PROCUREMENT SYSTEMS AND EFFECTIVENESS OF HEALTH CARE SERVICE DELIVERY IN UGANDA: A CASE OF SELECTED RURAL HEALTH CENTRE IIIS

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Abstract

The overall purpose of this study was to assess the contribution of the public procurement system on the effective health care services delivery in Uganda focusing on selected rural health centre IIIs. To achieve the above central objective, four research objectives were formulated that included; i) To assess the relationship between public procurement system and public funding of rural health centre IIIs; ii) To assess the relationship between public funding and logistics management for rural Health Centre IIIs; iii) To analyse the effect of logistics management on the effectiveness of health care service delivery; and lastly iv) To assess the effect of public procurement system on effectiveness of health care services in rural Health Centre IIIs. A sample of 205 was used for this study. The findings indicated that (a) public procurement system and public funding for rural HCIIIs had a strong relationship. Similarly, public funding and logistics management were positively related. It was also revealed that good logistics management led to the effectiveness of health care services delivery in rural HCIIIs. It was also concluded that public procurement systems had a positive contribution to the effectiveness of health care services delivery within rural HCIIIs. In spite of the positive relationships, there was still a need to better the procurement to make the health care service delivery even more effective. The current study

recommended the adoption of the Public-Private Partnership Model.

This would increase the effectiveness of the HCIII to 85% way above the current 67% contribution of the public procurement system for health.

BACKGROUND

In Uganda, over the years government has emphasized the importance of efficient and appropriate procurement, storage and distribution of essential medicines and health supplies (EMHS) at all levels of the health management system to ensure effective nationwide delivery of the Uganda National Minimum Health Care Package (Akech, 2005). Therefore, as a result, National Medical Stores (NMS) was set up by the National Medical Stores Act 1993 (Cap 207) as an autonomous body responsible for procurement, storage and distribution of essential medicines and health supplies (EMHS), to all Public Health Facilities in the Country.

National Medical Stores is mandated to procure, store and distribute Essential Medicines and Medical Supplies to all Public Health Facilities in the Country, including those of the Police, Army, and Prisons. This includes all Medicines directly or indirectly procured by NMS and those that are donated by various donors. In August 2012 this mandate was further expanded to include distribution of Vaccines across the country. National Medical Stores receives funds from the Government of Uganda for the procurement and storage of Essential Medicines and Health Supplies (EMHS), and their distribution to the various health facilities countrywide. The Management of NMS is accountable for these funds under the purview of the Public Finance Management Act, 2015 and the NMS Act, 1993. The above procedures are guided by the current procurement system in the health sector in Uganda.

Public procurement system in Uganda begins with the Ministry of Health

and Ministry of Finance Planning and Economic Development that do the budgeting and funding of the procurement of the drugs following the PPDA under the Uganda National Medical Stores (NMS), facilities and equipment at national level, while the District Authorities, do the procurement of local Procurement of equipment and facilities governed by the PPDA Act like Health Facility (HCIII) renovation, construction, and purchases of utilities and services, procurement of human resources under the Employment Act and Public Standing Order and lastly procurement of services (cleaning, utilities, security) is done by the Health Facilities (HCIIIs) under the relevant Laws. It could be noted that there are several procurement systems; however, most of the procurement is done by the agencies above the HCIIIs facility. The implementer or supervises the procurement following the relevant laws. Other systems where the HCIII facility does the procurement are services that have their guiding laws and tariffs already established. For instance, electricity water could have the tariffs and related matters established. For instance, electricity, water has the tariffs and related matters established while as electricity, water laws and tariffs and related matters established. They are monopolies.

The procurement system of public goods and services is intended to achieve effective health care service delivery (Appiah, 2014). Therefore, it's against this background that this study was set to analyse the effect of public procurement system on effective health care services.

