# Quality of Life Research in Cardiovascular Disease in Indonesia: A Scoping Review

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## ABSTRACT

***Background:*** *Cardiovascular (CV) disease remains the leading cause of mortality and disability worldwide, particularly in developing countries. Beyond mortality, health-related quality of life (HRQoL) is increasingly recognized as a key outcome and is commonly assessed using patient-reported measures. In Indonesia, cultural and linguistic diversity poses challenges, as most HRQoL instruments are developed in different contexts. This scoping review aimed to map HRQoL research in Indonesian cardiovascular disease populations by identifying validated instruments, describing study designs and measurement tools, and summarizing HRQoL outcomes.* ***Methods:*** *This review was registered on Figshare (DOI: 10.6084/m9.figshare.29218991) and conducted following the Joanna Briggs Institute methodology and PRISMA-ScR guidelines. Literature searches were performed in PubMed, ScienceDirect, Google Scholar, and included grey literature. Studies reporting HRQoL measurement in Indonesian populations were included.* ***Results:*** *A total of 54 studies were included. Both generic and disease-specific HRQoL instruments were identified. Common generic tools included SF-36, SF-12, WHOQOL-BREF, and PedsQL, while disease-specific instruments included MLHFQ, KCCQ, Seattle Angina Questionnaire, AFSS, ASTA, AFEQT, MacNew, and AQUAREL. Only several instruments have been culturally validated, while others were used without prior validation and some validated tools remained underutilized. HRQoL was influenced by clinical, psychological, behavioral, and social factors.* ***Conclusion:*** *HRQoL research in Indonesia is growing but remains heterogeneous. This mismatch highlights a critical gap between research capacity and real-world implementation in Indonesia. Greater use of standardized tools and longitudinal designs is needed to strengthen patient-centered cardiovascular care.*

***Keywords:*** *cardiovascular disease, patient-reported outcomes, quality of life.*

## INTRODUCTION

CV disease remains the leading cause of death[1] and disability[2] worldwide, with an even greater impact observed in developing countries.[2] In 2021, it ranked as the top global cause of mortality, with ischaemic heart disease accounting for approximately 13% of all deaths.[3] Aside from mortality, HRQoL is accepted as an

outcome to be recognized for these diseases. The most commonly accepted methods of measuring HRQoL is through a patient-reported set of HRQoL questionnaires.[4]

Indonesia is a nation characterized by considerable cultural and linguistic diversity.[5] After Indonesia declared independence in 1945, a unifying national language was established, known as Bahasa Indonesia. One of the primary challenges in conducting HRQoL research in Indonesia lies in the measurement instruments, which are typically questionnaires developed within different linguistic and cultural contexts. Examples include the World Health Organization Quality of Life (WHOQOL),[6] the Short Form-36 (SF-36),[7] as well as disease-specific tools such as the Minnesota Living with Heart Failure Questionnaire (MLHFQ)[8] and the Atrial Fibrillation Quality of Life (AF-QoL).[9] Consequently, HRQoL research in CV disease among Indonesian-speaking populations remains relatively limited, which may have contributed to the slow development and recognition of this field in Indonesia.

A scoping review is, therefore, appropriate to synthesize existing evidence, disseminate findings, and identify gaps in the literature,[10,11] particularly given that this topic has not yet been comprehensively reviewed. The primary goal of this scoping review was to identify and map the existing literature on HRQoL in CV disease. Specifically, we aimed to identify the HRQoL questionnaires that have been validated for use within the Indonesian language and cultural context, to determine the types of research designs and HRQoL instruments that have been utilized in the Indonesian population, and to report the findings regarding HRQoL outcomes in adults and children with CV disease in the Indonesian population. To our knowledge, this scoping review provides the first comprehensive overview of HRQoL assessment in Indonesian populations with cardiovascular disease. This review not only maps existing evidence but also critically highlights the mismatch between validated HRQoL instruments and their real-world utilization for CV disease research.

## METHODS

The protocol of this scoping review was registered with Figshare under DOI: 10.6084/m9.figshare.29218991. The review was conducted in accordance with updated guidance by Peters *et al*.[11] We incorporated the methodology outlined by the Joanna Briggs Institute for scoping reviews[12] and we adhered to the PRISMA Extension for Scoping Reviews (PRISMA-ScR) reporting guideline and checklist.[13] The review process was carried out in five stages: identification of the research questions, development of the search strategy, application of inclusion and exclusion criteria, data extraction, and presentation of the results.

A comprehensive literature search was performed across multiple databases, including PubMed, ScienceDirect, and Google Scholar (Due to the large volume and lack of structured indexing in Google Scholar, only the first 50 results sorted by relevance were screened, which is a pragmatic approach frequently used in scoping reviews. No additional relevant studies were identified beyond this threshold). This review encompasses publications available as abstracts, full-text articles, and supplementary materials until April 30th, 2025. In addition, grey literature such as undergraduate theses, master's theses, doctoral dissertations, and scientific posters were included, to enhance contextual relevance but may introduce variability in methodological rigor. An inclusive and sensitive search strategy was applied to maximize the retrieval of relevant studies,[14,15] followed by screening based on predefined inclusion and exclusion criteria. Keywords derived from the Population, Concept, and Context (PCC) framework were combined using Boolean operators and subject headings to identify potentially relevant articles.[16,17] The detailed keywords used for the PCC framework[12] are presented in Table 1.

The inclusion criteria for this review comprised studies that clearly reported the use of HRQoL measurements, tools, questionnaires, or surveys conducted in an Indonesian population. Only publications written in English or Indonesian were included due to time constraints and translation considerations, acknowledging the possibility that relevant studies published in other

languages may have been missed. All identified records from electronic database searches were imported into the Rayyan software application for reference management and duplicate removal.[18] Two independent reviewers screened the titles and abstracts, followed by full-text assessments to determine study eligibility. Any discrepancies between reviewers were resolved through consultation with a third reviewer. The study selection process is presented both narratively and in a flow diagram, in accordance with PRISMA-ScR guidelines.[13] All study designs were included to comprehensively map the existing evidence. Ethical approval was not required for this scoping review. Since the information is descriptive,[19] it will be used only to point out gaps in definition and culture,[20] and not intended to directly inform clinical decision-making. Methodological appraisal was conducted to provide contextual understanding of study quality and was not used as a basis for study exclusion.

## RESULTS

The study selection process is illustrated in Figure 1. A total of 253 records were initially identified through database searches. After removing 29 duplicate records (**Supplement 2**), 224 studies remained for title and abstract screening. During this stage, 144 studies were excluded by two independent reviewers (**Supplement 3**). Subsequently, we attempted to retrieve 80 full-text reports, of which 7 articles lacked full-text availability (**Supplement 4**). Therefore, 73 full-text articles were assessed for eligibility. After full-text screening, 19 articles were excluded for the following reasons: wrong population (n = 7), wrong outcome (n = 5), and wrong study type (n = 7) (Supplement 5).

A total of 54 studies were included in this scoping review, with the vast majority conducted in adult populations (n = 51). Across studies, heart failure (n = 20) and coronary artery disease (n = 15) emerged as the most frequently investigated conditions, indicating a strong research focus on chronic and high-burden cardiovascular diseases. The included studies addressed a range of objectives related to HRQoL, with most focusing on identifying associated factors (n = 24), while fewer studies evaluated interventions or conducted instrument validation.

The methodological quality of the included studies was assessed using several tools according to the study design (**Supplement 1**). Randomized controlled trials were evaluated using the Cochrane Risk of Bias 2 tool (RoB 2),[75] quasi-experimental studies were evaluated using the Risk Of Bias In Non-randomized Studies of Interventions tool (ROBINS-I),[76] cohort studies were evaluated using the Newcastle–Ottawa Scale (NOS),[77] and cross-sectional studies were evaluated using the modified Newcastle–Ottawa Scale (modified NOS).[78] In addition, validation studies of HRQoL instruments were assessed using the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) framework,[79] which evaluates

**Table 1. Population, Concept, and Context**

| | Key words |
|---|---|
| Population | kardiovaskular OR "penyakit jantung" OR "PJK" OR<br>"arteri koroner" OR "gagal jantung" OR aritmia OR alat pacu jantung OR "CIED" OR "perangkat elektronik implan jantung"<br>cardiovascular OR "cardiac event" OR "heart disease" OR<br>"CVD" OR "coronary artery disease" OR "heart failure" OR arrhythmia OR pacemaker OR "CIED" OR "cardiac implantable electronic device" |
| Concept | kualitas hidup OR "kepuasan hidup" OR " kesejahteraan hidup" OR<br>" kondisi kesehatan" OR validasi instrumen OR “desain studi” OR “metode surveilans” OR<br>"psikometrik" OR "studi validasi" OR kuesioner OR skala<br>Quality of Life OR "HRQoL" OR validated instrument OR "research design" OR "survey method" OR "psychometric properties" OR<br>"instrument's validation" OR questionnaire<br>OR scales |
| Context | Indonesia<br>Indonesian |

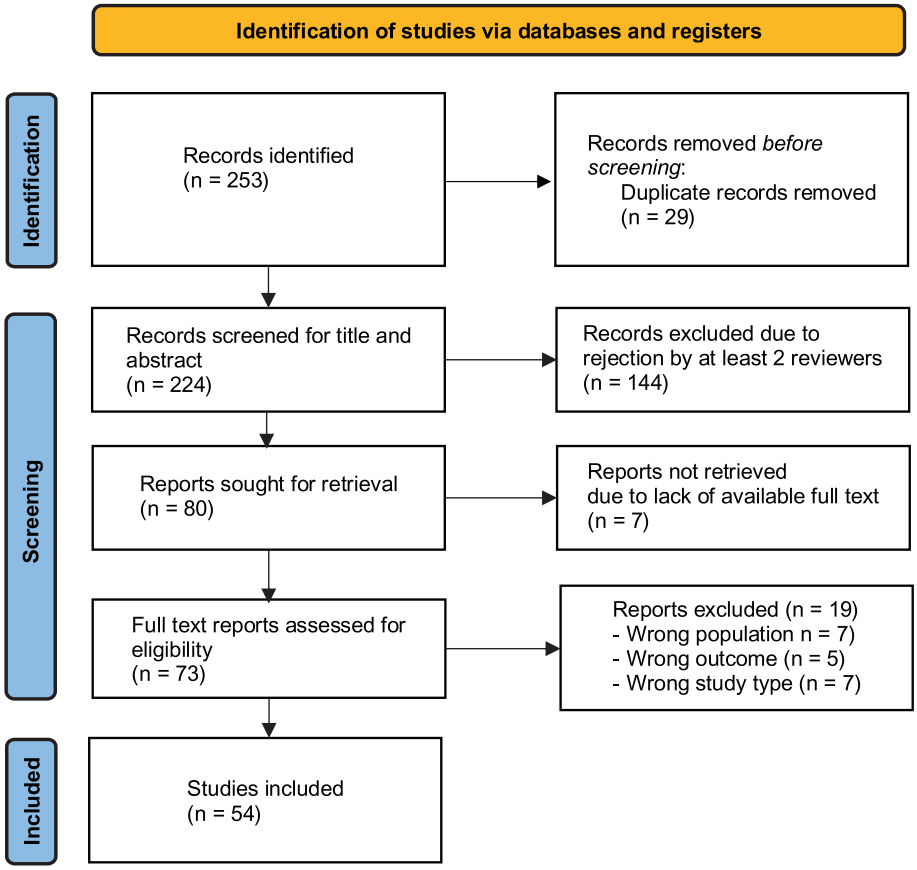


**Figure 1**. PRISMA flow chart for study selection

**Table 2. Summary of Included Studies**

| | | | |
|---|---|---|---|
| Purpose of study | Assessing HRQoL | | 8 |
| | Developing program/intervention for improving HRQoL | | 8 |
| | Exploring factors associated with HRQoL | | 24 |
| | Validation of instrument for HRQoL assessment | | 8 |
| | Exploring factors associated with HRQoL aspects | | 6 |
| Research methodology | Quantitative study | Cohort | 5 |
| | | Quasi-experimental | 4 |
| | | True experiment/randomized controlled trial | 4 |
| | | Cross-sectional | 39 |
| | Qualitative study | | 1 |
| | Mixed method | | 1 |
| Participants | Adult | | 51 |
| | Child | | 3 |
| Health problem | Cardiovascular disease (not specified) | | 5 |
| | Coronary arterial disease | | 15 |
| | Myocardial infarct | | 5 |
| | Heart failure | | 20 |
| | Atrial fibrillation | | 4 |
| | High degree AV block, sick sinus syndrome, symptomatic bradycardia | | 2 |
| | Congenital heart disease | | 3 |
| HRQoL questionnaire | Seattle Angina Questionnaire | | 1 |
| | SF-36 | | 9 |
| | WHOQOL-BREF | | 6 |
| | MLHFQ | | 13 |
| | SF-12 | | 4 |
| | KCCQ | | 3 |
| | AFQoL | | 1 |
| | AFSS | | 1 |
| | ASTA | | 1 |
| | AFEQT | | 1 |
| | MacNew Heart Disease | | 1 |
| | AQUAREL | | 1 |
| | PedsQL | | 3 |
| | Cost of Illness | | 1 |
| | Not Specified | | 2 |
| | HRQoL Aspects | | 6 |

