The Structural Equation Modelling of First Level Health Facilities' Performance-Based Capitation Payment in National Health Service

Ari Dwi Aryani
Department of Health Policy and Administration, Faculty of Public Health, Universitas Indonesia,
ari.dwi11@ui.ac.id

Adang Bachtiar
Department of Health Policy and Administration, Faculty of Public Health, Universitas Indonesia,
adang@post.harvard.edu

Cicilya Candi
Department of Health Policy and Administration, Faculty of Public Health, Universitas Indonesia,
cicilyacandi@ui.ac.id

The Structural Equation Modelling of First Level Health Facilities' Performance-Based Capitation Payment in National Health Service

Ari Dwi Aryani, Adang Bachtiar, Cicilya Candi*

Department of Health Policy and Administration, Faculty of Public Health, Universitas Indonesia, Depok, Indonesia

Abstract

The BPJS Healthcare Security implemented performance-based capitation/*Kapitasi Berbasis Kinerja* (KBK) payments to conduct structured and ongoing monitoring of the First Level Health Facilities/*Fasilitas Kesehatan Tingkat Pertama* (FKTP)'s performance throughout Indonesia. This study aimed to examine the direct and indirect effects of FKTP capacity on KBK and FKTP performance. This study was conducted in February 2023, and Structural Equation Modelling analysis was performed with secondary data from the BPJS Healthcare Security system database in 2021. Human resources were defined as the availability of doctors in FKTP, infrastructure as credentialing value, ownership and type of FKTP, and KBK, and performance as first contact, non-specialist outpatient referral ratios, and Chronic Disease Management Program/*Program Pengelolaan Penyakit Kronis* (Prolanis) participant ratio. The analytical results revealed that human resources directly and positively affected the KBK. The indirect effect analysis results suggested that only human resources impacted FKTP performance. In conclusion, human resources are critical in achieving the KBK and FKTP performance.

Keywords: First Level Health Facilities performance, human resources, Performance-based Capitation

Introduction

Equal access to health services is a challenge worldwide. Access to health services is one of the government's responsibilities of providing health insurance to the people in line with the primary objectives of the Sustainable Development Goals for Universal Health Coverage (UHC).[1] Unfortunately, half of the world's population is known to have no access to health services.[1] In implementing the UHC, equity is inherent and embodied in healthcare coverage, including access and use of services.[2] Studies show that First Level of Health Facilities/*Fasilitas Kesehatan Tingkat Pertama* (FKTP) services means crucial to reduce healthcare inequities.[3] The FKTP is the most accessible health service for insurance participants;[4] therefore, the future sustainability of healthcare system could be achieved through comprehensive first-level performance measures.[5]

To monitor the FKTP performance in a structured and continuous manner in Indonesia, BPJS Healthcare Security implemented performance-based capitation/*Kapitasi Berbasis Kinerja* (KBK) payment in 2016 aimed at improving the FKTP performance by monitoring and linking it to a monthly capitation payment.[6] The comparison of quality index values attained by KBK and non-KBK health facilities groups shows that applying KBK improves the FKTP quality.[4]

In Indonesia, policies providing incentives and disincentives to improve performance have been widely enforced but are more oriented toward motivating employees to improve performance. Providing incentives and disincentives has an impact on the sustainability and success of programs.[7] It is expected that by KBK payment, FKTP, as a gatekeeper, could meet such equity and efficiency aspects of health services and the responsiveness of health services provisions in fulfilling the rights and expectations of citizens for effective, quality, and needed health services. BPJS Healthcare Security, the National Health Insurance (NHI) organizer, implemented KBK payment in 2016 that was given to FKTP under the NHI scheme. Three indicators of KBK assessment include the number of contacts between FKTP and NHI participants, the ratio of non-specialized outpatient referrals, and the ratio of Chronic Disease Management Program/*Program Pengelolaan Penyakit Kronis* (Prolanis) participants.[8]

Correspondence*: *Cicilya Candi, Department of Health Policy and Administration, Faculty of Public Health Universitas Indonesia, Building F 2nd Floor Kampus Baru UI Depok, Depok City, West Java 16424, Indonesia, E-mail: cicilyacandi@ui.ac.id, Phone: +62 889-0619-9017*

