

ARTICLE

Development of a Care Coordinator Performance Measurement Tool for Indonesian Family Physicians

Retno Asti Werdhani MD MEpid PhD^a, Astrid Sulistomo MD MPH SpOk PhD^b, Herqutanto Herqutanto MD MPH MARS PhD^c, Ismail Wirawan MSL MM MSi PhD^d, Ekowati Rahajeng SKM MKes PhD^e, Adi Heru Husodo MD MSc PhD^f and Muchtaruddin Mansyur MD MS SpOk PhD^g

a Faculty Staff, Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

b Head, Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

c Faculty Staff, Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

d Faculty Staff, Department of Management, Faculty of Economy, Universitas Persada Indonesia, Jakarta, Indonesia

e Researcher, Research and Development Unit, Ministry of Health Republic of Indonesia, Jakarta, Indonesia

f Faculty Staff, Department of Family Medicine, Community, and Bioethic, Faculty of Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia

g Lecturer, Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Abstract

Background, aims and objectives: One of the roles of a family physician is as a care coordinator. This study aimed to develop a care coordinator measurement tool for family physicians in Indonesia. The instrument development method was conducted using Expert Judgement, the Delphi Technique and Factor Analysis. Thirteen themes relevant to the work of a care coordinator were obtained from 19 experts. Eighty-eight items were drafted from thematic definition and a literature search. Fifty-four items were selected through 2 rounds of Delphi Technique. No significant characteristic difference were found in both Delphi samples. The items considered very relevant to the work of a care coordinator (Likert scale 8-9) from more than 75% respondents were selected for factor analysis. A factor analysis was conducted on 249 samples. It showed an adequate number of samples and correlation for all items (KMO of Sampling 0.936 and Bartlett's Test < 0.001). Eleven factors were derived from the results of eigenvalue > 1. Thirty-three items were filtered after determined loading factor > 0.4. Cronbach's alpha for each factor varied from 0.7-0.91. Cronbach's alpha for a total of 33 items was 0.94 with total variation documented as high as 77%.

Conclusion: A valid and reliable care coordinator measurement tool for Indonesian Family Physicians has been developed, consisting of 11 factors and 33 items.

Keywords

Care coordinator, Care Coordinator Measurement Tool, complexity management, Family Physician, measurement, measurement indicators, person-centered healthcare, physician performance

Correspondence address

Dr. Retno Asti Werdhani, Jl. Sindang 2 no F1, Komp. Pertamina, Jatirawamangun, Jakarta Timur, 13220, Indonesia.

E-mail: retno.asti@ui.ac.id

Accepted for publication: 17 February 2017

Introduction

Family physicians are at the forefront of healthcare services and cooperating with multiple colleagues and health and social care disciplines in the best of interests of their patients [1,2] as recommended by McWhinney and Freeman [3]. In addition family physicians in primary care must also function as a patient's counsellor. In this way and as described by Starfield *et al.* [4] primary care services consist of comprehensive, longitudinal and coordinated care within the context of family and

community [5]. Accordingly, the function of physicians in primary care is as a *care coordinator* as well as a direct provider and care coordination has come to be one of the core functions of primary care doctors [6] and is integral to the provision of person-centered healthcare.

An instrument to measure and assess performance of family physicians as care coordinators remains in need of development, especially in Indonesia. McDonald *et al.* [7] have developed various dimensions of care coordinator; however, measurement indicators still need to be constructed. To address this deficiency, this study aimed to develop an instrument for Indonesian family physicians in

primary care who function as care coordinators. The instrument developed in this study is advanced as being of use to family physicians in Indonesia in improving the quality of health services provision and person-centered care.

Methods

Expert judgment, the Delphi Technique and Factor Analysis were employed to develop measurement instruments for family physician performance functioning as care coordinators in primary healthcare services [8-12].

Expert Judgement

An open-ended questionnaire was distributed to experts with various backgrounds from practitioners, members of professional organizations, experts in family and community medicine, master trainers for primary care physicians from various universities and health policymakers. They were requested to list measurements indicators that according to their respective opinions are required to assess the performance of family physicians functioning as care coordinators. All of their inputs were grouped into themes that represent measurement dimensions.

From the collected themes and from references, measurement items were developed by searching the definitions of each themes, considering repetitions, grammar and local conditions. Following the collection, these experts, as well as physicians, health policymakers and healthcare facilities managers, were asked the relevance of the collected items with the field conditions. These processes were conducted using 2 rounds of the Delphi Technique.

