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Making and Validating a Promotive and Preventive Effort Model for Stages 1-5 of Chronic Kidney Disease in Primary Care Services

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ABSTRACT

Background: The prevalence of Chronic Kidney Disease (CKD) is continuously increasing worldwide, including in Indonesia and has become a global public health problem. With the increased number of patients with CKD and the limited number of nephrologists, primary care physicians and specialists should play an important role in providing quality sustainable prevention and treatment by improving promotive and preventive efforts in primary care. Most patients with CKD can be managed by doctors in primary care in collaboration with specialist doctors in secondary and tertiary care. However, clinical practice guidelines for promoting and preventing CKD in primary care apparently have not been optimally implemented. **Objective:** This research aimed to make a promotive and preventive model for stages 1-5 of CKD in primary care. **Methods:** This research employed a research and development strategy with the following stages: (1) Preliminary study stage (literature review), (2) Development stage (initial draft of the model) and (3) Resources validation stage (in-depth interviews). **Results:** Five primary care physicians, two internists and one nephrologist participated in the validation stage for the initial draft of the model. The three stages of this research obtained the pattern of doctor’s practice for CKD and the feedback related to the model to be adjusted according to the condition of primary care in Indonesia. **Conclusion:** There is a lack of understanding and awareness of primary care physicians about prevention and treatment of CKD, and a lack of supporting examination facilities for serum creatinine and albuminuria in primary care for screening of the risk factors of CKD. A promotional and preventative model of stages 1-5 for CKD in primary care was successfully made and validated.

Keywords: *Chronic Kidney Disease, Primary Care, Promotive and Preventive, Making and Validating a Model.*

BACKGROUND

Currently, communicable diseases (CDs) have been displaced by non-communicable diseases (NCDs) as the most common cause of morbidity and mortality worldwide, which indirectly has a major impact on health care costs, productivity, and community growth. Chronic Kidney Disease (CKD) is one of the non-communicable diseases (NCDs) whose prevalence continues to increase worldwide¹.

According to the World Kidney Day (2015), it is estimated that about 8-10% of the world population suffer from CKD and millions of people die every year because they cannot obtain affordable therapy. The prevalence of CKD is increasing in the United States^{2,3}. According to recent research, diabetes and hypertension are the main causes of End Stage Renal Disease (ESRD)^{4,5}.

The prevalence of CKD in developing countries, including

Indonesia, also is increasing dramatically, and it is estimated that the number of kidney failure cases will increase disproportionately in developing countries. Therefore, CKD has become a major world health problem that must be solved^{1,3,6}.

The data from BPJS Kesehatan (2015) show that dialysis procedures for patients with CKD in the hospital is the second most common case and costs approximately 2.4 trillion rupiahs in a one year period⁷. Many non-specialist referral cases, in which more than 70% of diseases referred to hospital are diseases that can be solved in primary care services, are also the cause of double claims⁷. This fact shows that the commitment and competence of health facilities are still questionable and the BPJS Kesehatan budget has not been used effectively and efficiently.

With the increased number of patients with CKD and the limited number of nephrologists, doctors in primary care

services and specialists should play an important role in providing quality care for patients with CKD⁶. Most patients with CKD can be managed by doctors in primary care services in collaboration with specialist doctors in secondary and tertiary care services. However, the clinical practice guidelines for the prevention and treatment of CKD in primary care services apparently have not been implemented optimally. Previous research identified that there is still a lack of awareness and knowledge of doctors about CKD risk factors. As a result, doctors are not familiar with the recommended CKD diagnostic tools, and there is an assumption that prevention and treatment of CKD are less important⁶.

In order to avoid double claims and to reduce non-specialist referral rates, among other concerns, efforts that can be made to reduce the CKD incidence and the skyrocketing dialysis cost of CKD patients in hospitals include increasing promotive and preventive efforts in primary care services in healthy communities and for those who have risk factors for suffering from CKD. Furthermore, according to *Jaminan Kesehatan Nasional*, doctors in primary care services are 'Gate Keepers' who function as the first contact in formal health services and serve as referral filters in accordance with medical service standards⁷.

Based on this background, the researchers aimed to conduct research on the making and validating of promotive and preventive effort model for stages 1-5 of CKD in primary care services. The researchers wanted to examine what doctors in the primary service can do concerning the annually-increasing problem of CKD. Therefore, with this newly developed model, it is expected the incidence rate of CKD can be reduced in the future.

