Clinical Research

Indonesia-INTERASPIRE study: an Indonesian cross-sectional multicenter survey on cardiovascular secondary prevention in coronary heart disease

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ABSTRACT

BACKGROUND Cardiovascular disease (CVD) is projected to affect more than 23.3 million people by 2030. Therefore, CVD prevention strategies were established to decrease morbidity and mortality while enhancing overall well-being. The Joint European Societies (JES) guidelines on CVD prevention were developed to enhance preventive cardiology practices. This study aimed to evaluate the adherence to JES guidelines for cardiovascular prevention in routine clinical practice for secondary prevention.

METHODS This multicenter cross-sectional study was conducted in 7 centers between August 2020 and June 2021. Patients under 80 years old who had undergone percutaneous transluminal coronary angioplasty, coronary artery bypass graft, percutaneous coronary intervention, or experienced acute coronary syndrome were identified from medical records and interviewed a year later. Descriptive statistics were used to calculate the occurrence of risk variables, medication use, and index events associated with low-density lipoprotein cholesterol (LDL-C), hemoglobin A1c, and blood pressure (BP).

RESULTS A total of 402 participants (13.9% female) were interviewed, and their medical records were reviewed. Among the study population, 74.4% had a smoking history, 35.4% had dyslipidemia, 33.1% did not meet the BP target, and only 28.4% achieved the LDL-C target. Additionally, less than half (43.8%) participated in physical activity for >150 min/week. Only 15.6% of the patients among the centers who had scored >8 for the guideline-based target score.

CONCLUSIONS Most patients did not meet the guidelines for secondary prevention, primarily due to the high prevalence of dyslipidemia and physical inactivity, although some achieved the LDL-C target.

KEYWORDS cardiovascular diseases, guideline, rehabilitation, secondary prevention

Cardiovascular disease (CVD) is a major health concern, accounting for 50% of all non-communicable diseases and remaining the leading cause of mortality worldwide. It is responsible for 17.3 million deaths annually, a number projected to exceed 23.3 million by 2030.[1–3] According to the World Health Organization (WHO), CVD accounts for 30% of all global deaths, with ischemic heart disease and stroke as the primary causes.[4,5]

In the Asia-Pacific region, the prevalence of CVD is rising due to increasing rates of obesity, dyslipidemia, diabetes mellitus (DM), and hypertension, driven by rapid urbanization, high smoking rates, and reduced physical activity.[6] Mortality rates are notably higher in low- and middle-income countries, including Indonesia,[4,7] which bears the greatest burden of CVD. Nearly one-third of all fatalities in Indonesia are attributable to CVD, making it the leading cause of morbidity and mortality.[4,5] The estimated years of life lost due to early mortality from coronary heart disease (CHD) and cerebrovascular disease are 3,299 and 2,555 per 100,000 population, respectively.[4]

CVD prevention has emerged as a key strategy for reducing morbidity and mortality while enhancing quality of life (QoL). WHO has established eight targets to achieve this goal, emphasizing lifestyle modifications such as smoking control, diet, physical activity, blood pressure (BP), diabetes, and the utilization of medical drugs and technologies.[8] To support these efforts, the European Society of Cardiology (ESC) and other organizations have developed the Joint European Societies (JES) guidelines on CVD prevention to enhance preventive cardiology practices.[9] These guidelines have been updated regularly since 1994, with revisions in 1998, 2003, 2007, 2012, and 2016,[9,10] and focus on prevention strategies through national and international collaboration, communication, implementation, and evaluation.

The European Action on Secondary and Primary Prevention by Intervention to Reduce Events (EUROASPIRE) was first implemented by the ESC in 1995–1996[9] to assess adherence to the JES guidelines in routine clinical practice for secondary prevention. EUROASPIRE V, conducted from 2016 to 2018, is the most recent survey.[11] The latest EUROASPIRE study was conducted in 16 countries: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Egypt, Greece, Kazakhstan, Kyrgyzstan, Lithuania, Poland, Portugal, Romania, Russia, Sweden, Ukraine, and the United Kingdom. However, no such surveys have been conducted in Indonesia.