**Table 3. Characteristics of the studies**

| Exploring factors related to quality of life | | | | | | | | |
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| **Author, year** | **Study title** | **Population** | **CVD Type** | **HRQoL questionnaire** | **Sample size** | **Study design** | **Statistical analysis method** | **Key Findings** |
| Nuraeni et al., 2016[21] | Faktor Yang Memengaruhi Kualitas Hidup Pasien Dengan Penyakit Jantung Koroner | Adult | CAD | Seattle Angina Questionnaire | 100 | Cross sectional | Spearman's rank Multiple logistic regression | Depression (OR 5.450; p = 0.003), anxiety (OR 4.736; p = 0.002), and revascularization (OR 3.232; p = 0.033) were significantly associated with HRQoL, with depression being the strongest predictor |
| Febby et al., 2023[22] | Dukungan Keluarga Berhubungan Dengan Kualitas Hidup Pasien Gagal Jantung | Adult | HF | WHOQOL-BREF | 86 | Cross sectional | Chi-square | All domains of family support were significantly associated with HRQoL —informational (p=0.006), instrumental (p=0.017), appraisal (p=0.026), emotional (p=0.003), with emotional support strongest (POR=4.544). |
| Widistana et al., 2016[23] | Hubungan Antara Fungsi Diastolik Dengan Dengan Kualitas Hidup Pada Pasien Gagal Jantung Kronik Dengan Fraksi Ejeksi Normal | Adult | HF | MLHFQ | 32 | Cross sectional | Pearson's | Diastolic function was not significantly associated with HRQoL in heart failure patients (p > 0.05) |
| Tanziah et al., 2019[24] | Hubungan Tingkat Spiritualitas Dengan Kualitas Hidup Dan Kenyamanan Pada Pasien Jantung Koroner Di Rumah Sakit Islam Sultan Agung Semarang | Adult | CAD | WHOQOL-BREF | 110 | Cross sectional | Spearman's rank | Spirituality was significantly associated with HRQoL (p = 0.001) and comfort (p = 0.000), indicating a positive relationship between higher spirituality and better patient outcomes |
| Brikana et al., 2020[25] | Hubungan Antara Efikasi Diri Dengan Kualitas hidup Pasien Penyakit Jantung Koroner Di Rumah Sakit Bethesda Yakkum Yogyakarta Tahun 2020 | Adult | CAD | SF-12 | 110 | Cross sectional | Spearman's rank | Most patients had high self-efficacy (69%) and good quality of life (81%); self-efficacy was significantly associated with HRQoL (Spearman test, p=0.000), indicating a strong positive relationship. |
| Wulandari et al., 2019[26] | Peran Kecemasan, Coping Religius Islami, Kepuasan Pernikahan Dan Kondisi Fisik Pada Kualitas Hidup Terkait Kesehatan (Health Related Quality Of Life) Pasien Paska Infark Miokard | Adult | CAD | MacNew Heart Disease | 170 | Mixed method | Pearson's product moment | Anxiety had a significant negative direct effect on HRQoL, while marital satisfaction acted as a significant moderator in the relationship between anxiety and HRQoL |
| Kaban et al., 2022[27] | Faktor-Faktor Yang Berhubungan Dengan Kualitas Hidup Pada Penyakit Jantung Koroner Di Instalasi Rawat Jalan RSU Mitra Medika Medan | Adult | CAD | WHOQOL-BREF | 65 | Cross sectional | Chi-square | Significant associations with HRQoL were found for smoking (p=0.040), age (p=0.012), and occupation (p=0.003) |

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| Wahyuni et al., 2014[28] | Hubungan Self Care dan Motivasi Dengan Kualitas Hidup Pasien Gagal Jantung | Adult | HF | MLHFQ | 73 | Cross sectional | Chi-square | Self-care (OR 6.000; p = 0.001) and motivation (OR 4.056; p = 0.009) were significantly associated with HRQoL in heart failure patients. |
| Sari et al., 2017[29] | Analisis Biaya Akibat Sakit Serta Kualitas Hidup Pasien Diabetes Mellitus Tipe 2 Dengan Penyakit Jantung | Adult | CVD + DM | Not Specified | 110 | Cross sectional | Chi-square | Duration of illness was identified as a key factor influencing HRQoL in patients with type 2 diabetes and heart disease |
| Santika et al., 2023[30] | Hubungan Self Care Dengan Kualltas Hidup Pada Pasien Congestive Heart Failure (CHF) | Adult | HF | MLHFQ | 90 | Cross sectional | Chi-square | Self-care was significantly associated with HRQoL in CHF patients (p = 0.000), indicating that better self-care improves HRQoL outcomes |
| Haryati et al., 2020[31] | Kualitas Hidup Penderita Gagal Jantung Kongestif Berdasarkan Derajat Kemampuan Fisik Dan Durasi Penyakit | Adult | HF | MLHFQ | 93 | Cross sectional | Chi-square | Physical functional status was significantly associated with HRQoL (p=0.000), while disease duration was not associated with HRQoL (p=1.000). |
| Dedi et al., 2021[32] | Faktor-Faktor Berhubungan Dengan Kualitas Hidup Pada Pasien Congestive Heart Failure Di Rumah Sakit Mitra Medika | Adult | HF | MLHFQ | 80 | Cross sectional | Chi-square Logistic Regression | Significant predictors of HRQoL included disease duration (OR=2.29; p=0.013) and family support (OR=8.2; p=0.010), with family support as the strongest factor |
| Haryati et al., 2022[33] | Perbedaan Kualitas Hidup Penderita Gagal Jantung Kongestif Dengan Komorbid Diabetes Melitus Dan Komorbid Hipertensi | Adult | HF | MLHFQ | 88 | Cross sectional | Mann-Whitney | HRQoL was predominantly poor (52%) to moderate (48%), with no significant differences across comorbidity groups (p=0.843) |
| Awaludin et al., 2018[34] | Hubungan Kecemasan Dengan Kualitas Hidup Pasien Post Coronary Artery Bypass Graft (Cabg) Di Ruang Rehabilitasi Jantung Rumah Sakit Jantung Dan Pembuluh Darah Harapan Kita Jakarta | Adult | CAD paska CABG | Not specified | 25 | Cross sectional | Kendall Tau | Anxiety showed a significant negative association with HRQoL in post-CABG patients (p=0.001) |
| Arafah et al., 2020[35] | Hubungan Illness Acceptance Dengan Kualitas Hidup Pasien Gagal Jantung Di Poliklinik Jantung Rumah Sakit Um Um Daerah Dr. Zainoel Abidin Banda Aceh | Adult | HF | MLHFQ | 30 | Cross sectional | Pearson's Chi-Square | Illness acceptance was significantly associated with HRQoL (p=0.003), indicating better acceptance linked to higher HRQoL in HF patients. |
| Tatukude et al., 2016[36] | Hubungan Tingkat Depresi Dan Kualitas Hidup Pada Pasien Gagal Jantung Kronik Di Poliklinik Jantung Rsup Prof. Dr. R. D. Kandou Manado | Adult | HF | SF-36 | 38 | Cross sectional | Gamma Somner | Depression level was significantly associated with HRQoL in heart failure patients, where higher depression corresponded to poorer HRQoL (p < 0.05) |

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| Khaidirman et al., 2024[37] | Relationship of Left Ventricular Diastolic Dysfunction with Quality of Life in Heart Failure Patients with Reduced Ejection Fraction (HFrEF) | Adult | HF | MLHFQ | 96 | Cross sectional | Chi-square<br>Fisher's exact<br>Mann-Whitney | Severity of LV diastolic dysfunction is significantly associated with HRQoL (p=0.040) |
| Tromp et al., 2018[38] | Multimorbidity in Patients with Heart Failure From 11 Asian Regions: A Prospective Cohort Study Using The ASIAN-HF Registry | Adult | HF | KCCQ | 6480 | Cohort | ANOVA<br>Kruskal-Wallis<br>Chi-square<br>Multivariable Cox regression | Patients with multimorbidity, particularly the lean diabetic group, had significantly worse HRQoL and a higher risk of mortality or hospitalization (p < 0.001) |
| Herry et al., 2005[39] | The Influence Of Depression On The Quality Of Life Of Male Patients Post-Acute Myocardial Infarct | Adult | MI | SF-36 | n1=n2=15 | Prospective cohort | Chi-square | Post-AMI depression was significantly associated with reduced HRQoL in male patients (RR = 2.35; p = 0.030) |
| Luo et al., 2017[40] | Multinational And Multiethnic Variations In Health-Related Quality Of Life In Patients With Chronic Heart Failure | Adult | HF | KCCQ | 5697 | Prospective cohort | Chi-square | Lower HRQoL (KCCQ scores) and self-efficacy were observed in Asian populations, and HRQoL strongly predicted 1-year mortality (p < 0.001) |
| Lawson et al., 2023[41] | Patient-Reported Status And Heart Failure Outcomes In Asia By Sex, Ethnicity, And Socioeconomic Status | Adult | HF | KCCQ | 6549 | Prospective cohort | Chi-square<br>Wilcoxon | Worsening HRQoL (KCCQ decrease) was associated with a higher risk of HF hospitalization or death, while improvement was associated with reduced risk |
| Amin et al., 2021[42] | Evaluation of Quality of Life Based on the Length of Use And The Number of Stents of Post Percutaneous Coronary Intervention (PCI) Patients | Adult | CAD post PCI | SF-36 | 60 | Cross sectional | Spearman's correlation | PCI duration (p=0.039; r=0.267) and number of stents (p=0.001; r=0.406) were significantly correlated with HRQoL; fewer stents and longer duration associated with better HRQoL. |
| Fitria et al., 2023[43] | The Relationship Of Diuretic Therapy And Clinical Outcome On Quality Of Life Of Patients With Congestive Heart Failure | Adult | HF | MLHFQ | 98 | Cross sectional | Kruskal-Wallis<br>Mann-Whitney | Diuretic therapy and edema significantly influenced HRQoL (p<0.05) |
| Koto et al., 2024[44] | The Influence of Anxiety, Self-Efficacy, and Quality of Life In Coronary Heart Disease Patients | Adult | CAD | SF-36 | 70 | Cross sectional | Multiple logistic regression | Anxiety (p=0.034) negatively and self-efficacy (p=0.001) positively affected HRQoL; both significant in multivariable analysis (p=0.002) |
| Assessing quality of life | | | | | | | | |
| Author, year | Title of study | Population | CVD Type | QoL instrument | Sample size | Study design | Analysis method | Key Findings |
| Rosidawati et al., 2016[45] | Kualitas Hidup Pasien Pasca Bedah Pintas Arteri Koroner (BPAK) | Adult | CAD | Structural interview adapted from SF-36 | 6 | Qualitative assessment | | HRQoL in post-CABG patients was influenced by multidimensional factors (physical, emotional, social, and spiritual), with strong qualitative evidence highlighting the role of spirituality |