METHODS

This research aimed to produce a product, namely the Promotive and Preventative Effort Model for Stages 1-5 of Chronic Kidney Disease in primary care services. Accordingly, this research employed the strategy of research and development (R & D). The steps in R & D research include: 1) Preliminary Study Stage through literature review, 2) Development Stage, which is making the initial draft of the model, and 3) Resource Person Validation Stage conducted using a qualitative approach through in-depth interviews.

Research subjects for validation of the resource person were 5 general practitioners in primary care services or Public Health Care Centers (*Puskesmas*) and/or Family Doctors, 2 specialists in internal medicine and 1 nephrologist. The research was conducted in October-November 2017 in Kebumen Regency, Central Java Province, Indonesia. This research received ethical approval from STIKES Muhammadiyah Gombong, Kebumen with reference number 115.6/IV.3.AU/F/ETIK/XI/2017.

Data obtained in this research include: (1) data of the preliminary study stage (literature review), (2) data of the development stage results (initial draft of the model), and (3) data of validity test results of the resource persons. The data of this research were analyzed qualitatively

from qualitative data which were recorded during in-depth interviews after the initial model from the literature review was made. It is expected that the end result of the research, i.e. the promotive and preventive effort model for stages 1-5 of CKD in primary care services, can be used effectively and corresponds to the needs of primary care services in Indonesia.

The steps in analyzing the data were as follows: (1) summarizing the report in the form of the initial module from the literature study, (2) organizing the model systematically based on certain categories and subthemes, (3) making the data display in the form of chart, (4) performing cross-site analysis by comparing and analyzing the data profoundly, and (5) presenting findings, while drawing conclusions and making recommendations.

RESULTS

Preliminary Stage

The data for the review literature at the preliminary study stage were searched and collected by the first researcher (ARH). Data were obtained from articles, journals, research reports and relevant books, both printed and online versions. The articles over the Internet were searched by entering keywords in a predefined combination in targeted online database websites. The online database included EBSCOhost, Medline and Cochrane. Keywords used were: Chronic Kidney Disease, Prevention, Health promotion strategies, Primary Care, Early detection, Management, and Guideline.

The literature review generated 15 sources of literature that according to the researchers were relevant; next, these sources were evaluated, analyzed and interpreted by summarizing and discussing the relevant content with the supervisor. The 15 literature sources are from Australia, the United States, England, Canada, France, Japan, Cuba, Indonesia and Europe. They were published between 2002-2014. Their target users were primary care physicians, specialists in internal medicine and nephrologist doctors.

Development Stage

From the results of the review literature, the results of the model were divided into 4 main themes, namely: promotive efforts (primordial preventive), primary preventive, secondary preventive and tertiary preventive. The 4 main themes covered 5 subthemes which were then used for coding the subthemes of the in-depth interviews at the validation stage of the resource persons: (1) Detection and diagnosis of CKD, (2) Action plan (assessment, monitoring and prognosis of CKD), (3) Comorbidity and complications, (4) Treatment and indication of referrals, and (5) Education and prevention of CKD progression.

Validation Stage of Resource Persons

The in-depth interviews revealed that the resource persons of general practitioners in primary care services were mostly unaware of the definition of CKD.

"Chronic renal disease is a disorder of kidney function which lasts more than 1, 4 weeks." (N4, 16-18)

“Chronic kidney disease is a disease that attacks the kidneys and, part of the kidneys and the target and its surroundings which lasts for more than two weeks” (N5, 11-15)

1) Detection and diagnosis of CKD

Early detection and diagnosis by general practitioners in primary care services were still very rare, and even difficult to do because the condition of most patients who visited the primary care services was advanced CKD. It was revealed by almost all of the general practitioners in primary care services that the primary care services did not have a support facility to diagnose CKD. As a result, in the primary care services all of the patients with CKD were diagnosed only by considering complaints and physical examinations leading to CKD and were directly referred to secondary facilities. This finding was similar to that expressed by a specialist doctor that patients who visited a secondary facility were already in an advanced stage, so that early detection was very rarely performed.

“But we diagnose the patient usually because the patient come with kidney failure, diagnosing the severity level, or those come with high tension along with swelling of the leg or with severe anemia” (N1,44-53)

“... we do not carry out early detection, Mam.” (N3, 62-74)

However, due to limitations of supporting examination facilities in primary care services in Indonesia, according to specialists and nephrologists, the diagnosis of CKD can be done only by examining blood pressure, albuminuria/proteinuria (urine dipstick) and urine (glucose) reduction by using urine dipstick method.”

