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# Did The Horizontal Referral Policy in Indonesia Create Cost Savings ?

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## ABSTRACT

**Background:** In Indonesia, the referrals to hospitals by Primary Care Providers (PCPs) is high. In 2018, more than 15 per cent of patients visiting PCPs were referred to hospitals, while the cost for outpatient visits reached 51.2 trillion rupiahs. As of September 2019, Indonesia's Body of Social Security for Health of Indonesia (BPJS Kesehatan) enacted a horizontal referral policy. PCPs will refer patients to other PCPs with more resourced facilities. **Objectives:** To assess the impact of horizontal referral on hospital outpatient visits and how cost savings were made. **Methods:** This study is a non-experimental big-data analysis by observational descriptive method. **Results:** Data results were classified into two groups in order to separate data analysis affected by external COVID-19 pandemic factors. Group I consisted of data from September to December 2019 and group II consisted of data from January 2020 to October 2020. In data Group I, a total of 8.140 cases were referred horizontally and not referred to hospitals. Referral ratio decreased from 16,50% prior the policy enactment to 15,71% in December 2019. In data Group II, horizontal referral showed an increasing trend from January to October 2020 with 56.875 total cases being referred among primary care providers. Cost savings from September 2019 to October 2020 reached 25.891.347.236 rupiahs. **Conclusions:** The horizontal referral policy in Indonesia reduced the number of patients referred to hospitals, hence creating cost savings. It proposes collaboration among primary care providers, thus controlling unnecessary referrals to hospitals.

**Keywords:** cost saving; horizontal referral; outpatient visit

## BACKGROUND

To contain health care costs in a managed care setting, gatekeeping becomes a central component (1). The role of gatekeeping with a referral system ensures that other parts of the health-care system are able to specialize in different diseases or procedures. Gatekeeping has also been shown to decrease the number of medical procedures, specialist encounters and hospitalisations (2). However, the referral process faces a number of challenges from inefficiencies and rising demand, resulting in excessive wait times for many specialties (3, 4). In the Indonesian National Health Security Program, Jaminan Kesehatan Nasional (JKN), despite Primary Care Providers (PCPs) are the gatekeepers, the referral ratio is high. In 2018, more than 15% of patients visiting primary care providers were referred to hospitals, while 4.4% of the total referrals were non-specialty referrals suggesting that a high proportion of patients at the secondary care could have been treated at primary health care. This leads to an increase in hospital outpatient visits and costs within the JKN scheme. In 2018, the cost for outpatient visits reached 51.2 trillion rupiahs which increased 10.07% than 2017, signifying that an attempt must be conducted in order to control hospital outpatient visits.

With 21.746 PCPs having contract with Indonesia's Social Security Administering Body for Health Sector (BPJS Kesehatan) throughout the Indonesian archipelago, varieties of PCPs in regards of available doctors and resourced facilities are inevitable. Traditional vertical referral system allows PCPs refer to specialists even though, within the same area, there are other PCPs which are more resourceful. Analyzing the increasing numbers of vertical referrals, as of September 2019, Indonesia's Social Security Administering Body for Health Sector (BPJS Kesehatan) enacted a horizontal referral policy into the existing electronic referral system. Primary care providers will refer patients to other primary care providers with more resourced facilities. Payments were through the non-capitation scheme or included in the capitation coverage for government programs. No previous studies on horizontal referrals within the Indonesian JKN program have been done.

We hypothesized that the implementation of horizontal referral among PCPs contribute to the reduction of hospital outpatient visits thus create cost savings. Our aim was to study if there were lower referral ratio to specialized health care and hospital outpatient visits in PCPs implementing horizontal referrals and how cost savings were then created.

## METHOD

### Study Design

We conducted a non-experimental big-data analysis by observational descriptive method.

**Data Sources**

Quantitative data were obtained from BPJS Kesehatan national electronic referral database generated from health care services recorded by 21.746 primary care providers through P-Care application program with 223.470.668 JKN registered members. In the horizontal referral policy, PCPs referring to other PCPs were obliged to record the referral data in the Primary Care (P-Care) application program. Recorded data in the program consisted of the PCPs implementing the horizontal referral and the referred diagnosis. Data of PCPs referring to hospitals were also collected from the P-Care application program. Hospital outpatient visits data were collected from the V- Claim application program, an application program used by contracted hospitals to record hospital visits. Recorded data from this application program includes PCPs referring to hospitals, hospitals receiving the referrals and the referred diagnosis. Data regarding hospital outpatient costs were collected from hospital claims paid by BPJS Kesehatan during the given time period. Of this data, hospital unit costs were then determined.

**Data Analysis**

All data from the P-Care and V-Claim application program was prospectively collected and analysed using BPJS Kesehatan Business Intelligence (BI), data management program software. Data series per PCPs per month was analysed on a monthly basis from September 2019 to October 2020. Data analysed included the number of horizontal referrals per PCP per month, the number of PCPs referrals to specialists per PCP per month and the number of hospital outpatient visits per month. Data results were classified into two groups in order to separate data analysis affected by external COVID-19 pandemic factors. Group I consist data from September 2019 to December 2019 and group II consists data from January 2020 to October 2020. Although the onset of the COVID-19 pandemic was in April 2020, the pandemic had been declared by the government as a national disaster since January 2020. Analysis based on descriptive statistics on the referral data were generated to identify how horizontal referral affects the referral ratio and hospital outpatient visits, while descriptive statistics on the hospital outpatient visits and hospital claims were generated to analyze the cost savings.

