Quality of Life of Colorectal Cancer Survivors: Gender Differences in Inner Strength and Multiple Identities

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Abstract

Background

This study aimed to investigate the differences in inner strength, multiple identities, and quality of life among colorectal cancer survivors, with a focus on gender. Additionally, the study aimed to identify the factors that influence their quality of life.

Methods

This cross-sectional study included 170 colorectal cancer survivors in Korea. Participants were recruited from an online self-help group for colorectal cancer survivors. Participants were recruited from an online self-help group for survivors of colorectal cancer. Participants were divided into specific groups based on gender for the purpose of examining the differences in study variables, and additional analyses were conducted. The factors influencing their quality of life were identified through multiple regression analysis, without dividing the participants.

Results

The quality of life for male colorectal cancer survivors was higher than that of female survivors. In terms of inner strength, ‘anguish and searching’ was higher in male while ‘connectedness’ was higher in female. Inner strength was found to be the most powerful influencing factor on quality of life, after controlling for age and gender.

Conclusions

This study aimed to determine the significance of inner strength in survivors of colorectal cancer. It enabled a more comprehensive understanding of the quality of life in colorectal cancer survivors by not only focusing on the factors that impact quality of life, but also by examining how these impacts vary based on gender. To improve the quality of life for survivors of colorectal cancer, it is crucial to understand the impact of factors such as gender and inner strength. Additionally, it is crucial to establish personalized interventions that specifically target their unique characteristics. The inner strength plays an important role in improving the quality of life for survivors of colorectal cancer. This study suggests that inner strength is applicable to male cancer survivors and supports the inner strength theory.

Introduction

Colorectal cancer (CRC) is the third most common cancer worldwide, with 1,880,725 out of 19,292,789 newly diagnosed cases in 2020 [1]. The incidence of age-standardized CRC in Korea has increased from
20.6 per 1,000 in 1998 to 28.7 per 1,000 in 2019. The five-year relative survival rate for CRC patients in Korea from 2015 to 2019 was 74.3%. [2, 3].

Quality of life (QOL) is an important consideration for CRC survivors, as they may experience a range of physical, emotional, and social challenges. Factors that can impact QOL include pain, fatigue, sleep disturbances, ostomy-related changes, and psychological problems such as depression and anxiety [4–7]. Other factors that can affect QOL include age, gender, and occupation status [8–10]. Notably, a higher burden of symptoms resulting from CRC treatment corresponds to a lower QOL [11].

When considering gender, the QOL of female survivors generally exhibits a lower trajectory than that of males [12]. Furthermore, gender-specific differences have been identified in the factors influencing the QOL of male and female CRC survivors [13, 14]. Females commonly experience lower QOL concerning physical and sexual aspects, whereas males frequently encounter psychological symptoms like stress, depression, and sexual problems [15, 16]. Resilience is one of the factors that have shown positive associations with the QOL of cancer survivors [17]. Within the context of the growing emphasis on improving the QOL of cancer survivors, the role of inner strength is also emerging as a strategic approach to mitigate negative experiences and drive positive change for enhanced QOL [18, 19].

Inner strength is defined as an individual's ability to overcome adversity and promote their own well-being during life-altering events [20]. Previous study has primarily explored the concept of inner strength within the context of women's experiences [21]. Roux and colleagues have developed a middle-range theory of inner strength through conceptual analysis and meta-synthesis, specifically focusing on qualitative studies involving women [22]. Inner strength can be explained in two ways: the Northern European paradigm, which focuses on inner strength and successful aging, and the North American paradigm, which focuses on inner strength and health adversities [23]. In the North American paradigm, inner strength comprises dimensions such as "Anguish and Search," "Connectedness," "Engagement," and "Movement," ultimately influencing an individual's quality of life [18, 22, 24]. Studies have demonstrated that inner strength plays a significant role in enhancing the quality of life for patients with breast and lung cancer [19, 25].

While most of the studies on inner strength has focused on women, there have been qualitative findings indicating its relevance to men, despite being primarily developed for women. Smith's study [26] suggests that inner strength, initially explored within the context of women's experiences, is also important for men. However, studies specifically examining inner strength in men are limited, with a few exceptions focusing on aging. Consequently, there is a need for dedicated investigations that explore men's experiences and how inner strength manifests in their lives. Men also encounter similar pressures in their daily lives, underscoring the importance of hearing male patients' perspectives and understanding how their inner strength influences their well-being.