“... the key of the First Healthcare Facility is in albuminuria, the second in blood pressure, ... hypertension with DM, hypertension using tension, DM using reduction, leakage of both using albuminuria, which becomes three, well the cadres can measure blood pressure, can measure albuminuria, can reduce urine, also dipstick, measure blood pressure, so that all the three should be done in the first healthcare facilities. In short, those three are enough. “(N7, 322-326, 330-341)”

2) Action plan

According to most general practitioners in primary care services, CKD was rarely or not assessed and monitored well in primary care services because all patients were referred to secondary facilities. Even if it was assessed and monitored, according to the resource persons, it was limited to only controlling basic diseases (Diabetes mellitus and Hypertension) and only from physical symptoms that appeared.

“A patient with hypertension, for example, whom we found out later that the patient had a kidney failure, we did not do monitoring but we usually assessed it from whether blood pressure was controlled, the basic disease of Diabetes Mellitus was controlled, sugar was controlled, having no other complaints such as anemia or tightness or swollen feet, and so on. “(N1, 63-72)

3) Comorbidities and Complications

Comorbidities and complications should be well managed in order to prevent premature death from cardiovascular disease, which is the most common complication, even before the patient reaches the final stage of chronic renal disease or renal failure^{8,9,10}. This fact is important for a doctor because recognizing certain comorbidities and complications will facilitate a doctor to manage his/her patients properly⁶. The research found that most of the resource persons still did not understand the comorbidities of CKD.

“Comorbidity is accompanying diseases, such as hypertension, DM usually related to high cholesterol and hypercholesterol.” (N1,91-96)

Almost all of the resource persons understood that the most common complications of CKD were to the heart, such as of congestive heart failure (CHF) and an enlarged heart. In addition to the heart organ, complications from CKD according to the resource persons included lungs (pulmonary edema), metabolic acidosis, electrolyte disturbance (severe hyperkalemia), seizures, decreased consciousness, abnormalities in the brain and eyes, anemia, and bone disorders.

“heart may be, congestive heart failure may be a possible complication of chronic kidney.” (N3, 123-125)

4) CKD Therapy and Specialist/ Nephrologist Referral Indication

Based on the results of interviews with the resource persons, most of the general practitioners revealed that they rarely or even never gave therapy to patients with CKD in primary care services. This pattern was because all the patients who visited were referred to the hospital, and rarely were referred back to be treated in the primary care services.

“For this chronic kidney disease, I have referred, or I do not treat (such patients), they have been referred to a more competent specialist, that is to a specialist in internal disease, so I do not treat them in private practice.” (N5,231-236)

The indications of referring to a specialist, according to the resource persons, included hypertension or diabetes accompanied with complications, uncontrolled hypertension, clinical symptoms such as diuresis disorders, swelling of the feet and body, tightness, blood disorders such as anemia, which would be directly referred in order to obtain a more complete treatment and examination. The other reasons, according to some of the general practitioners in primary care services, were that they did not dare, were not confident and felt that it was not in the competence of general practitioners to treat chronic kidney disease, as well as limited supporting examination facilities to make the diagnosis.

“... on average, we refer back because we are not confident to treat chronic kidney disease, especially that those who already required hemodialysis once or twice a week, we are not confident, Mam.” (N3, 181-186)

5) CKD Education and Preventive Efforts

Education is a very important element, both in promotive and preventive efforts^{8,10}. Almost all the resource persons from the beginning gave education to patients with hypertension and diabetes mellitus to get routine checkups, take medication regularly, do regular exercise, perform dieting, reduce salt and protein intake, change lifestyle, and avoid smoking and stress. However, although in the

beginning the doctors provided education for the patients, there were many patients who did not come for checkups anymore and stopped treatment, so that they eventually came with complications such as stroke, ulcers, and kidney failure. This pattern was one of the obstacles expressed by the resource persons in primary care services, making it difficult to follow up the early detection and therapy for