**RESULTS**

**Distribution of PCPs**

Through BPJS Kesehatan Business Intelligence data management program, data regarding horizontal referral records were extracted. As many as 4.957 among 21.746 contracted PCPs implemented horizontal referrals from September 2019 to October 2020 throughout Indonesia. PCPs implementing horizontal referral by data analyses was defined as PCPs referring

or receiving horizontal referrals from other PCPs. Among 34 provinces in Indonesia, PCPs implementing horizontal referrals were dominated by those in the islands of Java and Sumatera (Figure 1).

**Figure 1. Geographical Distribution of PCPs Implementing Horizontal Referrals From September 2019 To October 2020**

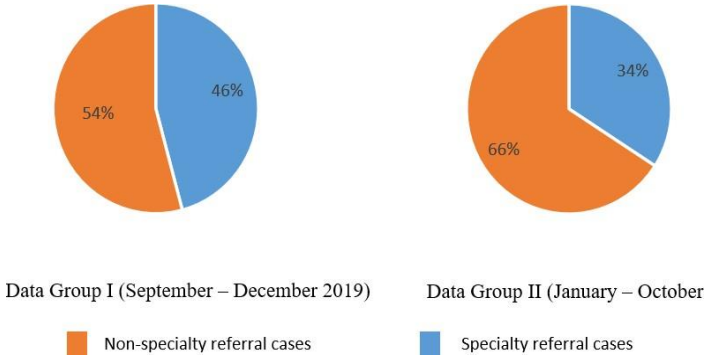

The latitude and longitude of the PCPs in the map were captured from the P-Care application program interconnected with the BPJS Kesehatan Online Health Facility Reference. Data sources of primary care visits, horizontal referrals and PCPs' location were analysed through BI data software. filtered from. Data source is filtered by data field: 1) Tgl_kunjungan Year, 2) kunjsakit, 3) JenisPPK, and 4) tgl_kunjungan (MY). Tgl_kunjungan Year filter keeps data year 2019 and 2020. The kunjsakit filter keeps True. JenisPPK filter keeps name of PCPs and their location. Tgl_kunjungan (MY) keeps 14 months of time frame. PCPs having a recorded data of either referring to other PCPs or receiving referrals from other PCPs during September 2019 and October 2020 were enlisted as PCPs implementing horizontal referral. The size of the circles resembles the number of PCPs implementing horizontal referrals in each province. PCPs implementing horizontal referrals were most dominant in Jawa Tengah ($n$ = 1.571), Jawa Barat ($n$ = 848) and Jawa Timur ($n$ = 768) provinces in the island of Java, followed by Lampung province ($n$ = 654) in the island of Sumatera.

### Non-specialty and Specialty Referral Proportion

Horizontal referral diagnosis among PCPs or vertical referral diagnosis from PCPs to specialists were recorder into the P-Care application program utilizing diagnosis codes from the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) 2010. Obtained data was then processed and analysed with the BI data management program through data fields encompassing referral time, specialty diagnosis codes and non-specialty diagnosis codes. As many as 821 diagnosis codes were enlisted as non-specialty diagnosis suggesting that referrals recorded with one of the 821 codes could have been treated in the primary care setting. The 821 diagnosis codes were previously stipulated by BPJS Kesehatan in order to evaluate non- specialty referrals. Referrals recorded with other codes were cases likely to have specialistic treatment. A total number of 41.873 referrals were non-

specialty cases, while 23.142 referrals were specialty cases. The proportion of horizontal referrals with non-specialty and specialty cases in each data group is shown by Figure 2.

**Figure 2. Proportion of Horizontal Referrals with Non-Specialty and Specialty Cases**




In data group I, the proportion of specialty horizontal referral was 45.84% (*n* = 3.731) while in data group II the proportion was 34.13% (*n* = 19.411). As for non-specialty referral, in data group I the proportion accounted to 54,16% (*n* = 4.409) while in data group II the proportion accounted to 65,87% (*n* = 37.464).

### Specialty Diagnosis Code Blocks

The ICD 10 diagnosis code were classified into ICD 10 code blocks in each data group. In data group I, the top specialty horizontal referral cases in accordance to ICD 10 code blocks were identified as E00–E90 Endocrine, nutritional and metabolic diseases (39,29%, *n* = 1.466), Z00–Z99 Factors influencing health status and contact with health services (28,30%, *n* = 1.056) and I00–I99 Diseases of the circulatory system (12,33%, *n* = 460). Data in Table 1 shows top ten diagnosis code blocks recorded as specialty horizontal referrals within the data group I time frame.