Inner strength is the driving force behind individual change, while multiple identities are the interactions with others that stem from individual behavior [27]. Among the various measures of social identities, multiple identities assess individuals' perception of belongingness to diverse social groups [27]. In a
study conducted with stroke patients, it was found that individuals who had multiple identities before experiencing a stroke reported higher levels of life satisfaction after the stroke occurred [28]. During the transitional period - cancer patients to becoming survivors, these individuals engage in various social group activities with people they can rely on. Maintaining relationships with a spouse or participating in self-help groups positively impacts individuals’ quality of life [29, 30]. It is crucial to examine not only the inner strength that motivates the establishment of relationships with others, but also the multiple identities that reflect the extent of social connections resulting from actions taken.

Therefore, the aim of this study is to assess the inner strength and multiple identities that influence individual behavior and determine their impact on the quality of life in CRC survivors. Additionally, this study will investigate gender differences in inner strength and multiple identities, as well as identify factors that affect quality of life.

Methods

Study design and participants

This study is a cross-sectional descriptive design. Data were collected from June 1 to 30, 2021, from members of an online self-help group community for CRC survivors. Participants’ eligibility was determined by whether they (1) were diagnosed with CRC at least 3 months ago; (2) were over the age of 18; (3) were able to communicate and were not illiterate. The sample size was calculated using the G*Power 3.1.9 program. The sample size of 166 participants was determined with an effect size of 0.5, significance level (α) of 0.05, number of independent variables (5), and statistical power (1-β) of 0.80 for multiple regression analysis and considering a 20% drop-out rate.

Characteristics information

General characteristics of participants were collected from the questionnaire, including demographic and clinical characteristics. Demographic characteristics included age, gender, employment status, religion, and marital status. Clinical characteristics included pathological diagnosis, stage, metastatic status, surgical history, time since diagnosis, presence of ostomy, treatment modality, and comorbidity.

Inner Strength

The Korean version of the Inner Strength Questionnaire (ISQ) was used to measure the inner strength of CRC survivors [24, 31]. The ISQ consists of four subscales and 27 items: anguish and searching, which encompasses the process of transitioning from fear and shock to acceptance during challenging life events; connectedness, which involves fostering supportive relationships with others; engagement, which entails participating in self-determination and embracing life’s possibilities; and movement, which refers to achieving relaxation and balance of both body and mind. All questions in the ISQ use a 5-point rating scale (1 = strongly disagree and 5 = strongly agree). The ISQ total score is computed as the sum of the four subscale scores and has a possible range of 27 to 135 points. Items of the anguish and searching
subscale are reverse scored prior to summing so that higher subscale and total scores indicate greater inner strength [24, 31]. The internal consistency coefficient (Cronbach’s α) of ISQ was 0.87 in this study.

Multiple identities

The measurement of multiple identities was conducted using the Korean version of the Exeter Identity Transition Scales (EXITS) [32]. Participants completed four items using seven-point rating scales (1 = do not agree at all, 7 = agree completely) [33]. Four items were used to assess whether participants had maintained their pre-cancer group memberships after their cancer diagnosis. One of the items was “After my cancer, I still participate in the same group activities as before my diagnosis.” Scores range from 4 to 28 points, and higher scores indicate a stronger degree of social connection with others. Cronbach’s α was 0.96 in this study.

Quality of life

QOL was assessed using the Functional Assessment of Cancer Therapy – General – 7 Item Version (FACT-G7) [34]. The FACT-G7 consists of seven high-priority items from FACT-G questionnaire. These items are divided into three domains: physical wellbeing (“I have a lack of energy”, “I have nausea”, and “I have pain”), emotional wellbeing (“I worry that my condition will get worse”), and functional wellbeing (“I am able to enjoy life”, “I am sleeping well”, and “I am content with the quality of my life right now”) [35]. Each question was measured on a 5-point Likert scale (0 = not at all and 4 = very much so). The total scores range from 0 to 28 points, with higher scores indicating better quality of life (QOL). Cronbach’s α of this scale was 0.80 in this study.

Data collection and ethical consideration

The data was collected through an online survey (Google Form) from June 1 to June 30, 2021. The survey was conducted in online communities (Naver Band, Self-help group) consisting of CRC survivors. The researcher posted and provided detailed information about the study on the first screen of the survey link, including the purpose of study. Those who wanted to participate in the study generated a page containing a questionnaire by voluntarily clicking on the provided link.

