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Implementation of universal health coverage in South Africa: formative effects, perceived quality of healthcare and modelling of health service utilisation indicators in a national health insurance pilot district

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2024

https://hdl.handle.net/10539/37574

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ABSTRACT

Background

According to the World Health Organisation, member countries should attain universal health coverage by 2030. To achieve this goal, South Africa introduced the National Health Insurance programme in 2012. Since then, the first phase of the pilot programme has been implemented in Tshwane and ten other country districts. Historically, no other health system reform in South Africa has generated more interest than the National Health Insurance. This 15-year preliminary plan and pilot received optimism and criticism depending on several factors. The pilot programme focusing on primary health care was implemented along with several other interventions. The components of the intervention included setting up: ward-based primary healthcare outreach teams, integrated school health programmes, district clinical specialist teams, centralised chronic medicine dispensing and distribution programmes, health patient registration systems, stock visibility systems, and contracting of private non-specialised (general) medical practitioners to provide services in public primary health care facilities. These interventions were envisaged to improve healthcare quality at the primary healthcare level and offset the burden of non-emergency (secondary) care at the hospital outpatient level. However, studies have yet to be done to determine population-level formative effects on primary and non-emergency secondary healthcare indicators, their relationships, and interdependencies. These data are needed to forecast and develop measures to meet the possible increase in health service utilisation. In addition, this information is essential to guide the possible scale-up of South Africa's National Health Insurance mechanism. Such guidance may be in setting benchmarks to monitor policy implementation, determine facility staffing, the package of health services, training needs, budget for medicines and consumables, and other resource allocation.

Aim

Therefore, this study first aimed to determine the formative effects of implementing the Medical Practitioners' contracting of the National Health Insurance pilot program on primary healthcare utilisation indicators measured at both primary and non-emergency secondary levels of care. A comparison was made between Tshwane national health insurance pilot district and Ekurhuleni district, which is not a pilot district. Furthermore, the study aimed to determine the relationships between healthcare utilisation indicators and their interdependencies and then provide a forecast for 2025.

Methods

This quasi-experimental and ecological study used selected primary health care and outpatient department indicators in the District Health Information System monthly reports between January 2010 and December 2019 for the Tshwane district and Ekurhuleni district. Thus, to determine the formative effects on primary healthcare utilisation indicators, the selected period was from June 2010 to May 2014. A total of 48-time periods (months), with 24 before (June 2010 to May 2012) and 24 after (June 2012 to May 2014) implementation of Medical Practitioners contracting of the National Health Insurance pilot programme. Similarly, June 2012 to May 2014 was the selected period to determine the effects on the perceived quality of care. A total of 24 months, with 12 before (June 2012 to May 2013) and 12 after (June 2013 to May 2014) implementation of the Medical Practitioners' contracting of the National Health Insurance pilot programme. To determine the relationship and interdependence between Primary Health Care and Outpatient Department indicators and forecasts for 2025, 113 time periods (quarters) were selected. There were 28 quarters before and 84 quarters after implementing the National Health Insurance pilot programme.

Similar methodological approaches were used to determine the effects of Medical Practitioners contracting in the National Health Insurance pilot programme on Primary Healthcare utilisation indicators and perceived healthcare quality. All study data types used in the thesis were continuous; thus, they were initially evaluated descriptively using means (standard deviations) and medians (interquartile ranges). The range was evaluated using minimum and maximum values. An Independent t-test assuming unequal variances was used to compare the means of Outpatient Department indicators in determining the effect of Medical Practitioners contracting in the National Health Insurance pilot programme on the perceived quality of healthcare. Single- and multiple-group (controlled) interrupted time series analysis was used to determine the effect of the National Health Insurance pilot project implementation on the utilisation of selected primary and non-emergency outpatient department indicators and perceived healthcare quality.

A different methodological approach was used to determine the interdependencies and relationships between selected primary healthcare and non-emergency outpatient department indicators and their forecasts for 2025. Initially, data were evaluated descriptively using means (standard deviations) and medians (interquartile ranges) and the range was evaluated using minimum and maximum values. Prior to the development of the vector error correction model, several steps were taken. Firstly, a natural log transformation of all time series data was done

to enhance additivity, linearity, and validity. Additionally, the level of lags at which variables were interconnected or endogenously obtained was determined due to the sensitivity of causality.