**Table 1. Top Ten Diagnosis Code Blocks Recorded as Specialty Horizontal Referrals in Data Group I**

| | Diagnosis Code Blocks | Number of Referrals (%) |
|---|---|---|
| E00–E90 | Endocrine, nutritional and metabolic diseases | 1.466 (39,29) |
| Z00–Z99 | Factors influencing health status and contact with health services | 1.056 (28,30) |
| I00–I99 | Diseases of the circulatory system | 460 (12,33) |
| A00–B99 | Certain infectious and parasitic diseases | 268 (7,18) |
| K00–K93 | Diseases of the digestive system | 145 (3,89) |
| R00–R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | 131 (3,51) |
| O00–O99 | Pregnancy, childbirth and the puerperium | 71 (1,90) |

| | | |
|---|---|---|
| M00–M99 | Diseases of the musculoskeletal system and connective tissue | 58 (1,55) |
| N00–N99 | Diseases of the genitourinary system | 37 (0,99) |
| J00–J99 | Diseases of the respiratory system | 33 (0,88) |
| Other code blocks | | 6 (0,16) |
| | **Total *N* = (%)** | **3.731 (100,00)** |

In data group II, the top specialty horizontal referral cases in accordance to ICD 10 code blocks were identified as E00–E90 Endocrine, nutritional and metabolic diseases (37,65%, *n* = 7.296), Z00– Z99 Factors influencing health status and contact with health services (28,04%, *n* = 5.433) and I00– I99 Diseases of the circulatory system (12,69%, *n* = 2.459). The referral diagnosis code blocks in data group II show similar patterns as that in data group I as seen in Table 2.

**Table 2. Top Ten Diagnosis Code Blocks Recorded as Specialty Horizontal Referrals in Data Group II**

| **Diagnosis Code Blocks** | | **Number of Referrals (%)** |
|---|---|---|
| E00–E90 | Endocrine, nutritional and metabolic diseases | 7.296 (37,65) |
| Z00–Z99 | Factors influencing health status and contact with health services | 5.433 (28,04) |
| I00–I99 | Diseases of the circulatory system | 2.459 (12,69) |
| A00–B99 | Certain infectious and parasitic diseases | 1.453 (7,50) |
| K00–K93 | Diseases of the digestive system | 797 (4,11) |
| R00–R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | 721 (3,72) |
| O00–O99 | Pregnancy, childbirth and the puerperium | 391 (2,02) |
| M00–M99 | Diseases of the musculoskeletal system and connective tissue | 328 (1,69) |
| N00–N99 | Diseases of the genitourinary system | 240 (1,24) |
| J00–J99 | Diseases of the respiratory system | 216 (1,11) |
| Other code blocks | | 44 (0,23) |
| | **Total *N* = (%)** | **19.411 (100,00)** |

**Non-specialty Diagnosis Code Blocks**

Among 4.409 non-specialty referrals in data group I, the top referral cases in accordance to ICD 10 code blocks were identified as E00–E90 Endocrine, nutritional and metabolic diseases (45,30%, *n* = 1.997), I00–I99 Diseases of the circulatory system (38,55%, *n* = 1.700) and A00–B99 Certain infectious and parasitic diseases (11,89%, *n* = 524). This is revealed in Table 3, which demonstrates top ten diagnosis code blocks recorded as non-specialty horizontal referrals within the data group I time frame.

**Table 3. Top Ten Diagnosis Code Blocks Recorded as Non-Specialty Horizontal Referrals in Data Group I**

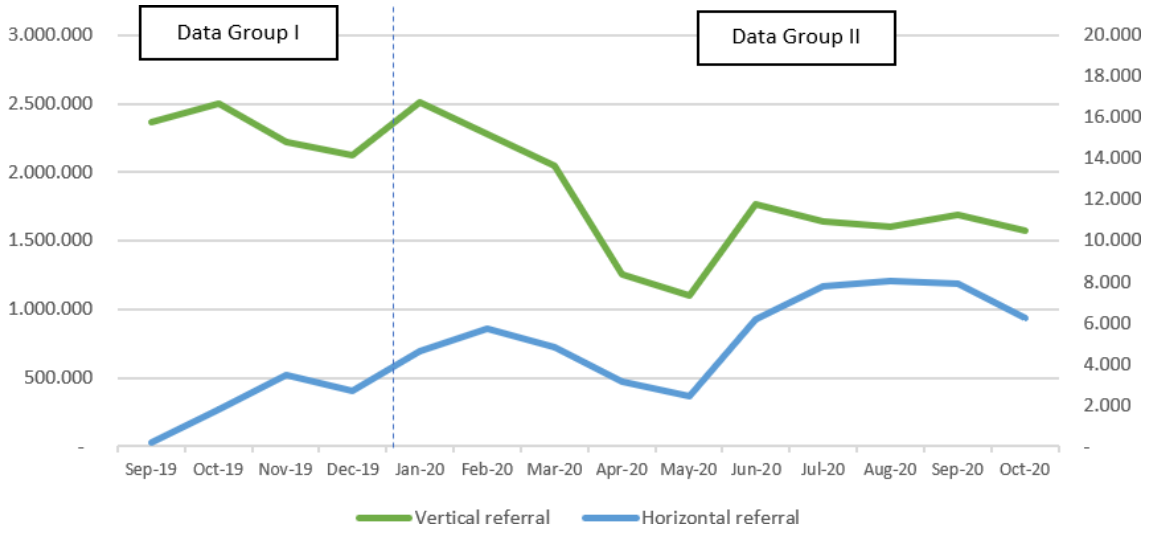
| Diagnosis Code Blocks | | Number of Referrals (%) |
|---|---|---|
| E00–E90 | Endocrine, nutritional and metabolic diseases | 1.997 (45,30) |
| I00–I99 | Diseases of the circulatory system | 1.700 (38,55) |
| A00–B99 | Certain infectious and parasitic diseases | 524 (11,89) |
| H00–H59 | Diseases of the eye and adnexa | 55 (1,24) |
| J00–J99 | Diseases of the respiratory system | 29 (0,66) |
| O00–O99 | Pregnancy, childbirth and the puerperium | 25 (0,57) |
| K00–K93 | Diseases of the digestive system | 20 (46) |
| R00–R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | 15 (0,35) |
| Z00–Z99 | Factors influencing health status and contact with health services | 15 (0,33) |
| L00–L99 | Diseases of the skin and subcutaneous tissue | 9 (0,21) |
| Other code blocks | | 20 (0,45) |
| | **Total *N* = (%)** | **4.409 (100,00)** |