This study was approved by the Institutional Review Board (Approval No: 1041078-202104-HRSB-096-01) and the approval document was attached to the online survey. Only those who agreed to participate in the study started the survey. Respondents who encountered difficulties in responding to the survey (e.g., due to old age) were allowed to complete the survey with the assistance of their guardians. The online survey was intended to take 10–15 minutes to complete, and a coffee voucher was presented to the participants who took part in the survey.

Data analysis

Data were analyzed using SPSS version 26.0 (IBM, Armonk, NY, USA). The general characteristics of the participants, disease-related characteristics, and study variables were analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. The normality of the study
variable was confirmed by the Kolmogorov-Smirnov test. The analysis of the difference in inner strength and quality of life among colorectal cancer survivors, based on gender, was confirmed using an independent t-test. The Pearson correlation coefficient confirmed a correlation between inner strength, multiple identities, and quality of life in patients with colorectal cancer. Hierarchical multiple regression analysis was conducted to identify the factors that influence quality of life. The Hedge's g value was calculated to provide an estimate of effect size [36]. For these analyses, α was set to 0.05.

Results

Characteristics of participants

The characteristics of the colorectal cancer (CRC) survivors are presented in Table 1. Among the participants, 78 (45.9%) were women and 91 (54.1%) were men. The median age of the men was 54 years, while that of the women was 52 years. About half of the participants (43.5%) had a job, and 50.6% had no religion. Most participants (81.8%) were married. More than half of the participants were colon cancer survivors (56.5%), and stage 3 was the most common (38.8%). Thirty-one (18.2%) of the patients had an ostomy, while 139 (81.8%) did not. The median time since diagnosis was 26 months. The participants had comorbidities, including hypertension, diabetes mellitus, coronary artery disease, as well as other conditions such as depression, hypothyroidism, and herniated lumbar disc.
Table 1
Demographic and clinical characteristics of study participants (n = 170)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Categories</th>
<th>Total</th>
<th>Male (n = 92)</th>
<th>Female (n = 78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td>53.5 (48–58)</td>
<td>54 (50–60)</td>
<td>52 (46–57)</td>
</tr>
<tr>
<td>Job</td>
<td>Yes</td>
<td>74 (43.5)</td>
<td>49 (66.2)</td>
<td>25 (33.8)</td>
</tr>
<tr>
<td></td>
<td>No (before diagnosis)</td>
<td>43 (25.3)</td>
<td>16 (37.2)</td>
<td>27 (62.8)</td>
</tr>
<tr>
<td></td>
<td>No (after diagnosis)</td>
<td>53 (31.2)</td>
<td>27 (50.9)</td>
<td>26 (49.1)</td>
</tr>
<tr>
<td>Religion</td>
<td>Christian</td>
<td>39 (22.9)</td>
<td>18 (46.2)</td>
<td>21 (53.8)</td>
</tr>
<tr>
<td></td>
<td>Buddhism</td>
<td>33 (19.4)</td>
<td>17 (51.5)</td>
<td>16 (48.5)</td>
</tr>
<tr>
<td></td>
<td>Catholic</td>
<td>12 (7.1)</td>
<td>9 (75.0)</td>
<td>3 (25.0)</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>86 (50.6)</td>
<td>48 (55.8)</td>
<td>38 (44.2)</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married</td>
<td>139 (81.8)</td>
<td>75 (54.0)</td>
<td>64 (46.0)</td>
</tr>
<tr>
<td></td>
<td>Unmarried</td>
<td>15 (8.8)</td>
<td>8 (53.3)</td>
<td>7 (46.7)</td>
</tr>
<tr>
<td></td>
<td>Divorced/bereavement</td>
<td>16 (9.4)</td>
<td>9 (56.3)</td>
<td>7 (43.7)</td>
</tr>
<tr>
<td>Pathological Diagnosis</td>
<td>Colon Cancer</td>
<td>74 (43.5)</td>
<td>31 (41.9)</td>
<td>43 (58.1)</td>
</tr>
<tr>
<td></td>
<td>Rectal Cancer</td>
<td>96 (56.5)</td>
<td>61 (63.5)</td>
<td>35 (36.5)</td>
</tr>
<tr>
<td>Stage</td>
<td>1</td>
<td>34 (20.0)</td>
<td>20 (58.8)</td>
<td>14 (41.2)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>37 (21.8)</td>
<td>20 (54.1)</td>
<td>17 (45.9)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>66 (38.8)</td>
<td>41 (62.1)</td>
<td>25 (37.9)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>33 (19.4)</td>
<td>11 (33.3)</td>
<td>22 (66.7)</td>
</tr>
<tr>
<td>Metastatic Status</td>
<td>No</td>
<td>122 (71.8)</td>
<td>75 (61.5)</td>
<td>47 (38.5)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>48 (28.2)</td>
<td>17 (35.4)</td>
<td>31 (64.6)</td>
</tr>
<tr>
<td>Surgery status</td>
<td>No</td>
<td>13 (91.2)</td>
<td>5 (38.5)</td>
<td>8 (61.5)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>157 (8.8)</td>
<td>87 (55.4)</td>
<td>70 (44.6)</td>
</tr>
<tr>
<td>Time since diagnosis (month)</td>
<td></td>
<td>26 (13.5–41)</td>
<td>29 (14–47)</td>
<td>24.5 (12–41)</td>
</tr>
<tr>
<td>Ostomy existence</td>
<td>No</td>
<td>139 (81.8)</td>
<td>73 (52.5)</td>
<td>66 (47.5)</td>
</tr>
</tbody>
</table>