The FKTP performance was improving after implementing the KBK. The number of contacts between FKTP and NHI participants increased by 18.8% in 2019 compared to 2018 and 2% in 2020 despite the COVID-19 pandemic.[9] The referral system was also improving, as seen by the decrease in the ratio of referrals to hospitals by 2.3% from 2018 to 2020.[10] Moreover, the implementation of KBK payment can reach 56.85% of diabetes mellitus (DM) and hypertension patients registered with the Prolanis, as well as 19.2% in controlled blood sugar for DM patients and blood pressure for hypertension patients in 2020.[10]

The capitation amount is given based on FKTP performance achieved with two criteria: FKTP has cooperated with BPJS Healthcare Security for at least one year and/or has a minimum of 5,000 registered participants.[4] The assessment of KBK payment is based on performance indicators multiplied by scoring criteria rating of performance achievement. The amount of capitation payment per FKTP is based on the sum of achievement scores per each indicator. BPJS Healthcare Security Regulations Number 2 of 2015 stipulates that KBK payments will be deducted if FKTP performance does not reach 100%.[11] In particular, the capitation rate is set separately for remote areas. Such policy succeeded in achieving a positive performance of FKTP, and provided quite a deterrent effect for Primary Health Care (PHC) that did not make maximum efforts to achieve the 100% KBK indicators.[12]

The availability of human resources (HR), in this case, doctors, nurses, midwives, and pharmacists, means a factor affecting KBK achievement and dominantly in all indicator achievements.[12] The number of contacts is achieved through NHI participants' visit to FKTP, or vice versa. The limited availability of HR has led to a non-achievement in a contact rate indicator of 150 per mile. Such situation is a double burden for PHC staff to provide NHI services and the Public Health Efforts Program. They are responsible of delivering services at PHCs and in communities.[12] This condition that visits to the NHI participants' homes could not be carried out.[13]

The availability of general practitioners affects the achievement of non-specialized referral ratios.[13] General practitioners are the service providers diagnosing the disease and deciding whether participants are referred to the hospital. A total of 144 diagnoses of diseases included in non-specialized referrals are by the competence of general practitioners.[4] In addition to HR, the availability of other personnel, such as administrative and medical record staff, affects KBK achievement. Administrative staff input health services data into the BPJS Healthcare Security application named PCare.[15] The data entered would affect the FKTP performance measures.[16] While medical record staff are needed to organize referrals influenced by proper coding, selecting the wrong coding at the time of referral would affect achievement in the non-specialized referral ratio.[17]

Limited infrastructure affects the achievement of contact rate indicators.[15] After the service is provided, recording is taken in the PCare apps to reach the number of contacts indicator so that infrastructure is needed to support the process. The availability of facilities used for health checks and diagnostic support affects achievement in non-specialized referral ratio indicators.[14] Non-specialized referrals are made as any available facilities are unable to support patients' treatment according to the 144 diagnoses.[4]

Good FKTP governance and organization affect the achievement of performance indicators. Inadequate support from the local government and absent policies supporting KBK are influential factors in the achievement of KBK.[15] The FKTP staff's authority for the assigned tasks has a significant relationship with the achievement of KBK indicators. The authority given would make clear the division of tasks and the responsibility of each staff.[18] Apart from authority, another influential factor is the commitment of the leadership and all staff at FKTP.[14]

Activity planning affects the achievement of the number of contacts indicator. Activities by PHC, such as home visits in the *Indonesia Sehat* (Healthy Indonesia) Program, could be integrated as an effort to achieve the number of contacts.[14] This study aimed to analyze a relationship between implementing KBK on FKTP performance and influential factors on FKTP performance achievements. The outcomes of this study are expected to improve the FKTP performance for an optimal implementation of KBK in all FKTPs in Indonesia.

Method

This study was conducted in February 2023 and used secondary data from the BPJS Healthcare Security with a total of 28,301 FKTPs in Indonesia in 2021.[6] The Structural Equation Model-Partial Least Square (SEM-PLS) was applied to analyze a correlation between a FKTP capacity with KBK and the FKTP performance (Figure 1). This study aimed to assess the effects of KBK on FKTP performance, in which the KBK was influenced by FKTP's capacity.[19]

The following are the stages carried out in SEM-PLS:
a. Multicollinearity

In a multiple regression model, multicollinearity is defined as a significant correlation or link between two or more independent variables.[20] Several assumptions must be met for analyzing the inner model, including the multicollinearity assumption. If there is multicollinearity, the predictive power is unreliable and invalid. If the Variance Inflation Factor