In data group IIthe top three non-specialty referral cases in accordance to ICD 10 code blocks were similar to that of data group I. They were identified as E00–E90 Endocrine, nutritional and metabolic diseases (48,38%, *n* = 18.125), I00–I99 Diseases of the circulatory system (40,53%, *n* = 15.184) and A00–B99 Certain infectious and parasitic diseases (5,78%, *n* = 2.167). However, further orders of diagnosis code blocks were different from that of data group I. This is revealed in Table 4, which demonstrates top ten diagnosis code blocks recorded as non-specialty horizontal referrals during the data group II time frame.

**Table 4. Top Ten Diagnosis Code Blocks Recorded as Non-Specialty Horizontal Referrals in Data Group II**

| | Diagnosis Code Blocks | Number of Referrals (%) |
|---|---|---|
| E00–E90 | Endocrine, nutritional and metabolic diseases | 18.125 (48,38) |
| I00–I99 | Diseases of the circulatory system | 15.184 (40,53) |
| A00–B99 | Certain infectious and parasitic diseases | 2.167 (5,78) |
| .H00–H59 | Diseases of the eye and adnexa | 652 (1,74) |
| O00–O99 | Pregnancy, childbirth and the puerperium | 340 (0,91) |
| K00–K93 | Diseases of the digestive system | 227 (0,61) |
| J00–J99 | Diseases of the respiratory system | 174 (0,46) |
| Z00–Z99 | Factors influencing health status and contact with health services | 152 (0,41) |
| R00–R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | 129 (0,34) |
| L00–L99 | Diseases of the skin and subcutaneous tissue | 116 (0,31) |
| Other code blocks | | 198 (0,53) |
| | **Total *N* = (%)** | **37.464 (100,00)** |

**Figure 3. Trend of Horizontal Referrals Among PCPs From September 2019 to October 2020 Compared to Trend of Vertical Referrals.**




**Horizontal Referral Trends**

Compared to vertical referrals, horizontal referrals showed an increasing trend graphic as shown in Figure 3. Vertical referral trend in data group I and data group II showed a declining pattern. The opposite pattern was shown by horizontal referrals. Although in April, May and October 2020 there was a decline in horizontal referrals, but the overall trend line tends to appear upward. The highest peak of horizontal referral was in August 2020 with more 8.019 cases referred horizontally among PCPs.

Several indicators were used to analyze referrals from PCPs. The non-specialty vertical referral ratio was used to analyze the numbers of cases referred to specialist that could have been treated in the primary care settings.

The ratio of total horizontal referrals to total vertical referrals and total horizontal referrals to non-specialty referrals was used to calculate the proportion of horizontal referrals to the vertical referrals, either specialty or non-specialty referrals. It was also used to analyze the comparison between two data groups, assuming that in data group II the ratio may be lower than that of data group I due to the COVID-19 pandemic. It was assumed that if the ratio was higher in data group II, the COVID-19 pandemic may not affect the horizontal referral implementation. Monthly data on number of vertical referrals, non-specialty vertical referrals and horizontal referrals were reviewed and recapped as exposed in Table 5.

