

Research Article

Financing and Availability of Essential Medicines Before and After Introduction of the National Hospital Insurance Fund Civil Servants and Disciplined Services Medical Scheme At Webuye District Hospital, Kenya

Lucy W. Mecca ^{a, b}, James Riungu ^c, and Eric M. Guantai ^a

^a Department of Pharmacology and Pharmacognosy, School of Pharmacy, University of Nairobi

^b Ministry of Health, Kenya

^c Jhpiego – Affiliate of Johns Hopkins University, KURHI/Tupange program, Kenya

* **Corresponding author:** Pharmacology and Pharmacognosy, School of Pharmacy, University of Nairobi, P.O. Box 19676-00202 KNH, Nairobi, Kenya, **Tel:** +254- 20-272509; **Email:** lucymecca@yahoo.com

Background: Financing is an important determinant of access to essential medicines. In Kenya, the National Hospital Insurance Fund Civil Servants and Disciplined Services Medical Scheme is a key contributor to financing the procurement of essential medicines.

Main Objective: To compare availability and funding of essential medicines at Webuye District Hospital, Kenya before and after implementation of the new National Hospital Insurance Fund Medical Scheme.

Methods: This was a longitudinal before-after study of four years (January 2010-December 2013); the latter two of which the scheme was in operation.

Results: After introduction of the scheme, there was a higher allocation for the medicines budget from the Facility Improvement Fund, which hosts finances from the National Hospital Insurance Fund ($p=0.008$). The actual expenditure on essential medicines was also higher. Expenditure on essential medicines by the government, reduced ($p<0.0001$). The stock out rate decreased by 2.28% though this change was not statistically significant ($p=0.099$). The Facility Improvement Fund expenditure on essential medicines was a significant negative predictor of stock out rate.

Conclusion: Although financing of medicines through the facility improvement fund increased after introduction of the new scheme, there was no change in the stock-out rate.

Key words: financing, availability, essential medicines, insurance

Received: November, 2014

Published: December, 2014

1. Introduction

Along with skilled healthcare providers, medicines are the most significant means to prevent, alleviate, and cure disease (United Nations, 2005)

Essential medicines are those medicines that satisfy the priority health care needs of the population. Essential medicines should be available within health systems at all times, in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at an affordable price (WHO 2002).

About 30% of the world's population lacks access to the essential medicines. In Africa, almost half the population or 15% of the world total lack access (WHO, 2004a).

In Kenya a study found that public facilities experienced stock-outs of basic essential medicines for about 46 days annually (Ministry of Medical Services and Ministry of Public Health & Sanitation, 2009).

Access to medicines depends on four factors: Rational selection of medicines, affordable prices, reliable health and supply systems, and sustainable financing (WHO, 2004b). Sustainable ways of financing medicines are important in ensuring access because medicines must be paid for.

Currently, the public health system in Kenya relies on four main sources of financing general government revenues (taxes), donor funds, user fees, and the National Hospital Insurance Fund (NHIF)—a government-sponsored health insurance scheme.

In July 2013, health services in Kenya were devolved from the central government and finances for essential medicines were sent to the counties. The discretion of where to procure medicines from also fell to the counties (KEMSA 2013).

Before the devolution of health services, the government procured medicines through Kenya Medical Supplies Agency (KEMSA). Hospitals ordered from KEMSA on quarterly basis. The standard order forms contained a limited number of essential medicines and supply of orders was characterized by a low fill rate (The World Bank, 2009). Donor contributions to the health sector largely (78%) went to funding HIV/AIDS-related programs (Chuma and Okungu, 2011).

National Hospital Insurance Fund is a state parastatal that was established in 1966. The Fund's core mandate is to provide medical insurance cover to all its members and their declared dependants. In 2012, the NHIF introduced a Civil Servants and Disciplined Services (NHIF-CSDS) Medical Scheme. Several hospitals including public hospitals, such as Webuye District Hospital, were contracted to provide services towards the new scheme. The scheme aimed at expanding the existing benefit package for civil servants and disciplined services to include an out-patient patient cover and an enhanced in-patient cover.

NHIF reimbursements, along with free maternity reimbursements from the government and cash collected from user fees (cost-sharing), are aggregated into one fund known as the Facility Improvement Fund (FIF). This fund is used to supplement the government budget in areas such as purchase of essential medicines, food, payment of salaries for casual workers and utility bills.

