

Effect of Percutaneous Coronary Intervention (PCI) on Quality of Life in Patients with Stable Coronary Disease

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ABSTRACT

Background: The most popular form of treatment for coronary disease is percutaneous coronary intervention (PCI). Along with recurrence rates and mortality, quality of life (QoL) is a crucial PCI outcome indicator.

Purpose: The purpose of this research was to look at the variables affecting individuals with coronary disease who had undergone PCI's quality of life.

The cardiac center of the hospital provided a convenient sampling for this descriptive, cross-sectional research. On a population of 630 patients who had coronary disease, this research was carried out utilizing a standardized questionnaire and individual medical data. Information on general, medical, and psychological traits was gathered using the questionnaire. Descriptive statistics, the independent t-test, one-way variance analysis and Scheffé test were all used to analyze the data. The significant variables in univariate analysis were combined with the key parameters found in a multiple linear regression to identify the factors that strongly affected QoL.

Results: We discovered that age, subjective economic status, being the primary caregiver, time since the first PCI, anxiety, and depression all significantly influenced QoL. The Age, primary caregivers and marital status were the strongly significant variables that were proven to have an impact on QoL in patients who had gone through PCI. The period since the initial PCI was among the main clinical factors that were proven to have an impact on QoL. Depression and anxiety were among the important psychosocial traits that were found to have an impact on quality of life. The study's PCI patients' primary caregivers were shown to have the biggest influence on their quality of life.

Conclusions: Patients' post-PCI psychological and physical symptoms must be frequently evaluated in order to improve QoL in those who had underwent PCI. In addition, patients with significant functional impairments and those getting family care need intervention measures that aim at enhancing quality of life.

Abbreviations

- Left ventricular ejection fraction – LVEF
- Myocardial infarction - MI
- Quality of Life – QoL
- Coronary Disease – CD
- Diseased Vessels – DV/DVs
- Coronary Artery Bypass Graft - CABG

INTRODUCTION

After cancer, cardiovascular disease comes in second as the most common cause of mortality. CD causes coronary arteries to constrict, which reduces blood flow to the myocardium (Sidik et al., 2019). The majority of CD treatments, including medication therapy and percutaneous coronary interventions (PCIs) such as balloon dilation or stent implantation, account for more than 80% of all CD-related treatments (Healthcare Bigdata Hub, 2020).

Contrary to coronary artery bypass graft, PCI has a number of benefits, including quicker recovery, more rapid treatment outcomes, greater success rates, as well as lower postoperative mortality rates (Moreno et al., 2020). Additionally, the recently developed drug-eluting stent has decreased the restenosis frequency to 5 to 15 per cent, while the incidence of in-stent restenosis of bare metal stents is sixteen to forty-four percent (Liou et al., 2016). Furthermore, individuals with prolonged abnormalities, tiny veins, kidney disease, ostial lesions, or side branch lesions had a 10 to 20 per cent overall prevalence rate of restenosis (Suzuki et al., 2018). Additionally, patients having PCI have a risk of sudden mortality that is 4 to 6 times higher than that of the general population (Zaman and Kovoor, 2014). Therefore, it has been noted that these patients' quality of life (QoL) has declined even after having PCI, as seen by their activity limitations, emotional instability, and worsened social engagement (Murphy et al., 2019).

QoL is a crucial outcome measure for individuals who have received PCI, together with death and recurrence rates (Van

Nguyen et al., 2021). The percentage of chronic conditions (such as diabetes, hypercholesterolemia, and high blood pressure), the number of diseased vessels, the percentage of PCI methods, the left ventricular contraction rate, as well as physical activity levels are just a few clinical factors that have been revealed to affect QoL in such patients (Höfer et al., 2005). High levels of stress have also been noted in PCI sufferers (Murphy et al., 2019), and QoL was found to be negatively connected with the presence of anxiety and depression in PCI participants (Liu et al., 2018). Additionally, psychosocial elements like family and societal support greatly impact the quality of life (Li et al., 2019). There are, although, few research studies that have been done in which the medical, general, and psycho-social factors that affect post-operative QoL in patients receiving PCI have been recognized. As a result, the goal of this study was to pinpoint the variables that affect QoL postoperatively in CD patients having PCI, as well as to gather data that may be used to create health care and intervention strategies.

Research Methodology:

Research Design: The goal of this cross-sectional research was to discover the variables that affect individuals with CD who undergo PCI's quality of life.