**Table 5. Total Numbers of Vertical Referrals, Non-Specialty Vertical Referrals and Horizontal Referrals per Data Group.**

| Variables | | Data Group I | Data group II | Total |
|---|---|---|---|---|
| Vertical Referral: | | | | |
| Total vertical referral (*n*) | a | 9.222.819 | 17.453.839 | 26.676.658 |
| Non-specialty vertical referral (*n*) | b | 332.829 | 396.386 | 729.215 |
| Non-specialty referral ratio (%) | a/b | 3,61% | 2,27% | 2,73% |
| Horizontal Referral: | | | | |
| Total horizontal referral (*n*) | c | 8.140 | 56.875 | 65.015 |
| Proportion of total horizontal referral to total vertical referral (%) | c/a | 0,09% | 0,33% | 0,24% |
| Proportion of total horizontal referral to non-specialty referral (%) | c/b | 2,45% | 14,35% | 8,92% |

In Table 5, the total numbers of referrals during the 14 months of time frame (September 2019 to October 2020) were 26.676.658. Of this amount, 0,24% (n = 729.215) referrals were non-specialty referrals, referrals of diagnosis that could had been treated in the primary care setting. Non-specialty referrals ratio is the percentage of total numbers of non-specialty referrals compared to total vertical referrals.

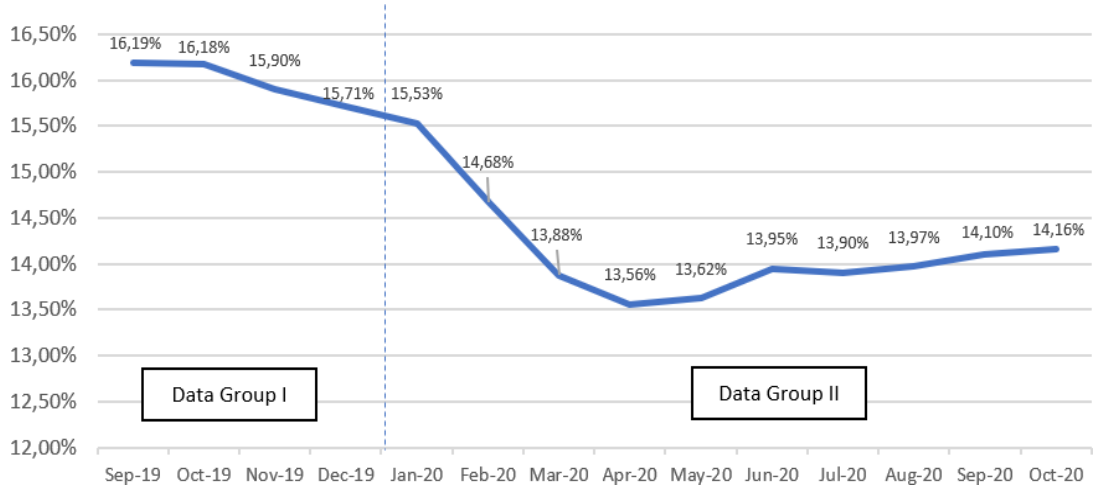
There were 8.92% (n = 65.015) horizontal referrals compared to total non-specialty referrals. In Group I, the percentage was 2.45% (n = 8.140) horizontal referrals compared to 332.829 non- specialty referrals. In Group II, the percentage increased to 14.35% (n = 56.875) horizontal referrals compared to 396.386 non-specialty referrals. A higher ratio in data group II suggests that the COVID-19 pandemic did not affect the implementation of horizontal referral, albeit the decreasing numbers of vertical referrals within the same period of time.

**Referral Ratio and Non-Specialty Referral Ratio Trends**

Referral ratio and non-specialty referral ratio are two indicators to evaluate performance of PCPs in the Indonesian JKN program.

Referral ratio is defined as the ratio of total vertical referrals to total visits in the PCPs per month. In 2018, the referral ratio was 16,50% and its trend tend to grow. Data results were synthesized from 118.716.139 primary care visits in group I and 123.260.813 primary care visits in group II. Since horizontal referral was in operation since September 2019, referral ratio showed a decreasing trend as shown by Figure 4.

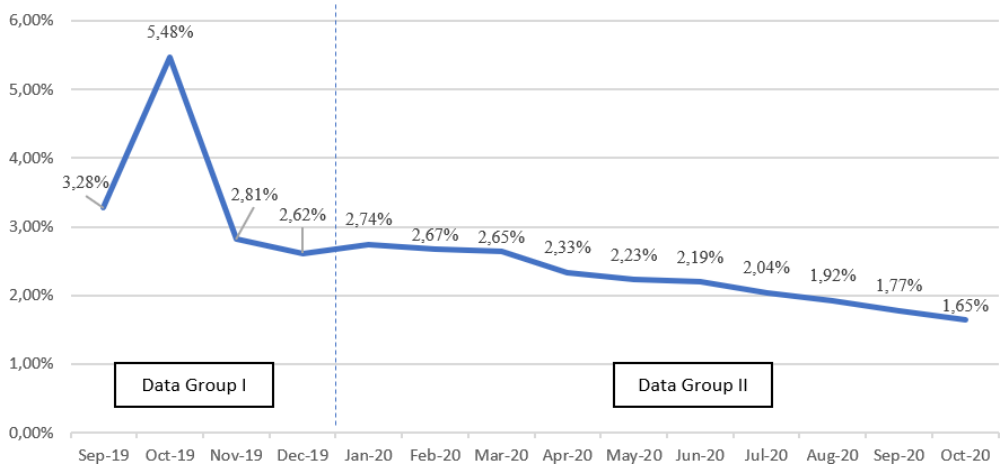
**Figure 4. Referral ratio (%) trend per month from September 2019 to October 2020.**




Data group I and group II showed a decreasing trend of referral ratio. After the implementation of horizontal referral since September 2019, referral ratio decreased with an average 0,15% decrease per month from September 2019 to December 2019 and 0,13% per month from January 2020 to October 2020.