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|---|---|---|---|---|---|---|---|---|
| Jumayanti et al., 2020[46] | Kualitas Hidup Pasien Dengan Penyakit Kardiovaskular Di Yogyakarta | Adult | CVD | SF-12v2 | 107 | Cross sectional | Univariate data (Mean (SD)) | HRQoL scores were higher in mental (56 ± 9.87) than physical domains (42 ± 9.88) |
| Hutagalung et al., 2014[47] | Kualitas Hidup Pasien Pascaintervensi Koroner Perkutan | Adult | CAD | WHOQOL-BREF | 50 | Cross sectional | Kategorical Univariate data (Percentage) | 50% of post-PCI patients had good HRQoL; descriptive findings without inferential statistics |
| Rachmawati et al., 2016[48] | Penilaian Kualitas Hidup pada Anak dengan Penyakit Jantung Bawaan Asianosis dan Sianosis | Child | CHD | PedsQL | 52 | Cross sectional | Univariate data (Mean (SD)) | There was a significant difference in HRQoL between CHD groups as analyzed using an independent t-test ($p < 0.05$) |
| Sensuwaty et al., 2023[49] | Kualitas Hidup Pasien Atrial Fibrilasi Post Rawat Inap Di RSD Dr. H. Soemarno Sosroatmodjo Tanjung Selor | Adult | AF | AFQoL | 20 | Cross sectional | Kategorical Univariate data (Percentage) | HRQoL in AF patients was generally good across domains (physical 55%, psychosocial 60%, sexual activity 55%) based on descriptive findings |
| Anggraini et al., 2018[50] | Kualitas Hidup Pasien Pasca-Percutaneous Coronary Intervention (Pci) | Adult | MI Post PCI | WHOQOL-BREF | 38 | Cross sectional | Kategorical Univariate data (Percentage) | HRQoL post-PCI was domain-dependent: low in physical (73.7%) but high in psychological (78.9%), social (63.2%), and environmental (55.3%) domains. |
| Komalasari et al., 2019[51] | Quality of life of people with cardiovascular disease: A descriptive study | Adult | CVD | WHOQOL-BREF | 397 | Cross sectional | Kategorical Univariate data (Percentage) | The majority (94%) reported good HRQoL. |
| Nurhidayah et al., 2022[52] | Dimensions of Quality of Life among Children with Congenital Heart Disease: A Survey | Child | CHD | PedsQL | 44 | Cross sectional | Univariate data (Mean (SD)) | HRQoL in children with CHD was predominantly affected by communication and psychosocial domains, based on descriptive analysis without inferential testing |
| Developing programs/interventions to improve quality of life | | | | | | | | |
| Author, year | Title of study | Population | CVD Type | QoL instrument | Sample size | Study design | Analysis method | Key Findings |
| Harigustian et al., 2021[53] | Pengaruh Inspiratory Muscle Training Terhadap Peningkatan Kualitas Hidup | Adult | HF | MLHFQ | n1=n2=16 | RCT (Pre-Post Test Design) | paired t test | HRQoL significantly improved in the intervention group ($p < 0.001$), with no significant change in the control group ($p = 0.362$) |
| Pratomo et al., 2024[54] | Pengaruh Perawatan Paliatif Terhadap Peningkatan Kualitas Hidup Pasien Anak Dengan Penyakit Jantung Bawaan Sianotik | Child | CHD | PedsQL | n1=n2=20 | RCT | paired t test | The intervention significantly improved HRQoL across all age groups, as indicated by reduced PedsQL scores ($p < 0.001$). |
| Nuraeni et al., 2019[55] | Effect Of A Workbook In Health Education On Self-Efficacy And Quality Of Life Of Patients With Coronary Heart Disease | Adult | CAD | SF-12 | n1=n2=24 | Quasi experimental | Mann-Whitney test Independent T-test Kruskal-Wallis, One-way ANOVA | Both groups showed improvement in self-efficacy and HRQoL over time; however, no significant difference in HRQoL was observed between groups. |

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| Karimullah et al., 2020[56] | Community-Based Cardiac Rehabilitation Improved Adherence to Medication, Quality of Life, and Rehospitalization Among Stable Coronary Artery Patients: A Cohort Study | Adult | CAD | SF-36 | n1=n2=73 | Cohort | ANOVA | Community-based cardiac rehabilitation significantly improved physical function, medication adherence, and HRQoL, and reduced hospitalization rates in CAD patients compared to controls |
| Purnama et al., 2020[57] | Edukasi Dapat Meningkatkan Kualitas Hidup Pasien Yang Terdiagnosa Penyakit Jantung Koroner | Adult | CAD | SF-36 | n1=n2=9 | Quasi experimental | Dependent t-test | Educational intervention was significantly associated with improved HRQoL in patients with coronary artery disease (p = 0.019) |
| Soetisna et al., 2020[58] | Combined Transepicardial And Transseptal Implantation Of Autologous CD 133+ Bone Marrow Cells During Bypass Grafting Improves Cardiac Function In Patients With Low Ejection Fraction | Adult | HF | MLHFQ | n1=n2=15 | RCT | Independent t-test<br>Chi-square | The CD133+ group showed significant improvement in functional capacity (6-minute walk test, p = 0.03), although no significant improvement was observed in MLHFQ scores (p = 0.09) |
| Iswahyudi et al., 2020[59] | Pengaruh Rehabilitasi Jantung Fase I Terhadap Kualitas Hidup Pasien Penyakit Jantung Koroner | Adult | CAD | SF-36 | N1= 30<br>N2 = 31 | Quasi experimental | Mann-Whitney | Patients undergoing phase I cardiac rehabilitation had significantly higher HRQoL across multiple domains compared to those without rehabilitation (p < 0.05) |
| Okviasanti et al., 2023[60] | Model Of Spiritual Nursing Care In Enhancing the Quality Of Life Of Patients With Heart Failure | Adult | HF | MLHFQ | 222 | Cross sectional | PLS-SEM | Disease (T = 7.553), psychosocial (T = 2.230), and environmental factors (T = 2.625) significantly influenced HRQoL, with spiritual wellbeing also showing a significant indirect effect on HRQoL (T = 2.669) |
| Instrument validation for quality-of-life assessment | | | | | | | | |
| Author, year | Title of study | Population | CVD Type | QoL instrument | Sample size | Study design | Analysis method | Key Findings |
| Yamin et al., 2023[61] | Validity And Reliability Studies Of The Indonesian Version of the Atrial Fibrillation Severity Scale (AFSS) | Adult | AF | AFSS | 60 | Cross sectional | Pearson's product-moment, Cronbach's alpha | The Indonesian AFSS demonstrated good validity and reliability (Cronbach's α = 0.819; ICC = 0.803–0.975) with significant correlations to SF-36 domains (r = 0.333–0.895; p < 0.01) |
| Yamin et al., 2023[62] | Validity And Reliability Studies Of The Indonesian Version Of Arrhythmia-Specific Questionnaire In Tachycardia And Arrhythmia (ASTA) | Adult | AF | ASTA | 60 | Cross sectional | Pearson's product-moment, Cronbach's alpha Spearman's test | The Indonesian ASTA demonstrated good reliability (Cronbach's α = 0.816; ICC = 0.856–0.983) with significant correlations to SF-36 domains (r ≈ 0.271–0.384; p < 0.05) |
| Basuki et al., 2021[63] | The Validity And Reliability Of The Macnew Heart Disease Health-Related Quality Of Life Questionnaire: The Indonesian Version | Adult | MI | MacNew Heart Disease | 24 | Cross sectional | Pearson's product-moment, Cronbach's alpha | MacNew Indonesian version showed excellent internal consistency (Cronbach's α >0.95), acceptable test–retest reliability (ICC=0.66), and moderate to strong validity correlation with SF-36 (r=0.47–0.71). |

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| Zulmiyusrini et al., 2023[64] | The Validity And Reliability of the Indonesian Version of Atrial Fibrillation Effect On Quality Of Life (AFEQT) Questionnaire For Atrial Fibrillation Patients | Adult | AF | AFEQT | 30 | Cross sectional | Kendall's tau Cronbach's alpha | The Indonesian AFEQT showed strong construct validity (r = −0.639 to −0.960), moderate correlations with SF-36 (r = 0.338–0.693), and excellent reliability (Cronbach's α = 0.947; ICC = 0.521–0.828) |
| Salim et al., 2017[65] | Validity And Reliability Of The Indonesian Version Of SF-36 Quality Of Life Questionnaire On Patients With Permanent Pacemakers | Adult | high degree AV block, sick sinus syndrome, symptomatic bradycardia | SF-36 | 20 | Cross sectional | Kendall's tau Cronbach's alpha | The Indonesian SF-36 demonstrated significant correlations with clinical parameters (6MWT: r = 0.363; p = 0.001; NT-proBNP: r = −0.269 to −0.271; p < 0.05) and good reliability (Cronbach's α > 0.70) |
| Yamin et al., 2019[66] | Cross-Cultural Adaptation And Validation Of The Indonesian Version Of AQUAREL On Patients With Permanent Pacemakers: A Cross-Sectional Study | Adult | high degree AV block, sick sinus syndrome, symptomatic bradycardia | AQUAREL | 32 | Cross sectional | Kendall's tau Cronbach's alpha | The Indonesian AQUAREL showed significant correlations with clinical parameters (6MWT r = 0.228; p = 0.048; NT-proBNP r = −0.268; p = 0.020) and SF-36 (r = 0.543; p = 0.000), with good reliability (Cronbach's α = 0.728) |
| Kusuma et al., 2019[67] | Validity And Reliability Studies Of The Indonesian Version Of The Minnesota Living With Heart Failure Questionnaire (MLHFQ): Quality Of Life Questionnaire For Patients With Chronic Heart Failure | Adult | HF | MLHFQ | 85 | Cross sectional | Pearson's product moment, Cronbach alpha Spearman's test | MLHFQ Indonesian version showed good validity (r=0.571–0.748) and reliability (Cronbach α=0.887; ICC=0.918) |
| Wicaksana et al., 2020[68] | The Indonesian Version Of The Medical Outcome Survey - Short Form 12 Version 2 Among Patients With Cardiovascular Diseases | Adult | CVD | SF-12 v2 | 194 | Cross sectional | Pearson's product-moment, Cronbach's alpha | The Indonesian SF-12v2 demonstrated good validity and reliability (α = 0.58–0.81; KMO = 0.74; Bartlett p < 0.05), supporting its use in cardiovascular patients |
| Exploring factors associated with aspects of quality of life | | | | | | | | |
| Author, year | Title of study | Population | CVD Type | QoL aspect | Sample size | Study design | Analysis method | Key Findings |
| Nuraeni et al., 2023[69] | Self-Efficacy in Self-Care and Its Related Factors Among Patients with Coronary Heart Disease in Indonesia: A Rasch Analysis | Adult | CAD | Self-care Self-efficacy | 103 | Cross sectional | Chi-square | Self-efficacy was significantly associated with care unit (p = 0.003) and duration of illness (p = 0.049), suggesting clinical factors influence patient self-management capacity |
| Wantiyah et al., 2020[70] | Correlation Between Spiritual Intelligence and Self-efficacy in Patients with Coronary Artery Disease | Adult | CAD | Self-efficacy | 138 | Cross sectional | Gamma Somner | Spiritual intelligence was strongly positively correlated with self-efficacy (r = 0.628; p < 0.001), suggesting psychological factors influence patient outcomes |
| Mirwanti et al., 2016[71] | Hubungan Kesejahteraan Spiritual dengan Depresi pada Pasien dengan Penyakit Jantung Koroner (PJK) | Adult | CAD | Spiritual well-being | 100 | Cross sectional | Spearman's rank | Spiritual well-being was significantly negatively correlated with depression (r = −0.571; p < 0.01), indicating that higher spirituality is associated with lower depression |

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| | | | | | | | | EECP therapy significantly improved functional capacity (6-minute walk distance) compared to control ($p < 0.01$) |
| Rampengan et al., 2015[72] | The Effect of Enhanced External Counterpulsation Therapy and Improvement of Functional Capacity in Chronic Heart Failure patients: a Randomized Clinical Trial | Adult | HF | Functional Capacity | N1=49 N2=50 | RCT | Mann-Whitney rank test | |
| Hardiyanti et al., 2022[73] | Pengaruh Pemberian Edukasi Berbasis Digital Cardicraf terhadap Tingkat Kepatuhan Monitoring Self-Care Management Pasien Gagal Jantung | Adult | HF | Self-care | 25 | One group quasi-experimental | Paired T-test | Digital education using Cardicraf significantly improved self-care management in heart failure patients, with mean scores increasing from 59.92 to 85.75 (paired t-test, $p = 0.000$) |
| Rochmawati and Amalia, 2021[74] | Self-care Behavior and Frailty Syndrome among Elderly Patients with Heart Failure | Adult | HF | Self-care | 87 | Cross sectional | Spearman's rank | Self-care behavior was inadequate (mean 48.70), and no significant correlation was found with frailty syndrome (mean 0.142; $p = 0.20$) |

the methodological quality of studies on measurement properties such as validity and reliability. Overall, the methodological quality of the included studies ranged from moderate to good, although several limitations were observed across study designs.

