cohort	SOC-13,QOL(0-100)	372	Breast cancer group:46.1+/-9.8 ,Control group:46.6+/-8.4	Breast cancer	Surgery+ Chemotherapy+ radiotherapy	Moderate
Camelia Rohani et al. (Rohani, Abedi, Sundberg, et al., 2015),	2015	Iran	Cohort	SOC-13, EORTC-QOQ C30	162	46.1+/-9.8	Breast cancer	Surgery+ Chemotherapy+ radiotherapy	moderate
Vera Gerasimcik-pulko et al. (Gerasimcik-Pulko et al., 2009) .Lithuani,2008	2008	Lithuania	Cohort	SOC-13,EORTC-QOQ-C30	100	56.6	Breast cancer	Surgery	low
Elisabeth Kenne Sarenmalm et al. (Sarenmalm et al., 2013),Sweden,2011	2011	Sweden	Cohort	SOC-13,EORTC-QOQ-C30	56	Primary breast cancer:65,recurrent breast cancer:65	Breast cancer	Surgery+ Chemotherapy+ radiotherapy	moderate

The ages of patients in the study were different but in 37.5% of studies, patients were older than 18 years old. In all studies, if the patients could not be co-operative, the articles would be excluded. About the type of SOC questionnaires, in 37.5% of the studies, 29 items were used and in 62.5% of them, 13 items were used, and about the QOL questionnaires, 37.5% were used. Functional Assessment of Cancer Therapy for General (FACT-G), 50 % European Organization for Research and Treatment of Cancer (EORTC), the Core quality of life questionnaire (QLQ C30), and 12.5% of WHO QOL 100 were employed. The sample size ranges between 56-210 and the total participants were 1047 patients in this systematic review. The

range of age of patients was between 24 to 84 years old. Regarding the type of cancer, 50% of studies conducted on breast cancer patients and the rest with lung cancer, cervical cancer, digestive system cancer, and hematopoietic system cancer, each one 12.5%. The method of treatment in 87.5% of the studies was surgery and 25% of whole was chemotherapy. In addition, 12.5 % of the studies had low qualification, 12.5% had high, and 75% had a moderate qualification.

#### **QOL and SOC general Aspect**

In the studies of Ran Ding ( $r^2=0.554$ ), Michiyo Mizuno ( $r=0.61$ ,  $p<0.01$ ), Camelia Rohani ( $B=0.5$   $p<0.001$ ), and Elisabeth Kenne Sarenmalm ( $r=0.3$ ,  $p=<0.01$ ), there was a significant correlation

**Table 2.** Inclusion and Exclusion criteria of the study

Studies	Inclusion criteria	Exclusion criteria
Ran Ding et al. (Ding et al., 2013),china,2012	were fully informed about the cervical cancer diagnosis /had decided on treatment and follow-up in 1 of the 2 hospitals for at least 9 months/ had no cognitive dysfunction /no concurrent cancer	
Andrea Floyd et al. (Floyd et al., 2011),USA,2010	male and female lung cancer patients were recruited from a regional cancer center, as well as from two local physicians And a newspaper advertisement. Age $\geq 18$ ,stage 1-4 lung cancer diagnosis within the past five years, and being both English speaking and literate	history of psychiatric hospitalization, endorsement Of alcohol abuse or dependence within the past two months, or having concurrent medical condition likely to influence short-term (i.e. six-month) survival.
Brindha Pillay et al. (Pillay et al., 2015),Astralia,2013	patients undergoing an allogeneic or autologous bone marrow or peripheral blood stem cell transplant as treatment for a Hematological malignancy at The Alfred Hospital. Age $\geq 18$ Able to speak and read English.	patient deemed by the treating team as too sick to engage with the researcher
Michiyo Mizuno et al. (Mizuno et al., 2009) ,Japan,2008	who had been newly diagnosed with gastrointestinal tract Cancer and had undergone surgery in one of five general hospitals in Japan over a four-month period. Aged at least 20 years, aware that they had cancer.	Have psychiatric disorder.
Camelia Rohani et al. (Rohani, Abedi, Omranipour, et al., 2015),Iran,2015	having sufficient knowledge of the Persian language to answer /breast cancer the questionnaires and no previous cancer history	
Camelia Rohani et al. (Rohani, Abedi, Sundberg, et al., 2015) ,iran,2015	women suspected of breast cancer, with an operable lump or Other symptoms in the breast, were recruited from the surgical wards at two hospitals in Tehran belonging to the Tehran university of medical sciences. Breast cancer diagnosis was confirmed with a quick pathology report during surgery	
Vera Gerasimcik-pulko et al. (Gerasimčik-Pulko et al., 2009),Lithuani,2008	female patient with T1-T2/N0-N1/M0 stages of breast cancer	no breast cancer, language problems, unwillingness to participate
Elisabeth Kenne Sarenmalm et al. (Sarenmalm et al., 2013)Sweden,2011		serious coexisting medical conditions ,a limited life expectancy due to advanced illness or cognitive impairment

between QOL and SOC (Ding et al., 2013).

