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Effects of Pharmaceutical Procurement Processes on Performance of Public Health Facilities in Mombasa County, Kenya

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Abstract

Performance in the Public Health facilities worldwide involves several key indicators in public procurement processes. Literature review suggests that, procurement efficiency and procurement effectiveness contribute to increased performance of Public Health facilities since drugs and commodities are always readily available for utilization and consumption. In most African countries, public procurement for pharmaceuticals is handled by personnel with limited knowledge and experience in designing optimal procurement systems to fit the ever changing demands in health facilities. The objective of this research project is therefore, to evaluate and establish how tendering procedures, skills and training, embracing technology and funding for pharmaceutical procurement processes affect performance of Public Health facilities in Mombasa County, Kenya. Several studies carried out on efficiency in procurement performance in health systems do not identify the quantitative and qualitative relationships between skills, tendering processes, technology and funding for pharmaceutical procurement processes in correlation to performance of Public Health facilities in Mombasa County.

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The study was conducted through a descriptive research design on Public Health facilities located within the Mombasa County. The target population constituted 217 Public Health facilities and a simple random sampling technique was used to select a sample size of 67 which was 30% of the total population. Interviewer administered questionnaire was used to collect primary data while secondary data gathered through reviews of both theoretical and empirical literatures. Pilot testing was conducted to obtain some assessment of the questions' validity and the likely reliability of the data. Reliability of the pre-test observation schedule was tested using internal Consistency technique. The data obtained was analyzed using both qualitative and quantitative analysis. The study found out that skills and training, tendering processes, embracing technology and funding for pharmaceutical procurement processes, contribute significantly to performance of Public Health facilities in Mombasa County. However, the results also indicated that, skills and training may not necessarily contribute to an equally linear positive performance relationship in the Public Health facilities in the Mombasa County due to intellectual capital flight.

Based on the findings, it can be concluded that the role of skills and training impact significantly on the performance of personnel involved in the procurement processes in making decisions while embracing technology simplifies and improves the overall procurement processes. The study recommends that, the Ministry of Health in the Mombasa County government proactively adopt programmes which can improve on skills and training development, embrace technology in procurement processes in order to liaise with other related departments. The County should adopt more flexible and agile tendering processes and finally improve on funding for pharmaceutical procurement processes and commodity availability.

Keywords: Funding; Information technology; Skills; Tendering procedure.

1. Introduction

1.1 Background information

Inability of country programs to procure essential medicines effectively and efficiently is a key barrier to commodity security against the right of every person to obtain and use health commodities when and where they are needed [35] The challenge, as with many Public Health objectives is, at least in part, financial on account of inadequate funding to purchase essential medicines for growing populations that do not have the means to access private health care or pay subsidized public sector prices [33].

Often overlooked however, is the need to build effective procurement processes which enable programs to select, forecast, and quantify pharmaceutical requirements at all times[35] It is also important to identify preferred suppliers manage tenders and bidding processes as well as maintain transparency and accountability to ensure quality of products[35] Routinely, efficient procurement for health programs requires specialized knowledge and expertise in essential medicines, and consumables, where quality products can be procured.

The pharmaceutical procurement processes get more complicated to achieve in the absence of supportive national and international Public Health policies, such as those involving commodity financing, global trade and patent protection issues. Decentralization of health services in devolved county governments combined with

national essential medicines policies and enforcement of laws and regulations that support transparency and accountability. Within this context, procurement of pharmaceuticals by and for public sector health programs has become an inherently complex process that involves the coordination of numerous government agencies, international funding sources, suppliers, and manufacturers [35].

In developing countries, inadequate availability and access to essential health commodities is apparently a barrier to delivery of essential health care. A recent survey by [34] found out that, the availability of 32 selected essential reproductive health (RH) commodities in public sector outlets was less than 25 percent. In a comparison study in Nicaragua, only 20 percent of these medicines were available to public sector clients according to a survey by a research firm, Program for Appropriate Technologies in Health. Efforts to address this challenge have focused on seeking additional and diversified funding sources and procurement channels.

Procurement, being the process of obtaining services, supplies, and equipment in conformance with applicable laws and regulations takes place locally, nationally, and internationally among a number of public, private, national, and local entities [17] In low-income countries, procurement process is often constrained by limited human resources, inadequate financing, and absence of information on prices and suppliers. Other factors include lack of awareness of government and donor regulations, overlapping procurement systems and processes, and unsynchronized or outdated rules and guidelines [17].

In Ethiopia, a policy objective of the essential health services package (EHSP), for example, states that all citizens have the right to a set of essential health services (Government of Ethiopia Health policy 1990). As a result, a parallel policy commitment to the full supply of health commodities to effect those services are required for the EHSP to meet its objective.

