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Medical, social, and personal factors as correlates of quality of life among older cancer patients with permanent stoma

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ABSTRACT

Purpose: The vast majority of cancer patients experience a substantial reduction in their quality of life (QOL) following a stoma procedure. There is a paucity of studies that examine QOL of patients with stoma and only a small percentage of these studies focuses on older patients. This study assesses the level of QOL of older patients with a permanent stoma; and examines the associations between three categories of variables -personal, medical, and social -and QOL.

Methods: This was a cross-sectional study. Seventy-five older cancer patients ($M = 75.1$ $SD = 8.6$) with permanent stoma participated in the study. Participants were recruited by their physicians from hospitals and clinics in the central region of Israel. All study measures were valid and reliable.

Results: Participants reported a moderate mean level of QOL. Men's QOL scores were higher than those of women. Positive correlations were found between perceived body image, self-care, self-efficacy, social support and QOL. A negative correlation was found between anxiety and QOL. Three variables emerged as significant predictors of QOL: self-efficacy ($\beta = 0.41$, $P < .001$), perceived body image ($\beta = 0.41$, $P < .001$), and gender ($\beta = -0.14$, $P < .05$). The model explained a variance of 73.6%.

Conclusions: Self-efficacy, perceived body image, and gender are the most important factors for QOL of older patients with stoma in this study. These three personal variables are more significant to QOL than either the medical or the social variables. The personal variables need to be considered by nurses when developing intervention programs aimed at increasing QOL among older cancer patients with permanent stoma.

1. Introduction

The term *stoma* stems from the Greek word that means *opening* or *orifice* (Bekkers, Van-Knippenburg, Van Dulmen, Van Den Borne, & Van Berge-Henegouwen, 1997). In a comprehensive surgical procedure, an opening is created in the stomach, leading to either the digestive system or the urinary tract and consequently, patients must cope not only with the effects of major surgery, but also with the loss of an important physical function, resulting in a major change in personal care (Kit-Man, Pak-Chun and Twinn, 2007). Stomas can be temporary (for a period of several months) or permanent, depending on their indication and patient comorbidities (Finlay, Sexton and McDonald, 2018). Permanent stoma has wide-ranging and long-term effects on a patient's quality of life (QOL), requires daily care adjustments and challenging psychological and social adaptation (Vonk-Klaassen, de Vocht, den Ouden, Hans Eddes and Schuurmans, 2016). These effects are the subject of the current study.

A cancer (colorectal) diagnosis is a common cause for performing stoma (Persson, Severinsson, & Hellströ;m, 2004). The WHO reports that colon and rectal cancer are the third most common type of cancer in men and second among women worldwide (Alwi, Setiawan and Asrizal, 2018), and constitutes 8% of annual cancer-related fatalities (Jemal et al., 2011). In the US, it is the third most common cause of cancer-related deaths among men and women (Siegel, Ma, Zhaohui and Jemal, 2014). In 2014, a total of 136,830 new cases of colorectal cancer were reported (Siegel, DeSantis and Jemal, 2014). In Israel, in 2013, a total of 3357 new cases of colorectal cancer were reported, of which 2065 (61.5%) were new cases affecting patients ages 65 and over (Israel Bureau of Statistics, 2016). The positive relationship between a diagnosis of cancer and age has been well established in the professional literature (Singer, Bachner, Shvartzman and Carmel, 2005; Finkelstein, Carmel & Bachner, 2017). Bosshardt (2003) reported that in the US, 74.8% of the new stoma patients were older people who had undergone surgery to remove a malignant tumor and that in most cases the stoma

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created was a colostomy. This is due to the high rate of cancer among this population (Bosshardt, 2003). In many countries colorectal cancer mostly occurs in the 6th and 7th decades of life (Szpilewska et al., 2018). Based on demographic trends, it is expected that the number of new patients with colorectal cancer will increase. Surgery, for colorectal cancer results in 10% of the cases in a permanent ostomy (Vonk-Klaassen, de Vocht, den Ouden, Hans Eddes and Schuurmans, 2016).