Indonesia, however, contributes data to the International Survey of Coronary Patients (INTERASPIRE) alongside 16 other countries from six continents. To address the gap in national data, the first author, serving as Indonesia's principal investigator in INTERASPIRE, initiated the Indonesia-INTERASPIRE study. This study aimed to evaluate and implement CVD prevention strategies based on recent guidelines while assessing risk factors for CHD through lifestyle changes and medication use.

METHODS

Study design

This multicenter cross-sectional study was conducted across seven hospitals in Indonesia: National Cardiovascular Center Harapan Kita (Jakarta), M. Djamil General Hospital, Padang (West Sumatera), Zainoel Abidin General Hospital, Aceh (Special Region of Aceh), Sardjito General Hospital, Yogyakarta (Special Region of Yogyakarta), H. Adam Malik General Hospital, Medan (North Sumatera), Saiful Anwar General Hospital, Malang (East Java), and Hasan Sadikin General Hospital, Bandung (West Java). Patients were selected using purposive sampling and were interviewed to collect updated information on risk factors, medication use, and lifestyle. The study was conducted between August 2020 and June 2021.

Study population

A total of 402 patients with acute symptoms of coronary disease or requiring revascularization procedures, such as balloon angioplasty, percutaneous coronary intervention (PCI), or coronary artery bypass graft (CABG), were included. Eligible participants were male and female aged 18–80 years who had a clinical diagnosis of CVD or had undergone treatment. This study included patients who had been hospitalized between 6 months and 2 years prior to the interview to ensure they had professional health services assisting them in meeting the required support for CVD prevention. Patients were retrospectively identified using diagnostic registers or hospital discharge records. Included cases comprised patients with acute coronary syndrome (ST-segment elevation myocardial infarction [STEMI], non-ST-segment elevation myocardial infarction [NSTEMI], and unstable angina pectoris [UAP]), elective percutaneous transluminal coronary angioplasty, and elective CABG.

Data collection

Trained research staff reviewed medical records and conducted patient interviews and examinations at least 6 months after the initial cardiovascular event or procedure. Standardized methodologies and identical tools were used across all study centers. Each patient

completed two report forms: (1) a patient record form, which documented medical records, and (2) a patient interview form, used for interviews and examinations.

Personal information, including age, sex, ethnicity, date of the index event, and history of conditions such as dyslipidemia, hypertension, DM, chronic renal disease, premature CVD, as well as smoking status and medications, was extracted from medical records. The interviews collected self-reported data on lifestyle factors (smoking habits, diet, physical activity, family history, and alcohol consumption), education, occupation, risk factor management, and current medications. The INTERASPIRE study's case record form was translated into Indonesian, and all self-reported questionnaires were validated.

As part of the study, patients underwent several examinations: (1) height and weight were measured to calculate body mass index (BMI) using WHO criteria for the Asian population, where overweight was defined as a BMI >23 kg/m^2 and obesity was defined as a BMI ≥25 kg/m^2;[12] (2) abdominal circumference was measured at the level of the umbilicus to assess central obesity, with thresholds set at ≥90 cm for men and ≥80 cm for women; (3) BP was assessed twice on the right upper arm while the patient was in a relaxed, seated position using a standardized digital automatic sphygmomanometer. High BP was defined as ≥140/90 mmHg, with a threshold of ≥140/80 mmHg in patients with DM based on the JES 5th edition (JES5) guidelines in 2012; (4) heart rate was measured using standardized pulse oximetry; (5) blood tests were conducted to measure total cholesterol, high-density lipoprotein, low-density lipoprotein (LDL), triglyceride, creatinine, hemoglobin A1c (HbA1c), fasting blood glucose, and oral glucose tolerance test (OGTT) levels. Low-density lipoprotein cholesterol (LDL-C) level was computed using Friedewald's formula when the triglyceride level was <155 mg/dl. Elevated HbA1c levels in diabetic patients were defined as ≥7.0%. An OGTT was conducted on participants without a prior diabetes diagnosis by measuring fasting and 2-hour plasma glucose levels following an intake of 75 g of glucose in 200 ml of water. Glycemic status was classified according to WHO criteria for diabetes and dysglycemia;[13] (6) urine test was conducted to examine the ratio of albumin/creatinine ratio; (7) serum test was done to analyze markers, such as IgG coronavirus disease 2019 (COVID-19), IgG quantitative COVID-19, IgM COVID-19, B-type natriuretic peptide, N-terminal pro-B-type natriuretic peptide, high-sensitivity troponin-I, and galectin-3; (8) carbon monoxide (CO) levels were analyzed using a Portable CO Breath Analyzer (MD Diagnostics Ltd., UK); and (9) validated questionnaires were completed, including the Hospital Anxiety and Depression Scale, Heart-Related Quality of Life, European Quality of Life-5 Dimensions, and the Medication Adherence Questionnaires.