A case study by [29] reported that, pharmaceutical procurement function in Zambia required many institutions to be involved. This often led to a coordination challenge in the pharmaceutical procurement process. The Ministry of Health received funds for health financing from both the Ministry of Finance and the bilateral and multilateral Cooperating Partners. Some CPs channeled their funds directly to the MoH and others channeled it through the Ministry of Finance. The Ministry of Finance made the funds available to the MOH for drug purchasing based on a quarterly/monthly disbursal schedule. This often led to purchasing in fragmented quantities some of which were too small to even float an international tender. The Ministry of Finance cited poor accountability as the reason for controlled and staggered disbursal of the budgeted funds to the MoH.

However, in 2008, Zambia Government created a distribution parastatal agency; Medical Stores Ltd (MSL). MSL instituted procurement practices more commonly seen in the private sector such as, creating performance incentive schemes for its staff and workers and investing in advanced technologically systems for warehouse management and fleet tracking. MSL also outsources its senior operational management to Crown Agencies Ltd under a fixed term contract which requires Crown agents to build local management capacity using global best practices in warehousing, inventory management and distribution (Dahlberg Global Development Advisors).

In Kenya, public hospitals and some private Health facilities procure their essential pharmaceutical commodities

through KEMSA, a state corporation under the Ministry of Health established under a parliamentary Act 2013. The Authority's mandate is to procure, warehouse and distribute medical commodities (medical logistics) to the Public Health facilities according to the public relations KEMSA website (2013). KEMSA obtained ISO 9001: 2008 certifications in 2010 and has subsequently been re-certified after every two years. KEMSA distributes health commodities to more than five thousand (5000) Public Health facilities country wide. Procurement of pharmaceuticals is through international and national competitive tendering. The parastatal appears to face key bureaucratic challenges that lead to among others, long procurement lead times, managing stock turn-over ratios, downstream price control (where applicable) and overall distribution system inefficiency [30].

With promulgation of the Kenya constitution, KEMSA has now embraced a new business model to align itself to the devolved system of county government and the health function. The effect is to ensure that Public Health facilities access medical commodities in adequate quantities without compromising on quality and costs. With funds for procurement of pharmaceuticals devolved to the Counties, KEMSA has reviewed all its systems, structures and business model to be fully aligned with the devolved government. The new business model according to its public relations website will make the corporation self-sustaining as funds will be of a revolving model.

To supplement pharmaceutical supplies to other private and non-governmental health facilities in Kenya, there are organizations that efficiently procure pharmaceuticals dedicated specifically to faith based organizations (FBO's) e.g. Medical essential drug supplies (MEDS); United Nations funded programs through global Fund to fight HIV/AIDS; Affordable Medicines Facility - malaria (AMFm) and United Nations Population fund amongst others. The objectives of these non-governmental organizations (NGO) are to improve procurement processes and performance in the Public Health facilities.

1.2 Problem statement

Most developing countries are facing a problem of rapid changes in public pharmaceutical procurement requirements [17]. The changes impact on the pharmaceutical procurement performance on the internal and external procedures and processes to achieve its objectives. Interactions between various elements of professionalism in procurement processes staffing levels and budget resources, procurement organizational structure whether centralized or decentralized contribute to overall performance in health facilities. Government regulatory Acts on public procurement drug policies influence the performance of pharmaceutical procurement processes which in turn affects operations of the Health facilities. In addition, pharmaceutical procurement processes faces challenges from rapid developments in technology which have led to new procurement methods [45] Public procurement cannot therefore be perceived as mere 'clerical routine,' as procurement practitioners are and should be involved in strategic procurement planning [16].

Public Health facilities in Mombasa County are reportedly faced with perennial lack of pharmaceutical commodities which impact on their performance. Most County Public Health facilities have of recent been identified with significant stock-outs of key medications. Essential drugs are frequently unavailable to patients a majority of whom are from the lower end of the social structure. This forces patients to seek out medicines in

the commercial sector where prices are much higher and prone to questionable quality.

It is apparent that, this situation may be associated with the pharmaceutical procurement processes. All procurements conducted by KEMSA are governed by the Kenya Public Procurement and Disposal Act 2005 (GOK).Annual procurement budgets for essential drugs and commodities are prepared by KEMSA in conjunction with various health departments countrywide. Although KEMSA has adequate capacity to distribute pharmaceuticals and commodities to Public Health facilities nationwide, their distribution network is only as extensive as the network of Public Health facilities according to [6] report. The report continues to state that, the National and County Governments, through its Health departments have resources to distribute drugs and commodities to the last mile of dispensaries and other Health facilities within Mombasa County.

