

Sense of coherence and coping strategies: How they influence quality of life in Iranian women with breast cancer

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Abstract

Aim: To investigate the mediation/moderation effect between Coping Behaviors (CBs) and Sense of Coherence (SOC) in the prediction of health-related quality of life (HRQoL) in breast cancer patients.

Design: Cross-sectional.

Methods: A total of 221 patients were included in this study. The 13-item Orientation to Life Questionnaire, Brief COPE and Functional Assessment of Cancer Therapy–Breast were investigated. Pearson's correlation coefficient and mediation/moderation analysis were performed.

Results: Significant correlations were observed for SOC, active coping, acceptance, positive reframing (PR), planning, use of emotional support (UES), use of instrumental support, behaviour disengagement and self-blame with HRQoL. Except for planning and acceptance, SOC partially mediated the CBs' effect on HRQoL. The UES and PR's effects on HRQoL were significant at lower SOC levels and diminished at higher SOC levels.

Conclusion: Practitioners can incorporate SOC and adaptive CBs, including PR and UES, into the rehabilitation programmes to improve HRQoL in patients.

KEYWORDS

breast cancer, coping, quality of life, sense of coherence

1 | INTRODUCTION

Breast cancer is the most common cancer in women worldwide, accounting for the highest number of cancer-related deaths among them. In 2018, nearly 2 million new breast cancer cases were diagnosed, and around 627,000 women died from it (World Health Organization [WHO], n.d.). Despite its increasing incidence globally, advanced medical therapies and early screenings in the last decades lead to a decrease in mortality rates. Due to its relatively good prognosis, it ranks fifth as the cause of death among cancers, even

though it is the most common (Ferlay et al., 2015). Among Iranian women, breast cancer is also the most prevalent cancer with even a lower mean age at the time of diagnosis in comparison to developed countries (Akbari et al., 2017). Being diagnosed with breast cancer is a distressing event that impacts a patient's physical, psychological and social functioning. Treatment-related side effects like fatigue, nausea and pain and a patient's self-image after surgeries affecting women's physical appearance can affect their lifestyle and social interactions (Daryaafzoon et al., 2020; Luoma & Hakamies-Blomqvist, 2004). Therefore, the concept of Health-related Quality

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of life (HRQoL) in patients living with breast cancer and the late effects resulting from the disease or its treatment is considered highly relevant (Montazeri, 2008).

Health-Related Quality of Life (HRQoL) is a multidimensional, dynamic concept with physical, psychological and social components (Ashing-Giwa & Lim, 2010; Zamanian et al., 2020). It defines an individual's general perception of his/her physical and mental health by focusing on a disease and its treatment effects on other aspects of life, considering other factors like income and freedom that are generally not regarded as health (Guyatt et al., 1993; Zamanian et al., 2015). In cancer research, HRQoL is an important outcome being used in clinical decision-making, treatment and management of symptoms, supportive care interventions and prognosis (Ashing-Giwa & Lim, 2010). Individual differences in being equipped with various types and levels of psychological resources and behavioural responses can determine their HRQoL. Sense of Coherence (SOC) and Coping strategies are two well-known factors in this respect (El Haidari et al., 2020; Eriksson et al., 2007). While SOC positively contributes to HRQoL (Antonovsky, 1993; Flensburg-Madsen et al., 2005), different coping behaviours show positive and negative effects on HRQoL (Carver, 1997; El Haidari et al., 2020).

SOC is a theoretical concept declared by Antonovsky in 1979 to explain why some people under stress become ill and some not. SOC is a core concept of the Salutogenic model of health that emphasizes on origins of health and well-being rather than factors causing disease (Super et al., 2015). It is defined as an individual's global view of life and an inner resource for coping with stressful life events. It has three main elements: comprehensibility, manageability and meaningfulness. Comprehensibility, the cognitive component, is the extent to which a person perceives events being understandable, predictable, transparent and structured. Manageability, the behavioural component, represents the extent of the belief that a person can cope and solve problems and the availability of resources to manage the situation. Meaningfulness, the motivational component, is how much a challenge is worthy of engagement and how much one feels life makes sense (Geyer, 1997). Antonovsky believed that SOC remains relatively stable after the third decade of life. Some studies confirmed SOC as a relatively stable entity (Schnyder et al., 2000). However, subsequent empirical studies showed that SOC increases with age (Eriksson & Mittelmark, 2017), but to a lesser degree in older adults (Feldt et al., 2007), and that interventions can have influences on SOC as well (Forsberg et al., 2010; Skodova & Lajciakova, 2013; Vastamaki et al., 2009).