All patient samples were stored in a cryotube in a freezer at –80°C. Each patient had a spare blood sample (1–2 ml) in three cryotubes: two containing plasma and one containing serum. Plasma was extracted from blood collected in EDTA tubes, while serum was obtained from blood collected in serum separator tubes. All blood samples were centrifuged at 2,000 × *g* for 10 min at room temperature.

Data management

The data management team at the National Cardiovascular Center Harapan Kita, Jakarta, oversaw the Indonesia-INTERASPIRE data. All data were collected electronically using a Microsoft Excel spreadsheet (Microsoft Corp., USA), with a unique identification number assigned to each center and participant. Data were submitted via an online system that evaluated their completeness, accuracy, and consistency.

Statistical analysis

Data from 402 patient interviews were analyzed, providing sufficient power to determine the prevalence of risk factors with a 95% confidence interval. All prevalence rates are presented as proportions. Descriptive statistics, including mean, standard deviation, range, and proportion, were used to assess the prevalence of risk factors, medication use by the center, as well as age and sex. SPSS software version 26 (IBM Corp., USA) was used to classify the continuous variables into categorical variables using the "Recode into Different Variables" function. The "Frequencies", "Descriptive", and "Crosstabs" functions were used to determine prevalence.

Ethical procedures

Ethical approval for each local administrator at each center was obtained from the Institutional Review Board of the National Cardiovascular Center Harapan Kita (No: LB.02.01/VII/447/KEP 047/2020). Participants provided informed consent before

data were collected from their medical records and interviews. The research assistant at each center also signed a case report form to confirm that informed consent had been acquired while the original signed consent statement was retained in the subject's file.

RESULTS

The study enrolled 402 participants across seven centers in Indonesia's major cities. All participants underwent medical record reviews, standardized interviews, physical examinations, and laboratory examinations. In the Indonesia-INTERASPIRE study population, 13.9% were female, and the mean age was 58 years. The predominant index event was PCI, followed by STEMI and CABG. Furthermore, more than 50% of the study group exhibited risk factors, specifically hypertension, which was associated with smoking. Although all patients had a history of CVD/index events, 97.9% were prescribed antiplatelet medications. However, important supportive therapy, such as statins, was provided to fewer than 80% of the study population. A detailed summary of the study population characteristics is presented in Table 1.

Table 1. Characteristics of interviewed patients by age, information related to CVD risk factors, and medication

Characteristics	n (%) (N = 402)
Age (years), mean (SD)	58 (8.65)
Age at index event (years), mean (SD)	56.4 (8.64)
Female sex	56 (13.9)
Index event (n = 402)	
PCI	145 (36.1)
STEMI	118 (29.4)
CABG	77 (19.2)
UAP	33 (8.2)
NSTEMI	29 (7.2)
Risk factor data from medical records (n = 387)	
Hypertension	236 (61.0)
Smoking	212 (54.8)
Dyslipidemia	137 (35.4)
T2DM	117 (30.2)
Discharge drugs data from medical records (n = 387)	
≥1 antiplatelet	379 (97.9)
Beta blocker	334 (86.3)
Statin	294 (76.0)
ACE inhibitor	254 (65.6)
ARB	103 (25.6)