The National Government through its parastatal National Hospital Insurance Fund (NHIF) recently distributed ambulances to most Provincial, District and Sub district health facilities. This was in addition to the already existing fleet of former GK Land Rovers that can be utilized to collect and distribute urgent medical supplies from KEMSA warehouse located in Changamwe, Mombasa city. However, perennial stock-outs continue despite the available distribution network.

National Government finances and funds various activities undertaken by KEMSA in their quest to achieve its objectives of service delivery and access to medical commodities. To improve and integrate effective procurement processes and operations, KEMSA is embracing technological advancements that are expected to improve efficiency in service delivery in Public Health facilities. Despite availability of funds from both the national and County Government, and donor agencies, there seems to be a perennial and significant lack of pharmaceuticals and commodities in Mombasa County Health facilities. Coordination between the pharmaceutical procurement entities in the County government may be a problem. Even with advancement of procurement technology, availability of pharmaceuticals and commodities to influence performance of the health facilities in Mombasa County remains dismal.

Skills and level of training of the procurement personnel is a key ingredient on the performance of pharmaceutical procurement processes for their participation in tendering procedures. Optimization of skills to implement current developments in technology may be a hindrance to the overall performance of the health facilities in Mombasa County.

This study seeks to establish the effects of pharmaceutical procurement processes on the performance of health facilities in Mombasa County taking into account, the skills, tendering processes, embracing technology and funding as possible independent variables.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study was to evaluate the effects of pharmaceutical procurement processes on the performance of Public Health facilities in Mombasa County.

1.3.2 Specific Objectives

i) To establish effects of tendering procedures on performance of Public Health facilities in Mombasa County.

ii) To evaluate the effects of skills on the performance of Public Health facilities in Mombasa County.

iii) To study the effects of embracing technology on performance of Public Health facilities.

iv) To establish the role of funding on the performance of Public Health facilities in Mombasa County.

1.4 Research questions

i) How do tendering processes and procedures affect performance of Public Health facilities?

ii) Does the level of skills of procurement personnel have any effect on performance of Public Health facilities in Mombasa County?

iii) How does embracing technology affect performance of Public Health facilities in Mombasa County?

iv) How does funding affect performance of Public Health facilities in Mombasa County?

1.5 Justification of the Study

With the devolution of the national government in 2010, the County governments face the task of up grading their procurement processes in order to enhance and maintain performance of the Public Health facilities. Literature review suggests that procurement processes, efficiency and effectiveness of the procurement function are key indicators of performance in the Public Health facilities [17]. Indeed, in all organizations, training and skills have become widely recognized as increasingly important assets. They are important because expertise is a "must" for proficient performance in these domains.

Past studies conducted by United States Bureau of Labor Statistics (USBLS) in 1999 on the relationship between worker skills to workforce productivity indicated that 32% of increased workforce productivity was due to increased training and skills. This research project is to evaluate the effects of skills, and procurement processes on performance of health facilities in Mombasa County. It is intended that the findings of this research project will be useful to Mombasa County health facilities in strengthening the procurement processes that may contribute to overall performance of the Public Health facilities. The study will also forms basis on which researchers can carry out further research on public procurement performance in health institutions.

1.6 Limitations of the study

It was difficult in making interview appointments with the senior members of staff due to their busy schedules. However, the researcher addressed most of the respondents by dropping the questionnaires at their respective offices or carrying out the interviews during the lunch break and after office hours to avoid interfering with their routine schedules. Getting access to information on skills of the procurement personnel and reaching targeted respondents was not easy. Some of the respondents were not conversant with procurement procedures as Public Health facilities in Mombasa County are managed by medical practitioners. The researcher however met the respondents during non-office hours to clarify on any ‘questionnaires’ questions not clear to the respondents.

To find the appropriate literature review for this study was hard. Very few researchers had researched on the research topic particularly at the County level. This made it difficult for the researcher to conduct sufficient literature review on the study topic. The researcher however maximized on all the available materials and internet documents to get the necessary literature.

2. Materials and Methods

2.1 Introduction

This chapter discusses the methodology adopted by the study to carry out the research project. The study aimed at evaluating factors that affect pharmaceutical procurement processes on performance of Public Health facilities in Mombasa County. This chapter describes the research design, the study area, the population of the study, the sampling procedure, methods of data collection, reliability and validity of the instrument and finally data analysis techniques adopted.

2.2 Research Design

A research design according to [20] is a conceptual structure within which research would be conducted aimed at providing for the collection of relevant evidence with minimal expenditure of effort, time and money. Reference [10] defines research designs as plans and procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis. The study used descriptive survey research design which according to [11] is aimed at establishing relationships between variables and concepts, whether there are prior assumptions and hypotheses regarding the nature of these relationships. This research design was justified as it enabled the researcher to determine the current status of the workforce by assessing their response and opinions with respect to the four variables under evaluation.