It seems that SOC is a health-benefiting factor, supporting people's subjective feeling of health and well-being (Eriksson et al., 2007). The influence of SOC can also be seen in other aspects of life. For example, when involving parents in their children's healthcare decisions, promoting their SOC can strengthen their ability to cope with their parental role in the hospital (Aarthun et al., 2018). Those with lower SOC are more vulnerable to difficulties in life (Wainwright et al., 2007), reduced mental health and quality of life (Eriksson et al., 2007); however, SOC's predictive power on physical health remains debatable (Brink, 2012; Endler et al., 2008; Flensburg-Madsen

et al., 2005). It has been assumed that SOC mainly connects to health through flexible and adaptive coping resources (Antonovsky, 1987).

Coping is a complex response broadly described as the cognitions and behaviours people use to remove a source of stress from their environment or alleviate its adverse effects (Mitchell et al., 1983). The psychological coping mechanisms are commonly termed as coping strategies, skills or behaviours. Carver defined 14 conceptually distinct coping behaviours and incorporated them into one scale (Carver et al., 1989).

2 | BACKGROUND

There are some previous studies about SOC, CBs and HRQoL among breast cancer women in Iran. Rohani et al. (2015) found that the degree of SOC and baseline ratings of several dimensions of HRQoL were the most important predictors of HRQoL changes 6 months later. Then in another study, they explored SOC as a mediator between HRQoL dimensions before the final diagnosis and the same dimensions at the 6-month follow-up within a sample of women with breast cancer (Rohani et al., 2015). The association of coping strategies on general QOL and pain in Iranian women with breast cancer was studied in another research (Khalili et al., 2013). In a meta-analysis done in Iran, they identified seven different psychological consequences of breast cancer. Among them, low quality of life ranked 3rd, and undesirable emotional, adaptive strategies in coping strategies were the fifth (Refaee Saeedi et al., 2019). A systematic review revealed that emotion-focused behaviours and seeking social support were the main coping strategies used by Iranian women with breast cancer, especially in the early diagnosis phase (Mehrabi et al., 2015). According to another study in Iran, using spiritual coping and positive religious coping strategies may play a vital role in the adjustment process (Khodaveirdyzadeh et al., 2016) and HRQoL (Zamanian et al., 2015) in Iranian breast cancer patients.

Some studies have investigated SOC and Coping in mediation and moderation analysis. In this research line, the interplay between SOC and Coping as two categories of psychosocial resources in alleviating stressful situations is investigated. A variable is considered a mediator when it carries an effect, in a way that an independent variable (IV) leads to some kind of change to the mediator variable, which then leads to a change in the dependent variable (DV); in other words, the relationship between IV and DV is partially or completely indirect through the mediator. Nonetheless, a moderating variable affects the magnitude or direction between two variables, which can be enhancing, buffering or antagonistic (Hayes, 2009, 2017). Thus, depending on this interaction, SOC and Coping might have a constitutive role as a mediator or a conditioning role as a moderator.

For instance, Mitonga-Monga and Mayer (2020) have recently examined the moderating effect of Coping between SOC and burnout and Work Engagement in a manufacturing organization in Congo. They found out that Coping related positively with SOC, while SOC and Work Engagement related negatively with burnout, and Coping acted as a moderator in the relationships

between variables (Mitonga-Monga & Mayer, 2020). In another study, Coping has been found as a mediator between SOC and mental QoL in patients with long-term illnesses (Kristofferzon et al., 2018). Calandri et al. (2017) studied the SOC's mediating role between coping strategies and adjustment (HRQoL, depression, affective well-being) in multiple sclerosis patients. Higher SOC was associated with higher mental health, higher affective well-being, and lower depression, and the mediation effect of SOC between coping strategies and mental health was significant for avoidance but not for problem-solving. Besides, no relationship was found between Coping, SOC and the physical component of the HRQoL (Calandri et al., 2017).