Introduction or reformation of similar schemes in other countries has been linked to improved availability of drugs in health facilities. For example in Mexico, reforms to the *Sistema de Protección Social en Salud* (System of Social Protection in Health) resulted in improved availability of drugs (Frenk et al., 2009). In a

study in Tanzania, increasing enrolment in the government's existing health insurance schemes was cited as one of the most promising solutions for addressing stock-out problems (Wales et al., 2014).

However in Ghana, introduction of the National Hospital Insurance Scheme (NHIS) was observed to impact negatively the procurement of medicines of about 92% of health facilities (SEND-Ghana, 2010).

The effects of the introduction of the NHIF-CSDS Medical Scheme on availability of essential medicines in Kenya are yet to be studied.

The main objective of this study was to compare the availability and funding for essential medicines before and after introduction of National Health Insurance Fund Civil Servants and Disciplined Services Medical Scheme at Webuye District Hospital, a public hospital in Kenya.

2. Methodology

2.1 Study design & site

A retrospective longitudinal before-after study of four years; the latter two of which the NHIF-CSDS Medical Scheme outpatient cover was in operation. The study period was 1st January 2010 – 31st December 2013.

The study was conducted at Webuye District Hospital. The hospital is situated Hospital situated in Webuye, Bungoma East district, Kenya.

2.2 Data collection

A list of 145 essential drugs for evaluation had been prepared by merging the Webuye District Hospital draft formulary list of 2010 and the Kenya Essential Medicines List 2010, then selecting drugs common to both lists (i.e. by complete enumeration). Anti-Retroviral drugs, anti-tuberculosis drugs and contraceptives which were not directly under the hospital were not included. Data was collected from quarterly Authority to Incur expenditure records, KEMSA Orders Forms and Invoices, Local Purchase orders and invoices from suppliers, S3 cards on which all hospital receipts are recorded, pharmacy summary budgets and stock control cards (electronic and manual) from pharmacy department.

2.3 Data analysis

The quantitative data was entered into Microsoft Excel. The data entered was then checked for accuracy and completeness before being exported to STATA Software version 10.0 and SPSS version 20.

The median of the quarterly FIF allocation for purchase of medicines was obtained for the eight quarters in each period. The percentage of FIF allocated was calculated as a proportion of the total amount available for budgeting. Mean percentage FIF allocation was calculated for each period.

The quantity and cost of each essential medicine received, sorted by source of funding (KEMSA, FIF, Other facility), was obtained for each period. The

quantity of each medicine received from each of the different sources was expressed as a proportion (percentage) of the total quantity of that medicine received during that period.

Stock-out rates were calculated as either overall percentage monthly stock-out time for all 145 medicines, and as individual stock-out rate per medicine. The total value of KEMSA order placed and supplied quarterly was obtained for the entire period. The cost of non-essential drugs procured quarterly was also obtained.

Results were considered statistically significant if the p-value is less than 0.05 or confidence level of more than 95%.

2.4 Ethical considerations and approval

Ethical approval obtained from the Kenyatta National Hospital/University of Nairobi Ethics and Research Committee (Ref-KNH-ERC/A/83).

Approval was also obtained from the administration of Webuye District Hospital.

3. Results

3.1 Allocation of FIF before and after the introduction of the NHIF civil servants scheme

The median of the quarterly FIF allocation for purchase of medicines was significantly greater in the period

after introduction of the new NHIF scheme (Kshs 1.04 million vs. 0.70million, $p=0.008$).

The mean proportion of FIF allocated quarterly for purchase of medicines (as a percentage of the total FIF for the quarter) was also higher in the period after introduction of the new scheme (9.12 % vs. 7.55%) though this increase was not statistically significant ($p=0.0502$).

3.2 Contributors to the Essential Medicines Budget

Three sources were found to contribute to the essential medicines budget: KEMSA, FIF, and other facilities (involves direct donations to the facility or supply from other hospitals)

3.2.1 Proportion of essential medicines procured through KEMSA, FIF and Other Facility

The quantity of each medicine received from each of the different sources was calculated as a proportion (percentage) of the total quantity of that medicine received during that period. These proportions were then averaged to yield the reported mean percentages (Figure 1).