### Validated HRQoL Instruments in Indonesian Populations with CV Disease

Among the studies included in this review, several general HRQoL questionnaires were utilized and published in Indonesian, including the SF-36, SF-12, WHOQOL-BREF, and PedsQL. Both the SF-36 and SF-12 were validated in populations with CV diseases. In addition to generic instruments, several disease-specific questionnaires were also employed and formally translated into the Indonesian language and validated with regards to culture for the CV disease population, including the AFSS, ASTA, MacNew Heart Disease questionnaire, AFEQT, AQUAREL, and MLHFQ.

### Study Designs and Types of HRQoL Instruments Used in Indonesian Populations with CV Disease

The body of evidence is dominated by quantitative studies (n=52), with cross-sectional designs (n = 39) being the most commonly employed. Across studies, this predominance of cross-sectional approaches limits the ability to assess temporal changes and causal relationships in HRQoL outcomes. Both generic and disease-specific instruments were used, with disease-specific tools, particularly those related to heart failure, appearing more frequently. The variability in findings across studies appears to reflect an unequal research focus, with certain cardiovascular conditions, such as heart failure and coronary artery disease, being more extensively studied than others, while conditions like arrhythmias and congenital heart disease remain relatively underrepresented.

### Findings of HRQoL Studies in Indonesian Populations with CV Disease

The included studies examining HRQoL in the Indonesian population demonstrated that HRQoL outcomes are influenced by a combination of clinical, psychological, behavioral, and social factors across various cardiovascular conditions. Interventional studies reported significant improvements in HRQoL following targeted interventions. Moreover, psychological factors were identified as key determinants of HRQoL. In contrast, some studies reported non-significant findings, such as Rochmawati et al. (2021),[74] who found no correlation between self-care behavior and frailty syndrome ($p = 0.20$), suggesting variability depending on patient characteristics and outcome measures. From a clinical perspective, disease-related factors such as comorbidity, functional status, and treatment characteristics also played an important role. However, not all physiological parameters showed consistent associations, as diastolic function was not significantly related to HRQoL in a study by Widistana et al., 2016;[23] $p > 0.05$).

Additionally, social and spiritual factors were consistently highlighted as important contributors to HRQoL. These findings were further supported by qualitative evidence, where spirituality and social support emerged as key dimensions influencing patients' perceived well-being (Rosidawati et al., 2016[45]). Taken together, these findings suggest that HRQoL among Indonesian CV disease patients is multidimensional and modifiable. Improvements in HRQoL are consistently observed following rehabilitation, education, and self-care interventions, while psychological, clinical, and social determinants play significant roles in shaping patient outcomes. However, variability across studies indicates the need for more longitudinal designs to better capture HRQoL trajectories in this population.

## DISCUSSION

### Validated HRQoL Measures for Cardiovascular Disease in the Indonesian Population

This scoping review represents the first comprehensive mapping of HRQoL assessment in Indonesia populations with CV disease. Importantly, it identifies a notable mismatch between the availability of validated HRQoL instruments and their actual utilization in clinical and research settings. The findings of this review indicate that HRQoL assessment in Indonesian cardiovascular disease populations utilizes a

combination of generic and disease-specific instruments, reflecting different measurement purposes and levels of specificity. Generic instruments such as the SF-36, SF-12, WHOQOL-BREF, and PedsQL are widely applied due to their ability to capture broad dimensions of health across diverse patient groups. These tools enable comparisons across diseases and populations, and several have demonstrated adequate psychometric properties in Indonesian settings, supporting their applicability in cardiovascular research.[65,68] In addition to SF-36 and SF-12 that have already been validated in the Indonesian language for CV disease patients, the newest version of PedsQL (4.0) was validated in pediatric patients undergoing hemodialysis,[80] and the WHOQOL-BREF was validated in elderly patients.[81] This suggests potential limitations in construct relevance when applied to CV disease contexts.

In contrast, disease-specific instruments provide a more focused evaluation of symptoms and functional limitations directly related to cardiovascular conditions. Instruments such as the KCCQ, Seattle Angina Questionnaire, and MLHFQ are frequently used to assess condition-specific domains, including symptom burden and functional impairment in heart failure and coronary artery disease.[21,38,67] Additionally, arrhythmia-specific tools such as AFSS, ASTA, AFQoL, and AFEQT have been introduced to capture more nuanced patient-reported outcomes in atrial fibrillation populations.[49,61,62,64] These disease-targeted instruments are particularly valuable in detecting clinically meaningful changes following interventions or disease progression. Tools such as AFSS, ASTA, MacNew Heart Disease questionnaire, AFEQT, AQUAREL, and MLHFQ have demonstrated acceptable validity and reliability, indicating that they are culturally appropriate for assessing HRQoL among Indonesian patients.[61–64,66,67] The KCCQ has also been translated and adapted into Indonesian in an undergraduate thesis; however, the full text was not accessible at the time of this review.[82] The Seattle Angina Questionnaire was also translated and validated, but its validation was embedded within a study on self-efficacy among patients with coronary artery disease by Wantiyah *et al*. in 2020[83] and was not captured in our systematic search. In contrast, no published evidence of translation or validation of the AFQoL questionnaire into Indonesian was identified. Nevertheless, it reveals a gap between validation and real-world use. Several well-validated instruments are not consistently implemented or integrated into clinical workflows, while others are still used despite limited validation, particularly in terms of methodological quality, population diversity, and longitudinal evidence. This mismatch represents one of the most important findings of this review and may partly explain the lack of standardization in HRQoL research in Indonesia. This suggests that instrument selection in Indonesia is driven not only by psychometric quality but also by practical factors such as familiarity. Another example from this review is that MLHFQ is the most commonly used instrument for the heart failure population, while WHOQOL-BREF is mostly used for CAD. These findings highlight the need for broader validation efforts and better dissemination to support more standardized HRQoL assessment.

### Research Designs and HRQoL Measurement Approaches in Indonesian Cardiovascular Studies

The methodological landscape of HRQoL research in Indonesian cardiovascular populations is predominantly characterized by observational approaches, with cross-sectional studies representing the majority of included designs. This pattern reflects a focus on identifying associations between HRQoL and various determinants rather than establishing causal relationships. While cross-sectional studies are valuable for exploring correlations and generating hypotheses, their inherent limitation in temporality restricts causal inference and the ability to assess changes in HRQoL over time or evaluate the long-term impact of interventions (an understanding that is particularly essential in chronic cardiovascular conditions).

Although several quasi-experimental studies and randomized controlled trials have been conducted, their proportion is still modest compared to observational studies. This imbalance may hinder a more robust

understanding of how HRQoL evolves across disease trajectories or responds to clinical and behavioral interventions. The scarcity of qualitative and mixed-method approaches further indicates that patient perspectives and contextual experiences are underexplored, despite HRQoL being inherently subjective and multidimensional.

In terms of measurement tools, the predominance of the MLHFQ highlights a strong emphasis on heart failure populations within Indonesian cardiovascular research. This is consistent with the high burden of heart failure and the need for disease-specific instruments that are sensitive to symptom changes and functional limitations.[67] The frequent use of generic instruments suggests an effort to capture broader dimensions of health status, enabling comparisons across different patient groups and conditions. These instruments are particularly useful for assessing overall well-being but may be less sensitive to disease-specific changes. The presence of a wide range of disease-specific instruments, indicates increasing recognition of the importance of tailored HRQoL assessment.[21,38,61–64] The publication timeline suggests increasing diversity of HRQoL instruments in recent years, reflecting growing awareness of patient-reported outcomes (Figure 4).

### Summary of HRQoL Outcomes in Indonesian Cardiovascular Disease Populations

The included studies encompassed a broad spectrum of CV disease populations. Based on the extracted data, the clinical groups were categorized into several major subgroups, namely, coronary artery disease, heart failure, arrhythmia, and congenital heart disease. This classification reflects the heterogeneous nature of CV disease. According to the World Health Organization, CV diseases represent a group of disorders affecting the heart and blood vessels, including coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, and thromboembolic conditions.[84] Similarly, the American Heart Association expanded this definition to include heart failure, valvular heart disease, and arrhythmias as part of the broader CV disease spectrum.[85] In this review, the majority of studies focused on heart failure (n = 20) and coronary artery disease (n = 15). These findings highlight that although CV disease is a broad and diverse group of conditions, research on HRQoL has been predominantly concentrated on heart failure and CAD populations, with relatively limited representation of other CV disease subgroups.

The included studies involved mostly adult patients (n = 51). Notably, no studies were identified that specifically evaluated the quality of life of caregivers or family members. This represents an important gap in the literature. CV disease affects not only patients but also their caregivers. It reduces patients' quality of life while increasing caregivers' physical and emotional burden, particularly as hospitalizations recur and the disease progresses, highlighting the need to recognize and support informal caregivers such as partners and family members.[86] However, studies evaluating caregiver quality of life remain limited and were predominantly conducted in non-Indonesian populations. For example, Polikandrioti *et al*. (2025) demonstrated that the physical and mental components of caregiver quality of life in a European population were significantly associated with multiple factors, including demographic characteristics, socioeconomic status, and patient-related clinical variables such as disease severity and hospitalization history.[87]

The included studies involved very limited representation of vulnerable or underrepresented groups. No studies specifically targeted marginalized populations such as individuals from low socioeconomic backgrounds, rural or remote communities, or patients with stigmatized conditions. Although a small number of studies included elderly or pediatric populations, these groups were not the primary focus and remain underrepresented. This shows a potential bias in the current evidence base, limiting the generalizability of HRQoL findings and risking the underrepresentation of populations with distinct social and healthcare access challenges. It also highlights the need for more inclusive research designs to ensure that HRQoL assessments accurately reflect the diversity of

cardiovascular patients in Indonesia. Future research should prioritize longitudinal designs, caregiver-centered studies, and inclusion of underserved populations.

In 1995, Wilson and Cleary[88] explained a conceptual model illustrating that overall quality of life results from a dynamic interaction of biological, psychological, and social factors. Biological and physiological variables influence symptom status, which subsequently affects functional status and shapes individuals' general health perceptions through the roles of motivation, environmental context, and psychosocial support. Ultimately, these interconnected pathways, along with individual and environmental characteristics, determine overall quality of life beyond purely medical factors. Based on this model, the included studies demonstrated a strong emphasis on biological, symptom, functional, and psychological domains, while personal and environmental determinants remained largely underexplored. Biological and physiological factors were the most consistently addressed across studies.