To the best of our knowledge, there are limited studies on the interaction between CBs and SOC among breast cancer patients, and studies investigating the potential mediating or moderating role of SOC and its interaction with CBs and disease parameters in the formation of cancer patients' HRQoL are entirely lacking. Thus, this study aims to investigate the interplay between CBs and SOC in Iranian breast cancer patients and their possible mediation and moderation effect and explore their role as predictors of health-related quality of life.

3 | METHODS

3.1 | Design

A descriptive and analytical cross-sectional design was used in this study.

3.2 | Method

In this study, participants were outpatient women with breast cancer recruited from three cancer centres in Tehran, Iran, from October 2014–May 2015 via convenience sampling method. Participants were mostly patients visiting the mentioned clinics for their regular follow-up visits ensuing surgery and during or after chemotherapy and radiotherapy sessions. Some participants were recruited from the clinics' breast rehabilitation unit, being there cause of lymphedema. The inclusion criteria were women aged 18 and above with a pathologically confirmed diagnosis of any breast cancer staging one to four, at least 1-week history of diagnosis and the ability to communicate in Persian/Farsi. Patients with a history of cognitive impairments for any reason, metastasis disease, a history of hospitalization, confirmed diagnosis for any psychiatric disorder, having a significant stressor in life during the last 6 months like divorce and death of a family member were excluded from this study. Data were collected via interviewer-administered method implemented by trained interviewers educating in psychology at masters and Ph.D. levels. The interviewers were closely supervised and debriefed during the data collection period and adhered to an interview protocol designed by the lead author. This strategy could help to reduce the

information bias since a standard assessment procedure was applied for each of the participants.

3.3 | Analysis

Descriptive statistics using frequency, percentage, mean and standard deviation (*SD*) were reported. Pearson's correlation coefficient was used to assess zero-order correlations. The coping strategies showing non-significant associations with either HRQoL or SoC or both were eliminated from further analysis. The initial regression analysis confirmed the assumption of homoscedasticity (p for the Koenker's test $<.05$). Mediation and moderation analysis was performed via conditional process modelling in PROCESS macro version 3.5 for SPSS (Hayes, 2017). The pick-a-point technic was used to identify if the effect of coping strategies on HRQoL varies with SoC in 16th, 50th and 84th percentiles. The Neyman–Johnson (NJ) procedure was also used to pinpoint the turning point(s) where slopes may significantly change and identify the subsamples' percentage showing a difference (Hayes, 2017). The mediation/moderation analysis investigated SOC and Coping in both the independent variable (IV) and mediator/mediator roles in predicting HRQoL as the outcome. Covariate variables were selected based on the literature and the statistical inference. A backward stepwise regression analysis (entry $p = .10$ and removal $p = .20$) indicated the social participation frequency, employment status, patient's education, age, self-reported patient's major psychological problems, hospitalization and history of mastectomy surgery were included as significant predictors of HRQoL ($p < .20$).

3.4 | Ethics

The Ethics Committee of Tehran University of Medical Sciences ethically approved the current study. The interviewers applied a standard procedure to describe the study purpose and the participants' rights, including the voluntary nature of their engagement, confidentiality and the right to terminate their participation in any stage without providing any reason. Their confidentiality was assured through coding participants, and the questionnaires and analyses were performed anonymously. All participants provided verbal informed consent.

3.5 | Instruments

The 13-item Orientation to Life Questionnaire (OLQ-13) was used to assess SOC, the shortened version of the SOC-29, developed by Antonovsky (1987). It measures the three main related components of SOC, comprehensibility (5 items), meaningfulness (4 items) and manageability (4 items) (Antonovsky, 1993). Each item is scored on a semantic scale of 1–7 points, giving a total score ranging from 13–91. This scale is cross-culturally valid and reliable, used in many languages and different populations (Eriksson & Mittelmark, 2017). The current study employed the previously validated Persian/Farsi version in the Iranian population (Rohani et al., 2010).