STATEMENT OF THE PROBLEM

Although the Public procurement system was intended to lead to effective health care service delivery in Uganda, the above expectation may not have been met especially in HCIIIs in the rural areas. The overarching question therefore was how much does a procurement system contribute to effectiveness of health care service delivery at rural health centre IIIs.

PURPOSE AND RESEARCH OBJECTIVES OF THIS STUDY

The study was set to analyse the effect of the procurement system on effective health care services in Uganda focusing on selected rural health centre IIIs in Wakiso district.

The study was guided by the following specific objectives:

To assess the relationship between public procurement system and public funding of selected rural health centre IIIs.

To assess the relationship between public funding and logistics management for selected rural Health Centre IIIs.

To analyse the effect of logistics management on the effectiveness of health care service delivery for selected rural Health Centre IIIs.

To assess the effect of the public procurement system on the effectiveness of health care services in Uganda for selected rural Health Centre IIIs.

RESEARCH HYPOTHESES

Public Procurement System and Public Funding

$H_0$1: Public Procurement System is not significantly related to the Public Funding of selected rural health centre IIIs in Uganda.

H_A1: Public Procurement System is significantly related to the Public Funding of selected rural health centre IIIs in Uganda.

Public Funding and logistics management

$H_0$2: Public Funding is not positively related to logistics management for selected rural Health Centre IIIs in Uganda.

H_A2: Public Funding is positively related to logistics management for selected rural Health Centre IIIs in Uganda.

Logistics Management and effectiveness of health care service delivery

$H_0$3: Logistics Management does not have a positive effect on the

effectiveness of health care service delivery for selected rural Health Centre IIIs in Uganda.

H_A3: Logistics Management has a positive effect on the effectiveness of health care service delivery for selected rural Health Centre IIIs in Uganda.

Public Procurement System and effectiveness of health care service delivery

H_04: Public Procurement System does not contribute to the effectiveness of health care services for selected rural Health Centre IIIs in Uganda.

H_A4: Public Procurement System contributes to the effectiveness of health care services for selected rural Health Centre IIIs in Uganda.

STUDY LITERATURE

Literature in this section was reviewed under the following sections; survey of available literature on the effect of the procurement system on effective health care services in Uganda; Procurement system and health care service delivery; Logistics Management and realization of Procurement System and Effectiveness of health care service delivery and its relationship with the procurement system

Survey of the available Literature

In the Ugandan context, several studies have been done procurement. These included the following (Kasule, 2007: Zikusooka et. al., 2009: Namaganda, 2011: Nantege, 2011: Olum, 2011: Musoke and Sodemann, 2016) have been conducted in the area of procurement system and compliance since the enactment of the PPDA act (2003) and PPDA Regulations (2003), health service deliveries in Uganda resource use, costs, and financing of health facilities, and lastly issues and dynamics of

health sector management. However, they do not cover the contribution of procurement system on the effective health care services delivery. It is the gap that the current study intended to fill.

Procurement system and health care service delivery

Procurement system in other institutions is aligned with a set of rules that guide governments purchasing of works and services, covering much broader aspects that stretch beyond simple rules concerning the process of acquiring goods, works and services by public sector entities (Stephanus, 2009).

Procurement management positively affected the performance of banks (Nantege, 2011). The most significant attributes being procurement system, legislation, procurement controls and monitoring. Owuoth and Mwangangi (2011) and Nantege (2011) had a good debate but it did not answer the questions posed by the current study. They did not consider the Procurement system at the health care service level. This current study addresses that gap by analysing the effect of the procurement system and effectiveness of health care service delivery in Uganda focusing on selected rural health centre IIIs in Wakiso district.