Abbreviations: IQR, Interquartile range

\*all values are reported n (%) except for age.

\*Multiple response
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Categories</th>
<th>Total</th>
<th>Male (n = 92)</th>
<th>Female (n = 78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>31 (18.2)</td>
<td>19 (61.3)</td>
<td>12 (38.7)</td>
</tr>
<tr>
<td>Modality (past)^b</td>
<td>Chemotherapy</td>
<td>130</td>
<td>67 (51.5)</td>
<td>63 (48.5)</td>
</tr>
<tr>
<td></td>
<td>Radiotherapy</td>
<td>58</td>
<td>38 (65.6)</td>
<td>20 (34.4)</td>
</tr>
<tr>
<td>Modality (present)</td>
<td>None</td>
<td>140 (82.4)</td>
<td>73 (52.1)</td>
<td>67 (47.9)</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy</td>
<td>28 (16.5)</td>
<td>17 (60.7)</td>
<td>11 (39.3)</td>
</tr>
<tr>
<td></td>
<td>Radiotherapy</td>
<td>2 (11.1)</td>
<td>2 (100.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Comorbidity^b</td>
<td>Hypertension</td>
<td>20</td>
<td>15 (75.0)</td>
<td>5 (25.0)</td>
</tr>
<tr>
<td></td>
<td>Diabetes Mellitus</td>
<td>16</td>
<td>14 (87.5)</td>
<td>2 (12.5)</td>
</tr>
<tr>
<td></td>
<td>Cardio-cerebrovascular</td>
<td>3</td>
<td>0 (0.0)</td>
<td>3 (100.0)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>12</td>
<td>9 (75.0)</td>
<td>3 (25.0)</td>
</tr>
</tbody>
</table>

Abbreviations: IQR, Interquartile range

^a all values are reported n (%) except for age.

^b Multiple response

**Inner strength, multiple identities, and quality of life by gender**

Among the subcategories of inner strength, men scored statistically significantly higher in ‘Anguish and searching’ (t=-3.91, p < .001, g = 0.02) and lower in ‘Connectedness’ (t = 3.42, p = .001, g = 0.40) than female (Table 2). There was a significant difference in QOL according to gender (t=-2.06, p = .041, g = 0.42). Male was also higher than female in multiple identities, but the difference was not statistically significant.
Table 2
Study variables comparison according to gender (n = 170)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Female (n = 78)</th>
<th>Male (n = 92)</th>
<th>t</th>
<th>p</th>
<th>Effect size (Hedge's g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inners strength</td>
<td>90.51 ± 13.17</td>
<td>92.45 ± 13.09</td>
<td>-0.96</td>
<td>.340</td>
<td>0.32</td>
</tr>
<tr>
<td>Anguish and searching</td>
<td>17.49 ± 5.50</td>
<td>20.83 ± 5.59</td>
<td>-3.91</td>
<td>&lt; .001</td>
<td>0.02</td>
</tr>
<tr>
<td>Connectedness</td>
<td>24.49 ± 5.94</td>
<td>21.20 ± 6.52</td>
<td>3.42</td>
<td>.001</td>
<td>0.40</td>
</tr>
<tr>
<td>Engagement</td>
<td>23.64 ± 4.14</td>
<td>24.71 ± 3.76</td>
<td>-1.76</td>
<td>.081</td>
<td>0.33</td>
</tr>
<tr>
<td>Movement</td>
<td>24.90 ± 4.09</td>
<td>25.72 ± 3.70</td>
<td>-1.37</td>
<td>.172</td>
<td>0.16</td>
</tr>
<tr>
<td>Multiple identities</td>
<td>13.65 ± 6.51</td>
<td>15.09 ± 6.46</td>
<td>-1.44</td>
<td>.153</td>
<td>0.08</td>
</tr>
<tr>
<td>Quality of life</td>
<td>16.17 ± 5.53</td>
<td>17.79 ± 4.77</td>
<td>-2.06</td>
<td>.041</td>
<td>0.42</td>
</tr>
</tbody>
</table>