Quality of life is a multidimensional concept. The World Health Organization defines QOL as “individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (World Health Organization Group, 1998, p. 2). In the context of health, QOL represents the individual's subjective perception of one's physical, social, and psychological welfare and one's satisfaction regarding the balance achieved between control and management of the disease (Camilleri-Brennan and Steele, 2001). Patients with a chronic disease define their QOL in terms of positive relationships, enjoyable activities, and a sense of security and significance in life (Carr, Tohompson and Kirwan, 1996). In addition, patients with chronic disease are highly concerned about their ability to care for themselves and function independently (Carr et al., 1996).

Having a stoma has a significant effect on the patient's QOL. Nugent, Daniels, Stewart, Patankar, and Johnson (1999) reported that 80% of patients with stoma experienced a change in their QOL after the surgery, which in general was manifested as a reduction in QOL (Anaraki et al., 2012). Research has shown that the reactions and emotions of patients who underwent stoma surgery included shock, hatred, disgust, aversion, shame, devastation, inability to accept the change (Brown and Randle, 2005), self-alienation, and alienation from others (Savard and Woodgate, 2009), as well as anxiety and depression (Xu et al., 2018) to the point of contemplating suicide (Krouse et al., 2009). A significant factor that was found to be related to QOL is the patient's ability to learn to take care of the stoma. Jayarajah and Samarasekera (2017) found a negative association between time taken to learn to care for the stoma and QOL. This implies that the sooner the learning begins in the initial period after surgery, the higher the long term QOL. Over the years, few meta-analysis studies that focused on the QOL of stoma patients were done. Sprangers, Taal, Aaronson, and teVelde (1995) reviewed 17 studies conducted between 1969 and 1992, which compared the QOL between colorectal cancer patients with and without a stoma. Comparisons included the factors of physical, psychological, social, and sexual functioning. The results of this review study indicated that patients with stoma reported higher levels of psychological distress, which included depression, loneliness, suicidal thoughts, sense of stigma, and low self-esteem. Another meta-analysis, which reviewed 22 studies conducted between 1982 and 1992, examined the psychosocial adaptation of patients who had undergone stoma procedure. Findings determined that 57% of the patients with stoma experienced a decline in libido, 23% were coping with emotional difficulties, and 45% experienced a decline in social relationships (Bekkers et al., 1995). A recent systematic review, which included 14 studies, revealed that all studies reported that living with a stoma influences the overall QOL negatively (Vonk-Klaassen, de Vocht, den Ouden, Hans Eddes and Schuurmans, 2016).

A review of the literature suggests that the prominent QOL-related factors that affect patients with stoma can be divided roughly into three categories: personal, medical, and social factors. Personal factors include variables such as age, gender, and personality traits; medical factors include variables related to the disease, such as its duration, type, and complications; and social factors include various types of social support, for example.

A paucity of studies have dealt with the QOL of people with stoma and among these studies, only a small percentage focused on older patients (65-years of age and older). The studies that examined older patients with stoma found that this cohort was characterized by poor health condition, poor physical functioning, and increased fatigue (Mahjoubi, Kiani Goodarzi and Mohammad-Sadeghi, 2010; Orsini et al., 2013). Moreover, older patients' self-reports indicated greater difficulty in self-care involving the stoma, and a general deterioration in their functional and occupational capacities, as compared to younger patients with stoma (Ma, Harvey, Stewart, Andrews and Hill, 2007). In this longitudinal study, which assessed the effect of age on QOL after stoma formation, patients had their QOL assessed three times: preoperatively, at six months, and at 12 months postoperatively. Difference in mental function was found according to age, with younger patients continuing to improve in QOL over 12 months, whereas any improvement in older patient's QOL over time was negligible. Regarding difference in physical functioning QOL, older patients started higher but reached their maximum QOL by 6 months, whereas younger patients continued to improve (Ma, Harvey, Stewart, Andrews and Hill, 2007). Additionally, a recent study showed that older patients where significantly less bothered by stool leakage than younger patients (Feddern, Emmertsen and Laurberg, 2015).

As the population ages, the number of patients with rectal cancer is expected to increase (Arnold et al., 2017) as well as the number of operative procedures involving the creation of an intestinal stoma. Hence there is a need for comprehensive studies focusing on the QOL of older patients with stoma (Gooszen, Geelkeren, Hermans, Lagaay and Gooszen, 2000) and the significant factors related to their QOL. To address this need, the current study set the following research goals: (A) to assess the quality of life of older patients with a permanent stoma; (B) to examine the associations between three categories of variables - personal, medical, and social -and quality of life. We assessed QOL 8–12 months postoperatively, because the decline in QOL is most significant during this period (Fingren, Lindholm, Petersen, Hallen and Carlsson, 2018). Gaining a better understanding of the factors related to QOL of this particular population in need is expected to facilitate the planning of intervention programs aimed at improving the QOL of older adults with permanent stoma.