Delphi Technique

Delphi samples consisted of primary care experts, primary care physicians, health policymakers and healthcare facilities managers. All items which were labeled "highly relevant" (Likert scale 8-9) by a minimum of 75% participants of 1st Delphi or 2nd Delphi and labeled "highly relevant" (Likert Scale 8-9) by 70-74% in both 1st Delphi and 2nd Delphi, were the items for care coordinator performance to be included as part of the instrument validation stage using Factor Analysis.

Factor Analysis

Exploratory Factor Analysis was conducted to determine item correlation and the number of dimensions formed by the items through both *eigenvalue* > 1 and *screeplot*. The total variations of care coordinator score that can be explained through the number of formed dimensions were expected to be ≥ 0.6 . After the number of dimensions were established, the loading factor (correlation between items and dimensions) was determined at 0.4 [12]. The items that were enlisted as final items were the items that have inter-

item correlations of 0.3-0.9 with a minimum 0.4 correlation towards its dimension and *alpha cronbach* (internal consistency) and a minimum of 0.6 for each dimension [11].

The study was approved by the Ethical Committee of the Faculty of Medicine Universitas Indonesia, letter number 265/UN2.F1/ETIK/2015.

Results

A total of 19 experts with backgrounds as practitioners, members of professional organizations, academics and health policymakers, completed an open ended questionnaire about the components considered to be necessary to assess performance of family physicians functioning as care coordinators in the primary care setting. These experts were academic staff of family and community medicine from various universities, members of the Indonesian Association of Family Physicians and Internal Medicine, as well as staff from the Ministry of Health holding a doctoral degree (12 out of 19), male (10 out of 19) and aged between 37-70 years old.

Thirteen themes were obtained from the experts' answers. The definitions from each theme developed by the expert panels were explored through reference study. From these definitions, potential items were formulated based on the operational definitions of the acquired theme. Based on these definitions, 88 items were formed taking into account repetitions, grammar and local conditions. The next steps were to achieve consensus by soliciting the experts' opinion on the 88 items acquired. Experts, primary care physicians, health policymakers and healthcare facilities managers were questioned regarding the relevance of the items with the field conditions. The number of individual participating in the 1st round Delphi were 110 and 81 participated in the 2nd round Delphi. There were no significant differences in the characteristics between 1st and 2nd round Delphi participants. (Table 1).

At 1st round Delphi, out of 88 items proposed, 26 of them were considered 'highly relevant' by $\geq 75\%$ participants. In the 1st round Delphi the item '*doctors who can be contacted by patients*' was proposed for the 2nd round Delphi. Out of 63 items proposed in the 2nd round Delphi, 21 items were considered highly relevant by $\geq 75\%$ of the participants. Then, 7 items that were considered 'highly relevant' by 70-74% in both the 1st round Delphi and the 2nd round were also included in the final instrument. Therefore, the final results showed a total of 54 (26+21+7) items that need to be validated through factor analysis for the Care Coordinator Instrument. (Figure 1).

A total of 249 participants from primary care facilities completed the draft for the Care Coordinator Instrument for family physicians in Indonesia considered the 54 items that had been extracted from the Delphi Round, a number sufficient to perform factor analysis (KMO 0.936). From *eigenvalue* > 1, the 54 items tested can be grouped into 11 factors/dimensions and the total variation that can be explained through these 11 dimensions was 77%. Loading factor minimum 0.4 was determined for items included

Table 1 Participant characteristics for the Delphi 1 and Delphi 2 analyses

Variables	Delphi 1 (N = 110) N (%)	Delphi 2 (N = 81) N (%)	P
Gender			
Male	31 (28.8)	24(29.6)	0.83 [#]
Female	79 (71.8)	57 (70.4)	
Education			
MD	48 (43.6)	36 (44.4)	0.97 [#]
Master/Specialist	47 (42.7)	35 (43.2)	
PhD/Sub-Specialist	15 (13.6)	10 (12.3)	
Occupation			
Full Time Practitioner	61 (55.5)	44 (54.3)	0.98 [#]
Full Time Lecturer	11 (10)	8 (9.9)	
Manager*	5 (4.5)	3 (3.7)	
Head of Health Facility*	2 (1.8)	2 (2.5)	
Practitioner and Lecturer	30 (27.3)	24 (29.6)	
Others*	1 (0.9)	0 (0)	
Age (years)	42.93 (9.61)	42.91 (10.34)	0.99 ^{##}
Length of professional career (years)	15.17 (9.23)	15.78 (9.63)	0.66 ^{##}
Length of work in institution (years)	11.09 (8.17)	11.31 (8.61)	0.85 ^{##}

