

## REVIEW ARTICLE

# The Quality of Life Among Coronary Heart Disease Patients After Percutaneous Coronary Intervention: A Scoping Review

Faizal Musthofa<sup>1</sup>, Yanny Trisyani<sup>2</sup>, Ristina Mirwanti<sup>2</sup>

<sup>1</sup> Faculty of Nursing, Universitas Padjadjaran, 45363, Bandung, West Java, Indonesia

<sup>2</sup> Department of Critical Care Nursing and Emergency, Faculty of Nursing, Universitas Padjadjaran, 45363, Bandung, West Java, Indonesia

## ABSTRACT

The purpose of this study was to identify a description of the Quality of Life (QoL) of coronary heart disease (CHD) patients after percutaneous coronary intervention (PCI). It used scoping review with a content analysis approach. CINAHL, Science Direct, and PubMed have systematically searched inception. The inclusion criteria in the study were that the article journal that published with the range 2010 to 2020 in English. The results obtained are 451 studies. After the analysis, We obtained 22 sources with study findings. Most of the literature evidence shows a significant improvement in the QoL in CHD patients after PCI. Still, the QoL is influenced by demographics, clinical variables, CHD severity, and comorbid diseases. The QoL after PCI increased optimally in the first month and decreased in the following month. Therefore, Nurses and other health workers must consider maintaining a healthy lifestyle to optimize the QoL after PCI.

**Keywords:** Coronary heart disease, Percutaneous coronary intervention, Quality of life

## Corresponding Author:

Yanny Trisyani, PhD

Email: yanny.trisyani@unpad.ac.id

Tel: +6281222073465

## INTRODUCTION

Coronary heart disease (CHD) is a fatal non-communicable disease that affects the quality of life. CHD patients experience shortness of breath, chest pain, and easy fatigue. Suffering was due to blockage of the coronary walls by fatty deposits or oxidized cholesterol, disrupting the blood supply to the heart (1). In addition, this condition causes the patient to experience physical, psychosocial, and spiritual symptoms that impact their quality of life (2). As a result, these conditions have a negative effect on the quality of life. Therefore, they must be treated with a revascularization strategy to restore vascular blockage, one of which is percutaneous coronary intervention (PCI).

PCI can improve the quality of life in CHD patients. However, Abdallah et al. (2013) found that quality of life is only felt between two months and two years after PCI treatment and that the benefit after two years is likely to be small or decreased (3). Several factors influence the possibility of decreasing PCI's Effect on quality of life, including demographics, lifestyle, and complications (4,5). No study has scope reviewed the quality of life after PCI among CHD. Therefore, this study aims to further identify the quality of life of CHD patients after PCI. It is hoped that nurses and other health workers will

consider this review in maintaining the Effect of PCI on the quality of life of CHD patients. The scoping review methodology is appropriate for this topic because it comprehensively examines the quality of life after PCI among CHD patients. The scoping review started with a broad research subject refined throughout the study procedure to allow more thorough analyses of effectiveness outcomes. The first study question that informed the initial search process was: What factors affect the quality of life after PCI among CHD patients, and how long does the intensity of the quality of life after PCI?

## METHOD

### Design

This study uses a scoping review method (6) conducted and reported using Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist and explanation (7).

### Search Methods

The literature search used three databases, namely CINAHL, Pubmed, and Science Direct. The literature search was conducted by keywords: coronary heart disease, percutaneous coronary intervention, quality of life.

### Eligibility criteria

The PEO (Population, Exposure, and Outcome) Framework is used to determine the study's feasibility

(Table I) (6). Furthermore, articles with qualitative and quantitative research with full text with vulnerability in 2010-2020 are available in English.

**Table I. PEO framework the quality of life among CHD patients after PCI: a scoping review**

PEO Framework	Inclusion criteria
<b>Population</b>	The study focused on Coronary Heart Disease Patients after PCI.
<b>Exposure</b>	Studies examining Percutaneous Coronary Intervention (PCI)
<b>Outcome</b>	The studies which describe the quality of life of CHD patients.

**Data collection and analysis**

The author carried out the study selection process following the PRISMA-ScR, including 1) identifying duplicate articles, 2) filtering by title and abstract, 3) full-text availability, and 4) full-text filtering based on eligibility criteria. Then, data is processed or extracted manually from study results using tables and analyzed based on content analysis. This content analysis method identifies in-depth the information written in the literature. Relevant data is data that is included in data items. The authors conducted a literature analysis and collected literature according to the research topic. Then the authors grouped the literature presented in tabular form. Furthermore, the author summarizes the results that have been selected, then reports into the results and discussion.