Logistics Management and realization of Procurement System

The realization of procurement system for hospitals is hinged on the availability of finance for procurement of health commodities, even distribution of health commodities, effective supervision and constant monitoring and evaluation which are found crucial in effective and efficient logistics management, which likewise determines the effective health care service delivery and capacity. A health care service delivery capacity and perceived quality to improve, there was need for the Ugandan Health Service logistics or supply system to receive constant monitoring and evaluation (Kasule (2007). On the other hand,

Zikusooka et. al., (2007) expanded their scope by analysing equitability of healthcare financing in Uganda and established that Uganda's health sector was significant under-funded, mainly relying on private sources of financing, especially out-of-pocket spending. The above studies had gaps that the current research tried to fill creating especially by assessing the relationship between procurement system and logistics management for HCIIIs in Uganda.

Effectiveness of health care service delivery and a procurement system

The process of procurement system determines how, where and when the human resources, medical resources, infrastructure and medicines would be accessed through the health system (Stephanus, 2009) and (Olum, 2011). However, scarcity of drugs and the hospital cannot give all drugs to its people because of its limited availability, and the pharmacy at the hospital sometimes receives drugs whose shelf life is short (Musoke and Sodemenn (2016). The literature survey revealed that there had been studies concerning Procurement system, legislation, logistics management and procurement of medicals in Uganda; however, these studies have not researched on how effective health care service could be delivered, logistics management in rural health centre IIIs interacts with procurement legislation. The current study was therefore fills the gaps of earlier studies.

METHODOLOGY

In this methodology section, research design, study population and sample, sampling design and procedures, data sources and collection instruments, validity and reliability of the research instruments, measurement of the research variables, data analysis, ethical issues, limitations of the study and delimitations of the study are highlighted.

Research design

This study adopted the cross-sectional design. Cross-sectional designs are a simple and least costly alternative to use with larger area coverage, (Sekaran, 2003). The cross-sectional design also allows for a wider range of the sample to be studied at the same time and more data is covered within a short period, (Sekaran, 2003).

Numbers of study population

The population of the study was composed of 1,219 that included i) members of the Health Centre III Management Committee; ii) members from district director of health services, National Medical Stores and Ministry of Health; iii) the ward in-charge(s); and iv) the staff of the Rural health centre IIIs.

Table 3. 2: study population

Rural health centre IIIs	Patients (average that visits the HCIIIs) per month	Health Centre III staff and district staff	overall
Nakawuka Health Centre III	178	105	283
Namulonge Health Centre III	192	91	283
Mende Health Centre III	251	127	378
EPICentre Health centre III	197	78	275
Total	**818**	**401**	**1,219**

Source: AHSPR 2014/2015

Determining the minimum sample size

For the current study, a minimum sample was based on a rate of 95%. It was deemed that the error would be 5%. If 100 questionnaires were sent out, about 80% would be returned fully completed. Given the distances to the four health centres, it is as estimated that about 20% were returned or filled properly. With the above information, a minimum sample size for this study was calculated based on the formula proposed by de Vaus (Saunders, Thornhill and Lewis (2009) which is:

$$n = P \times q \times \left[\frac{z}{e}\right]^2$$

n = the minimum sample size required

p = percentage of the questionnaires that would be completed and returned

q = Percentage of the questionnaires that would not be completed or lost

Z = the z value corresponding to the confidence level required

e = the margin of error

For this study, the confidence level was estimated at 95%, with a corresponding z value of 1 .96. The confidence interval or margin of error was estimated at 5%. Assuming that 80 per cent of the sample completes and returns the questionnaire, then the minimum sample was calculated as below.

$$n = P \times q \times \left[\frac{z}{e}\right]^2$$

$$n = P \times q \times \left[\frac{1.96}{5}\right]^2$$

$$n = 80 \times 20 \times \left[\frac{1.96}{5}\right]^2$$

$n = 1{,}600 \times .392^2$

$n = 1{,}600 \times 0.154$

$n = 246$

The minimum sample size (n) required for the study was adjusted to the total population of 1,219 to get the actual sample size (n') for the study. The actual sample size (adjusted) was therefore calculated in the following manner.

$$n' = 1 + \left[\frac{n}{N}\right]$$

Where: n = actual sample size, n = Minimum sample size and N = Study population.