The Brief COPE (Coping Orientation to Problems Experienced) is a shortened version of the COPE inventory (60-item), developed by Carver (Carver, 1997) to reduce the limitations in regards to its length and participant response burden. It is a 28-item scale, measuring 14 two-item coping strategies used in response to stressors. Each item is rated on a four-point Likert scale from 1 = "I have not been doing this at all"-4 = "I have been doing a lot of this." Thus, the score for each scale ranges from 2-8. The 14 subscales comprise self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion and self-blame. The Persian version of Brief COPE was used previously as a valid and reliable scale in Iranian veterans (Aflakseir, 2010) and spouses of patients under haemodialysis (Ashktorab et al., 2017).

To assess multidimensional health-related quality of life (HRQoL), the widely used, valid and reliable Functional Assessment of Cancer Therapy-Breast (FACT-B) scale was used. The instrument has been previously validated in Iranian women with breast cancer (Pato et al., 2015). The FACT-B is a 36-item questionnaire consisting of five subscales. The first four subscales, including physical well-being (seven items), social/family well-being (seven items), emotional well-being (six items) and functional well-being (seven items), all together form the FACT-General (FACT-G), and the fifth is breast cancer-specific subscale (BSC) containing nine items. Each item is rated on a 5-point Likert scale. The sum of all five subscales gives us the FACT-B total score, ranging from 0-144; the higher the total score, the better the HRQoL (Brady et al., 1997).

4 | RESULTS

4.1 | Sample characteristics

A number of 256 participants were screened for inclusion and exclusion criteria, 224 of whom were surveyed as eligible patients (response rate = 87.5%). However, one patient terminated her

TABLE 1 Sample characteristics (N = 221)

	N (%)	
Patient's age, mean (standard deviation)	47.14 (9.13)	
Social participation frequency, mean (standard deviation)	0.90 (1.44)	
Time since diagnosis, mean (standard deviation)	18.31 (15.05)	
Patient's education		
=>Diploma	42	19.0
<Diploma	179	81.0
Employment status		
Unemployed	184	83.3
Employed	37	16.7
Insurance status		
Yes	201	91.0
No	20	9.0
Hospitalization		
No	121	54.8
Yes	100	45.2
Patient's history of major psychological problem		
No	168	76.0
Yes	53	24.0
History of mastectomy surgery		
No surgery	67	30.3
Partial mastectomy	78	35.3
Total mastectomy	76	34.4

participation, which resulted in 223 as the final sample size. The coping questionnaire was not filled for two participants, who were excluded from the current study. Thus, a total number of 221 data were included in the analysis. The valid N might vary from 219-221 in mediation analysis due to missing data in some coping strategy variables. The demographic properties and clinical characteristics

TABLE 2 Pearson's correlation matrix between study variables (N = 223-219)

	FACT-B	SD	AC	Acc	H	CR	PR
Variables	Mean (SD)	2.84 (0.89)	2.82 (0.83)	0.49 (0.25)	0.52 (0.23)	0.49 (0.22)	2.70 (0.93)
FACT-B	90.32 (20.07)	0.11	0.23**	0.25**	0.10	0.10	0.33***
SOC	57.80 (13.47)	0.43***	0.16*	0.20**	0.16*	0.12	0.23**
		.121	.001	.123	.129		
		.021	.003	.018	.496	.086	.001

Note: The lower scripts indicate exact p-values.

Two to four missing data for coping strategies.

Abbreviations: AC, active coping; Acc., acceptance; BD, behavioural disengagement; CR, cope religion; D, denial; FACT-B, Functional Assessment of Cancer Therapy-Breast cancer; H, humour; PR, positive reframing; SB, self-blame; SD, self-distraction; SOC, sense of coherence; SU, substance use; UES, use of emotional support; UIS, use of instrumental support; V, venting.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

are reported in Table 1. The mean (SD) age of the sample was 47.14 (9.13) years. On average, 18.31 (15.05) weeks passed their diagnosis of cancer. The sample mostly had low education levels, and the majority of them received total or partial mastectomy surgery ($N = 154$, 69.7%).