2.3 Target Population

Reference [25] defines a target population as a complete set of numbers with some common observable characteristics. Reference [38] defines a target population in terms of numbers, geographical boundaries, and time. In this study, the target population was drawn from Public Health facilities listed in the Kenya open Data survey of 2014, as indicated in appendices III and IV. Consequently, 217respondents for this study were all employees working within the Public Health facilities and KEMSA a state parastatal that supplies pharmaceuticals and commodities.

2.4 Sample and Sampling Technique

2.4.1 Sample size

A sample size of 67 respondents was derived from the target population of 217 employees working within the Mombasa Public Health facilities, KEMSA, and some private hospital institutions. The sample size was obtained by basing on cluster random sampling according to the formula by [25] of estimating a 30% of the

target population of less than 10,000 as effective for social sciences. Results are shown in table 3.1.

Where the population is less than 10,000, Sample size for a given population can also be generated from a formula [5].

$n=\frac{z^2pq}{d^2}$, **where** n = the desired sample size for target population <10,000,

Z = normal standard deviation corresponding to 95% confidence interval, that is 1.96,

P = Proportion of the population estimated to have desired characteristics**.**

D=Design effect (2).

2.4.2 Sampling Technique

Table 3.1: Sampling technique

Department	Target Population	Sample size; 30% of Target population.
Ministry of health, CPGH	40	12
KEMSA	20	6
Tudor District hospital	15	5
Likoni Health Centre	15	5
Port Ritz District Hospital	15	5
Kongowea Health Centre	10	3
Mombasa county procurement department	20	6
Mwembe Tayari Sub District Hospital	10	3
Aga khan Hospital	20	6
Mombasa Hospital	12	4
Pandya Memorial hospital	20	6
Jomvu Kuu Health Centre	10	3
Makupa Health Centre	10	3
Total	**217**	**67**

Source; SARAM 2013

2.5 Data Collection Instruments

The researcher used structured questionnaire as the main primary data collection instrument. Questionnaires are less expensive in terms of saving time, convenience, and financial resources. The preference for the questionnaire is also based on the premise that it gives respondents freedom to express their views or opinions more objectively. Secondary data was collected from various sources such as library, published journals relevant to the study, government publications and the Internet. The data focused on tendering processes, skills and training, embracing technology and funding for procurement of pharmaceuticals as the constructs that affect performance of Public Health facilities in Mombasa County. The questionnaires were based on a 5-point Likert-type scale used.

2.6 Pilot Test

Prior to actual collection of data, a pilot testing was conducted to obtain some assessment of the questions' validity and the likely reliability of the data that was collected. It is during the pre-test of the instrument that the researcher is able to assess the clarity of the instrument and the ease of use of the instrument [25] .Since this is an interviewer-administered questionnaire, further inquiry on the length, clarity and ambiguity of the questions was also sought. The information collected during the pilot study was used to undertake a preliminary analysis to enable the research questions to be answered appropriately.

A pilot test was carried out on 10 respondents randomly selected from the sample frame where reliability and validity of the pre-test observations were done using internal consistency technique. Cronbach's Coefficient Alpha was then computed using statistical packages for social sciences (SPSS version-20) to determine how items correlate among themselves. If the coefficient is more than 0.73 the data collection instrument is taken as reliable but if it is below, the instrument is treated unreliable. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. The research instrument was justified to be used for collecting data because the Cronbach Alpha coefficient was 0.751. These correlations were considered adequate since other researchers generally recommend values of r =.800, or larger as ideal when using correlation to measure the reliability of measurement [14].

2.7 Data Processing and Analysis

First, Descriptive information after content analysis was converted into frequencies and percentages and presented using tables and bar-charts. Specifically, frequencies and percentages were tabulated for each section of the questionnaire. The first section of the questionnaire provided data on demographics, the second section to the forth section provided data for each of the independent variables and the fifth sixth section provided data for the independent variable.

2.8 Reliability and Validity of the Measurements

The study was aimed at establishing the association between the independent and dependent variable hence, the need to undertake correlation analysis. A correlation coefficient gives the strength and the direction of the

relationship between two variables. In addition to the strength of a relationship, the direction of association such as positive or negative was done using the Pearson correlation of relationship.

Pearson correlation coefficient is a measure of linear association between two variables. Values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive linear sense; a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables[38] .In this case each of the independent variables: tendering processes, skills and training, embracing technology and funding for procurement processes were correlated with the dependent variable, performance of Public Health facilities.

