

**Improving risk factors control among the people in areas with the highest burden
of cardiovascular diseases in Indonesia**

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Principal Investigator:
Siska Suridanda Danny

Co-investigator:
Anwar Santoso
Anna Ulfa Rahajoe
Ismoyo Sunu
Ario Suryo Kuncoro
Idar Mappangara
Surya Hafidiansyah
Renan Sukmawan
Budi Setianto

Abstract

According to Indonesia Basic Health Research, from 2007 to 2013 there was a significant increase in cardiovascular deaths and cardiovascular risk factors in Indonesia. Efforts to reduce cardiovascular risk should not only target the cardiac patients but also focus on behavior at the population level and health providers, which can be the most effective and cheapest approach. The main goal of the project is improve cardiovascular risk factors control at the population level in the areas with the highest cardiovascular burden in Indonesia. An estimated 2500 subjects will be recruited from provinces of South Celebes and Bangka Belitung, which are two of the top four provinces with the highest cardiovascular burden. Primary Health Care Centers/Community Health Care Centers (Pusat Kesehatan Masyarakat/Puskesmas) will be the center or a community-based intervention program to achieve study goals and objectives. Primary Care Physicians and members of Puskesmas staff will receive training for screening and managing subjects with moderate-high cardiovascular risk factors. At-risk individuals assessed by the SCORE and INTERHEART risk score will be identified from Puskesmas visit and recruited into the study. Intervention will be delivered in the form of individualized education and exercise program. The local Healthy Heart Clubs, a society-funded club under the Indonesian Heart Foundation will plan and execute the physical activity program for the study subjects. Special efforts will be made to identify local barriers and opportunities unique to the area regarding the implementation of healthy lifestyle. The expected outcomes are positive net change in the cardiovascular risk scores, including positive changes in term of smoking cessation, increasing physical activity, achieving target blood pressure and recommended LDL level among study participants.

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Overall Goal and Objectives

The overall goal and objectives of the project are as follows:

1. To identify the main cardiovascular risk factors profile among the population in areas with the highest cardiovascular diseases (CVD) burden in Indonesia, namely Provinces of South Celebes and Bangka Belitung
2. To promote components of healthy life-style among the population in those areas, in accordance to Indonesian Heart Foundation (IHF) and Indonesian Heart Association (IHA) guidelines and protocols
3. To assess the area-specific gaps of implementing a healthy life-style and to achieve adequate risk factors control in the population
4. To empower general physicians in charge of primary care centers in the intervention areas to identify and manage cardiovascular risk factors in accordance to IHA guidelines
5. To observe and evaluate the success rate of risk factors control before and after dissemination of the healthy life-style education and intervention program

B. Current assessment of need in target area

According to Indonesia Basic Health Research, from 2007 to 2013 there was a significant increase in cardiovascular deaths and cardiovascular risk factors in Indonesia. There are the four provinces in Indonesia which bearing the highest CVD burden, *namely*: South Celebes, North Celebes, East Borneo, Gorontalo and Bangka-Belitung. In addition, in term of socio-economics metrics, such as: *life expectancy at birth, human development index, calorie consumption and protein consumption*, there are two provinces which should be considered to be most appropriate target for an intervention program, namely: provinces of South Celebes and Bangka-Belitung.^{1,2}

Action to eradicate, control and prevent the impact of Cardiovascular Diseases requires action on two levels: at the population level and on the individual level². Prevention should not only target the cardiac patients but also focus on behavior at the population level and health providers, which can be the most effective and cheapest approach³. The evidences proved that changes in risk factors at the population level account for 50% reduction in mortality, whereas improved treatments account for only 40%⁴.

Furthermore, CVD risk prediction models, such as the Framingham prediction algorithm and SCORE are helpful in identifying individuals at increased risk. Fortunately, the Indonesian Heart Association has adopted the SCORE risk prediction model as national guidelines. But as a matter of fact: there are still barriers encountered in day-to day practices to implement those guidelines⁵. There are some barriers available in the field, such as: 76.3% of primary care physicians do not comply with the national guidelines, poor patients compliances, less patients education, and cost constraint⁵. Consequently, these barriers have hindered the efforts to mitigate the cardiovascular disease burden at the population level.

The implementation of Universal Health Coverage Insurance Scheme in Indonesia has made medical intervention possible for cardiovascular risk factors (e.g. better blood pressure glucose, and lipid profile control) for every citizens of

Indonesia regardless of social economy status, as long as the aforementioned barriers are overcome.

Being a nation of archipelago consisting of thousands of islands, Indonesian people are diverse in terms of languages, cultures, religion and life-style. Every island is unique and thus probably will need different approach to identify and manage cardiovascular risk factors in each area. Therefore, a direct population intervention program with the involvement of local stakeholders will be our approach in South Celebes and Bangka Belitung.