*Were merged in analysis [#] Chi Square Test ^{##} Independent T Test

Figure 1 Items Extraction with Delphi Methods

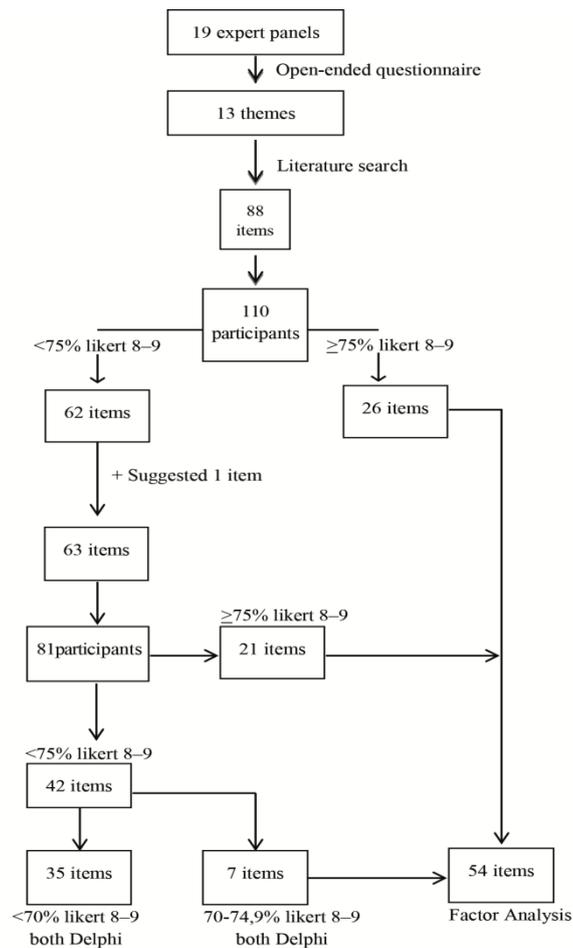
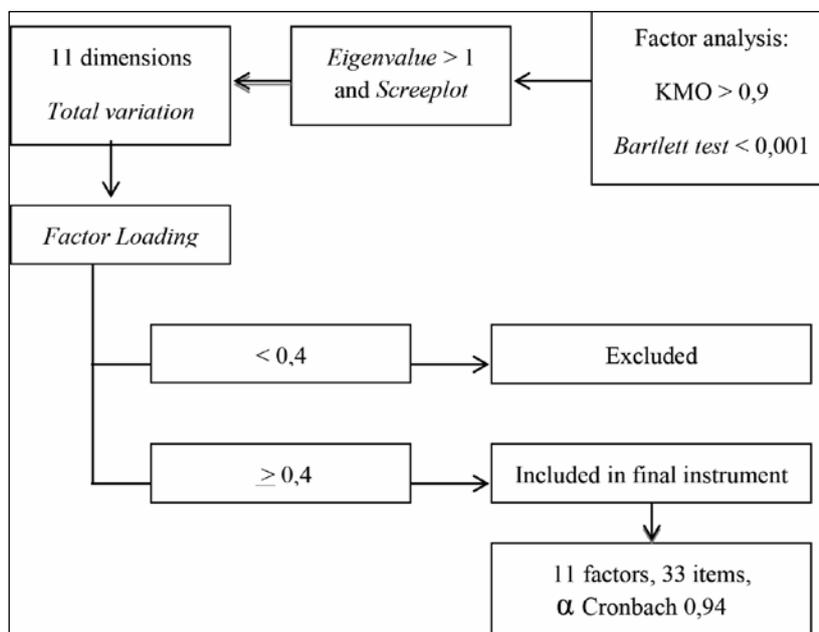


Figure 2 Items Extraction with Factor Analysis



Box 1 The 11 dimensions developed as part of the Care Coordinators Performance Instrument