### Dimension of QOL and SOC

In the studies of Andrea Floyd ( $r=0.61$ ,  $p<0.01$ )

a significant correlation between the physical dimension of QOL and SOC.

In the studies of Brindha Pillay ( $r=0.39$ ,  $p<0.01$ ) and

**Table 3.** Results of included study in this systematic review

Studies	SOC mean	QOL mean	Results
Ran Ding et al. (Ding et al., 2013)	59.01+/-11.52	120.30(17.92)- 126.22(16.84)	$P=0.001$ $R^2=0.554(T1)$ Adjusted $R^2$ T1=0.422 T2=0.186 T3=0.137
Andrea Floyd et al. (Floyd et al., 2011)	145.23+/-25.04		Regression Test {SOC and FACT-L physical $r=0.55$ , $p<0.01$ Regression Test {SOC and FACT-L Functional $r=0.61$ , $p<0.01$ Sobel Test {SOC and FACT-L physical sobel test statistic=2.74, $p<0.01$ Sobel Test {SOC and FACT-L Functional sobel test statistic=3.45, $p<0.01$
Brindha Pillay et al. (Pillay et al., 2015)	149.85+/-20.31	50(+/-)10	SOC as a predictor of social wellbeing (SWB), emotional wellbeing (EWB), functional wellbeing (FWB) at follow up after covarying for Physical wellbeing (PWB) 2-3 week post-transplant-----3months post-transplant SWB: $B=0.39$ , $P=0.01$ → $B=0.40$ , $P=0.01$ EWB: $B=0.48$ , $P<0.001$ → $B=0.44$ , $P<0.001$ FWB: $B=0.32$ , $P=0.03$ → $B=0.30$ , $P=0.01$
Michiyo Mizuno et al. (Mizuno et al., 2009)			Who QOL-26 was strongly correlated with the soc → $r=0.61$ Multiple regression analysis using QOL as the dependent variable → $B=0.47$ , $p<0.001$
Camelia Rohani et al. (Rohani, Abedi, Sundberg, et al., 2015)	breast cancer group: $T1=67.2(11.3)$ $p=0.000$ → $T2=63.1(13.4)$ $p=0.001$ ( $p=0.000$ ) control group: $T1=61.9(14)$ → $T2=62.9(13.4)$ $p=0.17$	breast cancer group: $T1=58.1(20.1)$ $p=0.000$ → $T2=68.7(18.5)$ $p=0.053$ ( $p=0.000$ ) control group: $T1=70.1(21.6)$ → $T2=72.4(18)$ $p=0.09$	group time → QOL=12.5 SOC=17.3 SOC----- $B=0.5$ $R^2=0.33$ statistical changes over time (p-value) $T1$ → $T2$ → QOL=0.000 SOC=0.000 Adjusted mean differences between groups over time $T1$ → $T2=QOL=+8.2$ SOC=-6.5
Camelia Rohani et al. (Rohani, Abedi, Sundberg, et al., 2015)	63.1+/-13.4		the degree of soc totally mediated variation of the patients ratings of global quality of life ( $p<0.001$ ) as well as CF and SF ( $p<0.05$ ) scales scores of the EORTC QLQ-c30 from $T1$ to $T2$ for the remaining variables, the degree of SOC indicates a partially mediating role: EF ( $p<0.01$ ), FA ( $p<0.05$ ), FI ( $p<0.05$ ), HI ( $p<0.001$ ) and MCS ( $p<0.001$ ) CF: cognitive SF: social EF: emotional FA: Fatigue FI: Financial difficulties, MCS: mental component summary
Vera Gerasimcik-pulko et al. (Gerasimcik-Pulko et al., 2009)			
Elisabeth Kenne Sarenmalm et al. (Sarenmalm et al., 2013)	Primay breast cancer=71.8+/-12.1 Woman with recurrence=70.3 +/-11.8	Primary breast cancer=5(+/-1.5) Recurrent breast cancer=4.9(1.5)	$r=0.303$ , $p<=0.01$

and Brindha Pillay ( $r=0.3$ ,  $p<0.01$ ), they reported a significant association between SOC and functional dimensions of QOL.

In the studies of Andrea Floyd ( $r=0.55$ ,  $p<0.01$ ) and Vera Gerasimcik pulko ( $p<0.025$ ), they found

Vera Gerasimcik pulko ( $P=0.002$ ), the researchers reported a significant association between SOC and social dimensions of QOL.

In the studies of Brindha Pillay ( $r=0.48$ ,  $p<0.001$ ), Camelia Rohani ( $p<0.01$ ), and Vera Gerasimcik

pulko ( $p=0.011$ ), the results show a significant correlation between the emotional dimensions of QOL and SOC.

Age at the time of diagnosis is a confounding variable that was controlled in the studies of Andrea Floyd, Michiyo Mizuno, Camelia Rohani, Vera Gerasmcik pulko, and Elisabeth Kenne Sarenmalm. Also, the cancer stage is another confounder which was controlled in the studies of Andrea Floyd, Camelia Rohani, and Vera Elisabeth Kenne Sarenmalm. The existence of comorbidity is another confounder that was controlled in the studies of Camelia Rohani and Elisabeth Kenne Sarenmalm.