2. Method

2.1. Sample and procedure

A convenience sample was used in this cross-sectional study, which included 75 older patients. Inclusion criteria were as follows: age 60 years and older; an official diagnosis of cancer in the patient's medical chart; a colostomy, ileostomy, or urostomy had been performed, 8–12 months after surgery; a permanent stoma had been created; patient was sufficiently proficiency in the Hebrew language to complete the study questionnaire.

After the Helsinki committee of the Clalit HMO approved the study, hospitals and clinics in the central region of Israel were contacted with a request to help recruit patients with permanent stoma. The sample was selected after applying the inclusion criteria. Potential participants were contacted by the physicians, who explained the goal of the study and requested their patients' participation. Patients who agreed to participate were ensured that data would be used solely for the purpose of the study and that their personal information would remain confidential. Interviews took place between March 2015 and October 2016, and were conducted by an experienced nurse who had been trained for the role of interviewer. Interviews lasted approximately 30–40 min. Of the 92 patients who were initially contacted, 15 died after having expressed their consent and two patients refused to participate, citing personal reasons. Thus, the total number of participants was 75 (a response rate of 81.5%).

2.2. Measures

Quality of Life was evaluated using the Fecal Incontinence Quality of Life Instrument, developed by Rockwood et al. (2000) in cooperation with the American Society of Colon and Rectal Surgeons, based on qualitative studies conducted with stoma patients who were coping with incontinence (Holzer et al., 2005). The Fecal Incontinence QOL Scales demonstrated significant correlations with the subscales of the SF-36. The scale includes 29 items related to four dimensions: 1. Lifestyle – 10 items (e.g., "I avoid visiting friends"); 2. Coping behaviors – nine items (e.g., "Every time I'm away from home I try to stay as close as possible to the restrooms"); 3. Depression/self perception – seven items (e.g., "I feel depressed"); 4. Shame – three items (e.g., "I make sure I don't smell of fecal matter"). Of the 29 items, 28 are measured using a five-point Likert-like scale, whereby 1 = "most of the time/completely agree," which is indicative of poor quality of life, and 5 = "irrelevant," indicating that the reason for negative feelings is not related to the stoma and therefore is indicative of a high QOL. One item in this instrument is measured using a six-point Likert-like scale. In the statistical analysis, a response of "irrelevant" on any of the questions was calculated as a missing value. A mean score was calculated for all of the items. Cronbach's alpha = .89.

2.2.1. Personal variables

We collected data regarding age (years), gender, family status (married or in a relationship/other), number of children, place of birth (Israel/Europe; Russia/Asia; Africa), level of education (up to 12 years; 13 to fifteen years; 16 years and above), employment status (employed/unemployed) living condition (alone/ with a relative), duration of hospitalization (days), the reason for surgery (colorectal cancer/bladder cancer/other), the type of surgery (colostomy/urostomy/ileostomy).

Body Image. Was assessed using the short version of the Body-Investment Scale (Orbach and Mikulincer, 1998). The scale includes 24 items representing four factors (six items per factor): body image feelings and attitudes (e.g., "I hate my body"); body care (e.g., "I believe that taking proper care of my body will improve my feelings"); body protection (e.g., "Whenever I get a bruise or a cut, I immediately take care of it myself"); and comfort in touch (e.g., "I tend to keep a safe distance from my interlocutor"). Responses to all of the items are provided using a five-point Likert-like scale, whereby 1 = "completely disagree" and 5 = "completely agree". A mean score was calculated for all of the items; a high score is indicative of a more positive attitude towards one's body. Cronbach's alpha = .83.

Acquisition of Self-care Skills. The scale devised by Mori (1998) was used to assess participants' stoma self-care skills following surgery. The scale includes 22 items related to skill acquisition for self-care, for example: "Did you know how to care for the stoma after being discharged from the hospital?", "Do you change the skin protector on your own?". Of the 22 items, 17 call for a yes/no response and the responses to five items are given using various graded scales. The overall score was calculated as a summation of the responses to all of the items, whereby a low score is an indication of a high level of self-care skills. Cronbach's alpha = .74.