4.2 | Correlational analysis

Table 2 reports the zero-order correlations between the study variables. SOC showed a moderately significant association with HRQoL ($r = .43$, $p < .001$). Notably, humour, cope religion, substance use and denial showed non-significant associations with both SoC and HRQoL ($p > .05$). Venting also showed non-significant association with FACT-B ($p = .060$). Thus, only active coping, acceptance, positive reframing, planning, use of emotional support, use of instrumental support, behaviour disengagement and self-blame were included in further analysis.

4.3 | Mediation analysis

Table 3 shows the results of the mediation analysis. Where SOC was set to be IV, only the use of emotional support and positive reframing showed some weak partial mediating role towards HRQoL. However, SOC could partially mediate the relationship between all the coping strategies and HRQoL. Planning (95% CI = [-0.01, 0.096]) and acceptance (95% CI = [-0.005, 0.085]) coping did not show any significant indirect effect.

4.4 | Moderation analysis

Table 4 shows the results of moderation analysis for significant interaction terms. SoC moderated the relationship of use of emotional support ($p = .062$) and positive reframing ($p = .010$) to HRQoL. In

terms of the use of emotional support, the NJ procedure indicated SOC = 63.24 to be the turning point, where 60.91% ($N = 134$) of the sample showed a positively significant yet decreasing effect on HRQoL. In terms of positive reframing, the SoC = 67.248 was identified as the turning point, where 70.78% ($N = 155$) of the sample showed a positively significant yet decreasing effect on HRQoL. As Figure 1 illustrates, as SoC increased, the effect of both coping strategies on HRQoL decreased in magnitude and significance level.

The moderation analysis was repeated to see how the two coping strategies could affect the relationship between SOC and QOL. In both models, it was revealed that the higher use of emotional support and positive reframing, the lower the effect of SOC on HRQoL in magnitude and significance level. Although non-significantly, these patterns were true for the effects of the other CBs, which decreased as a result of higher SOC.

5 | DISCUSSION

The purpose of the current study was to empirically examine the interplay of mediating and moderating roles of SOC and CBs in connection with HRQoL in women with breast cancer. Among CBs, humour, cope religion, substance use, denial and venting did not have a predictive role on HRQoL in breast cancer patients and no significant association with SOC.

Regarding mediation, the current results demonstrated that various CBs could affect HRQoL through SOC. Specifically, SOC carries the effects of Active Coping, Use of Emotional Support, Use of Instrumental Support and Positive Reframing on HRQoL but dampens Self-Blame and Behavioral Disengagement's impacts on HRQoL. Previous studies reported that disengagement coping strategies in cancer patients have been associated with poorer quality of life and more psychological distress (Perczek et al., 2002), and the current findings suggest that higher SOC can alleviate the negative effect of dysfunctional coping strategies. In addition, engagement-oriented strategies like active coping and positive reframing are coupled with

PI	UES	UIS	Bd	SU	D	V	SB
2.80 (0.81)	2.83 (0.87)	2.78 (0.92)	0.51 (0.13)	0.51 (0.10)	0.52 (0.25)	2.39 (0.87)	2.15 (0.97)
0.15*	0.29***	0.22**	-0.18**	-0.05	-0.13	-0.05	-0.22**
.028		.001	.007	.504	.060	.478	.001
0.15*	0.25***	0.20**	-0.24***	0.07	-0.09	-0.14*	-0.29**
.028		.003		.272	.170	.042	