Furthermore, the stationarity of time series data was determined using both graphical means and the Augmented Dick Fuller test to confirm the stability of each time series. Finally, cointegration was determined using the Johansen cointegration test to check for the correlation between two or more nonstationary series. After developing the Vector Error Correction Model, the Granger causality test was done to determine whether one series is helpful for forecasting another. Then the Vector Error Correction Model relationships between variables of selected primary healthcare and non-emergency outpatient department indicators were used to forecast the utilisation of both levels of services by 2025.

Results

The findings showed changes in primary healthcare indicators measured at primary and non-emergency secondary levels before and after contracting private medical practitioners of the National Health Insurance pilot programme. The study also confirmed the influence of selected primary health care and outpatient department headcounts on each other by finding four cointegration relationships between the variables. There were differences between single-group and controlled interrupted time series analysis findings for Tshwane district and Ekurhuleni district considered independently and collectively on the utilisation of primary health care services. Thus, the positive impact observed in primary healthcare utilisation post-June 2012 is not attributable to the implementation of the Medical Practitioners' contracting of the National Health Insurance pilot programme. Conversely, there were similarities between single-group and controlled interrupted time series analysis findings for Tshwane district and Ekurhuleni district considered independently and collectively on the perceived quality of primary healthcare. In the interpretation of this finding, the similarities indicated that implementing the Medical Practitioners' contracting of the National Health Insurance pilot programme positively influenced the perception of a better quality of primary healthcare in the Tshwane district.

Regarding primary healthcare indicators, there were differences between single-group and controlled interrupted time series analysis. Single-group interrupted time series analysis showed a 65% and 32% increase in the number of adults remaining on anti-retroviral therapy in Tshwane and Ekurhuleni districts, respectively **(relative risk [RR]: 1.65; 95%** confidence interval **[CI]: 1.64–1.66; p < 0.0001** and **RR: 1.32; 95% CI: 1.32–1.33; p < 0.0001,**

respectively). However, controlled interrupted time series analysis did not reveal any differences in any of the post-intervention parameters. Furthermore, single-group interrupted time series analysis showed a 2% and 6% increase in the number of clients seen by a professional nurse in the Tshwane and Ekurhuleni districts, respectively **(RR: 1.02; 95% CI: 1.01–1.02; p < 0.0001** and **RR: 1.06; 95% CI: 1.05–1.07; p < 0.0001,** respectively). However, controlled interrupted time series analysis did not show any differences in any of the post-intervention parameters. In addition, single-group interrupted time series analysis revealed that there was a 2% decrease and 1% increase in the primary healthcare headcounts for clients aged ≥5 years in Tshwane and Ekurhuleni district **(RR: 0.98; 95% CI: 0.97–0.98; p < 0.0001** and **RR: 1.01; 95% CI: 1.01–1.02; p < 0.0001,** respectively). Similarly, there was a 2% decrease and a 5% increase in the total primary healthcare headcounts in the Tshwane district and Ekurhuleni districts, respectively **(RR: 0.98; 95% CI: 0.97–0.98; p < 0.001** and **RR: 1.05; 95% CI: 1.04–1.06, p < 0.0001,** respectively). However, controlled interrupted time-series analysis revealed no difference in all parameters before and after intervention in terms of total primary healthcare headcounts and primary healthcare headcounts for clients aged ≥5 years.

Regarding secondary non-emergency outpatient department headcounts, single-group and controlled interrupted time series analyses revealed similar findings. Despite these similarities, single-group interrupted time series analysis showed a disparate increase in the outpatient department not referred headcounts, which were lower in the Tshwane district **(3 387 [95%CI 901, 5 873] [p = 0.010])** than in Ekurhuleni district **(5 399 [95% CI: 1 889, 8 909] [p = 0.004])**. Conversely, while there was no change in outpatient department referred headcounts in the Tshwane district, there was an increase in headcounts in the Ekurhuleni district **(21 010 [95% CI: 5 407, 36 611] [p = 0.011])**. Regarding the outpatient department not referred rate, there was a decrease in the Tshwane district **(-1.7 [95% CI: -2.1 to -1.2] [p < 0.0001]),** but not in the Ekurhuleni district. Controlled interrupted time series analysis showed differences in headcounts for outpatient department follow-up **(24 382 [95% CI: 14 643, 34 121] [p < 0.0001]),** the outpatient department not referred **(529 [95% CI: 29, 1 029 [p = 0.038]),** and outpatient department not referred rate **(-1.8 [95% CI: -2.2 to -1.1] [p < 0.0001])** between Tshwane the reference district and Ekurhuleni district.

