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Research Article

A Structured Community Health Screening Program and Impact on Patient Lifestyle Changes for Cardiovascular Risk Reduction

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Introduction

Cardiovascular Disease (CVD) is one of the leading causes of morbidity and mortality worldwide [1]. In the United States, this CVD related morbidity and mortality accounts for about $200 billion in health care costs, medications, and lost productivity. A majority of this expenditure is a reflection of poorly controlled risk factors for CVD [2]. CVD is a complex disease with multiple preventable and modifiable risk factors; sustained exposure to such risk factors increases the burden of disease. Studies have shown that over 75% of premature cardiac events are preventable and many of these cases can be managed with early detection and intervention of risk factors [3]. While CVD is multifactorial, there are modifiable factors that are often considered as avenues for intervention. These factors include lifestyle changes, blood pressure, lipid levels, diabetes status, and tobacco usage [4]. Previous studies have attempted to develop screening programs to evaluate and subsequently manage these risk factors for vulnerable patients.

Traditional risk calculators and assessments have shifted the discussion from treating established CVD to prevention of development of such conditions [5]. The goal of these tools is to eventually become proficient with identifying risk factors and thus allowing for successful primary prevention opportunities. With lifestyle and dietary changes, increase in exercise frequency, and elimination of tobacco usage, the risk of CVD can be reduced. Identification of both the disease and risk factors allows for management strategies to prevent and decrease cardiovascular events.

Previous studies have indicated that 20% of patients may experience a repeat cardiovascular event within one year after an acute MI [6]. Clinical studies such as the ALLEPRE trial have demonstrated that care coordination focusing on lifestyle intervention after acute coronary syndrome (ACS) can reduce the long-term risk for patients [7]. Thus, prevention programs have often been utilized for patients who are already high risk. However, when it comes to general community screening and prevention, previous studies have reported mixed results regarding efficacy. For example, a study researching the effects of health evaluations on the general population did not report improvement in CVD and overall mortality in patients who underwent screening. Yet, it

is important to note that this study did not plan health counseling with the screening and noted a low intensity of interventions offered to patients [8].

Similarly, many current community-screening programs offer an array of tests including basic blood work, electrocardiography focused echocardiography, and various forms of arterial screening for atherosclerosis. Once these tests are done, the results are sent to the individual and subsequently require a visit with a primary care physician for further interpretation. Barriers to follow up can result in gaps of care and lost opportunities for lifestyle changes. Thus, there are often missed chances to provide feedback toward making an impactful change for the participant following the completion of such programs.

To enhance the value of these community-based screening programs, the Heart Smart Screening Program (HSSP) was devised with a primary goal of combining point of care testing and focused education for cardiovascular risk reduction. A team-based approach was employed for the educational component, including a wellness nurse specialist and a cardiologist. Utilizing an evidence-based approach, the HSSP program featured an emphasis on maintaining a higher value and lower cost intervention for the community. We hypothesized that community-based screenings, which provide meaningful interventions, could positively impact lifestyle behaviors and thus clinical outcomes for the general population. As the HSSP focused on interventions for healthy living, this manuscript seeks to examine the impact of HSSP program through reported outcomes by the participants in a follow-up survey. Our study aims to quantify the impact of the HSSP on subsequent patient decisions affecting cardiovascular health.

Methods

This project was a retrospective review that identified the impact of the Heart Smart Screening Program (HSSP) on lifestyle habits of patients. The HSSP is our institutional cardiovascular risk assessment program instituted from 2011 to 2019 for a small transparent fee of ninety-nine dollars. This was primarily developed to provide cardiovascular risk screening and primary prevention opportunities via healthy lifestyle education to the general population. The program included a detailed patient survey which collected patient demographics and information regarding patient lifestyle such as diet, exercise routines, eating habits, alcohol consumption, smoking history, and traditional cardiac risk factors. Eating habits were further classified based on servings of fruits, vegetables, and meat. Cardiac risk factors included hypertension, diabetes, hypercholesterolemia, stroke, and family history of premature coronary disease.

All participants were screened in advance of the appointment by our scheduling team to ensure that established cardiovascular or atherosclerotic disease requiring evidence- based therapy was not already present. For example, those with prior myocardial infarction, stroke, peripheral arterial disease, or prior vascular interventions such as angioplasty or bypass surgery were not included. These patients were already classified as high-risk and thus would not benefit from a screening program focused on primary prevention. Table 1 shows the key populations who were targeted for screening and those who were considered ineligible for the HSSP. Patients were stratified based on a comprehensive risk assessment using the American College of Cardiology risk assessment tool: the Atherosclerotic Cardiovascular Disease (ASCVD) 10-Year Risk calculator [9].