TABLE 3 Mediation analysis of SOC and coping behaviors on FACT-B

Coping	FACT-B as the DV											R ²
	Models 1					Models 2						
	SOC as IV					SOC as the mediator						
	a	b	c'	ab	95% CI	a	b	c'	ab	95% CI		
AC						0.18**	0.36***	0.14*	0.07	[0.02, 0.12]	0.16	
UES	0.20**	0.17**	0.35***	0.03	[0.01, 0.07]	0.19**	0.35***	0.17**	0.07	[0.02, 0.12]	0.16	
UIS						0.19**	0.37***	0.11 _{.074}	0.07	[0.02, 0.12]	0.16	
BD						-0.20**	0.37***	-0.08 _{.217}	-0.07	[-0.13, -0.02]	0.16	
PR	0.23**	0.24***	0.33***	0.05	[0.02, 0.10]	0.20**	0.33***	0.24***	0.07	[0.03, 0.11]	0.16	
SB						0.28***	0.36***	-0.09 _{.159}	-0.10	[-0.16, -0.05]	0.20	

Note: The social participation frequency, employment status, patient's education, age, self-reported patient's major psychological problems, hospitalization, mastectomy surgery were included as covariate variables in the models. Two to four missing data for and three for coping strategies. Abbreviations: a, The IV's effect on the mediator; ab, IV's indirect effect on FACT-B; AC, active coping; Acc., acceptance; b, The mediator's effect on FACT-B; BD, behavioural disengagement; c', IV's direct effect on FACT-B; DV, dependent variable; FACT-B, Functional Assessment of Cancer Therapy–Breast cancer; IV, independent variable; PR, positive reframing; SB, self-blame; SOC, Sense of coherence; UES, use of emotional support; UIS, use of instrumental support.

* $p < .01$.

** $p < .01$.

*** $p < .001$.

TABLE 4 Moderation analysis of SoC in the relationship between coping strategies and FACT-B

	Effect (SE)	p	95% CI	ΔF [df]	p
UES	14.73 (5.93)	.014	[3.03, 26.43]	3.52 [1, 209]	.062
SoC	1.06 (0.30)	.001	[0.47, 1.64]		
Interaction term	-0.19 (0.10)	.062	[-0.38, 0.009]		
PR	19.36 (5.59)	.001	[8.25, 30.29]	6.79 [1, 208]	.010
SoC	1.14 (0.26)	<.001	[0.62, 1.66]		
Interaction term	-0.24 (0.09)	.010	[-0.43, -0.06]		

Note: Bolded p -values denote significant moderating roles.

Abbreviations: FACT-B: Functional Assessment of Cancer Treatment–Breast cancer; PR, positive reframing; SoC, sense of coherence; UES, use of emotional support.

higher HRQoL (Lampic et al., 1994; Yang et al., 2008), and current findings suggest that adaptive strategies partly enhance SOC, resulting in better HRQoL.