FACT-L (Functional Assessment of Cancer Therapy-Lung)

### Discussion

To our knowledge, this paper is the first systematic review on the correlation between SOC and QOL in cancer patients. Ding et al. found a meaningful association between SOC and QOL in that above half of the QOL variance was explained by the changes of SOC; however, the results of the regression analysis of confounding variables, such as age, sex, stage of cancer, and type of treatment, show the various degree of QOL change due to these variables, so that less than half of QOL variance was explained by SOC. When we reevaluated this association between QOL and SOC in the next stages, the degree of this association showed a significant decrease, which in multivariable models can be explained by the effect of confounding variables. Also, this decrease in the association can be the result of a change in the stage of cancer and treatment, although timing and chronicity can decrease the SOC in cancer patients. In the study of Floyd et al., a weaker association between SOC and QOL was found, 39% vs 55%. It can be due to differences between the samples of the two studies and the sex of subjects. They stated that depression was the most effective variable in the relationship between SOC and QOL, i.e. more

than physical well-being and functional well-being. Also, depression was the only factor that was the statistically significant probable mediator of the correlation between SOC and QOL. SOC can influence coping with depression that subsequently influences QOL. There is a bidirectional correlation between these variables. SOC has a negative correlation with depression. SOC and QOL are associated positively and may be mediated by depressive symptoms. SOC can be a protective factor that can adjust psychological dimensions and have an effect on QOL in cancer survivors.

The study of Brindha Pillay noted that patients with lower SOC experienced more depressed mood, less coping, and more symptoms than those with higher SOC, and patients' SOC before the transplantation is an important factor that can influence the level of depression, anxiety, and QOL in the acute transplantation period. It may be because of problems and complications of transplantation increase that leads to a decrease in the effect of SOC on QOL.

Maybe any of the association of SOC and QOL in their study was related to the time of evaluation of the patients, which was after the surgery, because they feel that an invasive procedure like surgery may cure them completely, so both QOL and SOC improve distinctly and make a stronger association between them. Also, it is possible that questioner EORTC of QOL is effective in these results.

Rohani et al. investigated the relationship between SOC and QOL six months after diagnosis of cancer, which was about 0.33 lower than the previous studies. Their results showed that even after the elimination of confounder variables, such as level of QOL prediagnosis, there was a positive association between SOC and QOL six months after diagnosis, which was a little lower than the studies with low timing. Meanwhile, they suggest that time can be a confounding variable.

Pulko et al. evaluated the condition of QOL between three groups with low, moderate, and high levels of SOC. The patients with a high level of SOC had

better QOL in comparison with moderate and low SOC. They agreed that SOC is connected with the side effects of treatment. In this paper, the reason for better QOL in patients with high SOC is that they can cope better with the stresses of cancer diagnosis and methods of treatment. They found that strong SOC is associated with lower distress and its idea supported Antonovsky's theory.

Heincsh et al. showed that women with strong SOC reported less fatigue, lower symptom burden, and higher QOL. Women with weak-normal SOC were more likely to drop out from the OptiTrain study and tended to have slightly poorer exercise session attendance. Women with breast cancer and weaker SOC benefitted as much from the exercise intervention, which is favorable with our results.

Kenne et al. concluded that although there was a correlation between SOC and QOL, its correlation coefficient was 0.303 and when we examined the coefficient of determinants, we found less association between SOL and QOL in comparison with other studies. The reason for this difference could be the conditions of their study.

At the end, overall result of different studies showed that there is a meaningful and strong association between SOC and QOL (on the basis of COHEN criteria), but different studies showed different level of association, which is under the effect of population, type of cancer, stage of cancer, recurrence, timing, culture, gender, age, and questionnaires. Although in this systematic review, the authors of the study attempted to use the studies with the same measurement tools, there were two questionnaires for QOL and one questionnaire in two types for SOC, one with 13 items and one with 29 items. And perhaps these differences have caused different results. In the two questionnaires used for QOL, the types of items were different. In EORTC C30, the items were mostly about objective components of QOL, while in WHO HRQOL QOO, more emphasis of the items was on the inter-personal relationships, the satisfaction of daily activities, self-

concept, and overall subjective determines.

Also, all these studies showed that passing the time decreases the association between SOC and QOL. It may be because of the feeling of being nondurable, complications of the disease, and the treatment that may decrease the effect of SOC on QOL. But in the study of Rohani et al., the low levels of physical, cognitive, social functions, and biological signs by timing were measured, but global QOL improved. However, we should know that it may be correlated with the type of cancer, for example, breast cancer is more curable.

### Conclusion

This study showed that there is a moderate correlation between SOC and QOL, i.e. higher SOC makes higher QOL. But both SOC and QOL, directly and indirectly, are affected by other variables such as type of cancer, stage of cancer, recurrence, timing, culture, sex, and age. Because of the importance of QOL and its strong relationship with SOC, promoting the ability of SOC is important, so it is recommended that in future studies, we should study the effective factors in promoting SOC as a personal factor.

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