1. **Bio-psycho-socio-cultural aspect** indicates identification of physical, biological, psychological, social and cultural contribution to the occurrence of a patient’s health problem.
2. **Functional and behavioral aspect** indicates the changing of a patient’s daily activities/function due to health problems/symptoms as well as the effects of a patient’s behavior on the health complaints/symptoms.
3. **Organizational skill** indicates the ability to have guided, rational, systematically planned and monitored cooperation in utilizing resources and facilities in an efficient and effective manner in order to achieve healthcare objectives.
4. **Teamwork skill** indicates the process of integrating and coordinating healthcare provided to each patient with a group of people to achieve setting objectives.
5. **Patient-centered care** indicates centralization of medical attention to the needs and concerns of the patient, as well as seeing the patient as part of his/her life and environment that can influence his/her health.
6. **Empathy and responsibility** indicates the ability to feel another’s emotional state and to try to solve problems by considering the other person’s perspective. Active listening and reflection on the content and patient’s feelings during consultation are needed to provide accountable care to patients.
7. **Patient medication education** indicates giving additional knowledge and skills to patient and family with the objective to transmit information or provide explanation about health problems and medications to build cooperation between the doctor and the patient.
8. **Patient prevention education** indicates additional knowledge and skills to patient and family with the objective to transmit information or provide explanation about health problem prevention for the patient, family and environment and to build cooperation between the doctor, patient, family and community.
9. **Follow-up care plan** indicates monitored, proactive and continuous medical care for the patient, which includes maintaining and/or improving long term health status.
10. **Medical information documentation** indicates providing health data that has been processed into a valuable and meaningful form to improve care and knowledge in supporting individual, family and society and health quality.
11. **Self-awareness and self-development** indicates the realization of limitation, solving personal issues, self-development, attending continuing medical education and improvement as well as increasing knowledge for the care of patients.

Table 2 Instrument dimension, Item correlation and *Loading Factor* of Care Coordinator data

FACTOR/ DIMENSION		ITEM INDICATORS	Item correlation	Loading Factor	Alpha Cronbach
1	Bio-psycho-socio-cultural aspect	A Identifies the patient's behavioral aspect (internal risk factor)	0,64	0,80	0,77
		B Identifies the patient's environmental aspect (external risk factor)	0,66	0,71	
		C Understands that contributing factors to health-illness spectrum and wellbeing are not only from the physical dimension but also from the patient's social and psychological dimensions, as well as from family and community	0,58	0,75	
2	Functional and behavioral aspects	A Identifies the patient's clinical aspect (natural history of disease)	0,55	0,78	0,71
		B Identifies the patient's functional aspect (impact of the illness on the patient's daily functions/activities)	0,64	0,62	
		C Identifies the patient's behavioral needs, discomfort, nutritional needs and functional status	0,63	0,79	
3	Organizational skills	A Gets involved in the development of healthcare services	0,53	0,82	0,73
		B Provides feedback about healthcare services to management	0,61	0,72	
		C Acts as a care manager	0,62	0,71	
4	Team work skills	A Delegates the patient's management to other health providers when needed, with due regard to the competencies of other disciplines	0,53	0,72	0,8
		B Contributes and actively participates in a well functioning multidisciplinary care team	0,66	0,75	
		C Ready to provide leadership for the healthcare team	0,62	0,72	
5	Patient-centered care	A Asks the patient to state what he/she thinks about his/her health problem	0,67	0,63	0,77
		B Knows more about the patient (biography, interpersonal relationship, personality, behavior, physical environment, social, culture, etc.)	0,65	0,64	
		C Provides the patient with the opportunity to speak, including to express his/her feelings	0,64	0,70	
6	Empathic and responsible	A Listens to what the patient says	0,63	0,80	0,8
		B Understands the patient very well	0,69	0,69	
		C Provides accountable healthcare	0,62	0,74	
7	Patient medication education	A Provides information to the patient about rules and controls required	0,64	0,66	0,88
		B Explains problems to the patient	0,72	0,80	
		C Explains medication given to the patient	0,70	0,83	
8	Patient prevention education	A Provides information to the patient about healthy life style	0,62	0,79	0,91
		B Provides information about disease risks	0,66	0,79	
		C Provides information about disease prevention	0,67	0,82	
9	Follow-up care plan	A Documents results of discussion with the patient	0,58	0,82	0,77
		B Writes a health problem management plan clearly	0,69	0,64	
		C Discusses and negotiates follow-ups about what to do when problems occur before the next consultation	0,69	0,55	
10	Medical information documentation	A Completes the list of problems of each patient at least in the second consultation	0,61	0,45	0,7
		B Keeps the documented results of discussion with the patient (informed consent form, counseling, etc.)	0,61	0,57	
		C Documents the patient's record so as to allow it to be accessible by all patient's healthcare providers	0,49	0,81	
11	Self-awareness and self-development	A Analyzes practical experience, including mistakes, to improve patient care (self-reflection)	0,70	0,46	0,71
		B Attends continuing medical education activities on a regular basis	0,45	0,83	
		C Acknowledges knowledge gap and skills in patient's case management	0,50	0,79	
Total Alpha Cronbach (33 items)					0,94