General health perception, operationalized as overall quality of life, was the primary outcome across all included studies. This domain was consistently assessed using standardized instruments. Descriptive studies further reinforced the central role of general health perception as the key endpoint of HRQoL research.[46,49,51] Other studies incorporated broader symptom-related constructs (values preferences) such as illness acceptance (Arafah *et al*., 2020)[35] and spiritual well-being (Mirwanti *et al*., 2016).[71] These variables reflected patients' subjective experience of illness and aligned with the symptom perception component of the Wilson and Cleary model. [88]

In contrast, social determinants were only partially addressed and were largely limited to interpersonal factors. Family support was examined by Febby *et al*. (2023),[22] while marital satisfaction and relational factors were studied by Wulandari (2019).[26] However, broader structural determinants such as socioeconomic status, healthcare access, and social inequality were rarely explored, except for large cohort studies such as that of Lawson *et al*. (2023)[41] that included socioeconomic variables. Personal characteristics, including motivation, values, and individual preferences, were notably absent from most studies. Although some studies indirectly addressed related constructs such as self-efficacy and coping (Wahyuni *et al*., 2014,[28] Nuraeni *et al*., 2023[69]), no studies explicitly examined patient motivation, health beliefs, or treatment preferences. This represents a significant gap, given the central role of personal factors in shaping health perceptions within the Wilson and Cleary model.[88] Environmental factors were also not addressed in the included studies. None of the studies examined contextual influences such as healthcare system accessibility, environmental conditions, or community-level determinants. Most studies were conducted in hospital-based settings, further emphasizing the lack of exploration of broader environmental contexts. Overall, the findings indicate that HRQoL research in CV disease populations remains predominantly focused on biomedical and individual-level psychological factors.

As such, this evidence may help inform a more holistic understanding of patient needs and support the development of patient-centered cardiovascular care approaches, particularly in integrating medical management with psychosocial and functional considerations. However, given the predominantly descriptive nature of the included studies, these findings should be interpreted as exploratory rather than as direct guidance for clinical decision-making. This review is intended to serve as a foundation for future research and policy development.

Furthermore, multiple studies validated widely used HRQoL instruments, including SF-36, MLHFQ, AFEQT, ASTA, AFSS, AQUAREL, and SF-12 (Salim *et al*., 2017; Yamin *et al*., 2023; Yamin *et al*., 2019; Yamin *et al*., 2023; Basuki *et al*., 2021; Zulmiyusrini *et al*., 2023; Kusuma *et al*., 2019; and Wicaksana *et al*., 2020).[61-68] The availability of these validated and relatively simple instruments supports their integration into routine clinical assessment, allowing clinicians to monitor patient-reported outcomes alongside clinical indicators. Importantly, many of these tools are freely accessible or widely used in research and clinical practice, making them well-

suited for use in low-resource settings.

Moreover, the key findings of the included studies not only provide the areas of study that are frequently studied, but also state the significant factors and appropriate interventions for Indonesian patients. At the biological level, factors such as multimorbidity, disease severity, and treatment-related characteristics appear to exert their influence indirectly through downstream domains. The consistent association between multimorbidity and poorer HRQoL, as well as the impact of therapeutic interventions such as diuretics and revascularization, indicates that physiological burden contributes to perceived health status primarily by altering symptom experience and functional capacity.[38,43] These findings reinforce the concept that biological impairment alone is insufficient to explain HRQoL variability without considering its functional consequences.

Psychological factors operate as important modifiers within the individual characteristics-domain of the model. The strong and consistent association of depression and anxiety with poorer HRQoL highlights their role in amplifying symptom burden and negatively influencing health perceptions.[34,36,39] In contrast, self-efficacy appears to enhance patients' ability to interpret and respond to their condition, thereby improving perceived quality of life.[25,44] This dual effect suggests that psychological states can either attenuate or exacerbate the transition from functional status to overall HRQoL. Social and environmental factors further shape this pathway, particularly in the transition toward general health perception and overall HRQoL. Family support, spirituality, and illness acceptance were consistently associated with improved HRQoL, indicating their role in buffering psychological distress and facilitating adaptive coping mechanisms.[22,24,35] Qualitative evidence also supports the integration of these dimensions as central components of patient well-being.[45]

In the Indonesian context, HRQoL appears to be strongly influenced by social and spiritual determinants, which may differ from Western populations where biomedical factors dominate. Importantly, the lack of consistent association between certain physiological measures and HRQoL, such as diastolic function, suggests that objective clinical parameters may not directly translate into patient-perceived outcomes.[23] This discrepancy further supports the Wilson and Cleary framework, emphasizing that HRQoL is ultimately determined at the level of patient perception rather than biological status alone.

This review extends the Wilson and Cleary model by demonstrating how, in the Indonesian context, social and spiritual factors may play a more prominent role. Overall, these findings highlight that effective strategies to improve HRQoL should not focus solely on disease management, but also target functional rehabilitation, psychological well-being, and social support systems. Future research should move beyond descriptive associations and focus on longitudinal, culturally grounded, and implementation-oriented studies to fully integrate HRQoL into cardiovascular care in Indonesia.

### Limitations

This review has several limitations. First, the screening of Google Scholar was restricted to the initial set of results sorted by relevance, which may have led to the omission of potentially relevant studies. In addition, the predominance of cross-sectional designs limits the ability to establish causal relationships and to capture temporal changes in HRQoL. While the inclusion of grey literature enhances the contextual relevance of this review, particularly by capturing local evidence not indexed in major databases, it may also introduce variability in methodological quality, as such sources are not always subject to rigorous peer-review processes. Furthermore, although methodological quality was assessed, studies were not excluded or weighted based on risk of bias, and no quantitative synthesis was performed, which may limit the ability to determine the overall strength of the evidence.

## CONFLICT OF INTEREST

All authors declared there is no conflict of interest.

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## SUPPLEMENTARY 1. QUALITY ASSESSMENT

Randomized controlled trials included in this review were assessed using the RoB 2 tool, which evaluates several domains including the randomization process, deviations from intended interventions, missing outcome data, measurement of outcomes, and selection of reported results. Overall, the RCT studies demonstrated relatively acceptable methodological quality, particularly in domains related to outcome measurement and reporting. Most studies clearly defined the intervention and outcome measurement procedures, which helped minimize measurement bias. In addition, the use of standardized quality-of-life instruments improved the reliability of outcome assessment. However, several limitations were observed. Some studies provided limited information regarding randomization procedures and allocation concealment, which may have introduced selection bias. Furthermore, in behavioral or rehabilitation interventions, complete blinding of participants and personnel was often not feasible, potentially increasing the risk of bias. Despite these limitations, RCT designs still provided stronger evidence compared to that of observational studies in evaluating the effectiveness of interventions aimed at improving quality of life among cardiovascular patients. Overall, the RCT studies demonstrated relatively acceptable methodological quality, particularly in domains related to outcome measurement and reporting (**Figure 1**).

Quasi-experimental studies were evaluated using the ROBINS-I tool, which assesses potential bias in non-randomized intervention studies. This tool examines several domains including confounding factors, participant selection, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of reported results. Overall, the quasi-experimental studies included in this review showed moderate methodological quality (**Figure 2**). The primary strength of these studies was the clear description of interventions and outcome measurements. Most studies used standardized quality-of-life questionnaires, allowing consistent outcome assessment. However, the risk of confounding factors remained an important concern. Unlike randomized trials, quasi-experimental studies often lack random allocation, which means that baseline differences between groups may influence the observed outcomes. In addition, some studies used one-group, pre-post designs, without a control group, making it difficult to determine whether the observed improvements in quality of life were attributable to the intervention or to other external factors such as natural recovery, changes in treatment, or regression to the mean. Another limitation was related to potential deviations from intended interventions, particularly in studies involving educational or rehabilitation programs where participant adherence to the intervention may have varied. These methodological issues suggest that the findings from quasi-experimental studies should be interpreted cautiously, although they still provide valuable preliminary evidence regarding potential interventions to improve quality of life in cardiovascular patients.

Cohort studies were assessed using the NOS to assess the risk of bias. This tool evaluates three main domains: selection, comparability, and outcome assessment. The included cohort studies generally demonstrated moderate to high methodological quality, with total scores ranging from 6 to 9 points. The higher scores in these studies were primarily attributed to appropriate cohort selection and well-defined outcome assessment methods. Several cohort studies had large sample sizes and clearly described follow-up procedures, which strengthened the validity of their findings (**Table 1**). Nevertheless, some methodological limitations were observed, particularly in the comparability domain, which sometimes had limited adjustment of confounding variables. Since quality of life in cardiovascular patients can be influenced by various factors such as comorbidities, treatment regimens, and socioeconomic status, insufficient adjustment of these variables may have affected the accuracy of the observed associations. Despite these limitations, cohort studies provide important longitudinal insights into how clinical and psychosocial factors influence quality of life over time, making them a valuable component

of the evidence base in this field

Cross-sectional studies constituted the largest proportion of studies included in this review; their quality was assessed using the modified NOS. The methodological quality of these studies generally ranged from 6 to 9 points, indicating moderate overall quality (**Table 2**). Most studies performed well in the selection domain, as they clearly defined their study populations and inclusion criteria. Additionally, the majority of studies used validated quality-of-life instruments such as MLHFQ, SF-36, WHOQOL-BREF, and SF-12, which strengthened the reliability of outcome measurement. However, the comparability domain frequently received lower scores, mainly due to limited adjustment of potential confounding variables. Many studies relied primarily on bivariate statistical analyses without extensive multivariable adjustment. This limitation may have affected the interpretation of associations between clinical or psychosocial factors and quality of life outcomes. Another important limitation of cross-sectional studies is their inability to establish causal relationships. Since exposure and outcome are measured at the same time point, it is not possible to determine whether the identified factors influence quality of life or whether patients with different levels of quality of life are more likely to report certain characteristics. Despite these limitations, cross-sectional studies remain useful for identifying patterns and potential determinants of quality of life among cardiovascular patients. They provide valuable baseline information that can guide future longitudinal and interventional research.

In this review, validation studies of HRQoL instruments were also included; their methodological quality was evaluated using the COSMIN framework (**Table 3**). Overall, most studies demonstrated sufficient internal consistency and test–retest reliability, as reflected by Cronbach's alpha and intraclass correlation coefficient (ICC) values exceeding acceptable thresholds, indicating good internal homogeneity and stability over time. Construct validity was generally supported, particularly convergent validity, as shown by significant correlations with established quality-of-life instruments such as the SF-36 or with relevant clinical parameters. However, discriminant validity was not assessed for several instruments, including ASTA, MacNew, SF-36, and AQUAREL. Regarding criterion validity, most instruments showed acceptable external validity through comparisons with external measures such as EHRA classification, the 6-minute walk test, and NT-proBNP levels. Despite these strengths, a key limitation identified across the studies was the lack of structural validity analysis. None of the studies performed confirmatory factor analysis (CFA), and only one study (SF-12v2) reported exploratory factor analysis (EFA), suggesting that the underlying dimensional structure of most instruments has not been formally validated in the Indonesian population. Nevertheless, all studies conducted cross-cultural adaptation and content validation using standardized translation procedures, supporting the relevance and comprehensibility of these instruments within the target population.