ACE=angiotensin-converting enzyme; ARB=angiotensin II receptor blocker; CABG=coronary artery bypass graft; CVD=cardiovascular disease; NSTEMI=non-ST-segment elevation myocardial infarction; PCI=percutaneous coronary intervention; SD=standard deviation; STEMI=ST-segment elevation myocardial infarction; T2DM=type 2 diabetes mellitus; UAP=unstable angina pectoris

Data from personal interviews, physical examinations, and laboratory tests were collected to assess lifestyle factors in patients with coronary syndrome following the index event. Regarding smoking trends, 74.4% of participants had a history of smoking, including both former and current smokers. Among the 212 participants who provided detailed smoking histories, the prevalence of smoking decreased from 54.8% before the index event to 11.7% at the time of the interview. Regarding physical activity, 43.8% of participants reported meeting the recommended 30 min of exercise per session, averaging 5 times per week. In terms of body composition, based on the Asia-Pacific classification, 2.0% of participants were underweight, 17.2% had a normal weight, 21.9% were overweight, and 58.9% were obese.

BP data collected during physical examinations revealed that 25.1% of participants had readings between 140/90 mmHg and 159/99 mmHg, while 8.0% had readings of ≥160/100 mmHg. Overall, 33.1% of the study population did not achieve the target BP of <140/90 mmHg. Meanwhile, 41.0% had a BP <130/80 mmHg, and 25.9% fell within the 130/80–139/89 mmHg range. When analyzed by index event, patients with UAP (60.4%) and those who underwent PCI (60.7%) had the lowest BP control rates, whereas the remaining subgroups exceeded 70% adherence to the target (Figure 1a). Additionally, over one-third of each subpopulation had a BP <130/80 mmHg across all index events, with the highest percentage reported in the STEMI group (49.2%).

Laboratory results showed that only 8.5% of the study population achieved the LDL-C target level of <55 mg/dl, while 28.4% reached <70 mg/dl. The remaining participants had LDL-C levels of 70–99 mg/dl (36.8%), 100–116 mg/dl (14.2%), and ≥116 mg/dl (20.6%). When analyzed by index event, the CABG subgroup had the lowest percentage of successful LDL-C control (<70 mg/dl) at 23.4%, followed by the UAP subgroup (27.3%) (Figure 1b). Across all index events, <10% of each subpopulation achieved an LDL-C level of <50 mg/dl, with most patients falling within the 70–99 mg/dl range. Notably, the NSTEMI and UAP subgroups had