(VIF) value of a regression model is lower than 9, it is considered to have no multicollinearity.[20]

b. Model evaluation

Model evaluations are assessed through estimated validity and reliability to observe the relationship between indicators and constructs.[21] Validity analysis is a method to observe the relationship between indicators in a construct and between constructs that make up a model, as well as direct and indirect effects, by looking at the t-value (CR) of >1.96. The expected value of the Average Variance Extracted (AVE) is greater than 0.5, so each variable is considered to have good discriminant validity. Composite reliability measures how well variables underlying constructs served in structural equation modeling. It is allowed to have a build reliability coefficient greater than 0.70. A value of CR ≥ 0.7 is required to achieve construct reliability.[21]

Results

The test was conducted to examine whether a multicorrelation between variables was found in this model. Table 1 displays the results of the multicollinearity test of the study data. The value of collinearity diagnostics results shows that the coefficient is below the measurement limit. This value means that all indicators of KBK, performance, governance, and infrastructure variables were not strongly correlated or related to the variables studied.

After evaluating the loading factor value, the next step is to look at the value of Cronbatch's alpha, composite reliability, and AVE. Table 2 shows that the reliability test of two latent variables (KBK and infrastructure) was considered very good, while the other three latent variables (performance, HR, governance) were considered otherwise. The AVE value illustrated the variance or diversity of indicators that latent variables could own. Thus, the greater the variance or diversity of indicators that latent variables could contain, the greater the representation of indicators on latent variables. The AVE value is acceptable if the value is greater than 0.5, meaning that more than half of the diversity of the
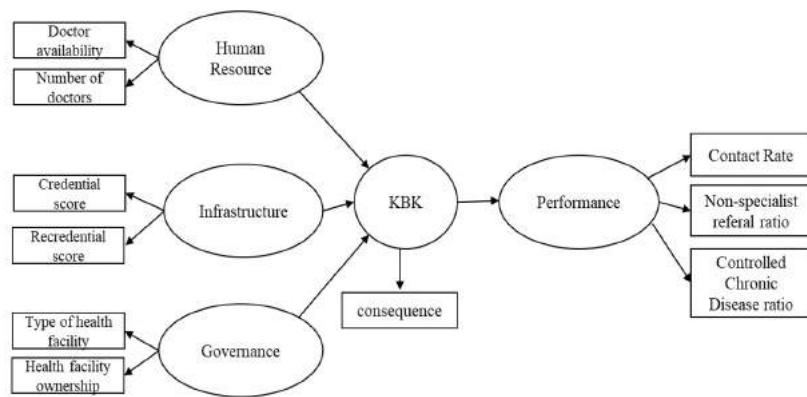
Notes: Construct (Variable latent): Human Resouce, Infrastructure, Governance, KBK, and Performance. Indicator: Doctor availability (HR1), Number of doctors (HR2); Credential score (Inf1), Recredential Score (Inf2); Type of Health Facility (Gov1), Health Facility Ownership (Gov2); Consequence (Consq); Contact rate (Perf1), Non-specialist referral ration (Perf2), Controlled Chronic Disease ratio (Perf3).

Figure 1. Research Framework

Table 1. The Results of the Multicollinearity Test

Variable	Variance Inflation Factor
Number of doctors	1.118
Doctor availability	3.231
Credential score	2.412
Recredential score	1.112
Health facility type	2.374
Ownership	2.374
Consequence	1.000
Contact rate	1.115
Non-spesialist referal ratio	1.039
Controlled chronic disease ratio	1.089

Table 2. Model Evaluation

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
KBK	1.000	1.000	1.000
Performance	-0.014	0.313	0.319
HR	-0.963	0.473	0.406
Infrastructure	1.000	1.000	1.000
Governance	-6.360	0.002	0.880

Notes: KBK = Performance-based Capitation/*Kapitasi Berbasis Kinerja*, HR = Human Resources
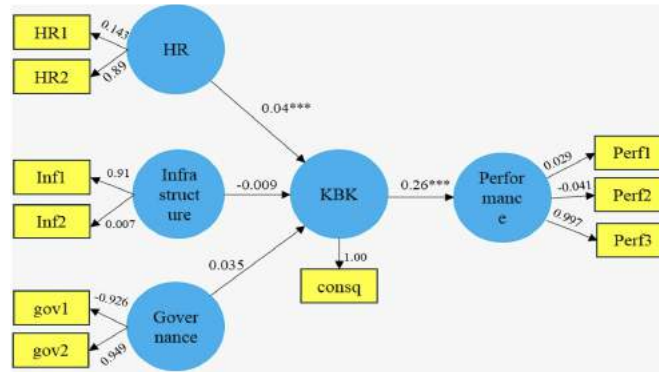