**Figure 1**. Quality Assessment for RCT Studies with RoB 2

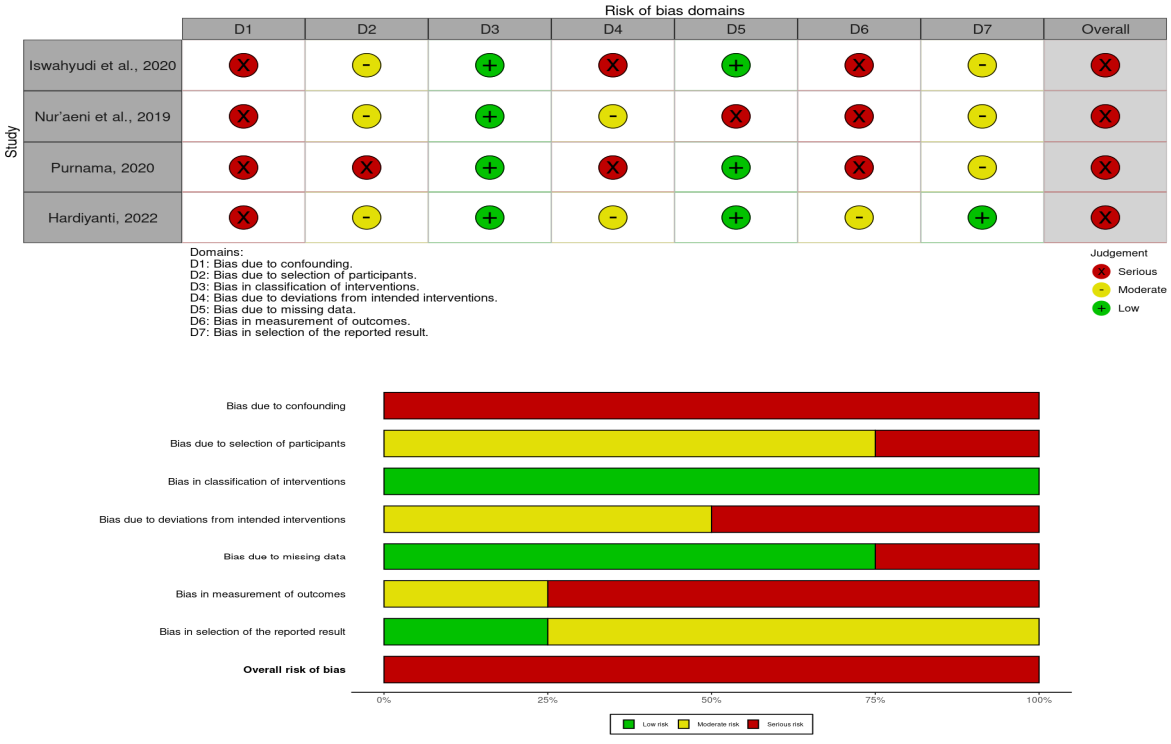


**Figure 2**. Quality Assessment for Quasi-Experimental Studies with ROBINS-I

**Table 1. Quality Assessment for Cohort Studies with NOS**

| Study | Selection | Comparability | Outcome | Total (★) |
|---|---|---|---|---|
| Herry et al., 2005 | ★★★☆ | ★☆ | ★★☆ | 6★ |
| Karimullah et al., 2020 | ★★★★ | ★★ | ★★☆ | 8★ |
| Lawson et al., 2023 | ★★★★ | ★★ | ★★★ | 9★ |
| Luo et al., 2017 | ★★★★ | ★★ | ★★☆ | 8★ |
| Tromp et al., 2018 | ★★★★ | ★★ | ★★★ | 9★ |

**Table 2. Quality Assessment for Cross-Sectional Studies with Modified NOS**

| Study | Selection | Comparability | Outcome | Total |
|---|---|---|---|---|
| Arafah et al., 2020 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Awaludin et al., 2018 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Brikana et al., 2020 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Dedi et al., 2021 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Febby et al., 2023 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Haryati et al., 2020 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Haryati et al., 2022 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Kaban et al., 2022 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Nuraeni et al., 2016 | ★★★★☆ | ★★ | ★★★ | 9★ |
| Santika et al., 2023 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Sari et al., 2017 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Tanziah et al., 2023 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Wahyuni et al., 2014 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Widistana et al., 2016 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Amin et al., 2021 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Anggraini et al., 2018 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Fitria et al., 2023 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Hutagalung et al., 2014 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Jumayanti et al., 2020 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Khaidirman et al., 2024 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Komalasari et al., 2019 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Koto et al., 2024 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Nurhidayah et al., 2022 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Okviasanti et al., 2023 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Rachmawati et al., 2014 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Sensuwaty et al., 2023 | ★★★☆☆ | ★☆ | ★★☆ | 6★ |
| Tatukude et al., 2016 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Basuki et al., 2021 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Kusuma et al., 2019 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Mirwanti et al., 2016 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Nuraeni et al., 2023 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Salim et al., 2017 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Salim et al., 2023 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Wantiyah et al., 2020 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Wicaksana et al., 2020 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Yamin et al., 2019 | ★★★★☆ | ★☆ | ★★☆ | 7★ |
| Yamin et al., 2023 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Zulmiyusrini et al., 2023 | ★★★★☆ | ★★ | ★★☆ | 8★ |
| Rochmawati et al, 2021 | ★★★★☆ | ★☆ | ★★☆ | 8★ |

**Table 3. Quality Assessment of HRQoL Instrument Validation Studies with COSMIN PRO**

| Authors | Instrument | Internal | ICC | Discrimination | Convergent | Criterion | CFA | EFA | Content | Rating |
|---|---|---|---|---|---|---|---|---|---|---|
| Yamin et al., 2023 | AFSS | * | * | * | * | * | – | – | * | Good |
| Yamin et al., 2023 | ASTA | * | * | – | * | * | – | – | * | Good |
| Basuki et al., 2021 | MacNew | * | * | – | * | * | – | – | * | Good |
| Zulmiyusrini et al., 2023 | AFEQT | * | * | * | * | * | – | – | * | Good |
| Salim et al., 2017 | SF-36 | * | * | – | * | * | – | – | * | Good |
| Yamin et al., 2019 | AQUAREL | * | * | – | * | * | – | – | * | Good |
| Kusuma et al., 2019 | MLHFQ | * | * | * | * | * | – | – | * | Good |
| Wicaksana et al., 2020 | SF-12v2 | * | – | * | * | – | – | * | * | Good |

## SUPPLEMENTARY 2. DUPLICATED STUDIES

| |
|---|
| Enhancing knowledge of Diabetes self-management and quality of life in people with diabetes mellitus by using *Guru Diabetes* Apps-based health coaching |
| The Effect of Enhanced External Counterpulsation Therapy and Improvement of Functional Capacity in Chronic Heart Failure patients: a Randomized Clinical Trial |
| The Effect of Enhanced External Counterpulsation Therapy and Improvement of Functional Capacity in Chronic Heart Failure patients: a Randomized Clinical Trial |
| Effectiveness of intravenous ibuprofen compared to intravenous ketorolac for improving the sleep quality patients of acute non-specific musculoskeletal pains |
| VALIDASI KANSAS CITY CARDIOMYOPATHY QUESTIONNAIRE (KCCQ) BERBAHASA INDONESIA PADA PASIEN GAGAL JANTUNG |
| *Validasi St European Quality Of Life-5 Dimensions (EQ-5D) Versi Indonesia Pada Pasien Hipertensi Di Puskesmas Kotagede II Yogyakarta* |
| Faktor yang Memengaruhi Kualitas Hidup Pasien dengan Penyakit Jantung Koroner |
| Faktor yang Memengaruhi Kualitas Hidup Pasien dengan Penyakit Jantung Koroner |
| Faktor yang Memengaruhi Kualitas Hidup Pasien dengan Penyakit Jantung Koroner |
| Kualitas Hidup Pasien Pasca Bedah Pintas Arteri Koroner (BPAK) |
| Kualitas Hidup Pasien Hipertensi Dengan Penyakit Penyerta Di Poli Jantung RSUD Ratu Zalecha Martapura |
| Kualitas Hidup Pasien Hipertensi Dengan Penyakit Penyerta Di Poli Jantung RSUD Ratu Zalecha Martapura |
| Hubungan antara fungsi diastolik dengan kualitas hidup pada pasien gagal jantung kronik dengan fraksi ejeksi normal |
| Tingkat Kualitas Hidup Pasien Hipertensi di Puskesmas Gunungsari Kabupaten Lombok Barat |
| Awareness Questionnaire Versi Bahasa Indonesia untuk Pasien Chronic Kidney Disease (CKD) dengan Hemodialisa: Pengembangan Dan Validitas |
| Kualitas Hidup Pasien Pascaintervensi Koroner Perkutan |
| Hubungan Self Caredan Motivasi dengan Kualitas Hidup Pasien Gagal Jantung |
| Penyuluhan hidup sehat dengan Diabetes Melitus di Desa Gurudug Kecamatan Pondok Salam Kabupaten Purwakarta |
| Validity and Reliability Studies of the Indonesian Version of Arrhythmia-Specific Questionnaire in Tachycardia and Arrhythmia (ASTA) |
| Self-Efficacy in Self-Care and Its Related Factors Among Patients with Coronary Heart Disease in Indonesia: A Rasch Analysis |
| The Validity and Reliability of the MacNew Heart Disease Health Related Quality of Life Questionnaire: The Indonesian Version |
| Validity and Reliability of the Indonesian Version of SF-36 Quality of Life Questionnaire on Patients with Permanent Pacemakers |

| |
|---|
| Relationship of left ventricular diastolic dysfunction with quality of life in heart failure patients with reduced ejection fraction (HFrEF) |
| Cross-cultural adaptation and validation of the Indonesian version of AQUAREL on patients with permanent pacemaker: A cross-sectional study |
| Validity and Reliability Studies of the Indonesian Version of the Minnesota Living with Heart Failure Questionnaire (MLHFQ): Quality of Life Questionnaire for Patients with Chronic Heart Failure |
| Multimorbidity in patients with heart failure from 11 Asian regions: A prospective cohort study using the ASIAN-HF registry |
| The Indonesian version of the Medical Outcome Survey - Short Form 12 version 2 among patients with cardiovascular diseases |
| 'A bridge to normal': a qualitative study of Indonesian women's attendance in a phase two cardiac rehabilitation programme |
| Hubungan Kesejahteraan Spiritual Dengan Depresi Pada Pasien Dengan Penyakit Jantung Koroner (PJK) |

## SUPPLEMENTARY 3. EXCLUDED BY TITLE AND ABSTRACT

| |
|---|
| The effects of synbiotics on indoxyl sulphate level, constipation, and quality of life associated with constipation in chronic haemodialysis patients: a randomized controlled trial |
| The Safety And Benefits Of The Healthy Heart Exercise For Patient With Coronary Heart Disease |
| Enhancing knowledge of Diabetes self-management and quality of life in people with Diabetes Mellitus by using *Guru Diabetes* Apps-based health coaching |
| Rate Control Efficacy In Atrial Fibrillation With Rheumatic Mitral Stenosis: Lenient Vs Strict Rate Control Strategies |
| Effectiveness Of ECP Therapy In Stable Angina Pectoris Patients |
| The Effect Of Enhanced External Counterpulsation Therapy And Improvement Of Functional Capacity In Chronic Heart Failure Patients: A Randomized Clinical Trial |
| Effectiveness Of Intravenous Ibuprofen Compared To Intravenous Ketorolac For Improving The Sleep Quality Patients Of Acute Non-Specific Musculoskeletal Pains |
| Penerapan Backward Elimination Untuk Seleksi Fitur Pada Algoritma K-Nearest Neighbor Untuk Klasifikasi Penyakit Gagal Jantung |
| Hubungan Kepatuhan Minum Obat Antihipertensi Terhadap Kualitas Hidup Pada Pasien Hipertensi |
| Laporan Akhir Penelitian Unggulan Perguruan Tinggi: Efektivitas Model Perawatan Berkelanjutan Dalam Meningkatkan Kualitas Hidup Siswa Penyandang Juvenile Diabetes |
| Gambaran Kualitas Hidup Pada Wanita Dengan Diabetes Mellitus |
| Perbandingan Algoritma Klasifikasi Pada Pasien Penyakit Jantung |
| Analisis Algoritma Gaussian Naive Bayes Terhadap Klasifikasi Data Pasien Penderita Gagal Jantung |
| Validitas Dan Reliabilitas Instrumen Kualitas Hidup Lansia Dengan Hipertensi |
| Penilaian Kualitas Hidup Pasien Hemodialisis Rutin Dengan Anemia Di Yogyakarta |
| Meningkatkan Kualitas Hidup Lansia Konsep Dan Berbagai Strategi Intervensi |
| Kualitas Hidup Pasien Diabetes Melitus Tipe 2 Yang Diterapi Rawat Jalan Dengan Anti Diabetik Oral |
| Perbandingan Kualitas Hidup Pasien Diabetes Melitus Dan Pasien Hipertensi Di Puskesmas Ngaglik I Sleman Yogyakarta |
| Penerapan Teori Self Care Untuk Mengatasi Intoleransi Aktivitas Pada Pasien Dengan Gangguan Sistim Kardiovaskular |
| Hubungan pengetahuan terhadap kepatuhan menjalankan pola hidup sehat pada pasien pasca intervensi koroner perkutan di RSUP dr. Hasan Sadikin Bandung |
| Kualitas Hidup Penderita Hipertensi Di Apotek Mercusuar Kaliwiro Wonosobo |
| Penilaian Kualitas Hidup Pasien Kanker Nasofaring Dengan Menggunakan EORTC QLQ-C30 Di RSUP Dr. Kariadi Semarang |
| Gambaran Kualitas Hidup Pada Pasien Diabetes Melitus |
| Tingkat Kualitas Hidup Pasien Hipertensi Di Puskesmas Gunung Sari Kabupaten Lombok Barat |
| Pengukuran Kualitas Hidup Pasien Hipertensi Di Puskesmas Mergangsan Yogyakarta Menggunakan European Quality Of Life 5 Dimensions (EQ5D) Questionnaire Dan Visual Analog Scale (VAS) |