-therefore the actual sample size is:

$$n = \frac{246}{1 + \left[\frac{246}{1{,}219}\right]}$$

$$n = \frac{246}{1 + (0.02)}$$

$$n = \frac{246}{1 + 1.20}$$

$n = 205$

The above sample has been adjusted using stratification to determine the actual number of the respondents from each of the rural health centre IIIs using the formulae below.

$$r = \left[\frac{c \times s}{p}\right]$$

$$r = \frac{283 \times 205}{1219} = \frac{48.5}{} = 49.$$

Where r = respondents, c = category (Rural health centre IIIs), s = actual sample size and: p = total study population

Table 3. sample size

Rural health centre IIIs			*Sample size*
Nakawuka Health Centre 111	r = [(cx s)/P]	= [(283 x 205) /1219]	48
Namulonge Health Centre III	r = [(cx s)IP]	= [(283 x 205) /1,219]	48
Mende Health Centre III	r = [(cx s)/P]	= [(378 x 205) /1,219]	63
EPI centre Health center III	r = [(cx s)/P]	[(275 x 205) / 1,219]	46
Total			**205**

Data collection methods

The validity of the items on the questionnaire

The content validity index when computed by two experts it gave an average 89%. Since this was greater than 70% as prescribed by Amin (2005), signified that the items on the research instrument were valid.

Reliability

The reliability is the degree to which a data collection instrument consistently measures whatever it is measuring (Amin, 2005). Reliability results ranged between .68 and .91 with an average of a

Cronbach Alpha coefficients of 0.80 which was above the usual cut off percentage of 50. This implied that the scales used to measure the study variables were consistent and therefore reliable and meeting acceptable standards for the research.

RESULTS AND INTERPRETATION

Public Procurement System and Public Funding of selected rural health centre IIIs.

The relationship between the management of the procurement system and funding was consonant with the first null hypothesis which stated that "there is no significant relationship between the management of the procurement system and funding". The first hypothesis was tested using both the Pearson's Product Moment Correlation (PMC) and simple linear regression tests' results. The correlation results indicate that there was a low positive significant relationship between the management of the procurement system and funding [r (205) =.259, $p<0.01$]. The implication of this was that for the management of the procurement system for medicines to be function well, there must be sufficient funding. In this case, there seems to be limited funding hence the low significance between the two variables.

The hypothesis was also subjected to regression analysis. This yielded the following sets of results. First, the R square of the model summary was .067. This translated into 67%. This meant that management of the procurement system explained only 67% of the funding that is availed to get medicines for the Health Centre IIIs.

The regression test also revealed that the relationship between the management of the procurement system and funding was liner [F (1,203) =14.576, $p<0.01$]. The implied that for any unit change in the management of the procurement system, there has to be a proportionate change in the funding for the medicines that are required in health centre IIIs.

The simple linear regression results also gave confirmatory results as showed in Table 5:10.

Table 6: coefficients of regression between management of procurement system and funding

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.198	.260		12.314	.000
	Management of procurement system	.249	.065	.259	3.818	.000
a. Dependent Variable: Funding						

The results (Beta = .259, $p<0.01$) in Table 5:4 confirm the fact that there is a relationship between the management of the procurement system and funding. Given the fact that the relationship is significant, it is appropriate to argue that the null hypothesis (H_0^1) "there is no significant relationship between management of the procurement system and funding" was jettisoned. The alternate hypothesis, "there is a significant relationship between management of the procurement system and funding" was supported instead.

Public Funding and logistics management for rural Health Centre IIIs

This was intended to analyse how public funding was related to the effectiveness of health care service delivery for rural HCIIIs. The relationship between public funding and logistics management for rural HCIIIs in Uganda was determined by testing the second hypothesis. The null hypothesis was that: H_o2: Public Funding is not positively related to logistics management for rural HCIIIs in Uganda.