**RESULTS**

**Description of study findings**

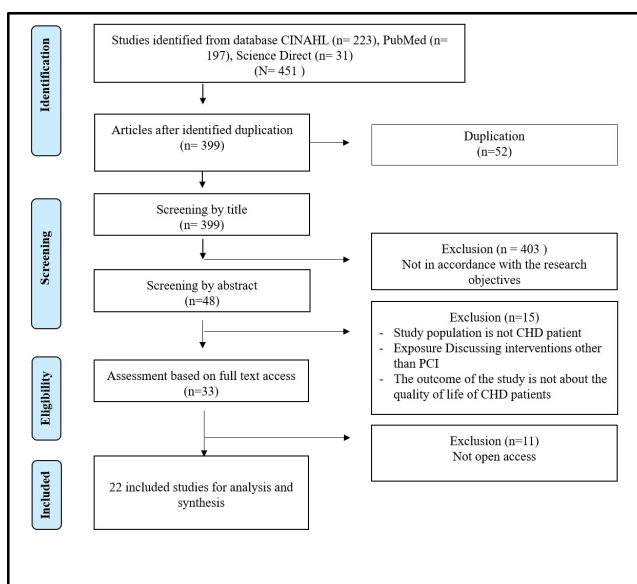
According to the search results, we found 451 studies in the electronic databases CINAHL (n=223), Pubmed (n=197), and Science Direct (n=31). Thus, we eliminated four hundred nineteen studies as irrelevant and duplicated. The authors also screened 32 studies and carried out ten studies that did not have full-text access. As a result, the author included 22 studies for analysis and synthesis in this study (figure 1) (8–29).

**Study characteristic**

All the research articles used in this scoping review study were studies published between 2010-2020, 22 studies were identified by design Meta-analysis (n=1), cohort (n=14), RCT (n=3), cross sectional (n=3). Studies from Iran (n=4), United States (n=8), Austria (n=1), Poland (n=1), China (n=2), Hong Kong (n=1), Korea (n=2), India (n=1), Netherlands (n=2), Canada (n=2). The study included 27,106 respondents (Table II).

**The quality of life of coronary heart disease patients after PCI**

The majority of studies found that CHD patients' quality of life improved after PCI. From the first to the sixth month, there was an increase in quality of



**Figure 1: Prisma flow chart diagram**

life based on increasing scores in angina frequency (13,19–22,26,27,29), physical limitations (13,19–21,27,29), physical function (10,16,17,21,23,24,26), treatment satisfaction (19,21) and social status (10,14,17,21,22,27). Meanwhile, a small number of studies describe a significant improvement in quality of life in CHD patients after PCI (8,9,12–15,24,25). For detailed findings of this review please refer to table III.

**Determinant factors affecting the quality of life of CHD patients after PCI**

The findings of this review show that demographics, clinical variables, CHD severity, and comorbid diseases are all determinants that affect the quality of life of CHD patients after PCI (fig.2) (9,11,13,17,28).

**Analysis 1: demographic factors on patients' quality of life after PCI**

There was a link between gender and the quality of life of CHD patients after PCI, with women performing worse than men (12). According to Jankowska-Polaska et al. (2016), there were statistically significant differences in quality of life by sex at the first month, six-month measure, and long-term/follow-up for 36 months with evidence that women have a poor quality of life in all domains (16). Blankenship et al. (2013) found that women had more recurrent angina after PCI than men (11). Other demographic factors and gender influence the quality of life outcomes of PCI patients (9,11,13,28). Age and education are essential factors influencing the quality of life of CHD patients after PCI. According to Yan et al. (2018), age affects the quality of life, with evidence of an increase in HRQOL in the elderly after PCI until one year in all domains of various health fields (p<0.01) (28). According to (12), age influences the quality of life, as evidenced by a higher average quality of life score in the 41-50 year age group (129.59 ± 15.95) compared to the elderly group. Furthermore, patients with a high

