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Health Related Quality of Life, Perceived Stress, Depression, Perceived Social Support, Coping Strategies and Health Locus of Control in Patients with Gastrointestinal Cancer; A Path Analysis Study

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ABSTRACT

Aims Gastrointestinal (GI) cancer is commonly increasingly prevalent among Indians and improvement of health related quality of life (HRQOL) has been one of goals in health care for people living with cancer. The aim of this study was to examine the relationships between perceived Stress, depression, perceived social support, coping strategies and Health locus of control (HLOC) with health related quality of life (HRQOL) in patient with gastrointestinal cancer.

Materials & Methods In this cross sectional study 100 Indian patients with GI cancer were selected with convenience sampling method from Nizam's Institute of Medical Sciences (NIMS) Hospital in Hyderabad, India from July 2013 to September 2014. Data were collected using questionnaires. Relationships between variables were tested by path analysis, using SPSS/AMOS 23.

Findings Maladaptive coping directly and negatively correlated with HRQOL (β=−0.15), mediated by perceived stress. HRQOL of the patients with cancer, who used more maladaptive coping perceived more stress, was worse. Perceived Social Support directly and positively correlated with HRQOL (β=0.44) mediated by perceived stress and depression, demonstrating that patients with higher perceived social support experienced less stress and depression; therefore, they have better HRQOL. Depression (β=−0.40) and Perceived Stress (β=−0.22) directly and negatively correlated with HRQOL. Perceived stress was mediated by Depression. There was no significant association between HLOC and HRQOL.

Conclusion The important role of social support needs to be communicated to family members in home visits. Promoting Coping and Adjustment to cancer and Psychological intervention for preventing and treating depression is necessary.

Keywords Gastrointestinal Cancers; Quality of Life; Psychological Stress; Depression; Social-support; Coping Skills; Locus of Control

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Introduction

Gastrointestinal (GI) cancer is increasingly prevalent and found to be as high as 34.9% of all malignancies among Indians [1].

In recent years, the evaluation of health outcomes has shifted focus from medical efficacy and safety measures to inclusion of patient-centered outcomes, such as Health-Related Quality of Life (HRQOL). Improvement of HRQOL has been one of the goals in health care for people living with cancer [2]. HRQOL is as important to patients with cancer as is their life expectancy and other issues related to survival. Thus, it has assumed as new important evidenced in recent studies [3].

Several studies have attempted to identify factors that affect the quality of life. Psychological and socio-demographic variables as well as disease and medical treatment had significant influence on HRQOL [4-10]. Patients with cancer with less social support experience more mental illness and lower quality of life. In addition, poor HRQOL is associated with negative illness perception. Although, several studies have shown that HRQOL is related to perceived stress and ability to cope with stressors during illness, perceived social support, depression, health locus of control, and illness perception [11-15], but still associations between psychological factors such as social support, coping strategies, perceived stress, depression and health locus of control among patients with cancer need more study. However, in previous studies, there is some uncertainty concerning the role of HLOC and, likewise, the relationship between HLOC and psychological factors related to cancer are largely unknown [16].

Studies that examined HRQOL in patients with GI cancer are negligible. The existence of relationships among psycho-social factors, such as perceived stress, depression, social support, coping strategies, and health locus of control that influence HRQOL has been shown in various types of patients with cancer separately, but there are few studies that examined the multiple interaction and intermediate role of these variables among patients with GI cancer.

Therefore, a better understanding of psychosocial factors related to HRQOL, leading to timely treatment, reduces the effects of cancer and its complication, contribute to improve survival, and HRQOL in patients with GI cancer. More Information and knowledge in this field lead to improvement of treatment methods.

To improve the efficacy of strategies or interventions that affect HRQOL and also to minimize the impact of GI cancer and its complication, it is important to clarify how psychosocial factors are linked to HRQOL.

Modeling relationships between psychosocial factors and HRQOL may provide important theoretical and clinical knowledge to improve the care of patients with GI cancer.