Figure 2. The Structural Equation Model-Partial Least Square Results

Table 3. Direct Effect of Latent Variables

	Coefficient	Mean	SD	t-value	p-value
KBK→Performance	0.268	0.269	0.017	15.447	<0.001
HR→KBK	0.040	0.041	0.004	11.121	<0.001
Infrastructure→KBK	-0.009	-0.009	0.006	1.499	0.135
Governance→KBK	0.035	0.026	0.025	1.400	0.162

Notes: SD = Standard Deviation, KBK = Performance-based Capitation/*Kapitasi Berbasis Kinerja*, HR = Human Resources

indicator could explain the latent variable.

Information obtained from Table 2 shows three variables having AVE values exceeding a minimum criterion of 0.5. This means that the three indicators of latent variable studied in this study could explain and measure the variable well. In contrast, the two construct indicators (performance and HR) belong to the poor category.

Figure 2 and Table 3 show the results of hypothesis testing as follows:

a. The Path Coefficients value on the KBK variable in hypothesis testing obtained a value of 0.268, which was >0 (positive effect), the t-value of 15.447, which was >1.96, and the significant value was <0.05. These results showed that the KBK positively and significantly affected performance.
b. The Path Coefficients value on the HR variable in hypothesis testing obtained a value of 0.040 (>0), a t-value of 11.121 (>1.96), and a significant value of <0.05. These results pointed out that HR positively and significantly affected the KBK.
c. The Path Coefficients value on the infrastructure variable in hypothesis testing obtained a value of -0.009 (<0), a t-value of 1.499 (>1.96), and a significant value of 0.135 (>0.05). These results showed that facilities and infrastructure had no negative and insignificant effect on the KBK.
d. The Path Coefficients value on the governance variable in hypothesis testing got a value of 0.035 (<0), a t-value of 1.400 (>1.96), and a significant value of 0.162 (>0.05). Based on these results, governance did not have a positive and significant effect on the KBK.

Table 4. Indirect Effect of Latent Variable

	Coefficient	Mean	SD	t-value	p-value
HR→Performance	0.011	0.011	0.001	8.265	<0.001
Infrastructure→Performance	-0.002	-0.002	0.002	1.444	0.149
Governance→Performance	0.009	0.007	0.007	1.388	0.166

Notes: SD = Standard Deviation, HR = Human Resources

Based on the Table 4, the results can be described as follows:
1. The KBK mediated the effect of HR on performance. The coefficient was 0.011, and the significance was 0.00 (p-value < 0.001). The KBK could strengthen the influence of HR on performance.
2. The KBK mediated the effect of facilities on performance. The coefficient was -0.002, and the significance was 0.149. The KBK was unable to strengthen the influence of facilities and infrastructure on performance.
3. The KBK mediated the effect of governance on performance. The coefficient was 0.009, and the significance was 0.166. The KBK could not strengthen the influence of governance on performance.

Discussion

Availability of Human Resources

The availability of HR means an influential factor to the KBK achievement.[22] The availability of HR (doctors, nurses, midwives, pharmacists) dominantly influenced all indicator outcomes.[12] The limited availability of HR led to the non-achievement of the contact rate indicator of 150 per mile. The number of contacts was achieved through visits, either made by participants to FKTP, or vice versa. However, it became a double burden for the PHC staff.

An issue attracting the most attention is the gap in the distribution of medical personnel in Indonesia.[23] The increasing proportion of medical personnel in the population has been considered insufficient to meet the demands.[23] In particular, the small and disparate distribution of health workers in the Eastern Indonesia, as well as the inadequate quality of services provided occur.[23] To reduce such service gap, the central government enforces the "Healthy Archipelago"/*Nusantara Sehat* (NS) program that spreads medical personnel to different regions. Unfortunately, NS workforce face various difficulties largely for the low well-being of theirs in rural areas. In the end, an equitable distribution of medical personnel in rural areas is not accomplished.

The digital transformation emerging in the health industry is also another issue affecting medical personnel that must follow any latest developments with their supporting skills and expertise. Data entry using the PCare apps is necessary to achieve the KBK. The absent documentation of the indicator achievement is a result of the lack education and expertise of health workers.[24] Therefore, to ensure that each achievement is properly documented, medical personnel need to acquire current knowledge and abilities.