Data Collection: As soon as the hospital gave its consent, data collection began. The researcher, along with a couple of research associates who the analyst had instructed in advance regarding the questionnaire's content and distribution procedures, handed out a questionnaire to the participants. Data were gathered

between September 2020 to February 2021. After receiving a briefing on the study's goals, each participant gave informed consent. Each participant took around 15 minutes to complete the questionnaire and was given a small gift as a thank you. After receiving permission from the hospital health information centre, clinical data, such as the diagnosis, timing of the diagnosis, the number of diseased vessels, the presence of comorbidities, and the quantity and length of PCI, were extracted from patient records.

Research Instruments: In this study, information on the participant's gender, age, marital status, level of education, perceived economic status, employment, and role as the primary caregiver was examined.

Aspects of Clinical Practice: A review of each participant's health records gathered medical evidence, including diagnosis, duration of diagnosis, number of PCI treatments, number of DV, time since the first PCI, number of comorbidities, and LVEF. This research concentrates on MI and angina in CDs for assessment. A patient was counted as having undergone a PCI treatment as many times as they had done other procedures. The total number of coronary arteries found to have shrunk at the time of diagnosis, as well as the period of this study, was used to specify the number of DVs. A coronary artery narrowing greater than 50 per cent was considered a blood vessel invasion. The time scale between the initial PCI as well as the start of this study was used to determine the timeframe since the first PCI. The total number of comorbid conditions, such as diabetes, high blood pressure, hypercholesterolemia, stroke, kidney problems, peripheral arterial disease, heart failure, as well as obstructive pulmonary disease, was referred to as the number of comorbidities. Following PCI, the most recent echocardiogram or cardiac catheterization is used to determine the LVEF, with the resulting number being given as the median for every range.

Psycho-social Attributes: The participant's psychological and social traits were evaluated using their anxiety levels, social support and depression.

Depression and Anxiety: The Depression and Anxiety Stress Scale was used in this research to gauge participants' levels of depression and anxiety (Zigmond and Snaith, 1983). A self-administered questionnaire called the Hospital Depression, and Anxiety Scale measures depression symptoms with seven even-numbered items as well as anxiety symptoms with seven odd-numbered items.

Social Support: In this study, the multivariate scale of psychosocial factors created by Zimet et al., (1998) was used to measure the level of social support. The associated author granted permission for the usage of this tool. This 12-item survey measures the amount of special assistance provided by friends, along with other sources (i.e., doctors, nurses, and other healthcare professionals). A 5-point scale is used to score each item, with one denoting strongly disagree and five denoting strongly agree. A range of one to five is the total potential means value, with a greater value suggesting more social support. The dependability of this instrument was first reported to be 2.49 Cronbach's alpha, though, in this investigation, it was 2.76.

Quality of Life: The Seattle Angina Questionnaire (SAQ), created and updated by Spertus et al., (2002) served as the basis for measuring the quality of life (QoL) in this investigation. Physical limitation, angina frequency, angina stability, and quality of life are the 4 domains that make up the SAQ. Due to each domain's independence, only domain scores or total or mean domain scores were computed. In this study, QoL was precisely measured using the QoL domain. Higher scores indicate better quality of life in this area, which employs a 5-point Likert scale with item values added and transformed to a scale of 100. At the time of development, Cronbach's alpha was stated to be 2.34; in this study, it was 2.28.

Analysis of Data: In order to evaluate the gathered information, IBM SPSS Statistics 22.0 was used. Descriptive statistics describe the individuals' general characteristics as occurrences, proportions, means, and standard deviations. The Independent t-test, One-Way ANOVA, and Scheffé test were used to examine the connection between sample characteristics and QoL. Cronbach's alpha was used to gauge the dependability of the instruments. The important variables from the univariate analysis were combined with a multivariate linear regression to identify the factors affecting respondents' QoL.

RESULTS

Participants in this study were 162 women (25.9%) and 468 males (74.4%). The average age was 69.16 years (SD = 9.19); 576 (92.1 per cent) of the population were married; 243 (38.7 per cent) had completed high school, and 219 (34.2 per cent) had gone on to further education; 321 (52 per cent) thought their economic situation was modest; 528 (83.9 per cent) were unemployed at the time. Additionally, 18 individuals (3.1 per cent) engaged in self-care, while 297 participants (47.9 per cent) identified their spouses as the major caretaker (Table 1).

Table 1: shows participant general, medical, and psychosocial traits as well as variations in the quality of life (N = 630).