Non-specialty referral ratio is defined as the percentage of total non-specialty referrals compared to total referrals. In January 2018, the non-specialty referral ratio was 5,62% and the trend grows subsequently. Since the implementation of horizontal referral in September 2019, there was a reduction of non-specialty referral ratio as shown by Figure 5.

**Figure 5. Non-Specialty Referral Ratio (%) Trend per Month from September 2019 to October 2020.**




Data group I and data group II showed a decreasing trend of non-specialty referral ratio. Although in October 2019 the ratio grew to 5,48%, in November 2019 the ratio reached 2,81%, thus followed by downward trend till October 2020. After the implementation of horizontal referral since September 2019, non-specialty referral ratio decreased with an average 0,22% decrease per month from September to December 2019 and 0,10% decrease per month from January to October 2020.

**Hospital outpatient visits and expenditure**

Data on hospital outpatient visits, including number of visits and costs per visit, were extracted from V-Claim application program and analyzed with BI data management software. Through the BI software, data from V-Claim were filtered by data filed 1) Tgl_kunjungan, 2) By_Kunjungan, 3)JenKunj and 4) NoRujukan.

Hospital outpatient visits in the JKN program are comprised of four different entry pathways:1) referrals from PCPs, 2) referrals from other hospitals, 3) referrals from other specialists within the same hospital; and 4) emergency unit. In year 2019 and 2020, referrals from PCPs accounted to 32,76% of all entry pathways to hospital outpatient visits. In the JKN program, hospital outpatient claims are paid based on package system called Indonesia Case-Based Groups (INA-CBGs). BPJS Kesehatan will pay hospital claims based on INA-CBGs tariffs for each group of diagnosis. The number of cases in hospital outpatient visits and their total expenditure through year 2018 to 2020 is shown in Table 6.

**Table 6. Number of Visits dnd Expenditure of Hospital Outpatient Visits in the JKN Program Year 2018 to 2020.**

| Year | Number of visits | Expenditure (Rp) |
|---|---|---|
| 2018 | 76.776.973 | 27.487.096.344.905 |
| 2019 | 84.749.444 | 32.005.997.510.785 |
| 2020 | 69.669.287 | 28.455.806.668.666 |

Through the BI software, data on number of cases were filtered by 1) Tgl_kunjungan, 2)JenKunj and 3) NoRujukan. Data on hospital outpatient expenditure was based on hospital claims paid with the INA-CBGs tariffs and filterd through the BI program by data field By_Kunjungan.

In 2019, total number of hospital outpatient visit cases and expenditure was higher than those of 2018. In 2020, the number of cases and expenditure declined which may be due to the COVID- 19 pandemic. Despite the decline, unit cost per visit rose. A more in-depth analysis was conducted by extracting data of hospital outpatient visits from PCP referrals entry pathway. V-Claim data source was filtered by data field NoRujukan to extract number of hospital outpatient visits from PCP referrals. Data was then recapped for each data group. Data group I and data group II in Table 7 and Table 8 show growing numbers of horizontal referrals and the decreasing numbers of hospital outpatient visits from PCP referrals.

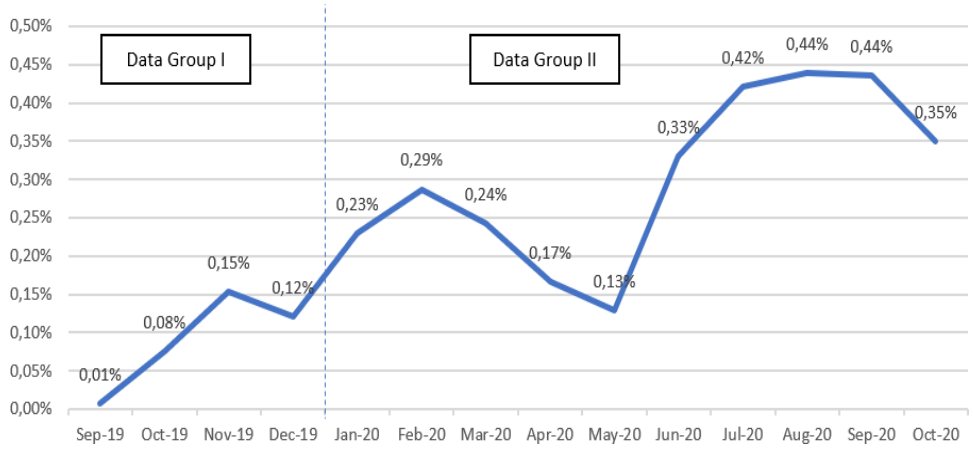
**Table 7. Horizontal Referrals and Hospital Outpatient Visits per Month In Data Group I**

| Month | Number of horizontal referrals (*n*) | Total hospital outpatient visits (*n*) | Hospital outpatient visits from PCP referrals (*n*) |
|---|---|---|---|
| Sep-19 | 179 | 7.565.654 | 2.526.928 |
| Oct-19 | 1.782 | 7.064.219 | 2.352.385 |
| Nov-19 | 3.499 | 6.866.471 | 2.279.668 |
| Dec-19 | 2.680 | 6.753.471 | 2.221.892 |
| **Total (*N*)** | **8.140** | **28.249.815** | **9.380.873** |