KEMSA contributed the largest average proportion of essential medicines (48.9%) in the period before the new scheme was introduced. In the period after, FIF contributed the largest average proportion of essential medicines (45.5%).

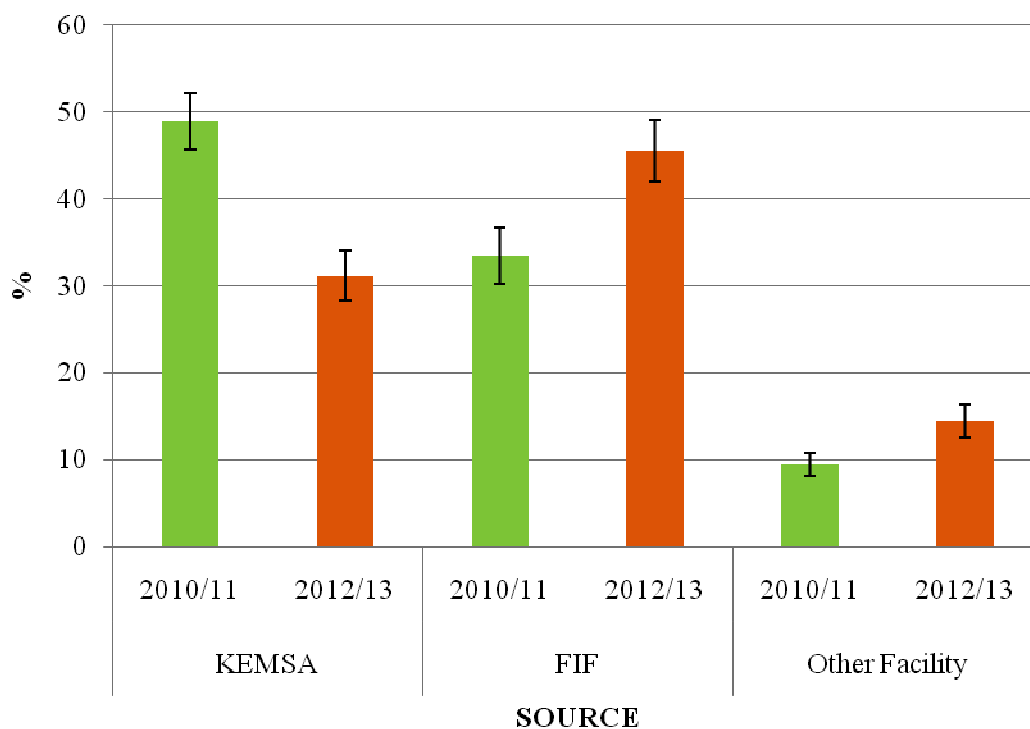


Figure 1: Mean proportion (%) of essential medicines procured and source

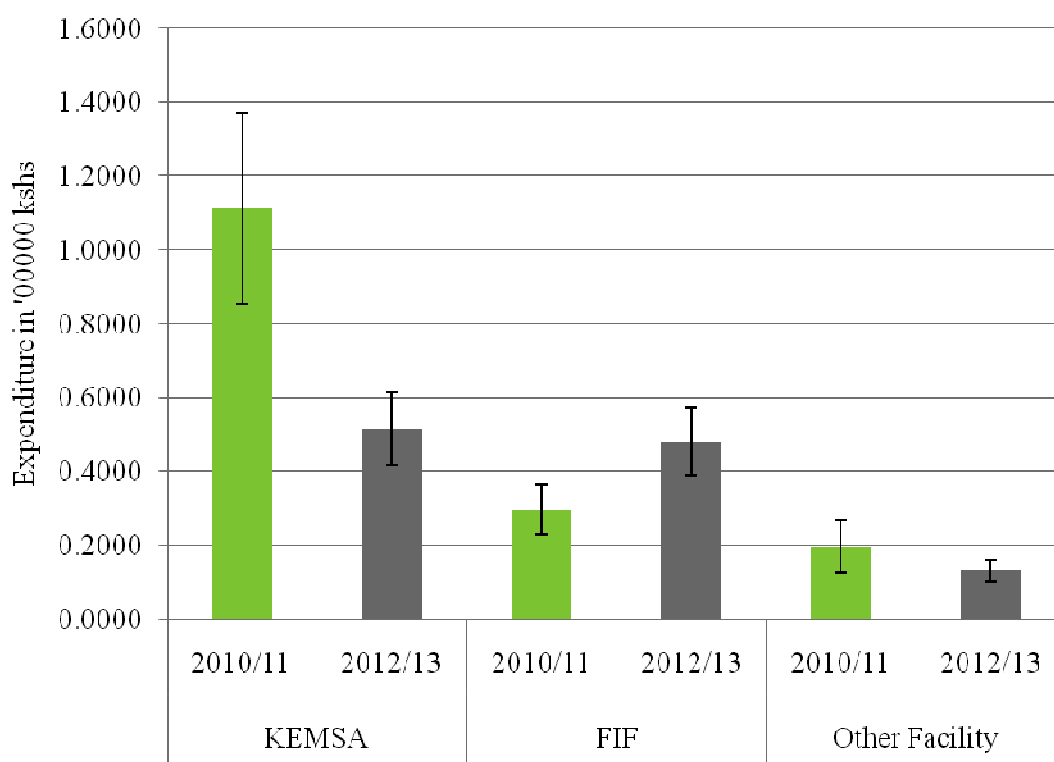


Figure 2: Mean expenditure on essential medicines by source

Table 1: Results from within-source comparison of proportion of essential medicine procured

Source	Hypothesis	p-value
KEMSA	KEMSA 2012/13 < KEMSA 2010/11	0.000
FIF	FIF 2012/13 > FIF 2010/11	0.000
Other Facility	Other facility 2012/13 > Other facility 2010/11	0.029

Table 2: Results from within-source comparison (expenditure)

Source	Hypothesis	P value
KEMSA	KEMSA 2012/13 < KEMSA2010/11	0.000
FIF	FIF 2012/13 > FIF 2010/11	0.000
Other Facility	Other facility 2012/13 > Other facility 2010/11	0.122

In 2010/11 the proportions of essential medicines from both KEMSA and FIF were significantly higher than that from other facilities ($p < 0.0001$). However, there was no

significant difference between the proportions from KEMSA and FIF for this period ($p = 0.050$).

In the period 2012/13, the proportion of essential medicines from the different sources was as follows: FIF > KEMSA > other facilities ($p < 0.017$).

Results of within-source comparison are shown in **Table 1**.

3.2.2 Expenditure on essential medicines procured through KEMSA, FIF and Other Facility

For each of the 145 essential medicines, the quantity of medicines received from each source was converted to monetary terms (Kenya Shillings). Mean expenditure per essential medicine was determined for the period before and after implementation of the NHIF-CSDS medical scheme (**Figure 2**).