**Table II: Characteristics of study**

Citation	Location	Age (mean)	Participant	Gender	Method
(8)	Korea	61,73	124 patients after PCI	(Male= 98, Female= 26)	<i>Cross sectional</i>
(9)	Iran	58.65 ±11.9	398 patients after PCI	(Male= 251, Female= 147)	<i>Cohort</i>
(20)	United States of America and Netherland	64±10	716 patients after PCI	Male =570	RCT
(23)	Austria	63±9,2	163 patients after PCI	Male =163	<i>Cohort</i>
(22)	The United States of America and Canada	68±9, 61±10	2.029 patients after PCI	Male =2029, Female =275	<i>RCT</i>
(24)	Iran	61.2 ± 8.7	290 patients after PCI	Male= 290	<i>Cohort</i>
(25)	China	60	649 patients after PCI	(Male= 484, Female= 165)	<i>Cohort</i>
(26)	United state	N/I	1149 patients after PCI	N/I	<i>Cohort</i>
(27)	United state	63	1.900 patients after PCI	Male =692	<i>Cohort</i>
(21)	United state	65	1800 patients after PCI	(Male= 1.366, Female = 434)	<i>RCT</i>
(28)	Hongkong	65-75	1957 patients after PCI	(Male= 1535, Female = 423)	<i>Cohort</i>
(29)	United States of America	57-66,6	2.765 patients after PCI	(Male = 1981, Female = 784)	<i>Cohort</i>
(10)	Iran	53,2±5	109 patients after PCI	(Male= 91, Female= 18)	<i>Cohort</i>
(11)	United state	N/I	7.818 patients after PCI and CABG	N/I	Meta-Analysis
(12)	Iran	57.7±0.65	106 patients after PCI	(Male= 32, Female= 74)	<i>Cross sectional</i>
(13)	Korea	63.7	3,362 patients after PCI	(Male= 2,312, Female= 1050)	<i>Cohort</i>
(14)	Netherland	63.4 ± 10.69	384 patients who underwent PCI	(Male= 303, Female= 81)	<i>Cohort</i>
(15)	Canada	61.9 ± 11.0	103 patients after PCI	(Male= 74, Female=21)	<i>Cross sectional</i>
(16)	Poland	63.4	137 ACS patients after PCI	(Male= 70, Female =67)	<i>Cohort</i>
(17)	China	Group A= 62.3 ± 5.39; Group B= 64.7 ± 6.82; Group C= 63.1 ± 7.83; Group D= 65.2 ± 6.74	166 multivessel CHD patients after transluminal PCI	(Male= 105, Female= 61)	<i>Cohort</i>
(18)	India	60.9 ± 10.8	35 patients after PTCl	N/I	<i>Cross-sectional</i>
(19)	United state	CTO= 63.5 ± 10.0 Non-CTO= 64.1 ± 11.1	2.688 patients after PCI with 167 CTO and 2521 non-CTO	(Male=1883, Female= 805)	<i>Cohort</i>