Analysis of Variance (ANOVA) test was done to analyze the amount of variation within each of the sample relative to the amount of variation between samples this was considered important since it makes use of the F-test (frequency) in terms of sums of squares effects over sums of squares residual[38] .Finally, Multiple Linear Regression analysis was used to analyze first the effect of each independent variable on the dependent variable and secondly the overall effect of the independent variables; tendering processes, skills and training, embracing technology and funding for procurement processes.

Multiple Linear Regression analysis is a statistical technique that models the relationship between a criterion or dependent variable (*Y)* and a set of predictors or independent variables(*Xi)* (for i = 1,2,3,4). This statistical relationship is of the form:

$$Y=\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + Є$$

Where, *Y* = Performance of Public Health facilities

β_0 = intercept

β_1-β_4 = Slopes coefficients representing the influences of the association of Independent variables over the dependent Variable.

X_1 = tendering processes

X_2 = Skills and training

X_3 = Embracing technology

X_4 = Funding for procurement processes

Є = Error term

$\beta_1, \beta_2, \beta_3$ And β_4 represent the independent contribution of eachindependent variable to the overall model where β_0 represents the intercept of thelinear model. Further, the general objective of the study which was to evaluate the effects of pharmaceutical procurement processes on the performance of Public Health facilities in Mombasa County used multiple regression analyzes to assess the overall effect of the independent variables on the dependent variables.

3. Results and Discussion

3.1 Introduction

This chapter contains findings of the study on the effects of procurement processes on the performance of Public Health facilities in Mombasa County, Kenya. Descriptive statistics was used to analyze the data in terms of percentages and frequency tables. Reliability among the multiple measures of the variables was measured using Cronbach's alpha coefficient

3.2 Response Rate

A total of 67 questionnaires were distributed to procurement managers in the Mombasa County Public Health facilities, Private hospital establishments and KEMSA Head office in Nairobi and Mombasa branch. In cases where the senior managers were not present questionnaire were distributed to their deputies. The researcher received 53 completed questionnaires out of the 67that were distributed. This represented an overall response rate of 79.10%. This response rate was considered adequate for further statistical analysis because it was over 60% which is recommended and indicated as good by [20]; the response rate is represented in figure 4.2.

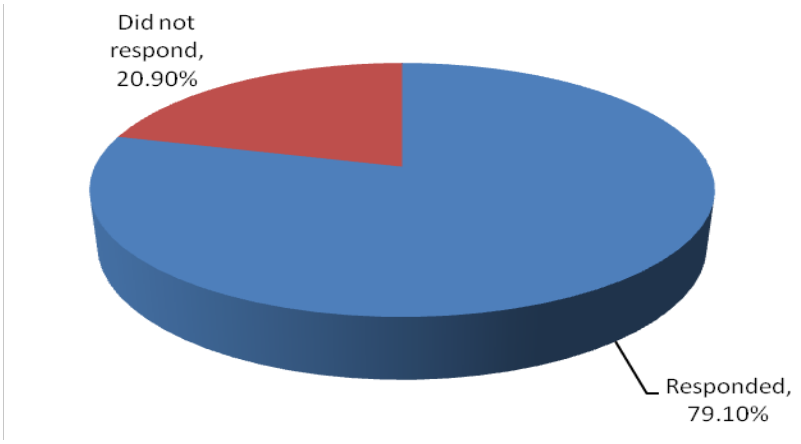

Figure 4.2: Response rate. Source: author's own research-Health facilities in Mombasa Kenya

3.2.1 Respondent profiles

There were a total of 53 respondents for this study of which 32 (60.4%) were males and 21 (39.6%) were females as shown in table 4.1 below.

Table 4.1: Gender Distribution of Respondents

Gender	**Percentage**
Males	Females
32	60.4%
21	39.6%
Total	100%

Source: Author's own research-Health facilities in Mombasa Kenya

Age of respondents was considered important for this study because experience in procurement processes improves with time since most of the respondents do not have basic knowledge in procurement methods.

Table 4.2 below shows that an equal number of respondents had work experience of between (1 to 5; 5 to 10; and 10 to 15) years standing at 28.3%. A total of 13.1% had work experience of 15 to 20 years, while only 2% had worked for more than 20 years in the Public Health facilities. Many years of experience enable respondents to provide more accurate information of a given concept of the procurement processes in the Public Health facilities such as tendering processes, skills and embracing technology in relation

Table 4.2: Working Experience in Years

Period	**Percentage**
1 – 5 years	28.3%
5 – 10 years	28.3%
10 – 15 years	28.3%
15 – 20 years	13.1%
20 – 25 years	2%
Total	100%

Source: Author's own research-Health facilities in Mombasa Kenya

Majority of respondents 26 (49%), were between ages of 30 - 40 years, 12 (22.6%) between 40 – 50 years, 2 (3.8%) above 50 years and 13 (24.5%) below 30 years as depicted in table 4.1.3 below. All age brackets were taken into account thereby reducing the level of biasness in the study.