into these 11 dimensions/factors and 33 items were conformed to meet these criteria. (Figure 2).

Discussion

Care Coordinator items measurements were developed from reference and dimensions from expert opinions were derived from academic staff from several Faculties of Medicine in Indonesia (Department of Community Medicine, Family Medicine, Public Health and Preventive Medicine), members of professional organizations (generalists and specialists) as well as from health policymakers (Ministry of Health). The next stage was the confirmation of each items by these experts as well as other participants that represent practitioners in government and private primary care facilities throughout Indonesia and managers of primary care facilities. This approach was taken in order to ensure agreement between items and actual fieldwork conditions.

The 54 items which were established through two rounds of use of the Delphi technique were extracted into 33 items through factor analysis by limiting the loading factor (correlations between items and its dimensions) at a minimum of 0.4 [12]. Cronbach's alpha coefficient value (reliability/consistency of a set of instrument) of 54 items and 33 items was above 0.9 (0.97 and 0.94). This means that a smaller number of items can be used while maintaining the same amount of reliability. The result showed that the newly developed Instrument with its total of 11 dimensions and 33 items was sufficiently reliable to measure the performance of family physicians in primary care functioning as Care Coordinator in Indonesia.

Each of the 33 items selected had a minimum correlation of 0.4 in terms of their dimensions, indicating that each of the 33 selected items were valid to describe their dimension groups. Cronbach's alpha (internal consistency) value of more than 0.7 for each dimension was also obtained, confirming that the dimensions and their items were consistent or stable. Item correlations were 0.45-0.72, demonstrating that the 33 items were valid.

From the development of the Care Coordinator Performance Instrument for family physicians in primary care, 11 dimensions and 33 items were obtained as indicators to measure the performance of Indonesian's family physicians as care coordinators in primary care. Each 11 dimensions consisting of 3 items are shown in Box 1.

All 11 dimensions were in accordance with the dimensions of care coordinator developed by McDonald [7] and Starfield [2,13]. Moreover, the role of 5-star doctors described by WHO [14], includes clinical leadership [15,16] and the family medicine approach [3] and these also were reflected in our dimensions for a care coordinator. When compared to the guide of Non-Communicable Disease's control from the Ministry of Health of the Republic of Indonesia, all 11 dimensions of a care coordinator which have been successfully established

from this study, also illustrates the role of physicians in the early detection of risk factors, the diagnosis of a patient's health problems based on the data, explain planned patient management and follow-up in collaboration with other health professionals, in order to attend the patient and his/her family and prevent complications [17].

The Instrument that has been developed in this study can be used to measure the performance of primary care physicians, in both public and private healthcare services, since its development has included a wide range of stakeholders, including primary care physicians working in private clinics, other independent practitioners, healthcare facility managers and officials of the Ministry of Health. Thus, the Instrument can be generalized in its use throughout the entire primary healthcare service.

The 360 degree/multi feedback from various sources such as self-assessment, supervisors and co-workers, was used in the development of the Instrument for family physicians in order to obtain more objective results from appropriate field situations and as part of health service evaluation. Furthermore, the Instrument can be expanded as part of periodic formative evaluations in order to develop self-reflection and development in family physicians as well as to enhance the development of collaborative care, especially in situations where there are no guidelines and a clear description of the responsibilities among the healthcare team. The instrument also can be expanded as a summative evaluation, for example, to determine the amount of incentives/allowances, which need to be aligned with the targets for patient care management. This could be reflected in the development of pay for performance financing systems.