Availability of Infrastructure Facilities

The limitation of infrastructure facilities affected the achievement of contact number indicator.[16] After providing the service, recording was done in the PCare apps to achieve the number of contact indicator; therefore, infrastructure is needed to support the process. The availability of facilities used for medical check-ups and diagnostic support affects the achievement of non-specialized referral ratio indicator.[14] The non-specialized referrals are made as the available facilities are unable to support patient treatment according to the 144 diagnoses.[5] The non-specialized referral indicator is an indicator showing the ability of FKTP to handle 144 diagnoses completely. In addition to general competent practitioners in completing the 144 diagnoses available at FKTP, limited facilities would make patients referred to hospitals. This condition results in the non-specialized referral ratio indicator not being achieved.

Conclusion

HR plays a crucial role in achieving the KBK and has an indirect impact on the FKTP performance. The government must significantly meet the HR needs in all health facilities in Indonesia and ensure the welfare of HR. The HR availability is not only limited to the number, but also equitable distribution of HR availability in each region in Indonesia to level up the KBK achievement and the FKTP performance. Furthermore, HR capabilities must be improved through seminars or workshops to meet expectations for achieving the most optimal KBK.

Abbreviations

UHC: Universal Health Coverage; FKTP: *Fasilitas Kesehatan Tingkat Pertama*/First Level Health Facilities; KBK: *Kapitasi Berbasis Kinerja*/Performance-based Capitation; NHI: National Health Insurance; Prolanis: *Program Pengelolaan Penyakit Kronis*/Chronic Disease Management Program; DM: Diabetes Mellitus; PHC: Primary Health Care; HR: Human Resources; SEM-PLS: Structural Equation Model-Partial Least Square; VFI: Variance Inflation Factor; AVE: Average Variance Extracted.

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Research and Community Engagement Ethical Committee of the Faculty of Public Health Universitas Indonesia (Reference 31/UN2.F10.D11/PPM.00.02/2023).

Competing Interest

The authors declared that there are no significant competing financial, professional, or personal interests that might have affected the performance or presentation of the work described in this manuscript.

Availability of Data and Materials

As a source of data and information from ProQuest, Scopus, Science Direct and BPJS Healthcare Security database in 2021.

Authors' Contribution

ARA and AB contributed substantially to the concept and work design. ARA conducted data analysis and data interpretation. CC drafting of the manuscript. ARA and AB revised critically for the content and final approval of the version to be published.