Table 4.3: Ages of Respondents

Age	Percentage
20 - 30 years	24.5%
30 – 40 years	49.05%
40-50 years	22.6%
More than 50 years	3.8%

Source: Author's own research-Health facilities in Mombasa Kenya

3.3 Reliability Analysis

Reliability of a measure indicates the extent to which it is without bias (error free) and hence ensures consistent measurement across time and across the various items in the instruments. It is therefore, an indication of the stability and consistency with which the instrument measures the concept and helps to assess the goodness of a measure. The rule of the thumb for cronbach alpha is that the closer the alpha is to 1 the higher the reliability [37] . A value of at least 0.7 is recommended. The data was justified to be used for further analysis because the Cronbach Alpha coefficient was more than 0.70 as indicated in the table 4.2.

Table 4.4: Reliability and Validity Measurement Results

Constructs	Number of items	Overall Cronbach's alpha
Independent variables		
Tendering processes	4	0.860
Skills and training	3	0.783
Embracing technology	4	0.741
Funding	4	0.731
Dependent variable		
Performance of Public Health facilities	9	0.751

Source: Author's own research-Health facilities in Mombasa Kenya

Some items had to be removed to improve the Cronbach's alpha coefficient in most of the independent variables. It was found that the reliability estimates and item –total correlations of the remaining constructs ranged from 0.731 to 0.860 which was reasonable, giving support for the validity of respondents rating.

From table 4.4 the internal consistency measures of the four independent variables namely tendering processes, skills and training, embracing technology and funding, the dependent variable performance of Public Health facilities were acceptable and valid because ($\alpha \geq 0.700$)

3.4 Descriptive Statistics of Independent and Dependent Variables

3.4.1 Tendering procedures for pharmaceutical requirements are adequately covered by the public procurement and disposal Act, 2005 of Kenya.

This question sought to establish whether tendering procedures enacted by the Kenya government under the Public Procurement and Disposal Act 2005adequately takes into consideration all aspects of pharmaceutical requirements for proper performance of Public Health facilities. Majority of the respondents (96.3%) strongly agreed that the Act adequately covers the pharmaceutical procurement procedures while a paltry 3.7% remained neutral (Table 4.5). The response collaborates well with the Public procurement and disposal Act's objectives to maximize economy and efficiency, promote fair competition, increase transparency and accountability in procurement procedures. As to whether tendering rules and regulations are a major hindrance to performance of Public Health facilities in Mombasa County, majority of the respondents strongly agreed (90.5%) while (1.9%) disagreed. Sentiments from those who agreed to the question related their experience to urgent emergency procurement for pharmaceuticals. The procedures required several steps involving a series of board meetings or departments to raise a purchase order. As to whether Procurement rules and regulations are clear to the procurement staff involved in tendering procedures, a majority of the respondents (84.9%) agreed, while (13.2%) had no opinion and (1.9%) disagreed. On whether Compliance with tendering processes contributes to performance in Public Health facilities in Mombasa County, a majority agreed with (50.9%) while (17%) disagreed and (26.4%) had no opinion. What the respondents at the facilities were interested in according to further probes was, availability of pharmaceuticals at all times and not compliance systems. Respondents were also asked on whether bureaucratic tendering processes maybe a cause for poor performance in the Public Health facilities in Mombasa County. A majority agreed at (90.5%) while (7.5%) had no opinion. It is therefore possible that, bureaucratic tendering processes according to the respondents reduce performance of Public Health facilities in Mombasa County.

Performance of Public Health facilities is dependent on availability of pharmaceuticals sourced in the most efficient methods and provided at the right time, delivered at the right place and of good quality. Procurement processes should not be a hindrance to effective performance of the health facilities where professional procurement staff and systems are in place.