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| Perbandingan Algoritma CatBoost dan XGBoost dalam Klasifikasi Penyakit Jantung |
| Hubungan Kepatuhan Minum Obat Terhadap Kualitas Hidup Penyandang Hipertensi Dengan Penyakit Penyerta Dan Tanpa Penyakit Penyerta |
| Kualitas Hidup Kesehatan: Konsep, Model Dan Penggunaan |
| Kualitas Hidup Anak Dengan Retardasi Mental |
| Faktor-Faktor Yang Berhubungan Dengan Kualitas Hidup Anak Thalassemia Beta Mayor |
| Hubungan Antara Diabetes Self-Management Dengan Kualitas Hidup Penderita Diabetes Melitus Tipe II Di UPT Puskesmas Babakan Sari Kota Bandung |
| Health Index Family Caregiver Dalam Merawat Anggota Keluarga Dengan Perawatan Paliatif |
| Hubungan Karakteristik Pasien Dan Rejimen Kemoterapi Terhadap Kualitas Hidup Pasien Kanker Di RS PKU Muhammadiyah Yogyakarta |
| Hubungan Antara Resiliensi Dengan Kualitas Hidup Pada Penderita Hipertensi |
| Kualitas Hidup: Studi Pada Pasien Penyakit Paru Obstruksi Kronik (PPOK) |
| Analisis Faktor-Faktor Yang Mempengaruhi Kualitas Hidup Pasien Diabetes Melitus Tipe 2 Di Instalasi Rawat Jalan Rsud Dr. Moewardi Periode Februari-Maret 2018 |
| Hemoglobin Dan Adekuasi Berkorelasi Dengan Kualitas Hidup Dan Kinerja Jantung Pada Pasien Hemodialisis |
| Gambaran Adaptasi Fisiologis Dan Psikologis Pada Pasien Gagal Ginjal Kronis Yang Menjalani Hemodialisis Di Kota Manado |
| Kepatuhan Dan Kualitas Hidup Pasien Diabetes Melitus Tipe 2 Di Rumah Sakit Di Jawa Tengah |
| Hubungan Antara Hipertensi Dengan Kualitas Hidup Pada Penduduk Di Kelurahan Kolongan Kecamatan Tomohon Tengah Kota Tomohon |
| Hubungan Antara Kerasionalan Peresepan Terhadap Kualitas Hidup Pada Pasien Hipertensi Di Puskesmas Mergangsan Yogyakarta Pada Bulan Januari–Februari 2016 |
| Pengukuran Kualitas Hidup Pasien Diabetes Melitus Tipe 2 Dengan Penyakit Penyerta Hipertensi Menggunakan SF-36 |
| Faktor Prediktif Efektifitas Edukasi Farmasis Pada Masa Pandemi Covid-19 Melalui Media Leaflet Terhadap Kualitas Hidup Pasien Hipertensi Di Puskesmas Sedayu 1 Bantul |
| Perbandingan Konseling Farmasi Dan Konseling Islami Terhadap Kualitas Hidup Pasien Diabetes Melitus Tipe 2 |
| Hubungan Persepsi Pasien Tentang Penyakit Hipertensi Dengan Kualitas Hidup Pasien Lanjut Usia, Tekanan Darah, Dan Jenis Terapi Antihipertensi |
| Keefektifan Logoterapi Untuk Menurunkan Derajat Depresi Dan Meningkatkan Kualitas Hidup Pasien Di Poliklinik Geriatri Rumah Sakit Umum Daerah Dr. Moewardi Surakarta |
| Awareness Questionnaire Versi Bahasa Indonesia Untuk Pasien Chronic Kidney Disease (CKD) Dengan Hemodialisa: Pengembangan Dan Validitas |
| Perbandingan Health-Related Quality Of Life (HRQoL) Antara Penderita Penyakit Ginjal Kronik Dengan Non Penyakit Ginjal Kronik Pada Penduduk Asli Desa Pedawa Buleleng Bali |
| Identifikasi Suara Jantung Normal Dan Abnormal Menggunakan Metode K-Nearest Neighbors |
| Hubungan Aktifitas Fisik Dengan Kualitas Hidup Pasien Hipertensi *Literature Review* |
| Gambaran Kualitas Hidup Lansia Dengan Hipertensi Pada Masa Pandemi Covid-19 |
| Penerapan Logistic Regression Untuk Mendeteksi Penyakit Jantung Pada Pasien |
| Pengukuran Kualitas Hidup Pasien Diabetes Melitus Tipe 2 Dengan Penyakit Penyerta Hipertensi Menggunakan SF-36 |
| Hubungan Antara Kecemasan Dengan Kepatuhan Minum Obat Pada Pasien Dengan Gagal Jantung |
| Hubungan Kepuasan Terapi Dengan Kualitas Hidup Pasien Diabetes Mellitus Tipe-2 Di Pelayanan Primer (Puskesmas Jetis 1 Bantul) |
| Hubungan Tingkat Stres Dengan Kualitas Hidup Pasien Tuberkulosis Paru Di Rumah Sakit Advent Medan |
| Upaya Pencegahan Kekambuhan Melalui Discharge Planning Pada Pasien Penyakit Jantung Koroner |
| Pengaruh Medication Therapy Management (MTM) Terhadap Outcome Klinik Dan Kualitas Hidup Pasien Hipertensi Di Puskesmas Kota Yogyakarta |
| Perubahan Kualitas Hidup Dan Nilai Cd4+ Pasien HIV/AIDS Dengan Pemberian Ramuan Jamu Imunostimulan Di Sragen |
| Hubungan Antara Kualitas Tidur Dengan Self-Care Pada Pasien Gagal Jantung |
| Gambaran Drug Related Problems (DRP's) Pada Penatalaksanaan Pasien Stroke Hemoragik Dan Stroke Non Hemoragik Di RSUD Dr M Yunus Bengkulu |

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| Pelatihan Tentang Perawatan Pasien Penyakit Kardiovaskuler Di Kelurahan Sei Agul |
| Pengaruh Logoterapi Untuk Menurunkan Tingkat Depresi Dan Meningkatkan Kualitas Hidup Pasien Penyakit Paru Obstruktif Kronik Di Rsud Dr. Moewardi Surakarta |
| Uji Validitas Dan Reliabilitas Kuesioner Medication Adherence Report Scale (MARS) Terhadap Pasien Diabetes Mellitus |
| Hubungan Antara Dukungan Sosial Dengan Penerimaan Diri Pada Pasien Pasca Stroke |
| Telemonitoring On Prolanis: Potensi Menjadi Solusi Peningkatan Kepatuhan Dalam Upaya Pencegahan Dan Pengelolaan Hipertensi |
| Implementasi Algoritma Naïve Bayes Classifier (Nbc) dan K-Nearest Neighbor Untuk Klasifikasi Penyakit Ginjal Kronik |
| Awareness Questionnaire Indonesian Version For Chronic Kidney Disease (CKD) Patients With Hemodialysis: Development And Validity |
| Pemeriksaan Kesehatan Jantung Dalam Rangka Pengembangan Aplikasi Screening Jantung Berbasis Android |
| Hubungan Regimen Terapi Terhadap Kualitas Hidup Pasien Kanker Menggunakan Kuesioner EORTC QLQ C-30 Di Rumah Sakit PKU Muhammadiyah Yogyakarta |
| Hubungan Kualitas Hidup Dengan Tekanan Darah Pada Lansia Hipertensi Di Masa Pandemi Covid-19 Di Puskesmas Jurangombo |
| Efikasi Pemantauan Hemodinamik Non-Invasif Pada Pasien Gagal Jantung: Literature Review |
| Pengaruh Neurofeedback Terhadap Migrain, Cemas, Dan Kualitas Hidup Pasien Di Rs Uns Surakarta (Operational Research) |
| *Health Related Quality Of Lifeamlodipine-Bisoprolol* Dan *Amlodipine Candesartan* Pasien Hipertensi Menggunakan Instrumen Sf-36 Di RS Bhayangkara TK. III Manado |
| Pengaruh Kodefikasi Penyakit Terhadap Ketepatan Laporan Morbiditas Rawat Jalan |
| Implementasi Algoritma K-Nearest Neighbor Untuk Klasifikasi Obesitas |
| Hubungan Pelaksanaan Fungsi Perawatan Kesehatan Keluarga Dengan Kualitas Hidup Lansia Dengan Hipertensi Di Desa Pecarikan Kecamatan Prembun |
| Asuhan Keperawatan Perioperatif Pada Pasien Ulkus Diabetikum Dengan Tindakan Debridemen Di Rumah Sakit Mardi Waluyo Metro Tahun 2022 |
| Kualitas Hidup Balita Stunted |
| Asuhan Keperawatan Perioperatif Pada Pasien Apendisitis Dengan Tindakan Apendiktomi Di Ruang Operasi Rumah Sakit Pertamina Bintang Amin Bandar Lampung Tahun 2020 |
| Hubungan Antara Dukungan Sosial Dan Kualitas Hidup Pada Pasien Gagal Ginjal Yang Menjalani Terapi Hemodialisis Di Rumah Sakit Urip Sumoharjo |
| Analisis Kualitas Hidup Pada Pasien Penyakit Ginjal Kronis Dengan Anemia Di Unit Hemodialisis RSUP Dr. Sardjito Yogyakarta |
| Cost Effectiveness Analysis (CEA) Program Pengelolaan Penyakit Kronis (PROLANIS) Diabetes Melitus Tipe 2 Peserta JKN Di Kota Serang Banten |
| Pengukuran Kualitas Hidup Menggunakan Instrumen Quality Of Well Being Self-Administered Scale (QWB-SA) Pada Pasien Hipertensi |
| Ancaman Dan Peluang Artificial Intelligence (AI) |
| Evaluasi Kualitas Hidup Responden Hipertensi Usia 40-75 Tahun Menggunakan Instrumen SF-36 Di Kecamatan Ngemplak, Sleman, Yogyakarta (Kajian Usia Dan Body Mass Index) |
| Deskripsi Perilaku Kesehatan (Health Behavior) Dan Kualitas Hidup Lansia Suku Dayak Tomun Di Desa Sungai Buluh, Kab. Lamandau, Prov. Kalimantan Tengah |
| Klasifikasi Cardiovascular Diseases Menggunakan Algoritma K-Nearest Neighbors (KNN) |
| Faktor-Faktor Yang Berhubungan Dengan Kualitas Hidup Anak Thalassemia |
| Pengaruh Pemberian Edukasi Berbasis Digital Cardicraf Terhadap Tingkat Kepatuhan Monitoring Self-Care Management Pasien Gagal Jantung |
| Acceptence Of Illness Dalam Mengevaluasi Domain Kualitas Hidup Pasien Kanker Payudara |
| Upaya Penanganan Gangguan Aktivitas Pada Penderita Gagal Jantung Selama Masa Pandemi Covid-19 |
| Efektifitas Dari 6MWT Untuk Meningkatkan Kapasitas Berjalan Pada Pasien Gagal Jantung: Studi Kasus |
| Pengukuran Kualitas Hidup Pasien Pengguna Antihipertensi Dengan European Quality Of Life 5 Dimensions (EQ5D) Questionnaire Dan Visual Analog Scale (VAS) |
| Penyuluhan Hidup Sehat Dengan Diabetes Melitus Di Desa Gurudug Kecamatan Pondok Salam Kabupaten Purwakarta |