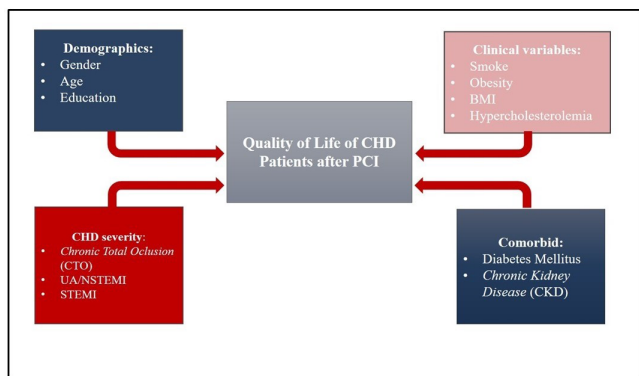
**Table III: Summary of findings**

Citation	Domain	Contributing Factor	Measurement	Overview of the quality of Life
(8)	Health	Experience of symptoms (frequency, severity, and distress), lipid levels, depression, social support, age, gender, education, smoking status, lack of exercise, ACS diagnosis.	HRQOL	The quality of life of patients after PCI shows moderate.
(9)	N/I	Age, gender, marital status, type of insurance, diabetes, and hypertension.	SAQ and SF-36	The SAQ PCI was not significant for physical limitations with a value (p = 0.74). Still, there was a significance for angina stability, angina frequency, treatment satisfaction, and disease perception (p=0.00). Based on SF-36 PCI did not affect physical function (p=0.38), emotional well-being (p=0.58) and social function (p=0.07)
(20)	<i>Physical limitations, frequency of angina and QOL</i>	N/I	EQ-5D	Quality of life improved significantly after PCI intervention in each abnormal FFR tertile. In contrast, the quality of life did not change in the control group. The improvement in quality of life in the peculiar low FFR subgroup had a value (p<0.001).
(23)	Emotional, social and physical	N/I	<i>MacNew – (HRQOL) and HADS</i>	MacNew HRQOL found that most patients improved in the first month after PCI (48.5%). Another 14.17% had clinically relevant improvement up to 6 months; at 12 and 24 months, only 4.3% and 3.1% showed improvement in MacNew HRQOL, respectively.
(22)	Physical limitations, angina severity, angina frequency, angina satisfaction and treatment, and angina-related quality of life	CKD	SAQ	At 1-6 months of follow-up, there was a significant effect of CKD on quality of life (p<0.05), and no effect at 12-36 months of follow-up (p≥ 0.05)
(24)	N/I	Smoking, age, gender, diabetes mellitus, lipoprotein level	SF-36	The quality of life of PCI and CABG patients after 6 and 12 months had no significant connection with age, gender, smoking, diabetes, or lipoprotein level (p=0.05). However, smoking affected the quality of life of PCI and CABG patients. (p=0.03).
(25)	Health	Smoking	SF-36	During the one year follow-up, smokers had lower quality of life compared to non-smokers in 6 domains p<0.05 (physical function, role limitations due to physical problems, general health perception, vitality of social functioning, limitations due to emotional issues) but not in physical illness (p= 0.235) or mental health (p= 0.050).
(26)	Angina frequency, physical health, and quality of life	N/I	SAQ	At one year, the proportion of patients free of angina or physical limits (physical function) very excellent/very good or quality of life was 57%, 58 %, 66% with PCI + OMT and 50%, 55%, 59% with OMT.
(27)	Angina Frequency, Physical limitations, Quality of life	N/I	AF, PL, QOL-SAQ, RDS.	At one month, DES-PCI resulted in better improvement than CABG for physical limitations (mean difference 8.1 points, 95% CI -9.9 to -6.3, p < 0.001) and quality of life (mean difference 1.9 points, 95 % Ci – 3.6 to -0.2, p = 0.03). Subscale. Six months later, the SAQ QoL subscale scores were equal for the two treatment groups but were somewhat higher with the DES-PCI for the disability subscale (mean difference 2.3 points, 95% CI -3.8 to -0.9, p = 0.002). Physical limitation scores and quality of life were greater one year after CABG (mean difference 2.0 [95 percent CI 0.4 to 3.6, p = 0.01] and 1.9 points [95 percent CI 0.4 to 3.4, p = 0.01], respectively). CABG remained to outperform these two SAQ subscales after 2 and 3 years of follow-up.
(21)	Angina frequency, physical limitations, quality of life, angina stability, and treatment satisfaction	Antianginal drug	SAQ dan SF-36	PCI had higher 1-month scores on the subscales for physical limits, quality of life, and treatment satisfaction than CABG (P 0.001 for all comparisons). However, the difference was not seen until six months later, and the score on the quality of life with SAQ was higher in the CABG group than in the PCI group at 12 months (difference, 2.4 points; P = 0.03).
(28)	N/I	N/I	HRQOL. SAQ	Elderly patients experienced comparable long-term quality improvement with younger patients after PCI. Our findings suggest that age cannot withstand revascularization because of the ongoing benefit in HRQOL.