3.4.2 Effects of skills and training *on the personnel involved in pharmaceutical procurement processes, on the performance of Public Health facilities in Mombasa County.*

Respondents were asked whether their skills and training helps them to improve their performance in procurement processes in Mombasa County. An overwhelming (96.3%) strongly agreed while a paltry (3.7 %) had no opinion (Table 4.6).On whether skills and training improves decision making leading to better performance, a majority agreed with a (90.5%) and a no opinion of (7.5%). On training strategies to improve skills in performance of health facilities, a majority agreed with a (84.9%) while (13.2%) had no opinion. The public procurement review (2006) of Scotland stated in its paper on skills that, increasing the skills and qualifications of individual employees was critical in supporting procurement processes and delivery of pharmaceuticals while at the same time fostering greater levels of workforce participation. In this context, improving skills and training to staff involved in the procurement processes in the Mombasa County will add

value in terms of procurement performance and at the same time increase confidence in their participation. County government commitment to improving skills and training is to up-lift the level of performance in the procurement processes thereby alleviating the perennial pharmaceutical stock-outs.

Table 4.5: Tendering procedures on pharmaceutical procurement

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**	**Std.dev**
Tendering procedures for pharmaceutical requirements are adequately covered by the public procurement and disposal Act, 2005 of Kenya.	0% 0	0% 0	3.8% 2	18.9% 10	77.4% 41	4.74	.524
Tendering procedures are occasionally a hindrance to urgent procurement of pharmaceuticals leading to poor performance of health facilities.	0% 0	1.9% 1	7.5% 4	22.6% 12	67.9% 36	4.57	.721
Procurement rules and regulations are not clear to the procurement staff involved in tendering procedures.	0% 0	1.9% 0	13.2% 1	22.6% 12	62.3 33	4.45	.798
Compliance with tendering processes leads to poor performance in Public Health facilities in Mombasa county.	0% 0	5.7% 3	50.9% 27	26.4% 14	17% 9	2.55	.845
Bureaucratic tendering processes maybe a cause for poor performance in the Public Health facilities in Mombasa county.	0% 0	1.9% 0	7.5% 4	22.6% 12	67.9% 36	4.57	.721

Source: Author's own research-Health facilities in Mombasa Kenya

Table 4.6: Skills and training on the personnel involved in pharmaceutical procurement processes.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std.dev
My skills and training helps to improve my performance in procurement processes in Mombasa County.	0% 0	0% 0	3.8% 2	18.9% 10	77.4% 41	4.74	.524
My skills and training improves procurement decisions leading to better performance of Public	0%	1.9%	7.5%	22.6%	67.9%	4.57	.721

Health facilities in Mombasa county.	0	1	4	12	36		
My training in current procurement strategies improves performance of Public Health facilities in Mombasa County.	0% 0	1.9% 1	13.2% 7	22.6% 12	62.3% 33	4.45	.798
Limitation of training facilities in Mombasa County leads to poor procurement performance in Public Health facilities.	3.8% 2	11.3% 6	26.4% 14	28.3% 15	30.2% 16	3.70	1.137

Source: Author's own research-Health facilities in Mombasa Kenya

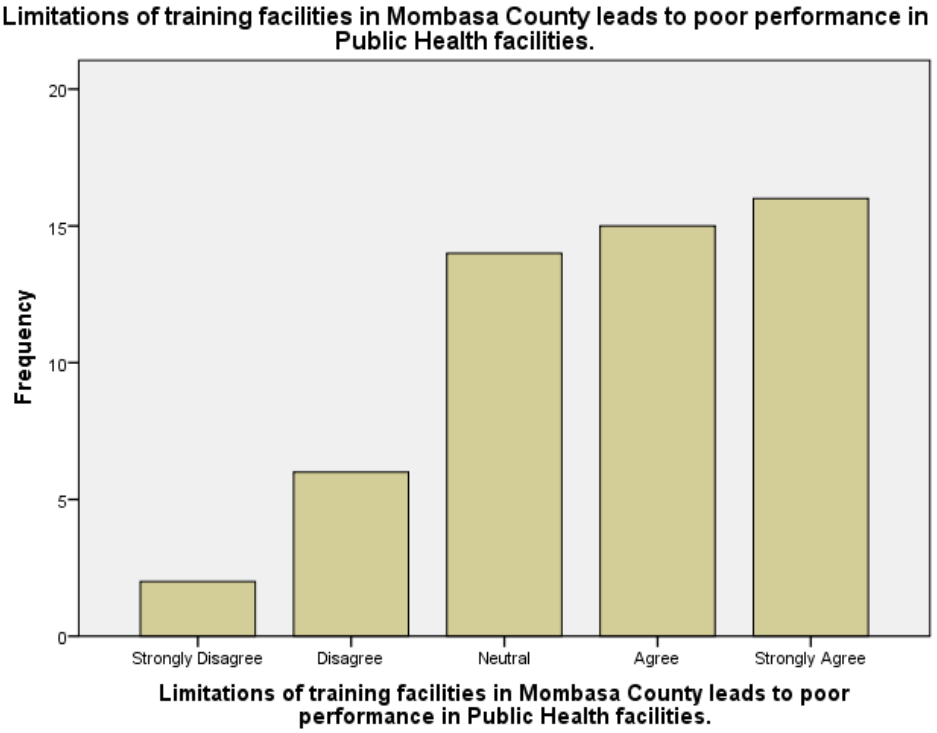

Figure 4.3: Limitations of Training facilities in Mombasa County. Source: Author's own research-Health facilities in Mombasa Kenya.