The principal aim of this study was to assess the effects of multiple interactions of perceived stress, depression, perceived social support, coping strategies, and health locus of control with HRQOL of patients with GI cancer, using path analysis.

Materials and Methods

The present cross sectional study was conducted from July 2013 to September 2014. Considering the prevalence of cancer (5-7 per 100,000 women) [17] and d=0.05, the sample size consisted of 100 patients, who suffered from GI cancer (esophagus, stomach, small intestine, colon, and rectum); the patients were selected with convenience sampling method from Nizam's Institute of Medical Sciences (NIMS) Hospital in Hyderabad, India.

Eligible participants were (a) within 6 to 12 months of a GI cancer diagnosis, (b) not diagnosed with another type of cancer, and (c) 40 years or older.

Patients who had cognitive problems or were too sick to participate in the interview were excluded. Data were obtained by face-to-face interview.

Demographic data: Data on demographic features were collected to assess the patients' characteristics, including age, gender, education, income, marital status, location, and type of family.

Short form 36 items (SF-36): The health-related quality of life was assessed, using short form 36 items (SF-36), including Physical Component Summary (PCS) and the Mental Component Summary (MCS), and 8 domains: physical function (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH), all scored from 0 to 100 with higher scores, indicating better health status [18].

Perceived Stress Scale (PSS14): Perceived Stress Scale (PSS14) is a psychological instrument for measuring the perceived stress. It is a measure of the degree to which situations in one's life are appraised as stressful. The questions in the PSS inquire about feelings and thoughts during the previous month. The highest score of PSS-14 determines the highest level of stress perceived by the respondents [19].

Center for Epidemiological Studies-Depression (CES-D): Depression assessed using the Center for Epidemiological Studies-Depression (CES-D) was originally published by Radloff in 1977; it is a 20-item measure that asks caregivers to rate how often over the past week they experienced symptoms associated with depression. Responses to the CES-D are rated on a 4-point scale, and the instrument total score ranges from a minimum score of 0 to a maximum score of 60. CESD scores of 16 to 26 are considered indicative of mild depression and scores of 27 or more are indicative of major depression [20].

Multidimensional Health Locus of Control Form C (MHLC - C): Form C of the Multidimensional Health Locus of Control Scales (MHLC-C) is an 18-

item that investigates the health-related control beliefs of persons with an existing medical or health-related condition. There are 4 subscales of the MHLC-C: Internal Health Locus of Control (IHLOC), Chance Health Locus of Control (CHLOC), Other People Health Locus of Control (OHLOC), and Doctor's Health Locus of Control (DHLOC). Responses are asked to rate, on a six-point Likert scale, the degree to which they agree or disagree to each statement. Scale scores on the MHLC – C are calculated by summing respective items for a total scale score. Higher scores indicate a stronger belief in that type of control [21].

The Brief COPE: The Brief COPE is one of the most frequently used self-report questionnaires, assessing a number of different coping behaviors and thoughts a person may have in response to a specific situation.

It is made up of 14 subscales: self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. In this study, the 14 coping scales were classified into adaptive versus maladaptive coping strategies [22].

Multidimensional scale of perceived social support assessment (MSPSS): This scale was developed by Zimet *et al.*; it is a 12-item on a 7 point Likert scale, including measure the degree to which a person feels that they are receiving social support in areas of their lives. Higher scores indicate higher perceived social support [23].

The data were collected through the above-mentioned research measurement scales and interpreted in the light of the objectives of the study by SPSS/AMOS (version 23.0) Software.

In order to provide basic information about variables of interest, simple descriptive statistics such as frequency, percentage in tables, and graphs were applied. The HRQOL was dependent and other variables were examined as independent variables. The direct and indirect effects of independent variables on the dependent variables were calculated, using path analysis.

Findings

Some of the patients' characteristics are presented (Table 1). The total score of HRQOL and all subscales was 46.97±5.08, being below the average score of 50; Vitality (41.52±6.77) was the lowest score followed by Bodily pain (43.96±4.23). Social Function (49.41±6.25) and Mental Health (47.16±5.11) were the highest scores, respectively.