The second hypothesis was first tested using the Pearson Product Moment correlation (PMC). This test was carried out because it would tell the direction of the relationship, that is whether positive or negative. The hypothesis was tested first using Pearson's Product Moment correlation. This yielded results of ($r(205) = 0.562$, $p<0.01$) which revealed showed that there was a positive and significant relationship between public funding and logistics management for rural HCIIIs. This statistic implied that the more public funding for the Health Centre IIIs obtained, the more logistics managed by the health sector and also for the rural Health Centre IIIs.

The hypothesis was also tested using a simple linear regression matrix. Regression analysis was used to predict the value of a variable in the model. The first output of the simple linear regression was a model summary which yielded an adj. R^2 of .340. This implied that logistics management had 34% effect on public funding for rural HCIIIs in Uganda.

The regression test also gave the linearity of funding and logistics management as $F(1,204) = 106.600$, $P < 0.01$. This shows that there was a linear relationship, which implied that an increase in funding led to an increase in logistics management for rural HCIIIs in Uganda and the reverse was also true. So, if there were more funds at the disposal of an H/C III, more or logistics would be managed at rural HCIIIs in Uganda, and vice versa.

Table 6. 14: Coefficients of public funding versus logistics management for rural HCIIIs.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant) *public funding*	1.535 .530	.163 .051	.562	9.399 10.325	.000 .000
a. Dependent Variable: logistics management for rural HCIIIs in Uganda						

Based on table 6.14 above, it could be stated that: Beta = 0.586 P < 0.01, the null hypothesis was therefore rejected and the alternative hypothesis supported. It was therefore concluded that Public Funding is positively related to logistics management for rural Health Centre IIIs in Uganda

Logistics Management and the effectiveness of health care service delivery

This was intended to articulate the effect of logistics management on the effectiveness of health care services in rural HCIIIs in particular. Nine predictor variables as given in the table were regressed against the effectiveness of health service delivery. Only one of the independent variables; logistic management contributed significantly to the model at the level of 0.05. The model had a mean value of 1.85 when all variables are kept constant. This meant that if all other variables go zero, then evenly distribution of health commodities would increase the mean by 0.294. Again, a 1% increase in an even distribution of health commodities would result in 0.294 increases ineffectiveness of health care services in HCIIIs in particular. The result showed that evenly distribution of health commodities was a prerequisite for the effectiveness of health services.

Logistics management and effectiveness of health care services

The third null hypothesis was tested first using correlation analysis. The results from this test were [r (205) = .757, p<0.01] which showed that there was a positive and significant relationship between logistics management and effectiveness of health care services delivery in rural HCIIIs. This statistic implied that effectiveness of health care services delivery in rural HCIIIs needed more logistics management.

The hypothesis was also tested using a simple linear regression matrix. The results of a model summary being Adj. R^2 = .571 or 57%, indicates how much of the total variation in the effectiveness of health care services delivery in rural H/C IIIs can be explained by logistics management.

The regression analysis that revealed the linearity between the two variables: F (1, 204) = 272.069, P < 0.01. This gave a linear relationship, which implies that an increase in a unit of logistics management led to an increase in unit of the effectiveness of health care services delivery in rural H/C IIIs vice versa. The simple linear regression further yielded results that were moderate as shown in table 10.