Table 1

Patients targeted for screening	Patients likely to be excluded from screening
• Ages 40-70 years old AND:	• Those likely to not benefit from screening such as:
• Family history of heart disease - premature CAD (< 65 years of age)	• Very young (< 40 years old) and low ASCVD risk (< 5% 10-year risk)
• Cholesterol disorders	• High ASCVD risk
• Borderline or high blood pressure	• Age ≥ 70
• Borderline diabetes or impaired glucose tolerance, metabolic syndrome profile	• Documented prior CAD
• Overweight or obese individuals	• Documented prior atherosclerotic vascular disease (stroke, carotid disease, peripheral vascular disease, abdominal aortic aneurysm)
• Smokers	• Chronic kidney disease (CKD stage ≥ 3)
• Individuals who don't fall into traditional intermediate Framingham risk but have one risk factor which is severe	
• Women < 60 years old with 2 cardiac risk factors	
• Erectile dysfunction	

Once the lifestyle survey data was complete, a non-invasive biometric screen, using a cholestech machine was used to determine the patient's total cholesterol, HDL, LDL, triglycerides, and blood sugar levels. This process was completed within approximately 7 minutes. During this time, the patient's blood pressure and BMI was also determined and a 12-lead electrocardiogram was completed. Results were immediately reviewed, and counseling was provided by a wellness nurse specialist, along with a consultation and written recommendations provided by a board certified cardiologist. The wellness nurse specialist interview included 30-40 minutes of review of the patient's lifestyle and risk factor survey data. This time was coupled with a focused assessment of patient specific goals and readiness to change, along with development of a comprehensive sustainable plan of action.

This second stage of the visit focused on an in-depth explanation of the data collected along with its significance in determining risk for heart disease and stroke. This was coupled with a discussion of lifestyle choices and the part that they play in exacerbating or mitigating that risk. Once the health and wellness goals were determined, the patient was educated on how to use their biometric results and screening information. The goal was to gain knowledge on long-term behavior change to prevent and effectively mitigate chronic disease in a sustainable manner and to promote health, wellbeing, and quality of life. The cardiologist reviewed the patient's overall risk assessment, blood work, and provided final recommendations.

Over the course of this study, 277 patients participated in the HSSP and completed the consultation appointments with a certified wellness nurse specialist and board-certified cardiologist. For purposes of this study, patients participating in HSSP were invited

