Prevalence of hypertension and efforts to develop a monitoring system for hypertension in community living in the coastal areas of Noloth and Itawaka Village, Saparua Island, Central Maluku District

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Abstract. Hypertension is a chronic medical condition due to the increased blood pressure. Uncontrolled hypertension might cause several complications, including stroke, heart and kidney disease. More complex problems for patients and families emerge when complications occur. The 2014 Health Profile of Maluku Province reported that the prevalence of hypertension in population aged 18 years or above was 457,152 people and only 50.74% had their blood pressure measured. This prevalence rate was low compared to the prevalence reported by The 2013 Basic Health Research (Riskesdas). The low prevalence rate was due to the shortage of facilities and medical personnel to conduct hypertension examinations, in addition to the low motivation of the community to have a regular blood pressure check. In 2014, the number of non-communicable diseases in Central Maluku was considered high but the incidence rate of hypertension was low. However, most of the non-communicable diseases were associated with hypertension. This study was aimed to develop a monitoring system in dealing with hypertension patients of Itawaka and Nolloth village. From secondary data obtained in 2015, there were 4.2% of 8.660 individuals from East Saparua who suffer from hypertension. It was also found that regular checkup of patients and their compliance on taking hypertension drug was low. We propose a monitoring mechanism as follows: screening patients with hypertension, mapping their location, develop patient forms on application in smartphone, filling out patients’ record according to their residence, assigning health workers responsible in the specified area and on a weekly basis monitor blood pressure and their compliance with taking anti hypertensive drugs.

1. Introduction
Hypertension is a condition of persistent abnormal increase of arterial blood pressure. Go et al. (2013) [1] through The American Heart Association (AHA) defines someone as having hypertension if they have systolic blood pressure of ≥ 140 mmHg and/or diastolic pressure of ≥ 90 mmHg. This disease is estimated leads to increased global morbidity rate of 4.5%, and its prevalence is comparable between developing and developed countries.

Hypertension is one of the main risk factors for heart problems. Apart from causing heart failure, hypertension can also result in kidney failure and cerebrovascular diseases. This disease is often called the silent killer due to the absence of symptoms and patients unconsciously develop complications in their vital organs. According to the World Health Organization (WHO)[2] data, in 2012 the mortality rate of cardiovascular disease globally reached 17 million and hypertension contributed to almost 9.4 million deaths cases due to cardiovascular diseases annually. This also increases the risk of coronary heart disease by 12% and increases the risk of stroke by 24%. In 2016, the Indonesian Ministry of Health conducted a National Health Indicator Survey (Sirkesnas) and reported that the prevalence of hypertension in Indonesia increased to 32.4% [3].
This disease requires high medical costs due to the frequent number of visits to the doctor, hospital care and long-term use of drugs. There are two treatments of hypertension, pharmacological and non-pharmacological therapy. Pharmacological therapy uses antihypertensive drugs proven to reduce blood pressure; whereas non-pharmacological therapy, also called lifestyle modification, includes smoking cessation, reduction of excess weight, alcohol prevention, diet modification and psychological interventions including reducing stress, physical exercise, and take sufficient rest.

Patient compliance is the main factor determining the success of therapy. Compliance and good understanding of the treatment affect blood pressure to prevent further complications. In general, compliance with treatment is defined as the level of behavior in which patients use drugs, adhere to all rules and advice provided by health personnels. According to WHO report 2012 [2], the average adherence of patients to long-term treatment of chronic diseases in developed countries was only 50%; while in developing countries the number was even lower. Factors affecting patients’ compliance in treatment include patients’ level of income, level of education, access to health facilities, age as well as availability of health insurance that relieves patients from paying medical expenses.

Success in controlling high blood pressure is a joint effort between patients and doctors who manage it. Compliance of a patient suffering from hypertension is based not only on adherence to take the drugs but also the active role and willingness of patients to check their health to the doctor, in accordance to specified schedule, and willingness to follow the recommended healthy lifestyle.