Because of the complexities which family physicians routinely encounter in primary care, co-workers, as well as patient leaders and links to service management, emphasize the need for care coordinators to experience exposure in terms of what is required to understand the relationship between the experience of practice (management of clinical practice) and the management of health services (management of health services organization). Experience and exposure in this context can be obtained by increasing the capacity of family physicians in primary care to improve their competence in organizational behavior and its relationship to holistic, comprehensive, integrated and continuous care. Here, building relationships and utilizing existing resources for the benefit of patients remains pivotal and experience of this nature can be organized in terms of a structured formal education for graduate doctors who wish to develop their careers in primary care as family physicians.

Conclusion

A Care Coordinator Performance Instrument for Indonesian family physicians in primary care has been developed as reported in the current study. The Instrument consists of 11 dimensions and 33 items with a total variation score of 77% and alpha cronbach coefficient of

0.94. This is the first time that an Instrument of this nature has been designed in Indonesia aimed at the measurement of current practice and its subsequent enhancement. It is anticipated that the Instrument will result in improved care coordination and enhanced patient experience and satisfaction with care. We advance the present study as an important contribution to the progress of person-centered healthcare.

Conflicts of Interest

The study was funded by departmental resources. We declare no conflicts of interest.

References

- [1] Bodenheimer, T., Bernard, L. & Casalino, L. (1999). Primary care physicians should be coordinators, not gatekeepers. *Journal of the American Medical Association* 281 (32) 2045-2049.
- [2] Stille, C., Jerant, A., Bell, D., Meltzer, D. & Elmore, J. (2005). Coordinating Care across Disease, Settings, and Clinicians: A Key Role for the Generalist in Practice. *Annals of Internal Medicine* 142, 700-708.
- [3] McWhinney, I.R. & Freeman, T. (2009). Principles of Family Medicine. Textbook of Family Medicine. 3rd edn., p. 13-29. Oxford: Oxford University Press.
- [4] Starfield, B., Shi, L. & Macinko, J. (2005). Contribution of primary care to health systems and health. *Milbank Quarterly* 83:457-502.
- [5] Meyers, D., Peikes, D., Genevro, J., Peterson, G., Taylor, E.F., Lake, T., Smith, K. & Grumbach, K. (2010). The Roles of Patient-Centered Medical Homes and Accountable Care Organizations in Coordinating Patient Care. Rockville MD: Agency for Healthcare Research and Quality.
- [6] Starfield, B. (1996). Public health and primary care: a framework for proposed linkages. *American Journal of Public Health* 86 (10) 1365-1369.
- [7] McDonald, K.M., Schultz, E., Noelle, P., Lonhart, J., Chapman, T. & Davies, S. (2012). Care Coordination Accountability Measures for Primary Care Practice. Rockville MD: Agency for Healthcare Research and Quality.
- [8] Brancato, G., Macchia, S., Murgia, M., Signore, M., Simeoni, G., Blanke, K., Körner, T., Nimmergut, A., Lima, P., Paulino, R. & Hoffmeyer-Zlotnik, J.H.P. (2006). Handbook of Recommended Practices for Questionnaire Development and Testing in the European Statistical System.
- [9] Strand, P., Sjoborg, K., Stalmeijer, R., Wichmann-Hansen, G., Jakobsson, U. & Edgren, G. (2013). Development and Psychometric Evaluation of the Undergraduate Clinical Education Environment Measure (UCEEM). *Medical Teacher* 13, 1014-1126.
- [10] Rattray, J. & Jones, M.C. (2007). Essential Elements of Questionnaire Design and Development. *Journal of Clinical Nursing* 16, 234-243.
- [11] Amir, M.T. (2015). Developing Questionnaire: Concept and Guidance for Behaviour, Attitude, and Personality Research. Jakarta: Prenadamedia Group.
- [12] Field, A. (2005). Discovering Statistics Using IBM SPSS. 2nd edn. London: Sage Publications Ltd.
- [13] Starfield, B. (1998). Primary Care: Balancing Health Needs, Services and Technology. New York: Oxford University Press.
- [14] Boelen, C. (2000). The Five-Star Doctor: An asset to health care reform? Geneva: WHO.
- [15] National Health System Leadership Academy. (2012). Clinical Leadership Competency Framework. London: NHS Leadership Academy.
- [16] Canadian Medical Association. (2013). Canada's go-to source for physician leadership training. Ottawa: Canadian Medical Association.
- [17] Ministry of Health Republic of Indonesia. The guide of Non Communicable Disease's control in Community Health Care. Jakarta: Ministry of Health Republic of Indonesia.