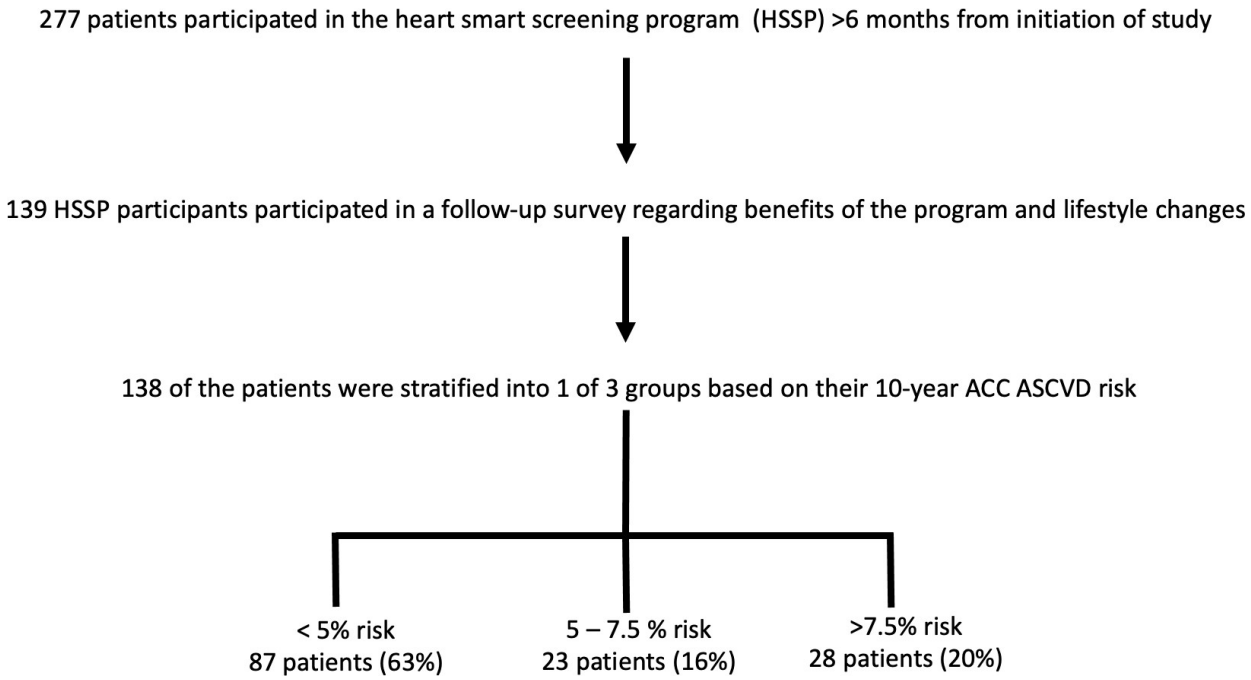

Figure 1: Study Design

to participate in a detailed telephone survey after at least 6 months from completion of the initial visit to the program. This survey assessed the impact of the HSSP program on their lifestyle habits and identified any changes they made to reduce cardiovascular risk. One hundred and thirty-nine patients successfully completed this final phone survey. Of these patients, 138 were stratified into one of three groups based on ASCVD risk (Figure 1), with 87 patients (63%) at < 5% risk (Low Risk), 23 patients (16%) at 5-7.5% risk (Moderate Risk), and 28 patients (20%) at >7.5% risk (High Risk). One patient was excluded from the stratification due to incomplete collection of information regarding ASCVD risk (n=138).

The follow-up telephone survey included questions to identify impact of HSSP on lifestyle and subsequent interventions as deemed related to the program participation (Figure 2). There were a series of "yes or no" questions, which resulted in a collection of bivariate variables. Based on the answers to these questions, further information was elicited which resulted in collection of continuous variables. These variables included amount of time since quitting smoking, quantification of smoking history, quantification of alcohol consumption, quantification of exercise, and quantification of weight loss (lbs).

Univariate two-group comparisons were completed using Wilcoxon rank-sum tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. Three-group comparisons were carried out using Kruskal-Wallis tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. Statistical significance was set at $p<0.05$. All analyses were performed using SAS 9.4 (SAS Institute Inc, Cary, NC, USA).

Table 2: Patient Demographics.

Age:	54.6 yrs (± 7.9 yrs)
Sex:	
Male	60 (43%)
Female	79 (57%)
Race:	
White	96 (69%)
Black	28 (20%)
Other	15 (11%)
BMI (N=138):	28.7 (± 5.4)
Smoking history:	
Nonsmoker	94 (68%)
Smoker	45 (32%)
Alcohol history:	
No	69 (50%)
Yes	70 (50%)
Personal history of CVD:	
Negative personal history	132 (98%)
Positive personal history	3 (2%)
Family history of CVD:	
Negative family history	97 (71%)
Positive family history	39 (29%)
Systolic blood pressure:	120.5 (± 14.2)
Diastolic blood pressure:	75.0 (± 9.1)
Resting pulse (N=127):	62.8 (± 9.5)
Exercise Heart Rate (N=117):	124.2-134.4 (± 6.5-6.4)
Total Cholesterol:	188.4 ± 32.1
HDL (N=138):	51.3 ± 18.2
LDL (N=132):	112.8 ± 29.1
Triglycerides:	131.8 ±116.0
Glucose:	90.8 ± 14.3

Has the Heart Smart program had a positive impact on your lifestyle and habits overall?	**Y**	**N**
Have you been a smoker?	Y	N
• **If yes, have you quit smoking? What year did you quit** • **YEAR _____**		
• **How long have you been smoking?** • **Packs/Day _____** • **Years Smoking _____**		
• **Are you making serious attempts to quit smoking?**	Y	N
Do you drink alcohol regularly?	Y	N
• **If yes, how would you quantify you alcohol consumption** • **Drinks/day _____** • **Drinks/week _____**		
• **Have you cut down on your intake since the Heart Smart study?**	Y	N
Do you exercise regularly?	Y	N
• **If yes, how many hours do you exercise** • **Hours/Day _____** • **Hours/Week _____**		
Has your diet changed to a more heart healthy diet?	Y	N
• **If yes, have you lost weight since you changed your diet?** • **How many pounds did you lose? (estimate) _____**	Y	N
Have you followed up with your doctor to discuss your Heart Smart test results?	Y	N
Have you been started on any medications after the Heart Smart program?	Y	N
Are you taking a daily Aspirin?	Y	N
Are you taking cholesterol medications (statins)?	Y	N
Are you taking blood pressure medications?	Y	N
Are you taking diabetes medications?	Y	N
Have you had any further heart testing after the program?	Y	N
Have you had a stress test after the Heart Smart program?	Y	N
Have you had a heart catheterization or angiogram after the Heart Smart program?	Y	N
Do you follow up within the Henry Ford Health System?	Y	N

Figure 2: Post HeartSmart Screening Program Lifestyle Impact Survey.