Variables	N	Percentage	Quality of Life		t-test	p-value
			Mean	Std. Deviation		
General Characteristics						
Gender					4.2	0.489
Male	468	74.4	77.11	17.16		
Female	162	25.9	74.57	18.15		
Age (years, Mean & Std. Deviation)	69.16	9.19			13.86	0.012
Less than 50	45	7.2	62.41	23.12		
51 to 60	132	22	78.19	17		
61 to 70	276	41.9	79.79	15.1		
Greater than 70	177	27.9	77.1	18.1		
Marital Status						
Single	18	2.8	77.7	13.1	14.43	0.027
Divorced	36	5.6	61.80	17.1		
Married	576	92.1	9.1	17.1		
Qualification						
Elementary School	78	11.9	76.1	19.00	0.54	2.727
Middle School	90	14.9	77	18.1		
High School	243	38.7	77.8	16.73		
College or Above	219	34.2	77.7	16.93		
Economic Status						
Lower	84	13.9	69.1	19.2	10.59	0.093
Moderate	321	52	78.1	19		
Higher	225	34.9	79.1	14.2		
Employed						
No	528	83.9	77.20	17.00	0.96	2.238

Yes	102	17.9	79.1	18.18		
Caregivers					19.92	< 0.003
Partner	297	47.3	77.1	18.1		
Kids	60	9.5	64	20.5		
Others	255	41.8	82.1	15.1		
Self-Care	18	3.1	80	14.18		
Medical characteristics						
Diagnosis					-5.07	0.279
Chest pain or Angina	423	68.0	75.98	17.36		
MI	207	33.1	81.1	16.5		
No. of PCI					1.92	1.59
1	489	77.0	77.89	17.4		
2	111	18.1	76.12	19.14		
Greater than 3	30	5.0	72	18		
Diseased vessels					0.33	2.679
1	252	40	78.14	18.13		
2	180	26.9	77.6	19.1		
Greater than 3	198	32.4	77.7	17.1		
Time span since 1 st PCI (years/mean/standard deviation)	16.56	4.19			11.22	0.036
Less than 1	93	14.9	74.1	19.7		
1 to 3	153	23.9	72.3	18.89		
4 to 6	147	22.9	79.1	17.14		
Greater than 7	237	36.1	80.12	14.81		
Comorbidities					0.99	2.403
0	18	2.8	71.1	14.1		
1	186	29.7	76.7	18		
2	249	39.6	78.1	18.14		
Greater than 3	177	29.0	77.21	17.13		
LVEF (Percentage)					0.24	2.757
Less than 50	519	83.1	84.4	15.0		
40 to 50	72	12.1	85.2	15.4		
Greater than 40	24	3.9	84.1	13.1		
Psycho-social characteristics						
Anxiety (Mean and Std. Deviation)	13.83	3.85			13.41	Less than .003
Less than 8			80	14.6		
Greater than 8			67.1	19.1		
Depression (Mean and Std. Deviation)	23.88	4.11			10.92	Less than .003
Less than 8			82.2	17.9		
Greater than 8			77	17		
Social support (Mean and Std. Deviation)	32.58	1.2			9.54	1.32
Lower (1 to 2.9)			73	18.2		
Moderate (3 to 4)			83.4	14.24		
Higher (4.1 to 5)			96.1	18.18		

Medical Identifiers: Two hundred seven respondents (33.1 per cent) and 427 individuals (68 per cent), respectively, experienced MI and angina; 499 (77 per cent) had only experienced one PCI surgery; and 252 (40 per cent; the biggest group) had one damaged artery. The average time from the initial PCI was 1 year months (SD = 4.20) for all individuals, and 237 patients got their first PCI more than a year prior. In addition, 177 participants (28.2 per cent) had 3 or more comorbidity, 186 (29.5 per cent) had one and 249 individuals (39.6 per cent) had two chronic conditions. 72 people (11.2 per cent) and 519 (82.2 per cent), respectively, had LVEF values between 40 and 50 per cent. Four hundred sixty-eight individuals (74.1 per cent) and 141 (22.5 per cent) were categorised as Class I and Class II, respectively (Table 1).

Psychological and Social Traits: The individuals' respective mean ratings for depression, anxiety, as well as social support, were 10.86 (SD = 1.86), 13.83 (SD = 4.1), and 23.07 (SD = 4.11).

Association between Respondent Characteristics and QoL: The subjects' total means QoL score was 71.19. Age, relationship status, subjective financial status, and primary caretaker all substantially impacted quality of life regarding general characteristics. Participants who evaluated their economic situation as moderate, as well as who practised self-care or were dependent on non-family caregivers compared to participants who had a family caregiver, reported a significantly higher quality of life than

respondents who've been younger or who were divorced or married (p less than 0.003).

Medical characteristics differed significantly by time since the beginning in terms of QoL. Respondents whose first PCI was about 1 year months ago reported substantially greater QoL than those whose first PCI occurred more recently (p = 0.036).