Table 10: Coefficients of logistics management and effectiveness of health care services delivery

Coefficients [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.575	.200		7.874	.000
	Logistics management	.684	.041	.757	16.495	.000
a. Dependent Variable: Effectiveness of health services						

Based on table 10, it could be stated that: Beta = 0.757, P < 0.01. This

meant that logistics management had a moderate positive significant relationship or effect on the effectiveness of Health care services delivery. It was, therefore, true to say that the null hypothesis was rejected and the alternative hypothesis supported

Public Procurement System and effectiveness of health care services

For the health care service to be effective especially in the rural area, there should be satisfactory quality of treatment and other services. The said satisfaction can only come about if there are: (1) Sufficient number of trained staff, (2) Performance of health workers, (3) Availability of needed medicines, (4) Effective provision of information, (5) Enough infrastructure at the health facility, (6) Availability of utilities, (7) Transport means, and (8) Possibility of referral systems. When all these obtain, they enable the health service provision to be good and therefore effective. To determine which of the above factors rural health centres considered to contribute to the effectiveness of the health service provision, factor analysis was done and the results are reported in Table 11.

Table 11 Factor analysis of effective health service

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.312	37.707	37.707	11.312	37.707	37.707	6.906	23.020	23.020
2	6.313	21.043	58.750	6.313	21.043	58.750	6.548	21.825	44.845
3	3.760	12.534	71.283	3.760	12.534	71.283	4.816	16.053	60.898
4	3.117	10.389	81.673	3.117	10.389	81.673	4.306	14.354	75.252
5	2.380	7.932	89.605	2.380	7.932	89.605	4.004	13.347	88.599
6	2.016	6.718	96.323	2.016	6.718	96.323	2.317	7.724	96.323
Extraction Method: Principal Component Analysis.									

From the principal component in order of characteristic roots were listed. The figures in the table were a result of factor extracts and factor rotation after the factor analysis. Column 2 to column 4 describe the original factor solution. Column 5 to 7 describe the intermediate factor solution. The final factor solution gave the following figures: component 1 had an eigenvalue of 6.906 with a percentage of 23%. Component 2 had an eigenvalue of 6.548 with a percentage of 21%. Component 3 had an eigenvalue of 4.816 with a percentage of 16%. Component 4 had an eigenvalue of 4.306 with a percentage of 14%. Component 5 had an eigenvalue of 4.004 with a percentage of 13%. The sixth component had an eigenvalue of 2.317 with a percentage of 7%.

When rotation was done using variance maximisation with Kaiser normalisation, it emerged that staffing was the most important factor. This factor was explained strongly staff being trained with the coefficient of .916; availability with a coefficient of .837; and being enough at the health facility with a coefficient of .696. The second factor was the performance of health workers. This factor was explained by staff being hardworking with a coefficient of .723; staff being caring with a coefficient of .837; customer care provision with a coefficient of .985; The third factor was medicines in the health centre. This was explained strongly by availability with a coefficient of .984. The fourth factor was mobility. This factor was explained strongly by the transportation of drugs with a coefficient of .979; and transport necessities with .692. The fifth factor was communication which was explained by information provision with a coefficient of .982; attention being paid to patients with a coefficient of .952. the sixth factor was variety in the health care service provision. This was explained strongly by the provision of counselling with a coefficient of .918; and immunisation with a coefficient of .953. Although eight items had been identified as the key marks or indicators

of the effectiveness of health care service provision, only six factors emerged to be the major ones.

The relationship between public procurement systems and effectiveness of health care delivery

The relationship between the public procurement systems and the effectiveness of health care delivery in rural health centre IIIs in Wakiso district of Uganda. This was in line with the fourth null hypothesis (H_o4) which stated that:" Public procurement systems are not significantly related to the effectiveness of health care service delivery in rural health centre IIIs.

The fourth null hypothesis was first tested using the Pearson Product Moment correlation (PMC). This test was carried out because it would tell the direction of the relationship, that is, whether positive or negative. The hypothesis was tested using correlation analysis. This yielded the result of $r(205) = 0.572$, $p<0.01$. Implied that there was a positive and significant relationship between procurement and effectiveness of health care service delivery.

The hypothesis was also tested using a linear regression matrix. The first output of the simple linear regression was a model summary whose outcome was an adj. R^2 of .344. This meant that procurement supplies had 34% effect on the effectiveness of health care service delivery.