Results

Participant characteristics (Table 2) demonstrated a cohort of 139 patients, including 43% male (N=60) and 57% female (N=79). The average age of patients was noted to be 54.6 ± 7.9 years. Racial demographics of the cohort include 69% of which identified as "White" (N=96), 20% as "Black" (N=28), and 11% as "Other" (N=15). Average BMI was reported as 28.7 ± 5.4. Average blood pressure was recorded as 120.5/75 ± 14.2/9.1 Resting pulse was also recorded, with an average of 62.8 ± 9.5.

Concerning baseline cardiac risk factors, 32% of patients endorsed a positive smoking history (N=45) and 50% of patients (N=70) endorsed social alcohol consumption. Ninety-eight percent reported negative personal history of CVD (N=138) and 29% patients (N=39) indicated a positive family history of CVD. Low-density lipoprotein (LDL) was successfully collected on (N=132) patients with an average of 112.8±29.1 mg/dL ("Near Optimal" Reference Range: 100-129 mg/dL) [10].

Concerning the impact of the HSSP on lifestyle, 83% of patients (N=116) reported a perceived positive impact directly because of the HSSP. Sixty-nine percent (N=96) of patients reported improved dietary changes because of participation in the program.

Along with the improvement in diet, all patients were counseled on lifestyle habits and developed a plan of increasing physical activity by our wellness specialist. Of the study population, 71% (N=96) endorsed increased exercise at follow-up survey. Because of these changes in diet and exercise habits after HSSP, 37% (N=51) patients endorsed weight loss from the time of the program to the completion of the phone survey, with an average weight loss of 3.8 ± 8.7 lbs. Of the 45 individuals with a positive smoking history, 8 patients noted attempts at smoking cessation directly due to the program (18%).

Similarly, 10 of the 70 patients who endorsed regular alcohol consumption indicated a decrease due to the program (14%).

Sixty percent of HSSP participants (N=84) followed up with their primary care doctor for additional intervention after receiving their HSSP results and recommendations. Due to these discussions, 9% (N=13) patients reported that their medication regimen was adjusted. Twenty-four patients (17%) underwent stress testing for further cardiac evaluation after HSSP. After further cardiac evaluation, one patient was ultimately referred for cardiac catheterization.

The final cohort of 138 patients was stratified based on ASCVD 10-year risk (Table 3). Among the groups, statistical significance was noted in demographic variables, which correlated with measures used to calculate ASCVD. These significant variables included age ($p<0.001$), gender ($p<0.001$), systolic blood pressure ($p<0.001$),

Table 3: ASCVD Stratification.

Impact of Heart Smart Screening Program (HSSP) on Participants Stratified by 10-year ASCVD Risk				
Impact as a Result of HSSP	ASCVD <5% (N=87)	ASCVD 5%-7.5% (N=23)	ASCVD >7.5% (N=28)	P-Value
Perceived Positive Impact on Lifestyle				
Yes	71	20	24	0.846
No	16	3	4	
Healthy Diet Changes				
Yes	57	17	22	0.428
No	30	6	6	
Exercise Changes				
Yes	61	15	19	0.798
No	24	8	8	
Weight Loss				
Yes	27	9	14	0.171
No	60	14	14	
Follow-up Appt with PCP				
Yes	53	16	14	0.367
No	34	7	14	
Medication Adjustment				
Yes	10	3	0	0.152
No	77	20	28	
Stress Test Completed				
Yes	13	6	5	0.400
No	74	17	23	
Cardiac Catheterization Completed				
Yes	1	0	0	0.99
No	86	23	28	
Decreased Alcohol Intake	5	5	0	0.013
Implemented Smoking Cessation	2	2	4	0.027

diastolic blood pressure (p=0.011), and HDL (p<0.001). In relation to pre-HSSP lifestyle information, patients were stratified based on their ASCVD 10-year risk scores and no statistical significance was noted between the three groups. A majority of HSSP patients perceived a positive impact on lifestyle regardless of their ASCVD risk (low risk 82%, moderate risk 87%, high risk 86%, p=0.846). Of note, statistically significant impact of HSSP with regards to smoking cessation was noted in the 8 patients who quit smoking, with higher ASCVD risk patients being more likely to quit smoking because of HSSP (low risk 25%, moderate risk 25%, high risk 50%, p=0.027).