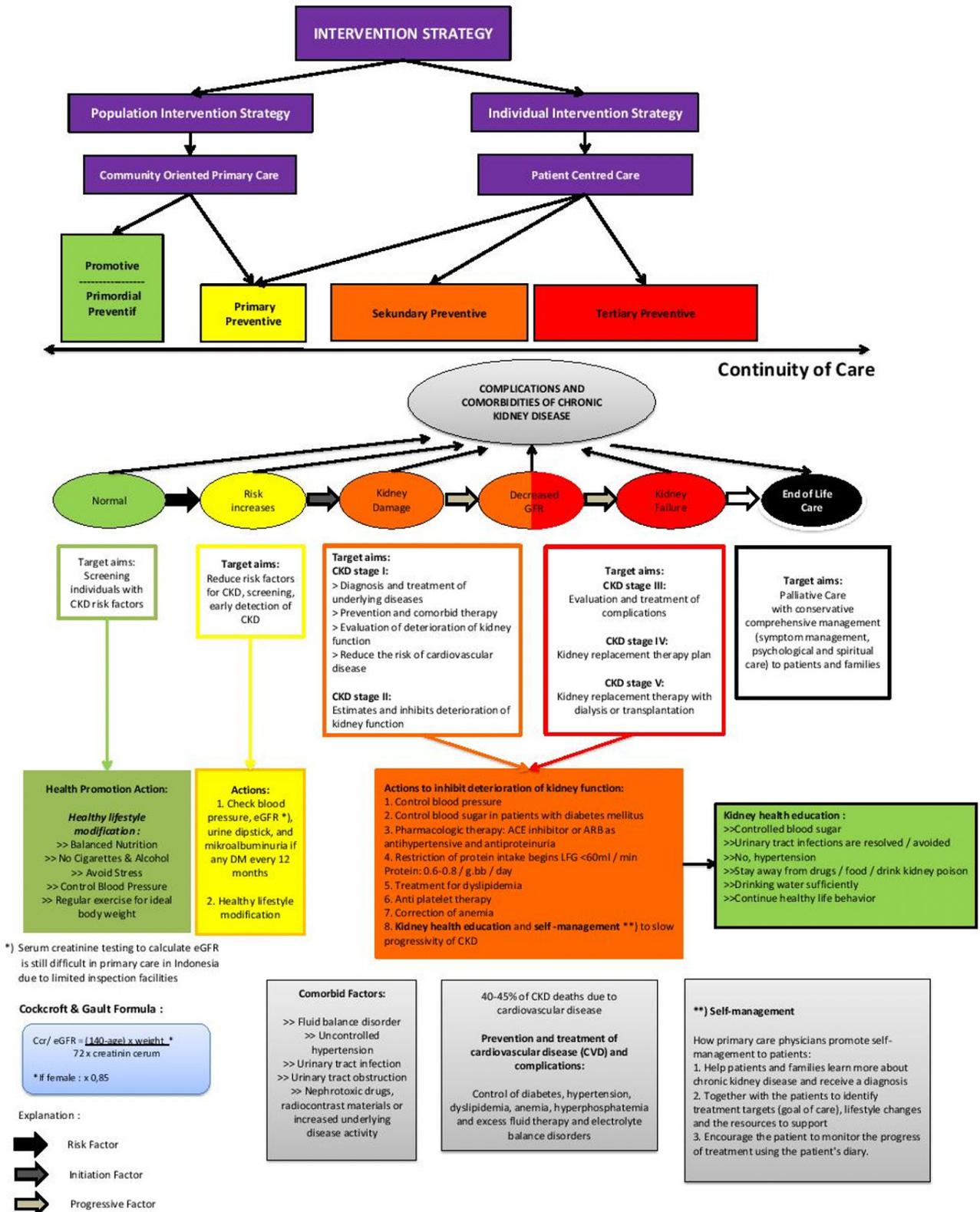


Figure 1. Promotive and Preventive Effort of Chronic Kidney Disease

Source: Almaguer et al, 2005: NKF-KDOQI, 2002: Ramirez, S, 2008

chronic disease patients.

“Education ... routine control, meaning (that we have informed) from the beginning the underlying diseases of chronic kidney failure like hypertension, blood sugar but sometimes the patient is difficult, sometimes out of control, stopped. Finally, they come with DM ulcers, already with stroke, with chronic kidney failure. Education when they have chronic kidney failure was only a kind of supporting education, for example, to my knowledge, because chronic renal failure only a matter of intake, or routine control, something like that. “(N3, 192, 198-212)

Promoting and preventive efforts for CKD become very important to prevent and inhibit the worsening of disease. This fact was said by the resource persons because if the kidney disease had reached the stage 5 or kidney failure, the cost incurred would be very expensive. Preventive efforts can be made at several stages, namely primary preventive, secondary preventive and tertiary preventive stages^{11,12}. It is intended that healthy individuals stay healthy, to prevent disease progression and to improve patient's quality of life^{8,9,10}. Such preventive efforts can be made through education to patients, families and the general public so that they understand about hypertension and diabetes mellitus, how to handle and control them so as not to cause complications, one of which is CKD^{11,12}.