C. Target Audience

1. The primary target are subjects with CVD and at risk subjects in selected areas in both provinces
2. Other stakeholders are primary care physicians who is in charge in primary care centers in selected areas, Faculty of Medicine of the local university, the community leaders and local Healthy Heart Clubs (a department under Indonesian Heart Foundation)

D. Project Design and Method

This is a population experimental study. Subjects will be selected from general population who came to the local Primary Community Health Centers (*Pusat Kesehatan Masyarakat/Puskesmas*) in study areas (South Celebes dan Bangka Belitung). Puskesmas are government-mandated community health clinics located across Indonesia. They are overseen by the Indonesian Ministry of Health and provide healthcare for population on sub-district level. Usually staffed by a physician, these centers provided maternal and child health care, general outpatient curative and preventative health care services, pre-and post natal care, immunization and communicable disease control program. In short, Puskesmas are the smallest unit of health care providers that are closest to the population at the grass root level. We plan to empower these Puskesmas as the base of the intervention strategies. Selected subjects will undergo assessment of cardiovascular risk factors profile and to identify current knowledge and practice on components of healthy lifestyle in both areas. Special efforts will be made to identify area-specific gaps of implementing healthy lifestyle that potentially could be different in South Sulawesi and Bangka Belitung, eg. eating habit or specific dishes in the area, local custom for exercise and smoking, etc. After identification of these factors, intervention strategies will be developed to address them, including but not limited to: smoking cessation education, exercise plans and healthy diet plans. Exercise plans will be developed in collaboration with local branch of Healthy Heart Clubs, a society-founded club under the Indonesian Heart Foundation, which already present in almost every districts in Indonesia. Specific risk factors; hypertension, dyslipidemia and diabetes mellitus will be treated as per Indonesia Heart Association Guidelines and protocol by the primary care physicians at each Puskesmas under the National Health Insurance scheme.

The project will be divided into four phases of action as follows:

Phase 1. Initiation and training

- Alignment meeting with local stakeholders: Regional Health Authority under the Ministry of Health, community leaders, government officials, Indonesian Heart Association and Indonesian Heart Foundation local branches to initiate and officially launch the project.
- Selection of Puskesmas in the study area will be based on regions of highest population, the availability of the local Healthy Heart Club and local feasibility (distance to city center, ease of transportation, etc). The province of South Celebes already establishes an e-network of Puskesmas for the purpose of telemedicine electrocardiogram and acute coronary syndrome consultation, which could be a foundation for Puskesmas selection in the area. The province of Bangka Belitung currently does not have such network thus Puskesmas selection will be made arbitrarily based on the aforementioned factors. A total of 50 Puskesmas will be selected in the study areas weighted to population number (35 Puskesmas in South Celebes dan 15 in Bangka Belitung)
- Development of education and intervention module for the study subjects. To develop a model of education on nutrition and components of balanced diet, we will work together with the Department of Clinical Nutrition Faculty of Medicine Universitas Indonesia and Universitas Hasanuddin. Special efforts are made to incorporate the use of local resources for healthy nutrition (fish and seaweed). Physical Activities Program planning will be developed together with the Healthy Heart Club under Indonesia Heart Foundation local branches.
- Development of project official website and mobile application for healthy lifestyle tracker for the study participants. These web-based approach will facilitate data collection, act as communication media and useful to engage the study participants to become more involved in their journey toward a healthy lifestyle.
- Working together with the Regional Health Authority under the Ministry of Health and Indonesian Heart Association local branch, a training program will be organized for the primary care physicians and nurses/educators from selected Puskesmas with the aim:
 - a. To find and measure *the practice gap* among the primary care physicians in conducting their daily clinical practices with the standard Indonesian Heart Association Guidelines
 - b. Training on the implementation of Indonesian Heart Association Guidelines using standardized modules
 - c. Introduction to the project and why it is being implemented
 - d. Presentation and distribution of materials needed for the project
 - e. Introduction of the project official website and mobile application for healthy lifestyle tracker as tools and communication media for the Puskesmas staff and project leader/coordinator

- f. Forming a network between the Puskesmas staff and the project leader, project manager, Healthy Heart Club coordinators and other stakeholders
- Phase 1 projected to be completed in 6 months.