Among the demographic variables, the mean HRQOL in married persons (42.72±6.58) was significantly more than single ones (33.61±6.04; t=- 5.84; p<0.01). The mean quality of life in joined family (42.95±8.05) was significantly more than the extended family (37.54±6.88; F=5.56; p<0.01). There was no relationship between age, income level, and gender with HRQOL (p>0.05).

Table1) Basic characteristics of the patients (n=100)

Variables	Frequency	Percentage
Age (years)		
40-49	9	9.0
50-59	39	39.0
60-69	37	37.0
70 and greater	15	15.0
Gender		
Male	53	53.0
Female	47	47.0
Marital status		
Married	78	78.0
Not married	22	22.0
Education status		
upto10th class	80	80.0
College	20	20.0
Income (USD) per month		
<150	74	74.0
≥150	26	26.0
Location		
City	41	41.0
Village	59	59.0
Type of family		
Nuclear	13	13.0
Extended	37	37.0
Joint	53	53.0
Perceived stress		
Low	37	37.0
Moderate	46	46.0
High	17	17.0
Depression		
Low	18	18.0
Moderate	39	39.0
High	43	43.0
Perceived social support		
Low	6	6.0
Moderate	40	40.0
High	54	54.0

The HRQOL had the most correlation with perceived social support (r=0.78) and the least correlation with maladaptive coping (r=-0.23; Table 2).

Table 2) Correlation matrix of study variables

Variables	1	2	3	4	5
1- Maladaptive coping	1				
2- Perceived Social Support	-0.24**	1			
3- Depression	0.29**	-0.66**	1		
4- Perceived Stress	0.66**	-0.52**	0.52**	1	
5- IHLOC	-0.13	0.12	-0.28**	-0.16	1
6- HRQOL	-0.23*	0.78**	-0.77**	-0.57**	0.25**

*significant at the 0.05 level; **significant at the 0.01 level

The fitness of model was perfectly acceptable. The most commonly used methods for assessing goodness of fit in initial model were RMSEA and X2. Root Mean Square Error of Approximation (RMSEA) calculates the size of the standardized residual

correlations, theoretically ranges from 0 (perfect fit) to 1 (poor fit), and "Chi-square" compares the observed variance-covariance matrix to the predicted variance-covariance matrix, theoretically ranges from 0 (perfect fit) to +∞ (poor fit).

RMSEA showed the appropriate model fitness (0.122). Also, X2 as the most important index of model fitness was 2.46. Insignificance of this index showed conceptual models' fitness (p>0.05).

In the next step, the direct and indirect effects of study variables were evaluated on HRQOL (Table 3).

Table 3) Regression weights of direct and indirect effects of variables of the model

Effects of variables of the model	Direct	Indirect
Maladaptive coping on HRQOL	-0.15*	-0.19**
Perceived Social Support on HRQOL	0.44**	0.35**
Depression on HRQOL	-0.40**	-
Perceived Stress on HRQOL	-0.22**	-0.10**
IHLOC on HRQOL	0.07	-
Perceived Social Support on Depression	-0.54**	-0.10**
Perceived Stress on Depression	0.24**	-
Maladaptive coping on Perceived Stress	0.60**	-
Perceived Stress on Perceived Social Support	-0.41**	-

"-" indicates an indirect effect not estimated.
*significant at the 0.05 level; **significant at the 0.01 level

The relationships between HRQOL and maladaptive coping (β=−0.15), Perceived Social Support (β=0.44), depression (β=−0.40), and perceived stress (β=−0.22) were significant (p<0.05) by standardized coefficient estimates for the paths. Perceived Social Support was positively related to HRQOL, but maladaptive coping, depression, and perceived stress negatively affected the HRQOL. Maladaptive coping (β=0.60) and perceived social support (β=-0.41) were significantly related to perceived stress (p<0.05). The model demonstrated that IHLOC was not significantly associated with HRQOL (β=0.07; p>0.05). According to the results, 75.0% of the HRQOL variation is explained by study variables.