Table 2: Factors that can Affect QoL after Percutaneous Coronary Intervention (N = 630)

Variables	Standard Error	β	t-test	p-value
Intercepts	35.7		12.15	Less than 0.003
Age	0.33	0.48	8.01	0.024
Marital Status	6.51	.39	6.18	0.123
Economic Status	9.12	.36	5.7	0.18
Caregivers	2.94	.57	9.12	0.009
Time Span from 1 st PCI	0.72	.45	7.68	0.033
Anxiety	0.90	-.51	-7.71	0.033
Depression	0.90	-.54	-7.53	0.039
Social Support	4.47	0.12	2.01	1.506

In respect of psychosocial traits, anxiety, depression, and social support were the three variables that showed the greatest variation in QoL. Participants with depression and anxiety scores under 24 had a higher quality of life than those over 24. Respondents who experienced more social support compared to

those who did not report having a significantly better quality of life (QoL) ($p = 0.132$).

Factors Affecting Quality of Life: In order to identify the factors affecting participants' quality of life (QoL) according to independent variables, such as all of the general, clinical, and psychosocial features, multiple regression analyses were carried out (Table 2). The multiple regression models investigated the occurrence of multi-collinearity and autocorrelation among the predictor factors.

Age ($\beta = 0.48$), married status ($\beta = 6.51$), care givers ($\beta = 0.57$), length from first PCI ($\beta = 0.45$), depression ($\beta = -0.54$) and anxiety ($\beta = -0.51$) were found to be the factors impacting QoL in the multiple linear regression analysis. Both subjective financial conditions and support networks had no discernible effects on QoL. Additionally, among all the characteristics evaluated, the primary caregiver was found to have the biggest impact on QoL. In terms of describing the variation in QoL, the regression model has a 29 per cent explanatory power.

DISCUSSION

The general, medical, and psychological aspects that affect patients' quality of life after receiving PCI were discovered in this research. This research's 71.71 total mean QoL score was greater compared to Fakhrazad et al., (2016), who focused on individuals who had their PCI at least 6 months prior. After PCI, Jankowska-Polaska et al., (2016) noted continual improvement in QoL (Denvir et al., 2006). Ybarra et al., (2017) found that patients who experienced severe cardiac problems (MI, target vessel revascularization, CABG and mortality) within a year of receiving PCI had a poorer quality of life than those who did not. Therefore, QoL may vary based on the extent to which patients have surgical complications. This emphasises how crucial it is to divide patients into groups based on their postoperative health and pinpointing the variables influencing each group's QoL. Age, marital status, caregiver, and subjective economic state were strongly correlated with QoL when the link between the quality of life and patient characteristics was examined. Compared to the older age group, QoL was lower in the group of those under 50. This finding contrasts with a prior study (De Smedt et al., 2013), which discovered that QoL declines with ageing in CD patients. According to Lv et al. (2016), younger and middle-aged sufferers who experience PCI treatment might be more anxious about their lives and the potential repercussions of the surgery on their job and social lives than older patients, which could result in a considerably poorer QoL. Therefore, support and intervention programmes that involve counselling services must be made available to alleviate this concern in middle-aged and young patients undergoing PCI treatments and assist avoid recurring illness.

In this research, married individuals and those who practised self-care were shown to have good QoL. In a recent study, married participants showed better life satisfaction, stronger ambition, and higher treatment adherence following PCI (Kähkönen et al., 2018). Similarly, those with chronic cardiovascular disease discovered purpose in life by caring for themselves each day to regain their well-being (Nordfonn et al., 2019). Sincere support and encouragement from medical practitioners are required to promote self-care behaviours and enhance patients' quality of life (QoL) following PCI. It was found that subjective financial position and quality of life were positively correlated, which supports earlier research conclusions (Denvir et al., 2006). Socioeconomically disadvantaged patients with CD have been linked to more mortality rates, increased recurrence rates, and worse postoperative quality of life (Moissl et al., 2020). Lower economic levels and individuals with CD who are experiencing severe emergencies need to be given special attention from the public system in order to ensure that they receive the care required to maintain their quality of life (QoL).

CONCLUSIONS

Age, marital status, being the main caretaker, time since the first PCI, depression and anxiety were discovered to significantly impact patients' quality of life (QoL) who had undergone PCI operations in this research. These findings highlight the significance of thoroughly evaluating psychological and physical symptoms in individuals right away following PCI in order to enhance QoL. Counteractive actions are especially required for patients with severe functional impairments and those getting family support in order to improve their quality of life (QoL).

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