Self-efficacy. Participants' self-efficacy was measured using the Stoma Self-Efficacy Scale, developed by Bekkers, Van-Knippenburg, Van Den Borne, and Van Berge-Henegouwen. (1996), which relies on Bandura's theory of self-efficacy (1977). The scale consists of 22 items that represent two factors: stoma care self-efficacy, which includes 13 items related to stoma self-care, and social self-efficacy, which is comprised of nine items that examine the participant's social functioning as related to coping with the stoma. Responses to all of the items are rendered using a five-point Likert-like scale, whereby 1 = "I do not feel confident" and 5 = "I feel sufficiently confident". The overall score was calculated as the mean score for all items, such that a high score indicates a high degree of self-efficacy. Cronbach's alpha = .96.

2.2.2. Medical variables

We collected data regarding number of comorbidities, permanent medications and late development of surgical complications.

Mental Health - Anxiety. Was assessed using the State & Trait Anxiety Inventory (Spielberger, Gorsuch, and Lushene, 1970). In the current study we used the state anxiety scale. The scale includes 20 items that describe various feelings of ease or anxiety: 10 of the items indicate a positive assertion of the condition, i.e., the presence of anxiety, and 10 items indicating a rejection of the condition, i.e., no anxiety. All of the items are ranked using a four-point Likert-like scale, ranging from 1 = "not at all" to 4 = "very much so". The overall score was calculated as the mean score for all items. In order to align the scores of the current scale with the directionality of the other scales the direction of positive items was reversed, such that a high score would indicate a low level of anxiety. Cronbach's alpha = .95.

2.2.3. Social variables

Social support. Was evaluated using the Multidimensional Scale of Perceived Social Support (MS PS's), developed by Zimet, Dahlem, Zimet, and Farley (1988), which measures informal support resources available to the individual. This self-report scale includes 12 items related to three types of social support resources: family, friends, and significant other. All of the items are scored using a seven-point Likert-like scale, whereby 1 = "completely disagree" and 7 = "completely agree". The overall score for the scale is calculated as the mean of the scores on all of the items; hence, a high score indicates strong sense of social support. Cronbach's alpha = .92.

2.3. Statistical analyses

The associations between variables were examined using Chi-Square, Pearson, and Spearman tests, according to the different scale structures (nominal, ordinal, or ratio). To examine differences between QOL mean scores, a *t*-test for independent samples was used. To determine the unique contribution of each of the independent variables to the explanation of QOL among participants, a hierarchical linear regression was employed. Internal reliability was measured using Cronbach's alpha. Statistical analyses were performed using the SPSS software, version 22. A significant *p*-value was defined as $p < .05$.

3. Results

The sociodemographic and illness characteristics of the participants are described in Table 1. The percentage of men in this study was higher than that of women, which differs from the ratio in the general older population. The mean age of participants was 75 years; most of them were married or in a relationship, cohabited with a relative, and unemployed. The mean number of children was three, and about half had between 13 and 15 years of education. Examination of the illness characteristics reveals that on average, participants had three comorbidities, required an average of five permanent medications, and the majority had either colorectal cancer or cancer of the bladder, which resulted in the creation of either a colostomy or a urostomy.

Participants reported a moderate mean level of QOL (relative to the scale's range). The QOL scores of women and men differed significantly, whereby men's QOL scores were higher than those of women. A positive significant correlations were found between perceived body image, self-care, self-efficacy, and QOL. In other words, the higher the scores on self-care skills, perceived body image, and self-efficacy, the higher were the scores on QOL. A negative significant correlation was found between sense of anxiety and QOL, such that the higher the level of anxiety was, the lower were the QOL scores. Finally, a positive correlation was found between social support and QOL such that the stronger the social support reported, the higher were the QOL scores. No significant correlations were found between age, number of children, level of education, postoperative complications, number of comorbidities, or number of permanent medications and the QOL (see Table 2).

A correlation matrix of all of the independent variables is presented in Table 3. Examination of the data indicates correlations of various strengths, ranging from $0.032 \geq r \geq 0.695$, whereby the strongest

Table 1
Participant's description according to sociodemographic and illness characteristics ($N = 75$).