**Table 8. Horizontal referrals and hospital outpatient visits per month in data group II**

| Month | Number of horizontal referrals (n) | Total hospital outpatient visits (n) | Hospital outpatient visits from PCP referrals (n) |
|---|---|---|---|
| Jan-20 | 4.646 | 6.161.087 | 2.027.614 |
| Feb-20 | 5.753 | 6.091.418 | 2.002.249 |
| Mar-20 | 4.804 | 6.010.137 | 1.974.330 |
| Apr-20 | 3.164 | 5.835.964 | 1.908.360 |
| May-20 | 2.435 | 5.766.295 | 1.883.848 |
| Jun-20 | 6.144 | 5.714.043 | 1.861.064 |
| Jul-20 | 757 | 5.661.791 | 1.838.383 |
| Aug-20 | 8.019 | 5.650.179 | 1.828.963 |
| Sep-20 | 7.927 | 5.621.150 | 1.815.632 |
| Oct-20 | 6.226 | 5.545.675 | 1.780.162 |
| **Total (*N*)** | **56.875** | **58.057.739** | **18.920.605** |

**Figure 6. The proportion trend of horizontal referrals to hospital outpatient visits by PCP referrals**




The proportion of horizontal referrals to hospital outpatient visits by PCP referrals showed an increasing trend, both in data group I and data group II. The number of horizontal referrals were compared to specifically the numbers of hospital outpatient visits by PCP referrals in order to exclude outpatient visits from other hospital entry pathways. The average proportion in data group I is 0,09%, while in data group II the average proportion reached 0,30%. Figure 6 pictures the proportion trend of horizontal referrals to hospital outpatient visits by PCP referrals.

**Cost Savings Analysis**

Cost savings analysis were used to evaluate the potential cost savings of the implementation of horizontal referrals from each data group. The analysis measured how much the total horizontal referrals in each data group would potentially halt health care spending in hospital outpatient visits. Variables included in the analysis were total horizontal referrals, total hospital outpatient visits from PCP referrals, expenditure for visits from PCP referrals and unit cost.

**Table 9. Cost savings analysis of horizontal referrals**

| Variables | | Data Group I | Data Group II | Total |
|---|---|---|---|---|
| Total horizontal referrals (*n*) | a | 8.140 | 56.875 | 65.015 |
| Total hospital outpatient visits from PCP referrals (*n*) | b | 9.380.873 | 18.920.605 | 28.301.479 |
| Expenditure for visits from PCP referrals (Rp) | c | 3.542.727.888.176 | 7.727.954.570.953 | 11.270.682.459.130 |
| Unit cost (Rp) | d = c/b | 377.654 | 408.441 | 398.237 |
| **Estimated potential cost savings (Rp)** | **e = a x d** | **3.074.103.560** | **23.230.081.875** | **25.891.347.236** |

Unit cost of hospital outpatient visits were measured by the expenditure for visits from PCP referrals divided by total hospital outpatient visits from PCP referrals. Hospital claims in the JKN were paid through Indonesian Case Based Groups (INA-CBGs) of which the tariffs vary dependent on hospital region and registered classification. The unit cost per hospital outpatient visit was a multiplier towards the total horizontal referrals. In data group I estimated cost savings were Rp3.074.103.560,00 while in data group II the estimated cost savings were Rp23.230.081.875,00. Unit cost within 14 months of time frame was Rp398.237, creating a total estimated cost savings of Rp25.891.347.236,00 as described by Table 9.

## DISCUSSION

The Indonesian JKN program relies on PCPs as health care gatekeepers in a multitiered referral system. They are expected to refer patients to specialists in hospitals only if they lack of medical resources needed or lack of certain competences. Although the capitation system for PCPs is incorporated with pay for performance, the lack of resources needed for medical treatment which varies throughout Indonesia necessitated PCPs to refer patients with non-specialty cases to hospitals, a condition which leads to a high rate of referrals and high costs. Similar circumstances are faced by other countries. For example, in China, multi-tiered medical system was intended as a viable solution to reduce overutilization of health care services but was

confronted with high referrals to hospital specialty care (5). Lack of the resources in certain health facilities make people perceive their quality as substandard compared to other health facilities, a condition which may lead to hospital overutilization (6, 7, 8). Similar condition also occurs in Indonesia. The lack of resources mainly in PCPs vary from one area to another, which is augmented by people's perception of primary care services. The Indonesian horizontal referral system was expected to overcome these challenges.

This is the first focused analysis on the effects of the Indonesian horizontal referrals on hospital outpatient visits and how it created cost savings. The horizontal referral system had shown several effects since its initial operation in September 2019.