In 2010/11, there was significantly different expenditure on essential medicines from the various sources ($p < 0.0001$). KEMSA recorded the highest expenditure per essential medicine at Ksh 111,380 followed by FIF at Ksh 29,798.

In the period after implementation of the new scheme FIF expenditure per essential medicine rose and almost equaled that of KEMSA (Kshs 48,201 vs. Ksh 51,523), both being significantly higher than that of other facilities ($p < 0.0001$).

Results of within-source comparison are shown in **Table 2**.

3.3 Availability of essential medicines

Total number of stocked out days in the month was calculated as the sum of all the days out of stock for the 145 essential medicines. Percentage Monthly Stocked-Out Time was then determined as a proportion of the highest possible total number of stocked-out days in that month.

The average monthly stocked-out time reduced from 21.75% in 2010/11 to 19.47% in 2012/13 though this reduction was not statistically significant ($p = 0.099$).

Time series analysis of variations in monthly stock out rates using an Autoregressive Integrated Moving Average model revealed that monthly stocked-out time was auto-correlated at the first lag and that FIF expenditure was a significant determinant of stock-out rates.

All other factors remaining constant, one unit increase in FIF expenditure (in Kshs 100,000) will result in a decrease in monthly stocked-out time by 3.31% of the original stocked out time (95% CI: 0.42%-6.13%). In addition one unit increase in the previous months FIF expenditure (in Kshs 100,000) will result in a decrease in monthly stocked-out time by 2.76% of the original stocked out time (95% CI: 0.40%-5.08%), all other factors remaining constant.