The approved and final model of path analysis is presented in Figure 1.

Discussion

This study aimed at examining a multifactorial path model to assess the relationship between perceived social support, coping strategies, perceived stress, depression, and HLOC with HRQOL in patients with GI cancer.

Simple univariate correlation model showed that the HRQOL had the most correlation with perceived social support, followed by depression and perceived stress. Maladaptive coping had the lowest correlation with HRQOL.

Cancer is still considered one of the most dreaded chronic diseases. Suffering from physical and psychosocial vulnerability puts individuals at greatest risk for depression. It exacerbates a series of problems for individuals with GI cancer. Depression is an important factor related to disability in patients with cancer and adds it to the suffering that patients already endure. These psychological disorders affect the acceptance of treatment and compromise its curative effect on patients. Depressive symptoms are common in patients with cancer and occur in response to psychosocial vulnerabilities, physical suffering, and proximity to death.

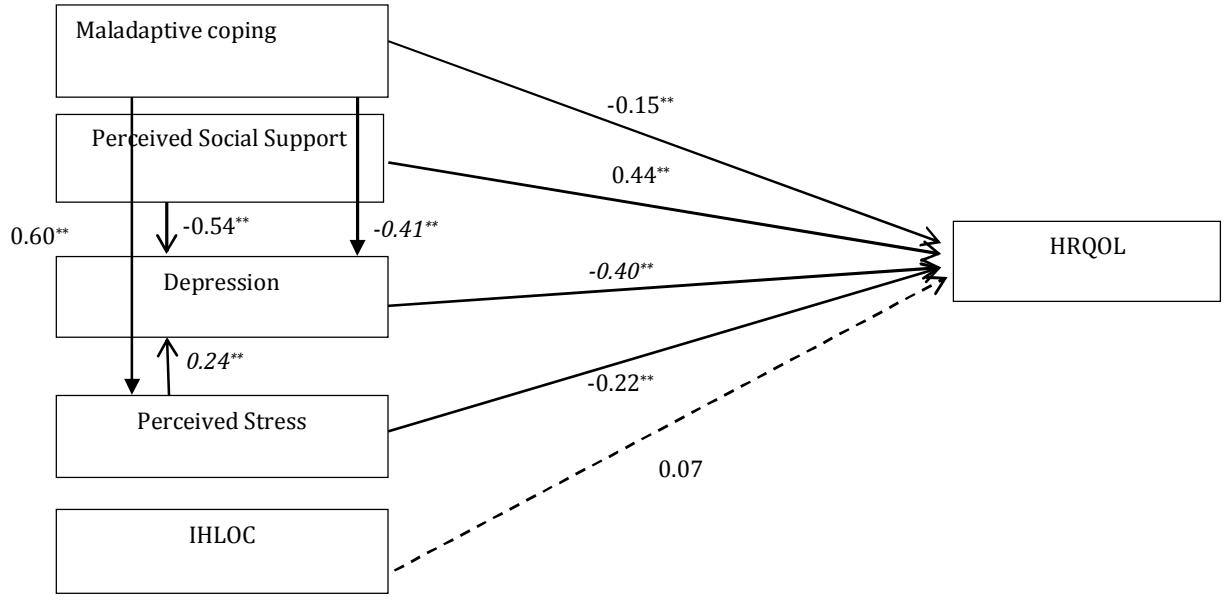

Figure 1) Approved and final model of path analysis for factors affecting the HRQOL in patients with GI cancer

The key findings of this study were that maladaptive coping directly and negatively correlated with HRQOL. Perceived stress mediated the relationship between maladaptive coping and HRQOL, demonstrating that patients with cancer, who use more maladaptive coping, have perceived more stress and, therefore, their HRQOL was worse.

Perceived social support directly and positively correlated with HRQOL. Perceived stress and depression mediated the relationship between perceived social support and HRQOL, demonstrating that patients with higher perceived social support experienced less stress and depression; therefore, they have better HRQOL.