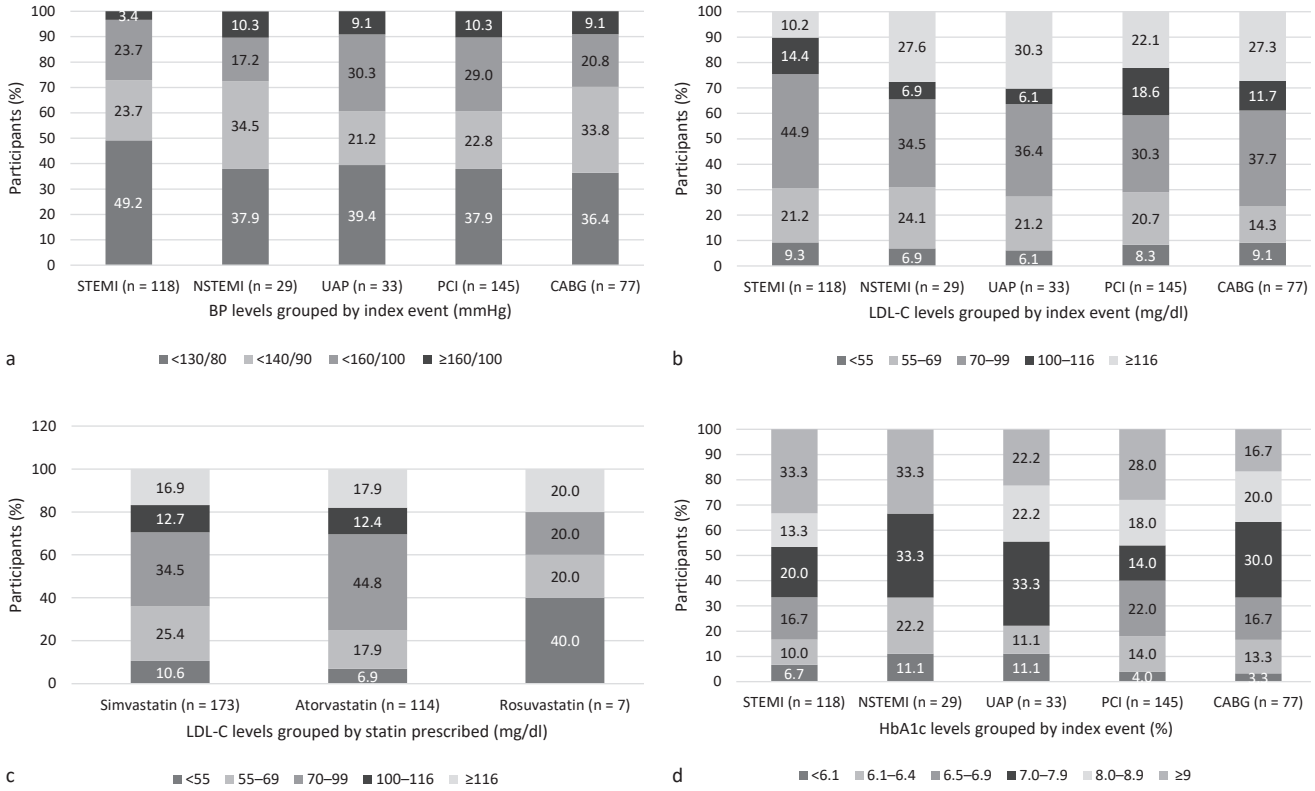

Figure 1. Risk factors of CVD at index events. (a) BP measurement obtained through physical examination at interview, grouped by index event; (b) LDL-C levels obtained through laboratory examination at interview, grouped by index event; (c) LDL-C levels obtained through laboratory examination at interview, grouped by statin prescribed; (d) HbA1c levels obtained through laboratory examination at interview, grouped by index event. BP=blood pressure; CABG=coronary artery bypass graft; CVD=cardiovascular disease; HbA1c=hemoglobin A1c; LDL-C=low-density lipoprotein cholesterol; NSTEMI=non-ST-segment elevation myocardial infarction; PCI=percutaneous coronary intervention; STEMI=ST-segment elevation myocardial infarction; UAP=unstable angina pectoris

Table 2. Summary of the guideline-based scoring parameters and proportion of the population achieving each parameter

Parameter	Subjects achieving target, n (%) (N = 402)
Non-smoking	103 (25.6)
BMI <25 kg/m^2	165 (41.0)
PA >150 min/week	176 (43.8)
BP <140/90 mmHg	269 (66.9)
LDL-C <70 mg/dl	114 (28.4)
HbA1c at target (<7.0%)	141 (35.1)
Antiplatelet prescribed	392 (97.5)
Lipid-lowering therapy prescribed	292 (72.6)
Beta blocker prescribed	329 (81.8)
ACE-inhibitor prescribed	204 (50.7)
Any RAAS inhibitor prescribed	337 (83.8)

ACE=angiotensin-converting enzyme; BMI=body mass index; BP=blood pressure; HbA1c=hemoglobin A1c; LDL-C=low-density lipoprotein cholesterol; PA=physical activity; RAAS=renin-angiotensin-aldosterone system

the highest percentages of LDL-C ≥116 mg/dl and the lowest proportion achieving <55 mg/dl.

At the time of the interview, 72.6% of the study population reported using statins, most commonly simvastatin (58.8%), followed by atorvastatin (38.8%) and rosuvastatin (2.4%). Analysis of LDL-C levels by statin type (Figure 1c) revealed that simvastatin and atorvastatin, if prescribed at similar rates can resulted in comparable proportions of patients having LDL-C <100 mg/dl—70.5% for simvastatin and 69.6% for atorvastatin. However, simvastatin was associated with more patients achieving LDL-C levels <55 mg/dl compared to atorvastatin (10.6% *versus* 6.9%). In contrast, rosuvastatin use was associated with the highest proportion of patients achieving an LDL-C level <55 mg/dl (40.0%).