Four common long-run trends were found in the relationships and dependencies between primary healthcare indicators measured at the primary healthcare level and the non-emergency secondary level of care needed to forecast future utilisation. First, a **10%** increase in outpatient departments not referred headcounts resulted in a **42% (95% CI: 28-56, p < 0.0001)** increase

in new primary healthcare diabetes mellitus clients, **231% (95% CI: 156-307, p < 0.0001)** increase in primary healthcare clients seen by a public medical practitioner, **37% (95% CI: 28-46, p < 0.0001)** increase in primary healthcare clients on ART, and **615% (95% CI: 486-742, p < 0.0001)** increase in primary healthcare clients seen by a professional nurse. Second, a **10%** increase in outpatient department referrals resulted in an **8% (95% CI: 3-12, p < 0.0001)** increase in new primary healthcare diabetes mellitus clients, a **73% (95% CI: 51-95, p < 0.0001)** increase in primary healthcare headcounts for clients seen by a medical professional, a **25% (95% CI: 23-28, p < 0.0001)** increase in primary healthcare headcounts for clients on ART, and a **44% (95% CI: 4-71, p = 0.026)** increase in primary healthcare headcounts for clients seen by a professional nurse. Third, a **10%** increase in outpatient department follow-up headcounts resulted in a **12% (95% CI: 8-16, p < 0.0001)** increase in primary healthcare headcounts for new diabetes mellitus, **67% (95% CI: 45-89, p < 0.0001)** increase in primary healthcare headcounts for clients seen by public medical practitioners, **22% (95% CI: 19-24, p < 0.0001)** increase in primary healthcare headcounts for clients on ART, and **155% (95% CI: 118-192, p < 0.0001)** increase in primary healthcare headcounts for clients seen by a professional nurse. Fourth, a **10%** increase in headcounts for total primary healthcare clients resulted in a **0.4% (95% CI: 0.1-0.8, p < 0.0001)** decrease in primary healthcare headcounts for new diabetes clients. Based on these relationships and dependencies, the outpatient department follow-up headcounts would increase from **337 945** in the fourth quarter of 2019 to **534 412 (95% CI: 327 682–741 142)** in the fourth quarter of 2025, while the total primary healthcare headcounts would only marginally decrease from **1 345 360** in the fourth quarter of 2019 to **1 166 619 (95% CI: 633 650–1 699 588)** in the fourth quarter of 2025.

Conclusion

The study findings suggested that improvements in primary health care indicators in National Health Insurance pilot districts could not be attributed to the implementation of contracting private medical practitioners but were likely a result of other co-interventions and transitions in the district. However, it might have resulted in an improved perception of quality of care at primary health care facilities, evidenced by a reduction in the self-referral rate for non-emergency hospital outpatient departments. The study also confirmed the influence of selected primary healthcare and non-emergency outpatient department headcounts on each other by finding four common long-run trends of relationships. Based on these relationships and trends, outpatient department follow-up headcounts are forecasted to increase by two-thirds.

Conversely, the total headcount for primary healthcare clients seen by a professional nurse will marginally decrease.

Recommendations

Based on the study findings, the bidirectional referral between primary and non-emergency secondary levels of care in the Tshwane district should be strengthened to offset the burden of care at outpatient departments of district hospitals. Thus, the district health information system should include a down-referral indicator to monitor this activity. With the implementation of National Health Insurance, there is a need to improve the perception of quality of care at the primary healthcare level through appropriate training, recruitment, and placement of medical practitioners. Similarly, professional nurses, the core providers of primary healthcare services, should be supported and capacitated in line with the epidemiological transition.