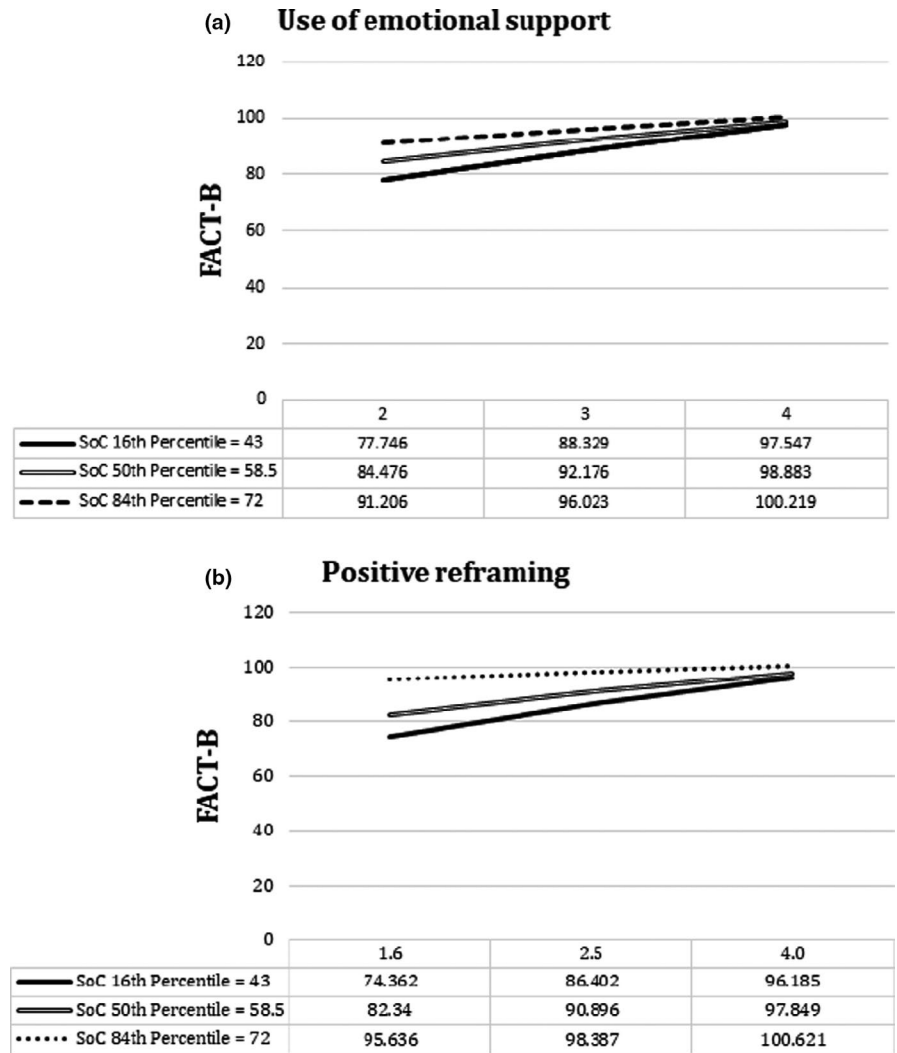
Inversely, when investigating CBs as mediators between SOC and HRQoL, only the Use of Emotional Support and Positive Reframing showed a weak partial mediating role towards HRQoL. Concerning moderation, likewise, the results indicated that SOC only moderates the relationship between Use of Emotional Support and Positive Reframing with HRQoL, not the other CBs. UES's impact on HRQoL is significant at lower SOC levels and diminished for higher values of SOC. Similarly, PR's effect on HRQoL is pronounced at lower SOC levels and subsided for higher levels of SOC. In other words, as SOC increased, the effect of both coping strategies on HRQoL decreased in magnitude and significance level.

The findings concerning PR and UES's effects may be accounted for by the nature of SOC, which is the perception of life being

comprehensible, meaningful and manageable. It may be likely that considering positive aspects of a distressing, daunting event would make it more manageable and that PR could make them more meaningful. Park et al., in a study, concluded that cancer survivors used PR as a way to make meaning from their cancer experience (Park et al., 2008); thus, one might suggest that PR may enhance the relationship between SOC and HRQoL, but the effect of PR was only found significant when SOC was lower. As SOC had a partially enhancing mediator role between PR and HRQoL, it may be suggested that PR and SOC may act as different sources of meaning-based resilience. In other words, those with already strong SOC do not use PR as a coping behaviour much since they already approach their situation *coherently*, which in turn rewards them with better HRQoL.

The same results of PR apply to UES in this study. Meaning the stronger the SOC, the weaker is the effect of UES on HRQoL. It can be speculated that individuals with high SOC levels feel

FIGURE 1 The mediation effect of (a) use of emotional support and (b) positive reframing in the link between sense of coherence (SOC) and quality of life (QOL). The dashed line indicates a non-significant effect



confident enough about their ability to deal with stressful situations, so they do not apply the UES coping strategy. They might not directly seek emotional support from others, indeed. However, this may not be the case in different situations; for example, in a study on the relationship between SOC and coping with stress in parents of children with autism, the SOC level was positively associated with seeking social support (Pisula & Kossakowska, 2010).