Variable	N (%)	Mean	Standard Deviation
Age		75.07	8.61
Gender			
Women	22 (29.3)		
Men	53 (70.7)		
Place of Birth			
Israel	19 (25.3)		
Europe/Russia	26 (34.7)		
Asia/Africa	30 (40.0)		
Family Status			
Married/in a relationship	48 (64.0)		
other	27 (36.0)		
Living Conditions			
alone	19 (25.3)		
with a relative	56 (74.7)		
Number of Children		3.10	1.71
Level of Education			
up to12 years	24 (32.0)		
13–15 years	37 (49.3)		
16 years and above	14(18.7)		
Employment status			
employed	7 (9.3%)		
unemployed	68 (90.7%)		
Number of Comorbidities		3.16	2.06
Duration of Hospitalization (days)		15.46	11.19
Number of Permanent Medications		5.12	3.55
Reason for Surgery			
Colorectal Cancer	37 (49.3%)		
Cancer of the Bladder	32 (42.7%)		
Other Cancer	6 (8.0%)		
Type of Surgery			
Colostomy	35 (46.7%)		
Urostomy	35 (46.7%)		
Ileostomy	5 (6.7%)		

correlation was between perceived body image and self-efficacy ($r = 0.695$) and the weakest correlation was between social support and self-care skills ($r = 0.032$). In medical research, the acceptable boundary for multicollinearity is $r > 0.70$ (Yoo et al., 2014).

All the independent variables found significant in the bivariate analyses were examined as possible predictors of QOL in a hierarchical linear regression analysis. Given the strong correlation between self-care and self-efficacy, only self-efficacy was entered into the model (Table 4). In the initial model, which included the variables of gender, self-efficacy, and body image, all three variables emerged significant and explained a high percentage (73.1%) of the variance of QOL. Meanly, male patients and those who reported a high level of self-efficacy and a positive body image also indicated higher QOL scores. Reviewing the second model, in which anxiety was added, reveals that in this model too, the variables of gender, self-efficacy, and perceived body image remained significant in explaining the variability in QOL. The added variable of anxiety did not significantly improve the ability of the model to explain variability in QOL scores ($\triangle R^2 = 0.005$, $p > .05$). All of the variables in this model explained 73.6% of the variance of QOL. In the third model, social support was added. Findings indicated that gender, self-efficacy, and perceived body image continued to positively and significantly contribute to explaining QOL scores, whereas the additional variable of social support did not contribute at all to the explanation ($\triangle R^2 = 0.000$). All of the variables in this final model explained 73.6% of the variability in QOL scores.

4. Discussion

The current study assessed the level of QOL of older patients with a permanent stoma, and examined the associations between personal, medical, and social factors and the QOL reported by these patients. Participants' mean QOL score indicated an intermediate level in relation to the scale range ($M = 2.43$, range 1–5). This finding is in accord with those of previous studies, which indicated that the creation of an abdominal stoma is a traumatic event that carries a strong emotional impact that requires a great deal of coping resources (Liao and Qin, 2014; Mahjoubi et al., 2010; Krouse et al., 2009). These patients have to cope not only with a diagnosis of cancer, but also with the outcomes of a surgical procedure, which entails a permanent and lifelong disability (Mori, 1998). In addition, an ostomy can change over the years, and therefore, the experienced problems can vary over time (Vonk-Klaassen, de Vocht, den Ouden, Hans Eddes and Schuurmans, 2016). Nugent et al. (1999) have reported that 80% of patients with stoma experienced a substantial change in QOL after the surgery, which for the most part was manifested as a decline in QOL (Arndt, Merx, Stegmaier, Ziegler and Brenner, 2004; Baxter, Jacobson and Young-Fadok, 2006; Krouse et al., 2009).

Six variables were found to be significantly associated with QOL. Men indicated a higher level of QOL than did women. This finding contradicts those of numerous previous studies, which reported that women have higher QOL since they tend to seek help more than do men (Krouse et al., 2009), and incorporate a greater number of coping behaviors than do men (Dàzio, Megumi Sonobe and Zago, 2009; Ran et al., 2016). Our finding may be explained by the different social

Table 2
Description of the study variables and their association with quality of life ($N = 75$).