Depression directly and negatively correlated with HRQOL, showing that patients with cancer with more level of depression had worse HRQOL.

Perceived stress directly and negatively correlated with HRQOL. Depression mediated the relationship between perceived stress and HRQOL demonstrating that patients with more perceived stress suffered from the high level of depression; therefore, their HRQOL was worse.

The results of path analysis model show no significant association between IHLOC and HRQOL.

The findings of the present study support prior research studies demonstrating that perceived social support, maladaptive coping, depression, and perceived stress influence HRQOL [24-27].

The diagnosis of cancer, its treatments, and complications are great sources of stress for the patient.

According to the conceptual model of stress [28], it may affect patient's psychological and physiological adaptation [29]. Patient understanding of disease and strategies to cope with stress and perceived social support are important to cognitive reconstructions, gaining control on the disease and consequently improve his/her HRQOL [30-32].

Changes in appearance and body image, impaired self-esteem, decreased energy, and limitations in daily activity because of pain may lead to depression and reduce HRQOL.

Patients who received more social support showed better results in HRQOL. More Perceived support may improve the patient's mental process in order to overcome cancer. Cognitive reconstruction and improving patient's resilience provide several ways of problem solving and enhance the patients' ability to cope with stress and improve their HRQOL.

In line with the results of the present study, several studies have shown that maladaptive coping strategies were associated with decreased quality of life [33-35].

Adaptive coping helps to mitigate psychological pressure and improve patient self-esteem, whereas maladaptive coping led to poorer adjustment to diagnosis and treatment, and decreased HRQOL [36].

In addition, getting more social support and using different ways to cope with cancer, planning, and solving related problems are linked to adaptive coping and better HRQOL.

Therefore, coping skills could be developed by psychoeducational programs and as a result, affect the level of depression, stress and HRQOL.

In present study based on simple univariate correlation model, significant correlation was found between HRQOL and IHLOC. This finding is in line with studies that failed to support the relationship between HLOC with HRQOL [37].

The results of path analysis model showed no significant association between IHLOC and HRQOL. This finding is not consistent with findings from other studies, showing that a high level of IHLOC is associated with better HRQOL [38, 39].

In order to explain this finding we can say that gaining control on the disease and being able to actively contribute to the treatment is socio-culturally dependent, so that different cultures may lead to different types of perceived locus of control.

Furthermore, several studies showed that environmental factors are linked to HLOC. In some patients with cancer, who lived in urban areas, more use of other powerful HLOC predicted low levels of HRQOL [40].

The important role of assessing the HRQOL in patients with cancer, if communicate with health administrators, can create awareness among treating medical care personnel and increase efforts to provide better facilities to such patients.

Patients with cancer should be continuously observed for physical and psychosocial functioning.

Psychological intervention for preventing and treating depression and coping with several stressors that threaten the HRQOL of patient with cancer is necessary.

The important role of social support needs to be communicated to family members in home visits after discharge from hospital.

The family is still a major support source for chronic disease patients though the current trend is changing with more and more families using other care providers.

The current study has some limitations. First, we collected data only from a central hospital in Hyderabad and using a convenience sampling limits the generalizability of the findings.

Since this study was cross sectional design, the relationship found between variables studied cannot be assumed to be causal.

Conclusion

The important role of social support needs to be communicated to family members in home visits. Promoting Coping and Adjustment to cancer and Psychological intervention for preventing and treating depression is necessary.

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Ethical Permission: The present study was approved by the Ethics Committee of the Nizam's Institute of Medical Sciences (NIMS) Hospital in Hyderabad, India in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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Informed consent was obtained from all individual participants of the study.

Conflicts of Interests: The authors declared that they have no conflict of interest.

Authors' Contribution: Malekzadeh M. (First author), Introduction author/Methodologist/Original researcher/Statistical analyst/Discussion author (40%); Hashemi mohammadabad N. (Second author), Introduction author/Original researcher/Discussion author (35%); Vazir Sh. (Third author), Introduction author/Methodologist/Original researcher/Statistical analyst/Discussion author (35%)

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