The linearity was $F(1,204) = 106.600$, $P < 0.01$. This shows that there was a linear relationship, which implied that an increase in procurement supplies led to an increase in the effectiveness of health care service delivery and the reverse was also true.

Table 13: Coefficients of procurement supplies and effectiveness of health care service delivery

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant) *public funding*	1.535 .530	.163 .051	.586	9.399 10.325	.000 .000
a. *Dependent Variable:* effectiveness of health care service delivery *for rural HCIIIs*						

Based on the results, it could be stated that: Beta = 0.586 P < 0.01, the null hypothesis was therefore rejected and the alternative hypothesis supported. It is therefore concluded that public procurement systems had a direct relationship with public funding.

Overall effect of public procurement system on effectiveness of health care service delivery

The measurement of effect was done using the path analysis technique. This is an extension of regression. It gives the magnitude of the hypothesised causal connections between sets of variables. In the current study, four sets were considered. A path diagram (Figure 9.1) is provided to help and explain clearly the sets of variables. The hypothesised model was used to establish a more reliable explanation that the effectiveness of health care service delivery of HCIII was a function of the public procurement system, that is EHCSD = f(PPS).

Hypothetical Model

Hypothetical Model was done to prove whether the effectiveness of health care services delivery of rural HCIIIs in Uganda was a function of procurement systems. The hypothesis model was used to determine whether procurement systems can affect the effectiveness of health care services delivery of rural HCIIIs in Uganda. The model considered the entire four hypotheses that were tested in this study. It shows the relationship between procurement systems and the effectiveness of health care services delivery of rural HCIIIs in Uganda and how they relate to logistics management public funding of health centre IIIs. The figure of the hypothesized model is shown below.

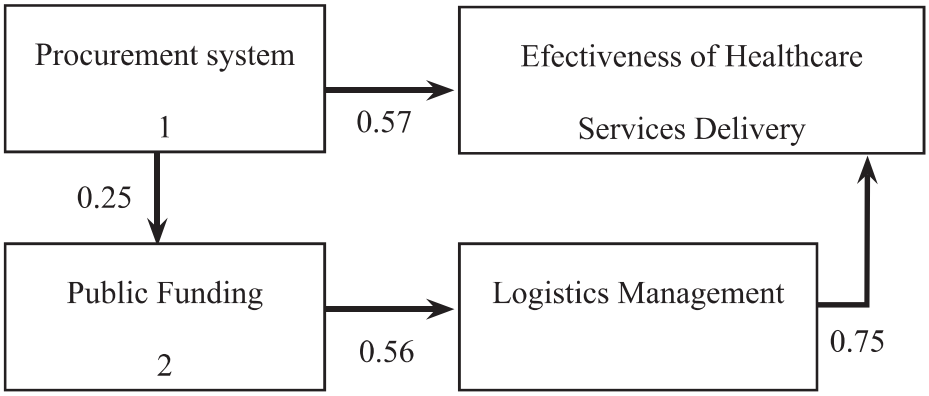

Figure2: Hypothesized model of procurement systems and effectiveness of health services delivery

Figure 2 the following considerations were taken into account: (1) All relationships between the variables are linear; (2) There are four variables, the independent variable (procurement systems), logistics management, public funding and the dependent variable (effectiveness of health care services delivery); (3) The causal paths that are relevant to the study variable effectiveness of health care services delivery in rural

health centre IIIs are from 1 to 2 to 3 and from 1 to 4.

The paths in the model established relationships, based on testing of the three hypotheses:

Public Procurement System is significantly related to Funding of rural health centre IIIs

Logistics Management has a positive effect on the effectiveness of health care service delivery for rural Health Centre IIIs.

Public Funding is positively related to logistics management for rural Health Centre IIIs.

Public Procurement System positively contributes to the effectiveness of health care services for rural Health Centre IIIs.

The path coefficients indicating the direct effect of a variable (obtained from testing of the hypothesis) are shown in the table below.