Variable	Number of Items	Range	Mean	Standard Deviation	Correlation to Quality of Life
Quality of Life	29	1-5	2.43	0.86	_
Personal Variables					
Age	1	60-93	75.07	8.61	r = 0.13
Gender	1				
Women			2.10	0.91	t = 2.06*
Men			2.57	0.81	
Number of Children	1	0-8	3.01	1.71	r = -0.06
Education	1	1-3	1.67	0.54	F = 0.02
Body Image	24	1-5	3.85	0.59	r = 0.76**
Self-care Skills	22	30-46	38.68	4.18	r = 0.39**
Self-efficacy	22	1-5	2.91	1.20	r = 0.79**
Medical Variables					
Late Development of Surgical Complications	7	7-19	14.73	1.76	r = 0.22
Number of Comorbidities	1	0-13	3.16	2.06	r = -0.06
Number of Permanent Medications	1	0-15	5.11	3.52	r = -0.09
Mental Health- Anxiety	20	1-4	2.83	0.62	Rho = 0.59**
Social variables					
Social Support	12	1-7	5.10	1.35	r = 0.45**

$^*p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$

Table 3
Correlations between independent variables ($N = 75$).

Variable	Gender	Body Image	Self-care Skills	Self-efficacy	Mental Health (Anxiety)	Social Support
+Gender	1	−0.068	−0.091	−0.160	−0.149	−0.039
Body Image		1	**0.335	**0.695	**0.597	**0.490
Self-care Skills			1	**0.595	**0.299	0.032
Self-efficacy				1	**0.640	**0.497
Mental Health (Anxiety)					1	**0.514
Social Support						1

*$p < .05$ **$p < .01$ + Examined using Spearman correlation.

Table 4
Personal, medical, and social variables that explained the sense of quality of life among elderly patients with stoma – a hierarchical linear regression analysis ($N = 75$).

	B	SE B	β	F	R^2	$\triangle R^2$
Personal Variables						
Gender	−0.27	0.12	−0.14	*-2.26		
Body Image	0.63	0.13	0.43	***5.03		
Self-efficacy	0.33	0.06	0.47	***5.36	0.731	
Medical Variables						
Gender	−0.26	0.12	−0.14	*-2.19		
Body Image	0.59	0.13	0.40	***4.52		
Self-efficacy	0.30	0.07	0.41	***4.19		
Mental Health (Anxiety)	0.26	0.22	0.11	1.18	0.736	0.005
Social Variables						
Gender	−0.26	0.12	−0.14	*-2.16		
Body Image	0.59	0.13	0.41	***4.45		
Self-efficacy	0.30	0.07	0.41	***4.15		
Mental Health (Anxiety)	0.27	0.23	0.11	1.19		
Social Support	−0.01	0.05	0.02	−0.21	0.736	0.000

*$p < .05$ ***$p < .001$.

contexts between our study and those of others. The Israeli society is multicultural, i.e., the society as a whole features a variety of beliefs, opinions, social norms, and behaviors, which have a different meaning in each culture. Thus, for example, intercultural differences were found in the importance that different cultures or ethnic groups attribute to indirect and reserved behavior versus direct and extroverted behavior, as well as differences in the range of personal space required and in the amount of physical contact during interpersonal interactions (Berry, Segall and Dasen, 2002).

The finding that coincided with those of previous studies was the strong positive correlation between perceived body image and QOL (Brown and Randle, 2005; Manderson, 2005; Persson et al., 2004). Body image has been found to be among the major factors related to the QOL of people with stoma (Ross et al., 2007). The postoperative challenge is to construct a new identity capable of coping with the stoma. The trend of maintaining a beautiful body, as well as cultural and personal variables all affect the individual's body image that usually result in perceiving the stoma as *unnatural* (Persson et al., 2004).

Self-care skills were found to be positively associated with QOL. In order for people with stoma to return to routine life, self-care involves managing personal hygiene and dealing with bodily excrement. Brown and Randle (2005), reported that the level of self-care skills significantly predicted adaptation to stoma and was positively related to QOL. Moreover, it appeared that among older patients with stoma, self-care skills were even more important, because this population is already coping with other age related functional difficulties that might affect their ability to apply the necessary self-care skills (Brown and Randle, 2005).