First, the increasing trend of horizontal referrals gave impact on the decrease of vertical referrals to specialists. The COVID-19 pandemic did not hinder horizontal referrals as shown by the trends of horizontal referrals in data group II (January to October 2020). Our study also illustrates that the proportion of horizontal referrals towards total vertical referrals and to non-specialty referrals in group II is higher than that of group I (0,33% compared to 0,09% and 14,35% compared to 2,45%, respectively). This was potentially due to more PCPs became more resourceful thus able to receive referrals from other PCPs.

However, the distribution of PCPs implementing horizontal referral throughout the Indonesian archipelago was still concentrated in the islands of Java and Sumatera, the two most developed islands in Indonesia (9).

Second, horizontal referrals contributed to the decline of hospital outpatient visits. As an effect from horizontal referrals among PCPs and the decrease of vertical referrals since the implementation of horizontal referral, numbers of hospital outpatient visits decreased both in data group I and data group II. Despite the declining hospital outpatient visits due to COVID-19 factors, horizontal referrals showed a growing trend as seen by the rising numbers of horizontal referrals in comparison to hospital outpatient visits in data group II. Similar pattern was seen in comparing numbers of horizontal referrals to hospital outpatient visits from PCP referrals. This suggests that the horizontal referral system was not affected by the pandemic in terms of how its implementation was rising even during the pandemic. Hence, it contributed in decreasing the number of hospital outpatient visits.

Third, horizontal referrals create cost savings. Our data analysis revealed that horizontal referrals among PCPs reduce the number of vertical referrals which equates to the reduction of hospital expenditure both in data group I and data group II. Total cost savings during the 14-month time frame reached 25,9 billion rupiahs. Cost savings were expected to increase in accordance with the increasing number of PCPs implementing horizontal referrals.

Our findings confirm the hypothesis that the implementation of horizontal referral among PCPs contribute to the reduction of hospital outpatient visits thus create cost savings. Cost savings were also attained despite the COVID-19 pandemic. We expect greater cost savings along with the increasing numbers of PCPs implementing horizontal referrals and numbers of cases being referred. It is essential that the implementation and monitoring activities to continue with several improvements.

In sufficing the medical resources needed for the PCPs to optimize the referral system, the role of the government is vital. A study by Teklu et al in Ethopia also highlighted the role of the government in standardizing health facilities and the referral system (8). In Indonesia, most PCPs are government owned Puskesmas, which clarifies the vital role of the central and local government albeit the bureaucratical procedures in providing the resources needed by Puskesmas. As endocrine, nutritional and metabolic diseases were the most horizontally referred cases, resources for treating these diseases should be prioritized when extending the numbers of PCPs implementing horizontal referrals.

Our findings reveal the proportion of PCPs receive specialty cases from other PCPs. This may be due to several competence of which the health workers in the PCP had achieved more than the others. Therefore, trainings and competence improvements for primary care health workers are essential. Besides trainings and competence improvements, collaboration and coordination among health workers also need to be amplified within the system as collaboration among health workers can influence the referral rates (10, 11, 12). The horizontal referral system may correspond to overcoming high referral rates, but the root cause, which is variation of provided resources and health worker competence, need to be addressed as well.

There are limitations in this study. Since it is a descriptive-method study through big data analysis, results data may not reflect the real situation comprehensively. We were unable to justify the quality of services by the PCPs receiving the referrals. Furthermore, quality of the e-referral data, which was recorded in the P-Care and V-Claim application program, were prone to human errors. Future studies should examine by more in-depth analyses on the quality of health services conducted by PCPs receiving horizontal referrals and improvements by PCPs referring horizontally.

## CONCLUSIONS

Big-data analysis on the Indonesia's BPJS Kesehatan e-referral system showed the horizontal referral policy in Indonesia reduced the number of patients referred to hospitals, hence creating cost savings even during the COVID-19 pandemic. Horizontal referral proposes collaboration among primary care providers, thus controlling unnecessary referrals to hospitals. It

is expected that further interventions to extend the numbers of PCPs implementing horizontal referral and their nation-wide distribution will take place. Furthermore, it is also essential to provide resources, trainings and competence improvement for PCPs in the system.

**Abbreviations**

JKN: Jaminan Kesehatan Nasional (Indonesia's health care security program); BPJS Kesehatan: Badan Penyelenggara Jaminan Sosial Kesehatan (Indonesia's Social Security Administering Body for Health Sector); PCPs: Primary Care Providers; ICD: International Classification Of Diseases; COVID-19: Coronavirus disease (2019); INA-CBGs: Indonesia Case-Based Groups.

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**Availability of data**

All data were collected from the BPJS Kesehatan national e-referral database.

**Authors' contributions**

Conception and design of study was made by AD. Acquisition of data by CI. AD and CI contributed to managing and processing data. AD, CI, RA performed analysis and interpretation of data. AD drafted the manuscript. All the authors edited the manuscript versions. All authors were involved in the interpretation of the results, and read, commented, writing up the paper and gave final approval of the submitted version.

**Competing interests**

The authors declare that they have no competing interests

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