Table 14: Paths coefficients of the study variables

Paths	Variable	Path's coefficient
P12:	Public Procurement System and Public Funding	0.25
P23:	Public Funding and logistics management	0.75
P34:	Logistics Management and effectiveness of health care service delivery	0.56
P14	Public Procurement System and effectiveness of health care services	0.57

Decomposition of the model and its effect

The path coefficients were used to decompose correlations in the model into direct and indirect effects. As stated earlier, all relationships were

linear; therefore, the total causal effect of procurement systems on the effectiveness of health care services delivery in rural health centre IIIs is the sum of all the paths from procurement systems to the effectiveness of health care services delivery in rural health centre IIIs. The indirect effect of procurement systems on effectiveness of health care services delivery in rural health centre IIIs was calculated by multiplying the path coefficients for each path from procurement systems to effectiveness of health care services delivery in rural health centre IIIs, that is; Public Funding to logistics management and Logistics Management and effectiveness of health care service delivery = 0.25 x 0.56 x 0.75 = 0.10; The implication is that the total indirect effect of procurement systems on effectiveness of health care services delivery is 0.10. The direct effect of procurement system on effectiveness of health care services delivery in rural health centre IIIs was added to this indirect effect to establish the causal effect of procurement systems on the effectiveness of health care services delivery in rural health centre IIIs that is; 0.10 + 0.57 = 0.67 (67%).

Based on the decomposition of the model and its outcome, it can be concluded that procurement systems are a major determinant of the effectiveness of health care services delivery in rural health centre IIIs, which confirms that effectiveness of health care services delivery in rural health centre IIIs can be planned strategically.

Proposed Public-Private Partnership (PPP) procurement model

Given the fact that the current procurement system contributes only 67% to effectiveness of health service delivery at H/C IIIs and complaints are still coming through, there is need to improve on the contribution of the procurement system. This study proposes new model called the Public-Private Partnership. It involves a Private Consultant as a Private Management Unit on behalf of government, a Private Pharmaceutical

Store JMS (private supplier) and the community as key players in achieving effectiveness of health care service delivery of rural health centre IIIs copied with a digitalized ICT system and hence further recommendation of the introduction of mobile clinics/Vans in the system. The PPPs will provide a vehicle for coordinating with non-governmental actors to undertake integrated, comprehensive efforts to meet community needs of health care service delivery at the rural health centre IIIs since these aim to take advantage of the expertise of each partner, so that resources, risks and rewards can be allocated in a way that best meets clearly defined public needs.

Simulating the contribution of PPP model to effectiveness of health care service delivery

The new PPP model's contribution to the effectiveness of health care service delivery of health centre IIIs could be determined by a simple simulation in the following steps.

Step 1: The percentage of a total causal effect is subtracted from 10. The total causal effect from the hypothetical model is 67%. So, 100% minus 67% leaves 33%.

Step 2: The product in step 1 above is multiplied by the direct effect. That is, .33 x .57 = 0.18. So the contribution of the PPP model is 18%.

Step 3: The product in step 2 is added to the total causal effect to derive the total causal effect after simulation. In this study, 18% is added to 67% giving a final figure of 85%.

Step 4: The conclusion based on the simulation is that it is viable to adopt the new PPP model as it promised to add value (18%) to the effectiveness of health care services.

CONCLUSION TO THE STUDY

In conclusion, it is appropriate to contend that given the fact that about 80% lives in rural areas, it is important for the health care services in those areas to be effective. This is so because the populations' well-being is dependent on the availability of health care resources especially the medicines. The contribution of the public procurement for health to the effectiveness of the health care services, especially at the health centre IIIs was found to be at 67% which was not satisfactory as far health is concerned. So a new model (PPP) was proposed. This new model promised to rise the contribution of procurement to 85%. The remaining 15% is explained by factors outside of the public procurement system.

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