Information regarding drug prescription trends revealed that the participants were prescribed at least one antiplatelet (97.5%), beta blockers (81.9%), angiotensin-converting enzyme inhibitors (50.7%),

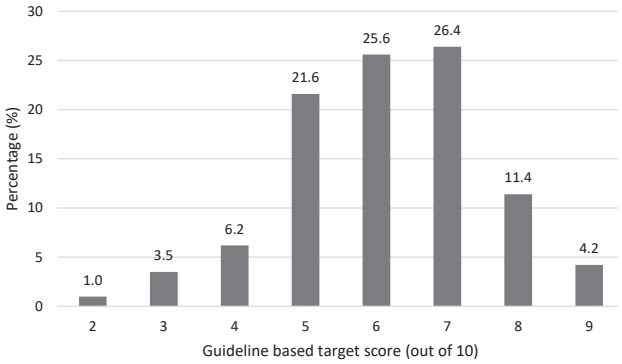

Figure 2. Result of guideline-based target scoring based on 10 parameters

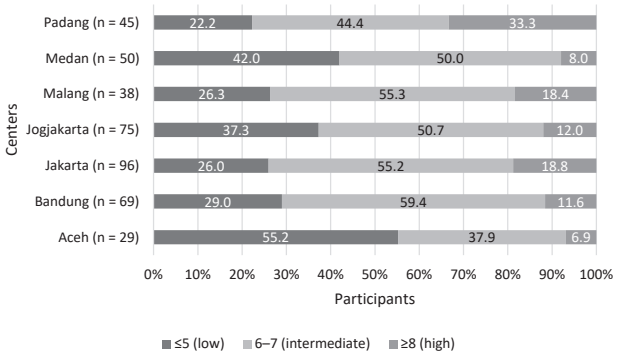

Figure 3. Distribution of the guideline-based target score across seven centers

angiotensin II receptor blockers (38.6%), and statins (72.6%). However, only 54.0% of participants reported receiving all four key drug classes for secondary CVD prevention: an antiplatelet agent, a lipid-lowering drug, a beta blocker, and a renin-angiotensin-aldosterone system inhibitor.

Interview data identified 128 participants with self-reported type 2 diabetes mellitus (T2DM) who were receiving diabetes medications. Only 35.0% achieved the target HbA1c level of <7% among them. When analyzed by index events, the UAP subgroup had the lowest proportion of patients achieving HbA1c control <7% (22.2%). In contrast, over one-third of participants in the other four groups achieved the target HbA1c level (Figure 1d).

A guideline-based target score was calculated for each participant based on 10 parameters, with one point assigned for each successfully met criterion. The proportions of the study population for each of these parameters are summarized in Table 2.

Scores ranged from 2 to 9, with the highest proportion of participants scoring 7 out of 10 (26.4%), followed by 6 out of 10 (25.6%) and 5 out of 10 (21.6%) (Figure 2). When comparing performance across centers, Padang had the highest proportion of participants achieving a score of 8 or higher (n = 45; 33.3%). In all centers except Aceh and Padang, the majority (>50%) of participants scored 6 or 7 out of 10 (Figure 3).

Interview data on cardiac rehabilitation programs revealed that 47.0% of participants were advised to undergo cardiac rehabilitation. Among them, 19.0% did not attend any sessions, 21.2% attended less than half, 5.8% attended more than half, and 54.0% completed the full program. Of the remaining 53.0% who were not advised to undergo cardiac rehabilitation, 10.8% voluntarily participated in a cardiac rehabilitation program. Overall, 48.8% of the study population engaged in some form of cardiac rehabilitation. Participants reported receiving various program components, including supervised exercise (75.5%), workshops (52.0%), dietary modification (43.4%), smoking cessation (36.2%), stress modification (33.7%), and written materials (18.9%).