The factors affecting the quality of life

There was a positive correlation between inner strength, multiple identities, and QOL in CRC survivors. Hierarchical regression was performed to identify factors affecting CRC survivors' QOL (Table 3). Independent variables inputted into the regression model were selected based on a literature review. The selected variables were age, gender, occupation, the presence of an ostomy, inner strength, and multiple identities. Job status was classified to dummy variable as 'lost their job after diagnosis of CRC' or 'have a job'.
Table 3
The Influencing Factors affecting on Quality of Life (n = 170)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>(Constant)</td>
<td>18.12</td>
<td>2.54</td>
<td>7.12</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Age</td>
<td>-0.04</td>
<td>0.05</td>
<td>-0.07</td>
<td>-0.86</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>1.49</td>
<td>0.82</td>
<td>0.14</td>
<td>1.82</td>
</tr>
<tr>
<td>Job after diagnosis (no)</td>
<td>-0.67</td>
<td>1.04</td>
<td>-0.06</td>
<td>-0.64</td>
</tr>
<tr>
<td>Job</td>
<td>1.70</td>
<td>1.00</td>
<td>0.16</td>
<td>1.71</td>
</tr>
<tr>
<td>Ostomy (yes)</td>
<td>-2.03</td>
<td>1.03</td>
<td>-0.15</td>
<td>-1.98</td>
</tr>
<tr>
<td>Inner strength</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple identities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adj. $R^2 = .07$, $F_{(5,164)} = 3.58$, $p = .004$
Adj. $R^2 = .31$, $F_{(7,162)} = 11.91$, $p < .001$

Abbreviations: SE, Standard Error; Adj. $R^2$, adjusted $R^2$.

The first model was based on age, gender, job ('lost job after diagnosis of CRC', 'have a job'), and the presence of ostomy, which can affect the QOL of CRC survivors. A significant influencing factor was the presence of ostomy (B=-2.03, p = .049), and people without ostomy reported a higher QOL than those with ostomy. It was statistically significant ($F = 3.58, p = .004$), and accounted for 7.1% of the variance in the model 1.

The second model concerned the inner strength of CRC survivors. In this model, significant influencing factors were age (B=-0.09, p = .020), gender (B = 1.46, p = .041), and inner strength (B = 0.18, p < .001). The quality of life was higher when the participant was younger, had higher inner strength, and was male. It was statistically significant ($F = 11.91, p < .001$), and accounted for 31.1% of the variance in the model 2.

**Discussion**

This study was conducted to investigate the inner strength, multiple identities, and QOL of CRC survivors, and to identify affecting factors of their QOL.
Focusing on sub-categories of inner strength, ‘Anguish and searching’ was higher in male when ‘Connectedness’ was higher in female. Considering that physical problems such as sexual dysfunction negatively affect QOL, especially in male CRC survivors [37], it can be argued that males experience and cope with their disease more intensely than females as a means of overcoming these symptoms. According to a study by Yanez et al. [35] using the same tool as this study (FACT-G7), the QOL of cancer-free individuals was 19.45 points, while cancer survivors of 11 types, including colon cancer, had a QOL score of 18.04. It has been reported that CRC survivors experience a lower QOL than other cancer survivors due to various long-term problems and bodily changes they must endure [38–40]. However, it is difficult to understand the specific difference in QOL in the mid-long-term aspect of 5 years or more, as the period after the diagnosis of CRC in this study was about 2 years.

Looking at inner strength from the perspective of resilience [20], CRC patients had lower resilience than male patients, which aligns with the overall findings of the study [41]. Among the four sub-categories of inner strength, only ‘Connectedness’ was the only which is higher in female than in male. The difference in inner strength exists according to gender, and it should be considered, even though the results were not significantly different.

The scores for multiple identities were higher in male survivors, but the difference was not statistically significant. However, support systems such as family or patient self-support groups play a pivotal role in helping patients adapt to their lives. CRC survivors are able to relieve pain by exchanging various stories with groups whose members have similar experiences [42]. It will be necessary to investigate the support system through in-depth interviews. Since a survey was conducted in the online community, there is a possibility that the participants may be homogeneous with individuals who already have multiple identities. Therefore, the results should be interpreted cautiously.