Patients who do not comply is a serious problem for health workers as the disease is mostly experienced by those without significant symptoms, feeling better, addition to the long-term therapy, side effects of the drugs, complex therapeutic regimens, poor understanding of the management and risk of hypertension and relatively high medical costs.

The results of research conducted amongst patients with hypertension in the catchment area of Kintamani I Health Center, reported that most of the patients (70.0%) had low compliance with taking the drugs [4]. A higher adherence with taking the medication was found in groups of patients aged > 50 years than group aged ≤50 years. In addition, other studies conducted using patients with hypertension in the First Level Health Facilities in Bandung in 2018 showed low level of compliance in 53% patients, moderate compliance in 32.3% patients, and high compliance in 14.2% patients [5]. The level of patients’ compliance was significantly correlated (p <0.05) with gender, education level, employment status, family history, incidence of complications, and experience in obtaining information related to hypertension and diet. The rate of compliance with taking the medication in patients with hypertension was 26.3%.

Several studies have been carried out using various methods to reduce the rate of hypertension and increase the awareness of patients with hypertension to comply with taking antihypertensive drugs. The American government program to control hypertension through the million heart program started in 2011 which aims to prevent the occurrence of one million heart attacks and strokes in 2017 [6]. In Indonesia, programs to control non-communicable diseases such as hypertension, diabetes mellitus, stroke and cancer have been carried out since 2011, called Posbindu PTM (non-communicable disease integrated development post) [7]. This effort is conducted through community-based programs that is based on awareness for early detection, monitoring and early follow-up of non-communicable risk factors independently and sustainably by targeting healthy community, those at risk and those already developed non-communicable diseases aged 15 years and over. Additionally, various efforts have been made to monitor compliance with taking antihypertensive drugs. There are several efforts to improve compliance, including:

a. Health promotion

Health promotion is required primarily to convey messages and decision-making process that can affect health management by providing information, creating awareness, changing attitudes and providing motivation to the community.

b. Community blood pressure screening

Providing community blood pressure screening at a monthly basis and providing special attention to patients with hypertension by conducting home visits at least once every two weeks
c. **Approaching families through health services’ home visits**
   The role of the family is very important in monitoring patients’ compliance with taking medication. Health services through home visits can provide information about the disease, monitor the treatment of patients.

d. **Blood pressure self-monitoring**
   Training on blood pressure measurement in patients and families of patients at home.

2. **Materials and Method**

2.1. **Study sites**
   The Saparua Timur Sub-district area consists mainly of mountainous and hilly areas yet the villages located mostly along the coastal area. The village of Nolloth is located between 32-34 South Latitude and 128.40 - 128.43 East Longitude with an area of 16 hectares, covering the area of land and sea. The village of Nolloth is located on Saparua Island, on the coast of Hatawano. Hatawano coast consists of six villages, extend from south to north. The Nolloth and Itawaka people use sea transportation services to connect them to Ambon, the Capital of Maluku Province, as well as to the city of Masohi, the Capital of Central Maluku District.

2.2. **Sampling method**
   Population in the study was the people with hypertension in Nolloth and Itawaka Village, Saparua Island, Central Maluku District. The sampling method used was total sampling. Researchers took data from respondents aged ≥18 years and those willing to be involved in the study. Those who met the inclusion criteria yet were pregnant were not included in this study.

2.3. **Data analysis**
   Univariate analysis was used to determine the prevalence of hypertension in coastal communities of Nolloth and Itawaka Village, Saparua Island, Central Maluku District.