**Table III: Summary of findings (continued)**

Citation	Domain	Contributing Factor	Measurement	Overview of the quality of Life
(29)	Angina frequency, Physical limitation, and Quality of life	Smoking	SAQ	At one year of follow-up, patients who smoked continuously reported a significantly lower frequency of angina SAQ, physical limits, quality of life, and EQ-5D VAS scores compared to never-smokers. PCI patients who quit smoking had substantially better angina control than regular smokers (mean difference 2.73; 95 percent CI, 0.13 to 5.33).
(10)	Emotional, physical, and social	Gender, education level, employees, smoking, hypertension, comorbidities, BMI, income, hypercholesterolemia	MacNew Heart Disease HRQOL	Except for emotional (P=0.244), there was a significant decrease (0.016) in the PCI group score, whereas there was a significant rise in the physical (P=0.007) and social (P=0.025) dimensions. Patients who had had PCI had considerably higher HRQOL at six months, but there was no difference after two years of follow-up.
(11)	N/I	Elderly, Gender, Diabetes, previous CABG, restenosis/revascularization, continued smoking post PCI, no exercise, COPD, CKD, active smoking, heart failure, high risk of restenosis, low economy, unemployment, depression, anxiety, and sexual dysfunction.	SF-36, MHIQ, RAND-36-SAQ, (DASI SF-36), Ferrans and Powers QLI, PGWB, QWB, SIP, SWED-QUAL.	Patients after PCI have been found to improve their quality of life after 1-6 months, whereas CABG treatments have been demonstrated to enhance their quality of life after 1-5 years.
(12)	N/I	Gender, education level, marital status, employment status, and smoking.	MacNew Heart Disease Health	There is a significant relationship between the quality of life score and age (p=0.0001), gender (p=0.039), and education level (p=0.004). Furthermore, smoking history (p = 0.029), body mass index (p = 0.018), number of afflicted vessels (p = 0.0001), comorbidities (p = 0.012), and family history all had a statistically significant correlation with quality of life scores.
(13)	Physical limitations, angina frequency, general health	Age, psychological support	SAQ, EQL-5	Angina-specific HRQOL status baseline scores from the three SAQ subscales were significantly lower in patients with UAS/NSTEMI than in STEMI. These findings are attributable to older age, comorbidities, and a heavier load of atherosclerosis, the requirement for specialized angina treatment, and the need for supportive care to enhance patients' overall health with acute coronary disease.
(14)	Physical health, psychological health, social relationships, and the environment	Gender, Antidepressants, cognitive perception	PHQ-9, WHO-QOL-Bref, Beck Depression Inventory (BDI), Health Complaints Scale (HCS)	General health and general quality of life did not increase at one month (p=0.222) but significantly improved at 12 months (p=0.<0.001) and 1-month follow-up (p=<0.001). The physical score domain showed the main effect of time (F=23.33, p <0.001). Physical Health significantly improved at 1 month follow up (p < 0.001) and 12 month follow up (p < 0.001)
(15)	No domain sharing	Restenosis	Time Trade-Off (TTO)	The patient did not have significant disutility (decreased quality of life).
(16)	Emotional, Physical, Social and global	Gender (female), Age (>60 years), diabetes	MacNew Heart Disease HRQOL	All patients improved in terms of quality of life (p 0.001). There was no significant difference in the quality of life between men and women.
(17)	Physical function, physical role, body pain, general health, vitality, social function, emotional role, and mental health	The total length of the stent	SF-36	Quality of life increased significantly (p0.05) in the areas of physical function, physical role, body pain, vitality, social function, and emotional role, but not in general health or mental health (p>0.05).  The total length of the stent is not related to the quality of life
(18)	Mobility, self-care, pain, routine activities, psychological functioning, and health status	Success factor: PTCL success	EQ-5D	PCI increases the quality of life in health status, physical limits, and illness perception.
(19)	N/I	N/I	Seattle Angina Questionnaire (SAQ)	The patient's quality of life increased following PCI in CHD patients with Chronic Total Occlusions (CTO), but there was no difference with non-CTO PCI.

Note: SAQ= Seattle Angina Questionnaire, EQL-5D= European Quality of Life-5 Dimensions, HCS= Health Complaints Scale, BDI= Beck Depression Inventory, PHQ-9 WHOQOL Bref= Patient Health Questionnaire-9 World Health Organization Quality of Life Bref, HRQOL= Health-Related Quality of Life, SF-36= Short Form-36, TTO= Time Trade-Off, DASI-SF-36= Duke Activity Status Index, SWED-QUAL= Swedish Health-Related Quality of Life Survey, SIP= Sickness Impact Profile, QWB= Quality of Well Being Scale, PGWB= Psychological Well-Being Index, QLI= Quality of Life Index, AF= Angina Frequency, PL= Physical Limitations, RDS= Rose Dyspnea Scale, HADS= Hospital Anxiety and 5 Depression Scale, MHIQ= MacMaster Health Index Questionnaire



**Figure 1: Factors Influencing the Quality of Life of CHD Patients After PCI**

level of education had a higher quality of life with a score ( $142.63 \pm 9.38$ ) (12). In contrast, patients with a low level of education and low economic status had a significantly lower HRQOL (8,10,12).