Discussion

This study demonstrates that community-screening programs, which integrate actionable interventions, can positively affect lifestyle habits. This is noted particularly when coupled with comprehensive wellness feedback and finalized recommendations onsite with a cardiologist. The goal is for participants to leave the program with specific recommendations to act upon in addition to their results. This unique feature of our program is not widely practiced at most other institutions, as many risk assessment-screening programs are independent risk screening facilities without access to clinician guidance. For example, some programs may be mobile in the community and not have capabilities for direct interaction with clinicians for counseling. In other settings, the program offered may require patients to undergo a battery of tests before reports are generated and mailed to patients, thus delaying opportunities for impact and personalization of results. These other routes of screening may or may not be beneficial, as patients have to wait to have their results interpreted. As evidenced by our study, the HSSP utilized immediate counseling efforts to encourage behavioral changes and promote cardiovascular health in the general population. The impact of immediate counselling and final advice from a cardiologist and a wellness specialist cannot be understated. As outlined by the positive impact seen in key areas on our follow-up survey, the HSSP offered a high quality and low-cost initiative that could improve longitudinal health outcomes for patients. A significant majority of patients who participated in the HSSP program indicated a positive impact on their life (83%).

The patients included in this study were stratified into three different groups based on their 10-year ASCVD calculated risk. When comparing these patient populations, there was no statistical difference in the impact of The HSSP on lifestyle. Thus, based on survey analysis, the majority of HSSP participants reported a positive impact on lifestyle habits regardless of baseline ASCVD risk. A similar result was demonstrated when stratified based on sex and race. Most patients reported a positive impact of HSSP regardless of the stratification. This study demonstrated that screening programs provided benefit to patients from multiple subgroups, despite underlying risk factors and including those without acute coronary syndrome as well.

An important consideration with improving health outcomes is proper care coordination. This aspect involves patient compliance and proper execution of recommendations provided by clinicians. Often, increased patient education can prove useful in strengthening the relationship between providers and patients and ensuring successful completion of recommended treatment options. Prior studies have elicited evidence of decreased cardiovascular risk, increased preventative action, and increase in behavioral changes due to increased patient education and thus increased awareness of cardiovascular disease [11].

Regarding the quality of patient education and the confidence in advice, patients reported significant satisfaction with the opinions provided by cardiologists and wellness specialists as a part of HSSP. Many patients indicated the comfort of knowing that disease and lifestyle experts gave the advice provided to them. As these patients were screened as part of the general population, many would have otherwise had limited opportunities to interact with the cardiology department due to a negative history of acute coronary disease.

The positive impact on lifestyle habits included changes in diet (69%) and exercise (71%), resulting in weight loss (37%). Changes were noted in decreased smoking (18%) and decreased alcohol consumption (14%). As per advice of the specialists in this program, many patients completed follow up appointments with primary care providers (60%) to ensure sufficient management of medical comorbidities. Prior attempts at secondary prevention programs highlighted an inverse correlation between adherence to clinician lifestyle recommendations and in-hospital mortality [12].

Prior studies have established the collective risk of not screening patients for cardiovascular risk. Clinical evidence has demonstrated that many individuals with pre- existing cardiovascular disease may exhibit latent cardiac dysfunction that leaves patients vulnerable to eventually exacerbating symptoms [13]. These studies have called for reasonable interventions for patients who undergo screening programs. Of the patients who participated in our HSSP, 17% were referred for cardiac stress testing and 9% experienced medication adjustments. This indicates programs such as HSSP lead to actionable decisions to identify and modify cardiac risk. As the HSSP incorporates a consultation from a cardiologist, the concern for over-referral is mitigated as well. Only one patient was ultimately referred for a cardiac catheterization.

Limitations

Limitations in this study included incomplete data from follow-up surveys of HSSP participants. Of the 277 initial participants in the HSSP, the telephone visit regarding the survey was completed in 139. However, we believe that additional data would likely have strengthened the value of the downstream impact of HSSP. Most of the data collected via follow-up surveys was obtained through patient self-report measures. In future iterations of this protocol, we hope to incorporate more nurse driven measurements for further validity. Although the initial results of this intervention-based community-screening program are promising, further studies on similar models with increased patient population will assist with confirming these results. Ideally, further studies

can incorporate greater patient diversity as well. Diverse patient demographics based on race, smoking status, insurance status, and history of CVD are essential for justification of scaling these programs to serve all members of the community. Of the patients who responded to the question, 51% (N=61) indicated that their mental health needed improving. Multidisciplinary interventions through care coordination can assist with identification of barriers and potentially increase rates of adherence with recommendations.