DISCUSSION

Numerous studies highlight the need for secondary cardiac prevention and rehabilitation for individuals with CHD. However, adherence to these measures remains inadequate across various regions, including Asia, Europe, and the USA.[14–17] Given these challenges, the Indonesia-INTERASPIRE study was initiated to assess adherence to secondary prevention strategies among the Indonesian population. Variability in the completeness of medical records and interview components was observed across study centers, partly due to differences in hospital record-keeping systems. To address this issue, the study incorporated parameters from both medical records and comprehensive personal interviews across multiple centers.

The findings revealed that over half of the participants had hypertension, and more than 50% were either current or former smokers. Additionally, dyslipidemia and T2DM were present in more than 30% of the population. The prevalence of hypertension in this study aligns with EUROASPIRE IV, which also identified hypertension as the most prevalent risk factor.[9] However, discrepancies emerged in smoking data, with medical records and self-report interviews

indicating that a considerably higher proportion of participants had a smoking history. Nevertheless, smoking control remains very poor in the Indonesian community, especially when compared to the European population, where only 37.7% reported smoking.[9] Furthermore, this study identified behavioral changes in smoking habits among 229 participants, showing a 44.2% decrease in smoking following the index event.

A meta-analysis by Wu et al[18] indicated a reduced risk of secondary CVD outcomes in individuals who ceased smoking compared to those who continued smoking following the occurrence of CHD. They also found that smoking cessation diminished the risk of new-onset angina in patients who successfully stopped smoking.[18] Given these benefits, patients need to be routinely evaluated for smoking status beyond their initial occurrence and receive education on smoking cessation in both in-hospital and out-of-hospital environments. However, interview data from this study showed that among the 48.8% of participants who attended a cardiac rehabilitation program, only 36.2% received smoking cessation education or intervention. While hospital-based smoking cessation education is improving, patients may also benefit from smoking cessation education outside hospital settings as part of the government's public health program. A key barrier to effective and sustained smoking cessation among our population is cigarette accessibility. Therefore, smoking cessation efforts should involve collaboration between healthcare providers, public health professionals, and policymakers to improve regulations and education.

Obesity also emerged as a major concern among the study population. According to the Asia-Pacific classification, a substantial proportion of participants were classified as overweight or obese. The latest JES guidelines strongly recommend weight loss to improve BP and lipid levels in both overweight and obese patients and to reduce the risk of T2DM.[19] The obesity trends observed in the Indonesia-INTERASPIRE study align with those of previous studies, such as EUROASPIRE, which reported a high prevalence of obesity.[9]

Dyslipidemia was prevalent in 35.4% of the participants, with a considerable proportion of participants failing to meet the LDL-C target of <55 mg/dl, particularly in high-risk populations. The proportion of participants achieving LDL-C <55 mg/dl was low across different index events: 9.3% for STEMI, 6.9% for NSTEMI, 6.1% for UAP, 8.3% for PCI, and 9.1% for CABG. Ultimately, only 8.5% of the cohort attained the target LDL-C level of <55 mg/dl, while 28.4% achieved an LDL-C level of <70 mg/dl. These findings align with those from EUROASPIRE IV and EUROASPIRE V, indicating that only 22% of men and 17% of women attained the target of <1.8 mmol/l in EUROASPIRE IV, while 71% of participants exceeded this threshold in EUROASPIRE V.[9,10] Furthermore, Soran et al[20] reported comparable findings, noting that many population-based studies demonstrated an inability to achieve targets following lipid-lowering treatments.

This study found that simvastatin and atorvastatin were prescribed in equal proportions, whereas rosuvastatin, the preferred high-intensity statin therapy, was prescribed to <5% of patients. This phenomenon is closely related to the national health insurance system, which covers only simvastatin and atorvastatin prescriptions.[21] Additionally, the National Drug Formulary categorizes statins as anticholesterol medications, restricting their use in patients with low LDL-C levels. All coronary patients are expected to maintain LDL-C levels <55 mg/dl, which falls below the threshold for statin coverage. Moreover, patients with coronary artery disease derive advantages from statins owing to their pleiotropic effects and lipid-lowering properties.[22,23] However, Indonesia's national health insurance system limits statin prescriptions based solely on quantitative cholesterol levels.