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| Kepatuhan Minum Obat Dan Kualitas Hidup Pasien Hipertensi Di Wilayah Puskesmas Kenjeran Surabaya |
| Korelasi Stress Dan Kualitas Hidup Pasien Hipertensi |
| Herbal Therapy And Quality Of Life In Hypertension Patients At Health Facilities Providing Complementary Therapy |
| Pengaruh Smartphone-Based Application Terhadap Kepatuhan Pengobatan Pasien Dengan Penyakit Jantung Koroner (PJK) Di Rumah Sakit Swasta Tipe A Kota Bandung |
| Gambaran Gangguan Tidur Pada Pasien Pasca Stroke Iskemik |
| Motivasi Kader Kesehatan Dalam Mengkaji Self-Care Pada Pasien Hipertensi |
| Hubungan Discharge Planning Dengan Kualitas Hidup Pasien Pasca Stroke Di Poli Neurologi RSAM Bukittinggi Tahun 2016 |
| Self Management Pasien Diabetes Melitus Dengan Komplikasi Kardiovaskular Dan Implikasinya Terhadap Indikator Klinik |
| Korelasi Domain Kelelahan Dan Kualitas Hidup Pada Pasien Hipertensi Di Indonesia |
| Kecemasan Dan Status Gizi Berhubungan Dengan Lama Rawat Inap Pada Pasien Jantung Di RSUD Jenderal Ahmad Yani, Metro, Lampung |
| Gambaran Profil Risiko Kardiovaskular Berdasarkan Skor Kardiovaskular Jakarta Pada Kader Kesehatan Di Desa Cilayung Kecamatan Jatinangor |
| Pengaruh Karakteristik Penderita DM Terhadap Kualitas Hidup Setelah Penerapan Hipnoterapi |
| Faktor-Faktor Yang Mempengaruhi Mortalitas Pada Pasien Dengan Fraktur Costa: Literature Review |
| Illness Representations In Chronic Diseases: A Literature Review |
| Hubungan Keikutsertaan Prolanis, Kepatuhan Minum Obat Dan Status Gizi Terhadap Kontrol Tekanan Darah Pada Pasien Hipertensi Di Puskesmas Kedaton Kota Bandar Lampung |
| Evaluasi Kepatuhan Pasien Hipertensi Lanjut Usia Melalui Home Pharmacy Care Di Wilayahkerja Puskesmas Paal V Jambi |
| Hubungan Kualitas Hidup Terhadap Tingkat Kecemasan Anak Penderita Kanker Yang Menjalani Kemoterapi Di RSUD Dr. Moewardi Surakarta |
| Hubungan Lama Menderita Dan Kejadian Komplikasi Dengan Kualitas Hidup Lansia Penderita Diabetes Mellitus Tipe 2 |
| Hubungan Dukungan Sosial Dengan Kualitas Hidup Pada Pasien Fraktur Ekstremitas Bawah Di RSUD Meuraxa Banda Aceh |
| Hubungan Tingkat Pengetahuan Tentang Kateterisasi Jantung Dengan Kecemasan Pada Pasien Sebelum Kateterisasi Jantung |
| Hubungan Budaya Pijat,Rorano Dan Bakera Terhadap Perubahan Masa Nifas Di Kota Ternate Provinsi Maluku Utara |
| Health- Related Quality Of Life For Multiple Myeloma Patients With Bone Metastases In Indonesia: A Cross-Sectional Study |
| Risk Factors For Depressive Symptom Changes In Indonesian Geriatric Outpatient |
| 'It Burdens Me': The Impact Of Stroke In Central Aceh, Indonesia |
| 'A Bridge To Normal': A Qualitative Study Of Indonesian Women's Attendance In A Phase Two Cardiac Rehabilitation Programme |
| Smoking And Quality Of Life - Is There Really An Association? Evidence From A Nepalese Sample |
| Efficacy Of The Behavior Of Low-Salt Diets In People With High Blood Pressure: A Literature Review |
| Snack-Based Pury, Safe And Beneficial To Maintain The Lipid Profile In Elderly |
| Design, Development, And Usability Testing Of A Mobileapp For Medication Reminder Among Patients With Chronic Conditions |
| Child Blood Pressure Profile In Bali, Indonesia |
| Dominant Factors Of Central Obesity In Hypertensive Patients |
| Diabcare Asia 2012: Diabetes Management, Control, And Complications In Patients With Type 2 Diabetes In Indonesia |
| Description On The Quality Of Life Among Elderly Affected By Dental And Oral Health In Jagir Health Centre Surabaya |
| Association of Serum Uric Acid with Prognosis in Patients with Myocardial Infarction: An Update Systematic Review and Meta-Analysis |
| Modifiable Risk Factors For Dementia In Indonesia: Results From STRiDE Project |
| Real-World Evaluation Of Perception, Convenience And Anticoagulant Treatment Satisfaction Of Patients With Atrial Fibrillation Switched From Long-Term Vitamin K Antagonist Treatment To Dabigatran |
| The Frailty Among Suburban Elderly Population After One-Year Covid-19 Pandemic In Cirebon Regency, Indonesia |

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| Assessing Burden, Anxiety, Depression, And Quality Of Life Among Caregivers Of Hemodialysis Patients In Indonesia: A Cross-Sectional Study |
| Self-Care Behavior Among Adult Patients With Hypertension In Padang, West Sumatra, Indonesia: A Cross-Sectional Study |
| Multimorbidity Increases The Risk Of Falling Among Indonesian Elderly Living In Community Dwelling And Elderly Home: A Cross Sectional Study |
| Factors Affecting The Outcomes In Stable Chronic Obstructive Pulmonary Disease Patients At An Army Central Hospital |
| Emotional Distress Is Associated With Lower Health-Related Quality Of Life Among Patients With Diabetes Using Antihypertensive and/or Antihyperlipidemic Medications: A Multicenter Study In Indonesia |
| Transformative Impact Of Islamic Spiritual Care (ISC) Enriched With Murottal: Alleviating Anxiety And Depression Among Coronary Heart Disease Patients Through Pre And Post Intervention Analysis |
| Determinant Factors Of Depression In Patients With Coronary Heart Disease |
| The Association Of Diabetes-Related Factor And Quality Of Life In Type 2 Diabetes Mellitus |
| Association Of Obesity With Heart Failure Outcomes In 11 Asian Regions: A Cohort Study |
| An Analysis Of The Short- And Long-Term Cost-Effectiveness Of Starting Biphasic Insulin Aspart 30 In Insulin-Naïve People With Poorly Controlled Type 2 Diabetes |
| Health And Productivity Burden Of Coronary Heart Disease In The Working Indonesian Population Using Life-Table Modelling |
| Literatur Review: Self Manajemen Penderita Jantung Koroner |

## SUPPLEMENT 4. LACK OF AVAILABLE FULL TEXT

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| A Randomized, Double-Blind, Placebo-Controlled Trial On Efficacy And Safety Of Blumea Balsamifera (Sambong) On Prognostic Parameters And Quality of- Life Of Chronic Heart Failure Patients |
| Community-Based Education And Exercise Program Results In Improving Quality Of Life And Reduce Rehospitalization Rate Among Stable Coronary Artery Disease Patients Of Malang Cardiovascular Care Community |
| Gambaran Kualitas Hidup Pada Pasien Penyakit Jantung Koroner |
| Pengalaman Pasien Gagal Jantung Terhadap Penggunaan Aplikasi E Discharge Planning Di RS PKU Muhammadiyah Gamping |
| Quality Of Life Assessment Of Patients With Aspirin And Clopidogrel As Oral Antiplatelet In The Cardiology Outpatient Clinics Of Bandung Central General Hospital |
| The Efficacy Of EECP Therapy To Improve Quality Of Life In Chronic Heart Failure Patients |
| VALIDASI KANSAS CITY CARDIOMYOPATHY QUESTIONNAIRE (KCCQ) BERBAHASA INDONESIA PADA PASIEN GAGAL JANTUNG |

## SUPPLEMENT 5. FULL-TEXT STUDIES EXCLUDED DUE TO WRONG POPULATION (P), OUTCOME (O), OR STUDY TYPE (T)

| Title | Reasoning |
|---|---|
| Correlation Between Nurse-Patient Interaction And Readiness To Care For Post-Treated Heart Failure Patients In The Intensive Care Room Malang, Indonesia | O |
| Exercise Training in Heart Failure: Clinical Benefits and Mechanisms | P |
| Hubungan Cemas Dan Depresi Pada Pasien Dengan Penyakit Jantung Koroner (PJK) | O |
| Hubungan Fungsi Keluarga Dengan Kualitas Hidup Pasien Penyakit Kronis Degeneratif Di Fasilitas Kesehatan Tingkat Pertama | P |
| Illness Cognition And Depression Among Patients With Coronary Heart Disease | O |
| Instrumen Monitoring Pasien Dalam Terapi Warfarin | T |
| Keyakinan Pasien Gagal Jantung Dalam Mengontrol Kesehatannya (Health Locus Of Control): Studi Preliminari | O |

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| Kualitas Hidup Pasien Hipertensi Dengan Penyakit Penyerta Di Poli Jantung RSUD Ratu Zalecha Martapura | P |
| Literatur Review: Kualitas Hidup Pasien Coronary Artery Disease (CAD) | T |
| Penerjemahan Dan Validasi Kuesioner “Educational Needs Of Caregivers Instrument” Ke Dalam Bahasa Indonesia Pada Caregivers Pasien Gagal Jantung | O |
| Pengkajian Frailty Meningkatkan Kualitas Perawatan Pada Pasien Gagal Jantung | T |
| Quality Of Life Among Patients With Cardiac Disease: The Impact Of Comorbid Depression | P |
| Quality of life in heart failure: New data, new drugs and devices | P |
| Studi Literatur: Faktor-Faktor Yang Mempengaruhi Kualitas Hidup Pasien Penderita Gagal Jantung Di Indonesia | T |
| The Importance Of Selecting Permanent Pacemaker, Evaluating The Heart And Assessing Quality Of Life In Cardiac Patient | T |
| The Relationship Between Quality Of Sleep And Quality Of Life Of Patients In Medan, Indonesia | P |
| Tingkat Kualitas Hidup Pasien Setelah IMA Dengan Menjalani Program Rehabilitasi Jantung Berbasis Latihan (Literature Review) | T |
| Validasi St European Quality Of Life-5 Dimensions (EQ-5D) Versi Indonesia Pada Pasien Hipertensi Di Puskesmas Kotagede II Yogyakarta | P |
| Penyuluhan Perawatan Diri (Self Care) Penderita Penyakit Jantung Koroner di Wilayah Puskesmas Air Saga Kabupaten Belitung | T |