References

1. World Health Organization. Primary health care measurement framework and indicators: Monitoring health systems through a primary health care lens. Geneva: World Health Organization; 2022.
2. Paul E, Deville C, Bodson O, et al. How is equity approached in universal health coverage? An analysis of global and country policy documents in Benin and Senegal. Int J Equity Health. 2019; 18 (1): 195. DOI: 10.1186/s12939-019-1089-9
3. Burström B, Burström K, Nilsson G, et al. Equity aspects of the Primary Health Care Choice Reform in Sweden – a scoping review. Int J Equity Health. 2017; 16 (1): 29. DOI: 10.1186/s12939-017-0524-z
4. Hidayat B, Cahyadi N, Andalan A, et al. Evaluasi Sistem Pembayaran FKTP Era JKN: Dampak KBK Terhadap Kinerja Puskesmas dan Efisiensi. (Edisi 5 Bulan September 2017). Jakarta: BPJS Kesehatan; 2017.
5. Southey G, Heydon A. The Starfield Model: Measuring Comprehensive Primary Care for System Benefit. Healthcare Manage Forum. 2014; 27 (2): 60–64. DOI: 10.1016/j.hcmf.2014.06.005
6. BPJS Kesehatan. Monitoring Evaluasi Capaian Kapitasi Berbasis Kinerja Tahun 2020. Jakarta: BPJS Kesehatan; 2021.
7. Ashcroft R. Health promotion and primary health care: Examining the discourse. Soc Work Public Health. 2015; 30 (2): 107-116. DOI: 10.1080/19371918.2014.938395
8. BPJS Kesehatan. Peraturan BPJS Kesehatan No 7 Tahun 2019 tentang Petunjuk Pelaksanaan Pembayaran Kapitasi Berbasis Kinerja Pada Fasilitas Kesehatan Tingkat Pertama. Jakarta: BPJS Kesehatan; 2019.
9. Augustian R, Dumilah A. Analisis Capaian Kapitasi Berbasis Kinerja Fasilitas Kesehatan Tingkat Pertama di Wilayah Jakarta Timur pada Masa Pandemi Covid-19. Syntax Lit: J Ilm Indonesia. 2023; 8 (7): 5205–5222. DOI: 10.36418/syntax-literate.v6i6
10. BPJS Kesehatan. Peraturan BPJS Kesehatan No. 2 Tahun 2015 Tentang Norma Penetapan Besaran Kapitasi dan Pembayaran Kapitasi Berbasis Pemenuhan Komitmen Pelayanan Pada Fasilitas Kesehatan Tingkat Pertama. Jakarta: BPJS Kesehatan; 2015.
11. Maujudah SA. Faktor-Faktor yang Berhubungan dengan Pencapaian Indikator Kapitasi Berbasis Komitmen Pelayanan pada Puskesmas di Wilayah DKI Jakarta Tahun 2018 [Thesis]. Depok: Universitas Indonesia; 2018. 222 p.
12. Unso MR, Kolibu FK, Maramis FR. Analisis Pemenuhan Indikator dalam Sistem Kapitasi Berbasis Komitmen (KBK) Terhadap Pembayaran dan Pemanfaatan Dana Kapitasi di Puskesmas Tuminting Kota Manado. Kesmas J Kes Masy Univ Sam Ratulangi. 2019; 8 (6): 345-354.
13. Lestari M. Analisis Faktor-Faktor yang Mempengaruhi Pencapaian Indikator Kapitasi Berbasis Pemenuhan Komitmen Pelayanan Pada Puskesmas di Kota Padang Tahun 2016 [Thesis]. Padang: Universitas Andalas; 2017.
14. Sandra C, Herawati YT, Baroya N, et al. Implementasi Kebijakan Pembayaran Kapitasi Berbasis Pemenuhan Komitmen Pelayanan (KBKP) di Kabupaten Jember. Ikesma: J Ilmu Kes Masy. 2021; 17 (1): 52-58. DOI: 10.19184/ikesma.v17i1.22441
15. Widaty D. Indikator Pembayaran Kapitasi Berbasis Pemenuhan Komitmen Pelayanan pada Fasilitas Kesehatan Tingkat Pertama di Surabaya. JAKI. 2018; 5 (2): 111-116. DOI: 10.20473/jaki.v5i2.2017.111-116

16. Agustinakhoeriyah G, Mardiah IM, Hidayati MH. Analisis Faktor yang Mempengaruhi Kapitasi Berbasis Komitmen (KBK) di Puskesmas Cikancung Dinas Kabupaten Bandung. Cerdika J Ilm Indonesia. 2021; 1 (8): 954-959. DOI: 10.59141/cerdika.v1i8.162

17. Munawarah SH, Misnaniarti M, Isnurhadi I. Sumber Daya Terhadap Pencapaian Indikator Kapitasi Berbasis Pemenuhan Komitmen Pelayanan (KBKP) di Puskesmas Kota Palembang. Gaster. 2020; 18 (1): 37-49. DOI: 10.30787/gaster.v18i1.415

18. Hair J, Alamer A. Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. Res Methods Appl Ling. 2022; 1 (3): 100027. DOI: 10.1016/j.rmal.2022.100027

19. Veillard J, Cowling K, Bitton A, et al. Better Measurement for Performance Improvement in Low- and Middle-Income Countries: The Primary Health Care Performance Initiative (FKTPPI) Experience of Conceptual Framework Development and Indicator Selection. Milbank Q. 2017; 95 (4): 836-883. DOI: 10.1111/1468-0009.12301

20. Frost J. Regression analysis: An intuitive guide for using and interpreting linear models. Pennsylvania: Jim Publishing; 2019.

21. Tentama F, Anindita WD. Employability Scale: Construct Validity And Reliability. Int J Sci Tech Res. 2020; 9 (4): 3166-3170.

22. Ariyani AD. Factors Affecting the Achievements of Performance-Based Capitation: A Scoping Review. J Jaminan Kes Nas. 2022; 2 (1): 53–65. DOI: 10.53756/jjkn.v2i1.52

23. Center for Indonesia's Strategic Development Initiatives. White Paper: Indonesia's Health Sector Development (2024-2034). Jakarta: Center for Indonesia's Strategic Development Initiatives; 2023.

24. Ardhiasti A, Setiawan ER. Performance-Based Capitation Payment at First Level Health Facility in Malang. J Pend Kes. 2021; 10 (2): 209-225. DOI: 10.31290/jpk.v10i2.2268