“Yes, all risk factors must be controlled from the beginning” (N7, 100-101)

“Yes, if one of the underlying diseases of for chronic kidney disease such as DM and hypertension can be more controlled, the chronic kidney disease can be more controlled, many patients will not fall to complications of kidney failure” (N8, 203-209)

DISCUSSION

The research found that early detection and diagnosis by general practitioners in primary care services were very rarely done and even difficult to perform because most patients who visited the primary care services were in advanced CKD. This pattern is similar to results from previous research that found CKD and its complications are also a disease that is largely not yet diagnosed and handled well in primary care services^{6,13}.

Action plans through assessment and monitoring of CKD were very rarely done or not performed well in primary care services, since all patients were referred to secondary facilities. As a matter of fact, an action plan through the assessment and monitoring of CKD should be carried out to minimize the progression of the disease^{8,9,10,14}. This finding is similar to what was found in previous research that showed general practitioners in primary care services are not aware of CKD risk factors, doctors are not familiar with the recommended CKD diagnostic tools and there was a general assumption that the treatment of CKD is less important⁵.

It was revealed by the nephrologists that the earlier the reference, the better, meaning that if there is one of the indications to be referred, the referral should be made

immediately without waiting. This finding is similar to previous research that found delays in referring to specialists / nephrologists in patients with CKD are correlated with increased morbidity, mortality and costs^{8,9,10,14,15}.

Therefore, based on the analysis of the researchers, the keys in making promotive and preventive efforts for CKD in the primary services are that the primary care doctors must understand the natural course of the disease, what are the signs and symptoms of CKD risk factors, when patients should be referred, and understand that the basic diseases of hypertension or diabetes mellitus are comorbid factors that must be well controlled in primary care services, so that the complications and disease progression can be prevented^{6,8,10,16,17}.

It was also found that the guidance from the existing literature review was not entirely applicable in primary care services in Indonesia, especially the supporting examination for the main diagnosis of CKD, namely serum creatinine and albuminuria tests were not available in Indonesia. Therefore, the resource persons gave a feedback that the supporting examination should be adjusted with the facilities available and can be used effectively. Since the results of serum creatinine and albuminuria tests serve as the supporting examination for the diagnosis of CKD, the resource persons gave a feedback that the diagnoses of chronic renal disease can be performed through blood pressure examination, dipstick urine reduction or GDPP and urine dipstick for albuminuria/ proteinuria.

This research was aimed at the making and validating of a promotive and preventive effort model for stages 1-5 of kidney disease in primary care services, because the researchers wanted to give an overview of the importance of knowledge and understanding of doctors in primary care services about the natural history of CKD^{12,15,19}. Using the promotive and preventive effort model for stages 1-5 of chronic kidney disease in primary care services, doctors in primary care services will better understand and be able to perform continuity of care and provide assistance to healthy individuals with risk of CKD or individuals who have already suffered from CKD^{8,10,14}. It is also expected that this research is able to increase awareness of doctors in primary care services that the management of patients with CKD is part of a continuity of care, so that if there is indication of referral to specialists/nephrologists, it does not mean that the duty as a general practitioner in the primary care services ends. There are still many aspects which can be done as doctors in primary care services by educating and training about self-management for patients so that they can empower themselves to control risk factors, comorbidities and complications in order to prevent disease progression, even including palliative efforts for patients who have suffered from the final stage of CKD^{8,14,16,19,20}.

This research has several limitations involving how the samples were taken randomly, the small number of samples that may result in bias, and the principal researchers who may not have thoroughly analyzed the existing data. Other limitations of this research include that the resulting model has not been validated by experts, but only by resource

persons and the model product has not been tested in the field through experimental study. Meanwhile, the strength of this research is that this research employed research and development (R & D) and this method is the best method to obtain the result of a reliable product model.

CONCLUSIONS

This research obtained the practice pattern of general practitioners in primary care services in Indonesia. The findings showed that there is still a lack of understanding and awareness of general practitioners in primary care services about sustainable prevention and treatment in patients with CKD, and a lack of supporting facilities for serum creatinine and albuminuria testing in primary care services for screening/detection of individuals with CKD risk factors. From this research, a Promotive and Preventative Effort Model for Stages 1-5 of Chronic Kidney Disease in Primary care services has been successfully made and was validated by the resource persons and adjusted according to the conditions of primary care services in Indonesia.

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Ethical Approval and Informed Consent

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Availability of Data and Material

Data and material can be accessed via corresponding author.

Conflict of Interest

None.

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