A negative binomial regression model based on the stock-out rate of individual medicines revealed that that an increase in supply of an essential medicine by procurement through FIF was associated with a significant drop in stock-out rate. All other factors remaining constant, a unit increase in number of quarters an essential medicine was received through FIF would result in a decrease in total days out of stock by 10.43 % of the original total days out of stock (95% CI: 7.00% - 13.74%).

Availability from KEMSA was also found to be a significant determinant of stock-out rates. All other factors remaining constant, a unit increase in the number of times an essential medicine was not received from KEMSA when ordered or not on KEMSA list would result in an increase in the total days out of stock by 12.15% of the original days out of stock (95% CI: 9.01%, 15.37%).

Other factors that were used in regression of monthly stock-out rate include cost of non-essential medicines, expenditure from other facilities, and KEMSA expenditure. These factors were not found to be significant. The constant in both models was significant ($p < 0.05$) suggesting other factors may also be influencing stock-out rates.

4. Discussion

The increase in FIF allocation for the medicines budget after introduction of the new scheme was probably due to additional funding from NHIF. Government reimbursements for free maternity services towards the end of the year 2013 may also have contributed to this increase.

KEMSA was the largest contributor to essential medicines expenditure in the period before introduction of the new NHIF scheme. KEMSA supply declined after the new scheme was introduced. This could be attributed to the reduction in number of essential medicines included in the KEMSA Standard Order Form with time. The number of essential medicines in the list decreased from 116 essential medicines in early 2010 to 71 in September 2013. Another reason could be financial constraints. A press statement in 2013 revealed that KEMSA was only able to meet 65% of the quantified needs of Public Health Facilities due to budgetary constraints (Ministry of Health 2013).

Until June 2013, KEMSA was funded by the national government and by development partners (KEMSA 2013). Following devolution of health in July 2013, there was a delay followed by a halt in automatic supply from KEMSA. Funds for procurement of medicines were devolved to the counties. Generally, public health facilities in Kenya experienced logistical problems due to lack of structures and clear guidelines. The Parliamentary Committee for Health received several submissions outlining the extent of shortage of medicines in public health facilities (Parliamentary Committee for Health).

FIF contributed the largest proportion by quantity of essential medicines after introduction of the new scheme. The proportion of essential medicines contributed by FIF was greater after introduction of the new scheme and FIF expenditure on essential medicines increased. This is likely due to increase in amount of FIF allocated for medicines in 2012/13 and also because receipts from KEMSA, previously the major supplier, declined in this period. In one study, it was found that the FIF fund is increasingly being used for procurement of medicines, to plug the gap resulting from insufficient supplies from KEMSA (Luoma et al., 2010).

Our study showed that the proportion of essential medicines contributed by other facilities was greater after introduction of the new NHIF scheme at Webuye District Hospital. This could be attributed to increased cross-health facility exchange of essential medicines occasioned by declining KEMSA supply.

The methodology used in medicine availability studies is quite varied, making comparisons difficult. In our study, overall, there was no significant change in the stock-out rate after implementation of the new scheme. In contrast, reforms to the Mexico's *Seguro Popular* (People's Insurance) resulted in improved availability of drugs. This particular scheme was aimed at universal coverage therefore more financing was available than in the case of NHIF-CSDS (Frenk et al., 2009).

In a recent study, inadequate funding was the most strongly cited (57.9%) factor that caused unavailability of essential medicines in public hospitals (Mwathi and Osuga, 2014). We found that FIF expenditure was a significant determinant of stock-out rates, with an increase in amount of FIF spent on medicines associated with a decrease in percentage stocked out time.

Our study also showed that stock out rate depended on the number of times an essential medicine was

purchased through FIF and the number of times it was ordered from KEMSA and not received or was off the KEMSA list. It means therefore that when a medicine was on the KEMSA Standard Order Form and orders for that particular medicine were honored, there was decrease in the stock-out rate of that medicine. This underlines the fact that erratic supply is a factor than can lead to stock-outs.

From literature, inappropriate selection of medicines, irrational use of medicines, poor inventory keeping, poor forecasting and quantification methods, poor distribution practices are some of the other factors that are known to reduce availability of medicines (Mwathi and Osuga, 2014).

The slight decrease in monthly stock-out rate could have been due to increased funding of the medicines budget through the next major source, which is the FIF. However, supply of essential medicines from KEMSA also declined during this period.