Among the 128 patients with self-reported diabetes, only 35.2% achieved the target HbA1c level of <7%, as recommended by the JES5 guidelines, while an even lower percentage (18.8%) met the JES4 goal of <6.5%. Compared to EUROASPIRE IV, in which approximately one-third of the population achieved HbA1c <6.5%, our study participants demonstrated poorer glycemic control.[9] Laiteerapong et al[24] found that individuals with HbA1c levels ≥6.5% exhibited an elevated incidence of microvascular and macrovascular events, whereas those with HbA1c values ≥7.0% demonstrated a heightened mortality risk. Consequently, further efforts are required to improve glycemic management in our population to prevent adverse outcomes.

Data on cardioprotective drug prescriptions were obtained from two sources: discharge information from medical records and self-reported data during

patient interviews. Self-reported data reflected drug prescription and use trends following hospital discharge, indicating secondary prevention behaviors. The study found that only 54.0% of participants consistently used all four CVD secondary prevention medications, as reported during the interviews. This finding is consistent with those of multiple studies conducted in mainland China, as summarized in a review by Ni et al,[25] which indicated that adherence to these drugs progressively diminished over the follow-up period. Nonetheless, long-term pharmaceutical therapy is required for the treatment of CHD, and nonadherence to cardioprotective medications may render any attempt to treat CHD futile, potentially resulting in severe adverse health outcomes.[25,26]

This study also found that 43.8% of participants complied with the recommended 30 min of exercise, averaging 5 times per week. Exercise provides cardioprotective benefits by increasing cardiovascular fitness and improving traditional and non-traditional CVD risk factors. More specific exercise recommendations for cardiovascular secondary prevention involve defining the exercise mode, intensity, and duration, collectively known as exercise prescriptions.[27] This approach is especially relevant in high-risk patients to avoid risks while optimizing the benefits.

Using the criteria of this study to compute a score out of 10, slightly more than half of the population scored between 6 and 7 points. This scoring system was based on the latest INTERASPIRE study findings presented at the ESC Congress in 2023.[13] The INTERASPIRE study showed comparable results, with participants in each examined country scoring between 6 and 7 out of 10. However, while 1% of the INTERASPIRE population achieved a perfect score of 10, none of our participants exceeded a score of 9.[13] This discrepancy may be attributed to the poor performance of our study population in specific factors. A relatively low percentage of participants met the key targets, such as non-smoking, LDL-C <70 mg/dl, HbA1c <7.0%, BMI <25 kg/m^2, and physical activity >150 min/week.

The Indonesia-INTERASPIRE study had certain limitations. First, while the study included seven centers from major cities in Indonesia, the results may not fully represent the national population. Given Indonesia's diverse geographic distribution, expanding the study to include more academic centers could provide a more comprehensive understanding across regions. Additionally, the participating centers primarily treated patients whose medical care is entirely covered by national health insurance, limiting insights into the characteristics and behaviors of patients outside this scope. Second, the survey had incomplete data from both the medical records and personal interviews, which restricted the number of parameters available for analysis. However, the data management team obtained data from several parameters to calculate the guideline-based target scores. These parameters were obtained from standardized interviews, physical examinations, and laboratory examinations to ensure reliable and accurate information about the adherence and results of the nation's cardiovascular secondary prevention efforts.

In conclusion, the Indonesia-INTERASPIRE study provides insights into the suboptimal implementation and adherence to secondary prevention among patients with coronary heart syndrome across major centers in Indonesia. Key indicators of adherence, including BP, LDL-C, and HbA1c control, were generally poor, highlighting the need for further assessment of patient compliance and the suitability of medications covered by Indonesia's national health insurance. Stronger collaboration between medical providers and public health professionals is essential to improve cardiovascular prevention programs. The success of these programs lies not only in the relationship and interaction between patients and their medical providers but also in the underlying health system and institutional policies and regulations that shape the nation's healthcare system. Expanding such collaborative efforts may enhance long-term care for patients with coronary syndrome, promote lifestyle changes and therapeutic targets, and ultimately improve QoL while reducing mortality rates.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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