3. **Results and Discussion**
   The population data and number of patients with hypertension collected in this study in Nolloth and Itawaka Village are shown in Table 1 and Table 2, respectively.

| Table 1. Population data and number of patients with hypertension in Nolloth Village |
|----------------------------------|----------------|----------------|----------------|----------------|
| Nolloth Village | Population | Number of patients hypertension | Number of patients visited health personnel | Number of patients visited health personnel |
| Sector 1 | 240 | 64 | 9 | 55 |
| Sector 2 | 230 | 61 | 8 | 53 |
| Sector 3 | 215 | 57 | 8 | 49 |
| Sector 4 | 215 | 57 | 8 | 49 |
| Sector 5 | 300 | 80 | 11 | 69 |
| Sector 6 | 280 | 75 | 10 | 64 |
| Sector 7 | 460 | 123 | 17 | 106 |
| Sector 8 | 215 | 57 | 8 | 49 |
| Sector 9 | 210 | 56 | 8 | 48 |
| Sector 10 | 280 | 75 | 10 | 64 |
| Total | 2598 | 705 | 97 | 608 |
Table 2. Population data and number of patients with hypertension in Itawaka Village

| Itawaka Village | Population | Number of patients hypertension | Number of patients visited health personnel | Number of patients visited health personnel |
|----------------|------------|---------------------------------|------------------------------------------|------------------------------------------|
| Sector 1       | 160        | 43                              | 7                                        | 36                                        |
| Sector 2       | 172        | 46                              | 8                                        | 38                                        |
| Sector 3       | 180        | 48                              | 8                                        | 40                                        |
| Sector 4       | 180        | 48                              | 8                                        | 40                                        |
| Sector 5       | 168        | 45                              | 8                                        | 37                                        |
| Sector 6       | 192        | 51                              | 9                                        | 42                                        |
| Total          | 1020       | 281                             | 48                                       | 233                                       |

Based on data from Table 1 and Table 2, the percentage of patients with hypertension in the two villages was quite similar, 27.13% in Nolloth and 27.54% in Itawaka. This percentage was lower than the results conducted by Risliafa et al. (2014) [8] who reported that hypertension in coastal areas was 64.4%. However, compared to the prevalence of hypertension in Maluku according to the 2018 Basic Health Research (Riskesdas) [9] data the prevalence of hypertension was only 4.6%, showing a high prevalence of hypertension in Nolloth and Itawaka is high. The low prevalence rates might be influenced by the lack of facilities and medical personnel to conduct hypertension measurement, aggrivated by community’s low motivation to do regular blood pressure checks.

In Nolloth, of 705 respondents suffering from hypertension, only 13.75% were routinely visit health facilities; whereas the rest did not do any checkup. In Itawaka, there were 281 respondents who suffered from hypertension. Of these, only 17.08% ever controlled in health facilities, while the remaining 82.92% did not do any checkup. The high percentage of patients with hypertension, who did not visit health facilities to do routine blood pressure checks, is one indicator of a lack of patient awareness of the disease experienced. In addition, by routinely doing health examinations at health facilities, health workers are able to monitor the success of treatment provided, and could early detect signs of complications due to hypertension. Consequently, preventive measures could be conducted earlier.

From data collected, mapping of patients with hypertension mapping was carried out based on the place of residence. The researcher and the head of puskesmas assigned health workers (doctors, nurses and midwives) in the health facilities to be in charge for monitoring, according to the specified working area. The ratio of health personnel and patients used in this study were 1: 25. Thereby, in one sector there were 2-4 health workers assigned. Each village was provided one smartphone useful to enter all the monitoring data that every week. Data were entered according to the format made in a special application. Monitoring data is conducted in health facilities; whereas patients who rarely control at the puskesmas on a regular basis, are educated and encouraged to promote their awareness to conduct health checks at health facilities, in addition to do home visits (Figure 1).
4. Conclusions
The prevalence of hypertension in Nolloth was similar to Itawaka, which were 27.13% and 27.54%, respectively. After the screening process is completed, we propose a monitoring mechanism as follows: mapping location of patients, Develop patient forms or application in mobile phone, filling out patient forms using applications on smartphones, assigning health staff responsible in the area, filling out the identity of patients with hypertension according to their place of residence, monitoring weekly blood pressure and community’s compliance in taking anti hypertensive medication.

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