Self-efficacy was found to be positively related to QOL. This finding is in line with those of former studies. A high degree of self-efficacy improves levels of motivation, ambition, and adherence to personal goals, and increases the amount of effort invested not only in performing the desired behavior, but also in facing difficulties and making adjustments when adopting said behavior (Bandura, 1977). Consequently, one's beliefs regarding self-efficacy can help monitor personal functioning and affect one's mental well being and QOL. Hence, people with stoma who aim to take responsibility for their self-care and believe that they have the skills to do so enjoy better postoperative QOL (Simmons, Smith, Bobb and Liles, 2007; Xu et al., 2018).

Anxiety was found to be negatively associated with QOL. This finding is in accord with those of previous studies, which examined the psychological effects of cancer on patients (Brown and Randle, 2005; Hodgkinson et al., 2007; Krouse et al., 2009). Anxiety develops as a result of a deficient cognitive process, whereby the perception, interpretation, and expectations regarding an event are neither rational nor adaptive (Kalisch et al., 2005). In the case of cancer patients with stoma, in addition to the aforementioned concerns, the anxiety is related also to the deep feeling of shame and to fears related to the loss of control, to incontinence and to the possibility of leakage and faulty equipment (Manderson, 2005; Persson et al., 2004; Savard and Woodgate, 2009).

Finally, positive correlation was found between social support and QOL. Studies report that high levels of social support and the availability of support sources in general, affect many aspects of the individual's life, exerting a positive effect in the majority of cases. Absence of social support has been shown to be related to greater vulnerability to outside stresses, which have been shown to affect mental health (Bachner, 2005). Brown and Randle (2005) report that patients with stoma who received low levels of social support experienced greater difficulties in adapting to the stoma than did patients who received high levels of social support.

Results of the linear regression analysis point to three variables that emerged significant in explaining QOL levels, namely, gender, perceived body image, and self-efficacy. These three variables are all belong to the group of the personal variables. Interestingly, in the current study, the medical and social variables, which typically play a significant role in strengthening the individual and facilitating the process of coping with and adapting to the stoma, were found to be less significant than the personal variables, a finding which is different from those of previous studies (Balboni et al., 2007; Bloom, Stewart, Chang and Banks, 2004).

5. Conclusion

Self-efficacy, perceived body image, and male gender are the most important factors that contribute to the QOL of older patients with stoma. These three personal variables are more significant to the patient's QOL than either the medical or the social variables.

5.1. Study limitations

Some potential limitations of our study need to be acknowledged. The number of participants was relatively small, especially given that multiple variables were examined. The small sample size also did not permit the inclusion of variables' subscales into the regression equation. Nevertheless, despite its small size, the sample included patients recruited from several hospitals. Moreover, the descriptive correlational study design did not allow for conclusions based on causal explanations—but rather examination of associations between variables at a given point in time. Also of note, although we limited the data collection to 8–12 months postoperatively, we did not examine the exact time duration between the surgery and the interview which might have had an impact on the study findings. Finally, although we used validated and reliable measures intended for use with a population of patients with stoma, it should be noted that the data collected from the questionnaires were based on participants' self-reports. Given these limitations, future research should replicate our study with larger and more representative samples.

5.2. *Implications for theory and practice*

On the theoretical level, the ability of some of the personal variables to explain QOL levels of older patients with stoma contributes to an in depth understanding of the factors associated QOL of this population. Hence, future research need to continue investigate these variables (self-efficacy, perceived body image, and gender), as well as other personal variables such as patients' sense of control and optimism, which have been shown in previous studies to contribute to effective functioning and increase people's motivation for coping with various difficulties and challenges. An additional factor that should be examined in future studies is the ability of patients with stoma to communicate openly with significant others about the cancer and the stoma, as previous research has shown that the ability to express emotions and fears related to the disease correlated positively with measures of mental health (Bachner and Carmel, 2009). It is important to examine all of these variables in the framework of longitudinal studies that employ large representative samples, in order to examine changes over time and to draw causality related conclusions.

On the practical level, these findings may lead to the development of intervention programs intended to assist nurses and other healthcare professionals in improving the QOL of older patients with stoma. Such interventions should focus on helping patients increase their sense of self-efficacy and improve their perceived body image. Special attention need to be devoted to addressing female patients, as the findings indicated that their QOL levels were lower than those of male patients.

Conflicts of interest

None.

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