Insurance schemes are seen as one of the ways to address health financing issues. During implementation, it is important that the context and surrounding issues are taken into account. The NHIF implemented the scheme into a health system that was experiencing major gaps in funding. The quality of care of the NHIF beneficiaries was probably compromised due to lack of availability of essential medicines. Issues that should be addressed when designing a health insurance scheme include policy objectives, population coverage, benefits to be included, organization of health services, premium calculation and payment mechanism, utilization and cost-control measures and administrative arrangements (WHO 2012).

Conflict of Interest declaration

The authors declare no conflict of interest.

Acknowledgements

The authors thank the staff at Webuye District Hospital, particularly the Medical Superintendent Dr. Caesar Bitta, as well as the Pharmacists Dr. Martha Mandale, Dr. Lidy Anyanzwa, Dr. Ferdinand Ndubi and all pharmacy staff for their selfless assistance. The authors also acknowledge Dr. Mercy Mulaku for her generous input.

References

Chuma, J, and Okungu, V (2011). Viewing the Kenyan health system through an equity lens: implications for universal coverage. *Int J Equity Health* **10**:22.

Frenk, J, Gómez-Dantés O, and Knaul FM (2009). The democratization of health in Mexico: financial innovations for universal coverage. *Bulletin of the World Health Organization* **87**:542-548.

Kenya Medical Supplies Agency 2013. Frequently Asked Questions, 2013. Available at <http://www.kemsa.co.ke/> (Accessed August 2014)

Luoma M, Doherty J, Muchiri S, Barasa T, Hofler K, and Maniscalco L (2010). Kenya Health System Assessment 2010.

Ministry of Health, 2009. Public Expenditure Tracking Survey 2008. Available at: www.ihpmr.org/ (Accessed November 2013)

Ministry of Health (2013). Press statement. Available at: <http://www.kemsa.co.ke> (Accessed August 2014)

Ministry of Medical Services and Ministry of Public Health & Sanitation, 2009. Access to Essential Medicines in Kenya -A Health Facility Survey. Available at: <http://apps.who.int/> (Accessed September 2013)

Mwathi MW, and Osuga BO (2014). Availability of essential medicines in public hospitals: A study of selected public hospitals in Nakuru County, Kenya. Available at: <http://www.academicjournals.org/> (Accessed August 2014)

Parliamentary Committee for Health. Eleventh Parliament-Second Session: Report Of The Departmental Committee On Health On Emerging Challenges of Devolving Health Services. Available at: <http://www.parliament.go.ke/> (Accessed August 2014).

SEND - Ghana (2010) Balancing Access with Quality HealthCare: An Assessment of the NHIS in Ghana (2004-2008) <http://www.sendwestafrica.org> (Accessed October 2014).

The World Bank, 2009. Public Sector Healthcare Supply Chain Strategic Network Design For Kemsa -Driving Service Improvements through Supply Chain Excellence. Available at: <http://siteresources.worldbank.org/> (Accessed December 2013).

UN Millennium Project, 2005. Prescription for Healthy Development: Increasing Access to Medicines. Report of the Task Force on HIV/AIDS, Malaria, TB, and Access to Essential Medicines, Working Group on Access to Essential Medicines. Sterling, Va.: Earthscan.

United Nations 2003, *Indicators for Monitoring the Millennium Development Goals*. Available at: <http://unstats.un.org/> (Accessed December 2013)

Wales J, Tobias J, Malangalila E, Swai G, and Wild L (2014). Stock-outs of essential medicines in Tanzania: A political economy approach to analyzing problems and identifying solutions. Available at: <http://twaweza.org/> (Accessed September 2014)

World Health Organisation, 2002. The selection of essential medicines. WHO policy perspectives on medicines. Available at: <http://whqlibdoc.who.int/> (Accessed December 2013)

World Health Organization, 2004. The world medicines situation. Geneva: World Health Organization. Available at <http://apps.who.int/> (Accessed December 2013)

World Health Organisation, 2004. Equitable access to essential medicines: a framework for collective action. WHO policy perspectives on medicines. Available at: <http://whqlibdoc.who.int/> (Accessed August 2013)

World Health Organization, 2012. Pharmaceutical Financing Strategies. Available at <http://apps.who.int/> (Accessed December 2013)