When considering the literature, no study investigating the same interactions between SOC and CBs and their effects on HRQoL in breast cancer patients was found. However, they were some related ones. For instance, Laschober et al. examined the mediating effects of coping styles on the relationship between disclosure concerns and HRQoL in HIV-positive individuals. Their findings exhibit the two coping styles, PR and acquiring social support, attenuated the negative relationship between disclosure concerns and HRQoL while the others did not. Even though the sample population was different and the direct variable studied differed from this current study, the outcome and the mediating effect of only these two coping styles were quite interesting. In agreement with the current findings, PR and UES might have different roles and effectiveness compared to other

coping behaviours (Laschober et al., 2019). Yang et al. concluded in their study that engagement coping strategies (active coping, acceptance, seeking support, positive reframing and having a fighting spirit) have a moderating role between stress and mental health QoL and found a mediating role for disengagement coping (denial, distancing) in breast cancer patients (Yang et al., 2008). A very weak mediation role for two coping behaviours, namely PF and UES, was observed. On the one hand, they used stress as the predictor, and on the other hand, their outcome was mental health QoL, but the current study used SOC as the predictor and HRQoL as the outcome.

Some similar findings about the mediating role of SOC between coping and adjustment (HRQoL, depression, affective well-being) has been found in multiple sclerosis patients. Higher SOC is associated with higher mental health, more increased affective well-being, and lower depression. It is noteworthy to highlight that they found no relationship between coping, SOC and the physical component of the HRQoL (Calandri et al., 2017). This discrepancy in results might be due to the different population samples. In line with the current findings, another study tested the longitudinal role of SOC as a mediator of HRQoL before final diagnosis, and ratings of the same dimensions of HRQoL at a 6-month follow-up within women with

breast cancer and confirmed SOC's mediating role (Rohani, Abedi, Sundberg, et al., 2015).

In sum, the moderation analysis indicated the higher the SOC, the lower the effect of CBs on HRQoL, which was significant only for the use of emotional support and positive reframing. However, SOC was shown to be the mediator of the effects of CBs. These findings suggest some differences in the underpinning mechanism of the effects of SOC versus CBs on HRQoL, at least in breast cancer patients.

5.1 | Limitations

There are some limitations to the presented study. The cross-sectional design may not be able to find out about the stability of SOC and whether the relationship between CBs and SOC remains the same during time. Further longitudinal studies can reveal the direction of the effects as well. Besides, the sample was recruited from Iran's capital, which impeded us from generalizing the study results to the whole population. More importantly, the study sample was recruited using a convenience sampling method, which relies on volunteer patients. Although multiple centres were targeted to approach the study population to reduce the selection bias, this sampling method might impose the risk of a non-representative sample. Therefore, the external validity of the study findings is constrained. Nonetheless, the study results are restricted by the sample's demographic properties, who were mainly less educated and of lower socioeconomic status. More importantly, the female gender might affect the results as well, as some studies suggested there is a gender difference concerning the effect of SOC on health status (Carmel et al., 1991). Thus, the findings should be interpreted with reasonable cautions, and further studies may investigate the possible gender effect in these relationships.

6 | CONCLUSION

This current study provides a new contribution to the knowledge about CBs predicting HRQoL through SOC by investigating the mediation and moderation roles of SOC and CBs with the same sample and variables. It supports the hypothesis that SOC is the mediator in these relationships and makes some theoretical clarification on SOC's role, promotes the clinical understanding of SOC and provides implications for intervention. SOC can give a beneficial dynamic in coping with stresses caused by diseases like breast cancer. Considering the confirmed mediating role of SOC, it would be helpful that rehabilitation professionals and psychologists working with breast cancer patients focus on the recovery of SOC and its promotion to improve their QoL. Moreover, PR and UES's effect on HRQoL is pronounced at lower SOC levels and subsided for higher SOC levels. Therefore, probably a useful short-term strategy in individuals with lower SOC could be helping them using PR and UES coping strategies more effectively to reach a higher level of HRQoL.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

HZ involved in conceptual design, methodology and supervision. MAT involved in data analysis, initial manuscript and data curation. AMA involved in data interpretation and write-up. MD involved in conceptual design and data collection management. BT, SR and AE involved in data collection and data entry. All authors reviewed the manuscript and contributed intellectually. The final manuscript was approved by all authors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request. The authors are aware of and authorize the availability/accessibility of data.

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