Meanwhile, the QOL of female CRC survivors was lower than that of males. This result reflects those in previous studies showing that women's QOL was lower than that of men in overall life [9]. Previous studies have found differences in specific factors that affect the QOL of colon cancer survivors according to gender [43]. Since this study did not investigate sexual activity or satisfaction and the economic status of respondents, it was not possible to infer any relationship or influencing factors between such characteristics and QOL. It was not possible to infer any relationship or influencing factors between these characteristics and QOL. However, previous studies have found that women experienced social difficulties and psychological problems due to changes in body image, while men experienced symptoms mainly caused by social and colorectal cancer itself [15, 37, 44].

The QOL of CRC survivors was positively correlated with inner strength and multiple identities. Similar results to previous studies have shown that there is a positive correlation between higher levels of inner strength and multiple identities and better the QOL [25, 31]. There have been no previous studies investigating CRC survivors’ inner strength. However, Temprado et al. [45] found the resilience of CRC survivors with ostomies was positively correlated with their QOL. In other words, the higher the resilience of CRC survivors, the less pain they experienced, which had a positive effect on their adaptation to a new
life. In further studies, it is necessary to investigate variables correlated with QOL in various physical, psychological, and social aspects based on inner strength and parameters that affect their QOL.

In this study, gender, age, and inner strength affected CRC survivors’ QOL. Inner strength was the factor with the greatest influence on CRC survivors’ QOL. Inner strength was the most significant predictor of QOL in breast cancer survivors [19]. This result confirms the hypothesis that improving the inner strength of cancer survivors can enhance their QOL.

Meanwhile, Thong et al. [10] conducted a study on the QOL of long-term colorectal cancer (CRC) survivors. The study found that long-term CRC survivors had a similar overall QOL. Still, young CRC survivors mainly experienced loss of physical function, health deficiencies, symptoms, or financial problems. This finding contradicts the results of the study, which demonstrated that younger age is associated with higher the QOL. This study is being evaluated due to the wide age range of the subjects, ranging from 27 to 77 years old. The median age was 53.5, which differs from previous studies. In addition, although age influences QOL, the correlation between QOL and age is related to differences in physical activity ability [46]. Therefore, future studies should include additional measurements of the participants' physical abilities.

Physical factors, such as gender, age, and symptom experience, as well as psychosocial factors, such as inner strength and resilience, exist as factors that affect the QOL of CRC survivors [47]. Further studies should be conducted to explore and gain a deeper understanding of the factors that influence the inner strength and QOL of colon cancer survivors. These studies would help to address the limitations of the current study and expand our knowledge of colon cancer survivors, taking into consideration gender and intestinal health differences. Furthermore, the contribution of primary care and experts to solve the unmet QOL problem of CRC survivors is low [37]. Therefore, attention should be paid to supporting nurses at the medical level as an intervention to improve the QOL of CRC survivors.

Limitations

This study employed a recruitment and selection process that targeted participants from an online self-help group community. This approach was chosen due to the possibility that the subjects were already in a state of good health. However, this methodology presents a limitation in the exploration of associated factors, as psychological symptoms such as anxiety and depression, which can significantly influence quality of life, were not assessed. Consequently, caution should be exercised when attempting to extend and apply the results obtained from this study to broader populations.

Conclusion

Although the research on inner strength has predominantly focused on women, this concept holds broad applicability for both men and individuals diagnosed with cancer. In summarizing the relationship between inner strength, multiple identities, and quality of life among colorectal cancer survivors, it was found that inner strength exerted the most substantial impact on their quality of life. The results indicated
that inner strength had the most significant positive impact on the quality of life of the participants. Moreover, gender differences in inner strength were observed, with females exhibiting greater levels of connectedness, while males reported higher levels of anguish and searching. To enhance the inner strength of male colorectal cancer patients, it may be advantageous to prioritize interventions like expressive writing programs. These programs can facilitate self-awareness, self-identity confirmation, and the development of problem-solving skills. Regarding female patients, healthcare providers should emphasize the significance of connectedness and consider incorporating strategies to foster supportive relationships with oneself, family, friends, and spiritual support into individualized care plans.

Declarations

Ethics approval

This study was approved by the institutional review board (approval no: 1041078-202104-HRSB-096-01).

Availability of data and materials

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest

The authors declare no competing interests.

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Author contributions

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