Conclusions

A comprehensive program with immediate counseling has benefit in affecting positive lifestyle changes, encouraging behavioral changes, and promoting cardiovascular health as shown in this study using HSSP. These findings were demonstrated across varying cardiovascular risk profiles. Such community-based programs may emphasize the value of beneficial lifestyle changes to individuals and improve long-term cardiovascular risk for our patients. Further study on such programs with increased patient populations could assist with developing strategies for larger rollout of these opportunities. Ideally, greater screening in general patient populations can be a low-cost and high-value option that will lead to increased access to cardiovascular health promotion and reduce prevalence of avoidable adverse events, thus improving overall patient health outcomes.

References

1. Patel P, Ordunez P, Connell K, et al. Standardized Hypertension Treatment and Prevention Network. Standardized Hypertension Management to Reduce Cardiovascular Disease Morbidity and Mortality Worldwide. South Med J. 2018; 111: 133-136.
2. Johnson NB, Hayes LD, Brown K, et al. Centers for Disease Control and Prevention (CDC). CDC National Health Report: leading causes of morbidity and mortality and associated behavioral risk and protective factors-United States, 2005-2013. MMWR Suppl. 2014; 63 :3-27.
3. Stewart J, Manmathan G, Wilkinson P. Primary prevention of cardiovascular disease: A review of contemporary guidance and literature. JRSM Cardiovasc Dis. 2017; 6: 2048004016687211.
4. Padwal R, Rashead M, Snider J, et al. Worksitebased cardiovascular risk screening and management: a feasibility study. Vasc Health Risk Manag. 2017; 13: 209-213.
5. Mahmood SS, Levy D, Vasan RS, et al. The Framingham Heart Study and the epidemiology of cardiovascular disease: a historical perspective. Lancet. 2014; 383: 999-1008.
6. Giannopoulos G, Karageorgiou S, Vrachatis D, et al. Usefulness of a Structured Adult Education Program in Modifying Markers of Cardiovascular Risk After Acute Myocardial Infarction. Am J Cardiol. 2020; 125: 845-850.
7. Paoli G, Notarangelo MF, Mattioli M, et al. ALLiance for sEcondary PREvention after an acute coronary syndrome. The ALLEPRE trial: A multicenter fully nursecoordinated intensive intervention program. Am Heart J. 2018; 203: 12-16.
8. Skaaby T, Jørgensen T, Linneberg A. Effects of invitation to participate in health surveys on the incidence of cardiovascular disease: a randomized general population study. Int J Epidemiol. 2017; 46: 603-611.
9. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published correction appears in Circulation. 2019; 140: e596-e646.
10. ABIM laboratory test reference ranges. https://www.abim.org/Media/bfijryql/laboratory-reference-ranges.pdf. Updated 2022.
11. Bourgette-Henry SJ, Davis A, Flood J, et al. The Wahine Heart Wellness Program: A Community Approach to Reducing Women's Cardiovascular Disease Risk. Hawaii J Health Soc Welf. 2019; 78: 341-348.
12. Thakkar JB, Chow CK. Adherence to secondary prevention therapies in acute coronary syndrome. Med J Aust. 2014; 201: S106-S109.
13. Stewart S, Chan YK, Wong C, et al. Impact of a nurse-led home and clinic-based secondary prevention programme to prevent progressive cardiac dysfunction in high-risk individuals: the Nurse-led Intervention for Less Chronic Heart Failure (NIL-CHF) randomized controlled study. Eur J Heart Fail. 2015; 17: 620-630.
14. Patel J, Al Rifai M, Blaha MJ, et al. Coronary Artery Calcium Improves Risk Assessment in Adults With a Family History of Premature Coronary Heart Disease: Results From Multiethnic Study of Atherosclerosis. Circ Cardiovasc Imaging. 2015; 8: e003186.
15. Blaha MJ, Cainzos-Achirica M, Greenland P, et al. Role of Coronary Artery Calcium Score of Zero and Other Negative Risk Markers for Cardiovascular Disease: The MultiEthnic Study of Atherosclerosis (MESA). Circulation. 2016; 133: 849-858.