Phase 2. Recruitment and Identification of local barriers and opportunities

- The primary care physicians in selected Puskesmas will recruit study subjects from the general population who came to their general outpatient clinic or preventive services. Eligible subjects are male or female aged 40-55 years old with one additional risk factor for cardiovascular diseases (hypertension, dyslipidemia or diabetes mellitus) who agreed to participate in the study.
- Participants will undergo stratification of total cardiovascular risk using SCORE and INTERHEART risk score. A questionnaire will be used to assess knowledge, attitude and practice of the subjects regarding components of the advised healthy lifestyle. The questionnaire will incorporate efforts to identify local barriers and opportunities of healthy lifestyle adaptation by study subjects.
- All participants will undergo baseline measurements of body mass index, blood pressure, blood sugar and lipid profile levels. When indicated, primary care physicians at each Puskesmas will treat these risk factors under the National Health Insurance scheme.
- Preliminary data collected will be analyzed for baseline characteristics and level of cardiovascular risk. Initial comparison could be made between the two study areas to identify the presence of area specific difference in risk factors, or knowledge, attitude and practice among study participants in different regions.
- Phase 2 projected to be completed in 3 months and could be parallel with Phase 3

Phase 3. Intervention and maintenance

- After identification of risk factors and barriers, study subjects and immediate family members will receive education program on the components of healthy lifestyle; how to achieve balanced diet, smoking cessation and regular physical activities, given by appointed educators together with the primary care physicians. Physical activities will require the subjects to participate actively in the programs scheduled and supervised by the local Healthy Heart Club
- The appointed educator will act as counselor for the study subject for the duration of the study. Educator will provide information, consultation and printed materials as needed and also will perform regular visits at a pre-specified intervals
- Willing participants are given access to mobile application (android-based apps) as healthy lifestyle tracker to keep information on their weight, diet pattern, exercise, smoking habit, passive smoking exposure, etc. When applicable, they could compare their numbers with aggregates data from other subjects.
- Phase 3 projected to be completed in 6 months

Phase 4. Evaluation and data analysis

- Upon completion of the intervention program, each study subject will once again undergo complete stratification of cardiovascular risk and questionnaire to assess knowledge, attitude and practice of the subjects regarding components of the advised healthy lifestyle.
- Repeat measurements of body mass index, blood pressure, blood sugar and lipid profile levels.
- Collected data will be input and analyzed, such as changes of cardiovascular risk score and also changes in knowledge, attitude and practice on balanced diet, smoking habit, exercise pattern.
- Special recognition and appreciation will be given to Puskesmas with the highest number of subjects who reached study outcomes (champion Puskesmas)
- Phase 4 projected to be completed in 3 months

E. Evaluation Design

Expected outcomes are as follows:

1. Positive net change in SCORE and INTERHEART Risk Score before and after implementation of the program
2. Proportion of subjects who quit smoking $\geq 30\%$ of originally active smoker
3. Reaching target blood pressure $< 140/90$ mmHg in $\geq 50\%$ of hypertensive patients
4. Reaching recommended values of LDL cholesterol < 100 mg/dL in $\geq 50\%$ patients with moderate to high cardiovascular risk according to SCORE and INTERHEART
5. Proportion of subjects who become at least moderately active (by the INTERHEART standard) $\geq 30\%$ of originally sedentary subjects

The results of the project will be disseminated in national and international seminars/symposium, along with publication in national and international peer-reviewed journals. In addition, we will utilize local and national media and also social networks (facebook, twitter, instagram) to promote and disseminate the intervention program if proven effective to reach project goals. Project report and recommendations will also be provided to regional health authorities under the Ministry of Health to be utilized in advocacy/policy briefs to be implemented further in other regions.

F. Workplan and schedule

This will be an 18 months project conducted in 3 phases as outlined in project methods. Starting point will be January 2018. Phase 1 is preparation and initiation highlighted in yellow. Alignment meeting with local stakeholders along with development of study materials and tools will take be our main focus. Initiation phase will end with a training program for Puskesmas staff and officially launch the

project in each study area. Phase 2, highlighted in yellow is recruitment phase, projected to be completed in maximum of 3 months. Phase 3, shown in blue, is the main project phase when intervention in the form of education and physical activity program is delivered. The final chapter highlighted in red will be phase four which is the evaluation and dissemination. Detailed workplan an schedule are as follows.

Table 1. Proposed Schedule for Project Implementation

ACTIVITIES	MONTH																	
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
Alignment meeting	X																	
Puskesmas selection	X																	
Development of project website and mobile apps	X	X	X	X														
Development of study questionnaire	X	X	X	X														
Development of education module	X	X	X	X	X													
Puskesmas staff training and project kick-off						X												
Recruitment							X	X	X									
Baseline risk measurement and blood chemistry							X	X	X									
Education and physical activity program								X	X	X	X	X	X	X	X			
Follow Up									X	X	X	X	X	X	X			
Repeat risk measurement and blood chemistry																	X	
Data Entry							X	X	X	X	X	X	X	X	X	X	X	
Statistical Analysis																	X	X
Manuscript writing and dissemination																	X	X

G. References

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