**Analysis 2: clinical variable factors on quality of life of CHD patients after PCI**

The study of (12,24,25,29) mentioned that smoking is one factor that worsens the health status of CHD patients after PCI. Active smokers had a lower quality of life than nonsmokers after a one-year assessment using the baseline HRQOL. Patients who smoked regularly had a low HRQOL score, whereas patients who quit smoking and did not smoke had a high HRQOL score of  $128.72 \pm 16.71$  (12,25). In addition to smoking, being overweight, hypercholesterolemia, hypertension, diabetes, and BMI significantly impact the quality of life (10,12). Thus, smoking has become a clinical variable that has a significant effect on other clinical variables.

**Analysis 3: CHD severity factors on quality of life of CHD patients after PCI**

The severity of CHD has a significant impact on the quality of life of CHD patients after PCI. Compared to PCI in non-Chronic Total Obstruction (CTO) patients, PCI intervention in CHD patients with CTO had a significant effect on decreasing quality of life (15). Furthermore, using the SAQ measurement, the quality of life of STEMI patients was poor than that of NSTEMI patients ( $p < 0.001$ ) (13).

**Analysis 4: factors of comorbid disease on quality of life after PCI**

Chronic Kidney Disease (CKD) was found to directly impact the quality of life of CHD patients after PCI in this study (22). Meanwhile, comorbid factors such as diabetes mellitus were investigated indirectly as confounding factors, which means that comorbidity became a significant factor and was adjusted to see the independent relationship with other variables (8,10,12). The intensity of quality of life of CHD patients after PCI The quality of life of CHD patients after PCI is only temporary. The quality of life of CHD patients improved at the time of PCI intervention, with the most significant

improvement at one month ( $P < 0.0001$ ). 48.5 percent of patients had a high quality of life in the first month after PCI, 14.17% in the 6th month, 4.3% in the 12th month, and 3.1% in the 24th month (23). Therefore, the quality of life after PCI was optimal only in the first month and decreased in the following month.

**DISCUSSION**

This research revealed that the overall population’s quality of life improved significantly after PCI for CHD patients. Improved quality of life after PCI occurs because the PCI procedure dilates blood vessels by making skin incisions and inserting catheters into impaired blood vessels using balloons and stents that play a role in opening narrowed coronary arteries, which CHD patients experience. Coronary arteries, lowering the patient’s quality of life (30). The findings of this review were consistent with previous research on the elderly population. According to the previous systematic evaluation, there is a significant improvement in cardiovascular health in the elderly. After PCI, the quality of life in the elderly improves for one year in various health domains (31). However, elderly patients recover physically more slowly than younger patients. Although this review and previous reviews found an improvement in quality of life after PCI, the findings of a shorter duration of quality of life were optimal in the first month after PCI in the large population studied. The quality of life was optimal in the first month after PCI is because most patients believe that PCI can prolong life and prevent infarction; therefore, patients do not maintain a healthy lifestyle (32).

Several factors influence the quality of life of CHD patients after PCI. Demographics, clinical variables, CHD severity, and comorbid diseases have been shown to impact the quality of life of CHD patients after PCI. According to the findings of this review, the quality of life of CHD patients after PCI was optimal at one month. This review is supported by (33), which states that CHD patients after PCI recover faster within one month than those who have not; additionally, patients report fewer physical limitations and body pain and a better quality of life and treatment satisfaction. However, in the two-year follow-up study, the quality of life status in the month following the first month decreased because most patients believe that PCI can prolong life and prevent infarction. Thus, do not maintain a healthy lifestyle, such as not smoking, maintaining physical activity, eating a healthy diet, avoiding stress, and other healthy lifestyle choices (32). Nurses and other health professionals play an essential role in changing health behaviour (A low-fat diet, reduced salt intake, quitting smoking, reducing or quitting alcohol, and regular exercise) and anticipate stress, anxiety, and depression, such as strengthening spirituality to maintain the quality of life of CHD patients after PCI (34,35). However, this review has some limitations, such as the authors’ failure

to use sources from grey literature and less database; instead, they rely solely on research results published in a database.

## CONCLUSION

According to the review's findings, most studies show that CHD patients have a higher quality of life after PCI. Several factors influence CHD patients' quality of life, including demographics, clinical variables, CHD severity, and comorbid diseases. The quality of life of CHD patients who have had PCI improves optimally in the first month and then declines in the following month. Furthermore, the habits of patients after PCI in leading a healthy lifestyle at home influence their quality of life. It is hoped that nurses and other health workers will consider this review of PCI on the quality of life of CHD patients by considering the factors that can affect the quality of life, both preventable and unpreventable.

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