3.4.3 Effects of embracing technology in procurement processes on performance of Public Health facilities in Mombasa County

The question was put forward to evaluate the effects of embracing technology in procurement processes and whether, it enhances performance of Public Health facilities in Mombasa County. A majority of the respondents were positive with a (96.3%) agreeing while only (3.7 %) were of no opinion regarding embracing technology as a tool for improving procurement processes in performance of Public Health facilities in Mombasa County (Table 4.7). Respondent's opinions on implementing technology as a priority to improving procurement processes and performance of Public Health facilities received a(90.5%) agreeing while (9.4%) remained neutral (Table 4.7). Another question to respondents on whether benefits of technology in procurement processes on

performance of Public Health facilities have not been realized in Mombasa County, received a positive value of (83%) and a (3.8%) disagreeing. As a follow up, respondents were asked to give an opinion on whether installing technology software was expensive in consideration to the level of integration with other departments in the Mombasa County. A total of (56.6%) agreed while (18.9%) disagreed with (43.4%) remaining neutral. Respondents on whether lack of technology in procurement processes affects Performance of Public Health facilities in Mombasa County indicated positively a (75.5%) and a (24.5%) disagreeing to the statement.

Table 4.7: Embracing technology in procurement processes

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std.dev
Embracing technology in procurement can enhance performance of Public Health facilities in Mombasa county.	0% 0	0% 0	3.8% 2	20.8% 11	75.5% 40	4.72	.533
Implementing technology is not a priority due to lack of knowledge and knowhow in using the systems.	0% 0	1.9% 1	7.5% 4	22.6% 12	67.9% 36	4.57	.721
Benefits of technology in procurement processes have not been realized in Mombasa County on performance of Public Health facilities	0% 0	3.8% 2	13.2% 7	22.6% 12	60.4% 32	4.40	.862
Installing technology software is expensive considering the level of integration with other departments in the Mombasa County	3.8% 2	11.3% 6	28.3% 15	30.2% 16	26.4% 14	3.64	1.111
Lack of technology in procurement processes affects performance of Public Health facilities in Mombasa County.	0% 0	0% 0	0% 0	24.5% 13%	75.5% 40	1.75	.434

Source: Author's own research-Health facilities in Mombasa Kenya

As the procurement function of many organizations including the Kenya Government become more strategic, procurement technology allows for a processes re-design that makes the processes more open with accountability, transparency and reporting capabilities thereby speeding up the procurement cycle. The effects are to provide greater access to more opportunities for supplies according to [7]. Chartered institute of purchasing, (2008) procurement technology helps organizations accelerate procurement processes by integrating suppliers and inventory management in order to improve on stock level performance. The general consensus on the objective of embracing technology was a "strongly agree" among the respondents.

3.4.4 Effects of funding for procurement processes on performance of Public Health facilities in Mombasa County.

Table 4.8: Funding for procurement processes

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std.dev
Funding for pharmaceutical procurement processes is inadequate in meeting the County's health needs.	0% 0	0% 0	3.8% 2	18.9% 10	77.4% 41	4.74	.524
Funding by the national and County government for procurement of pharmaceuticals affects performance of Public Health facilities.	0% 0	0% 0	7.5% 4	24.5% 13	67.9% 36	4.60	.631
Funding for pharmaceutical procurement is well supported by non-governmental organizations.	0% 0	1.9% 1	9.4% 5	22.6% 12	66% 35	4.53	.749
Availability of funds for pharmaceutical procurement has no effect on performance of Public Health facilities in Mombasa County.	0% 0	0% 0	11.3% 6	28.3% 15	60.40% 32	3.49	.697
Cost sharing as a form of a revolving fund in financing procurement of pharmaceuticals has limited effect on performance of Public Health facilities in Mombasa county.	7.5% 4	18.9% 10	32.1% 17	32.1% 17	9.4% 5	3.17	1.087

Source: Author's own research-Health facilities in Mombasa Kenya

This question sought to investigate whether funding for pharmaceutical procurement processes was inadequate in meeting the Mombasa County's pharmaceutical health needs. Majority (96.3%) agreed that funding was inadequate in meeting the pharmaceutical requirements in Mombasa County, while (3.8%) remained neutral (Table 4.8). Respondent's opinion on whether funding by both the national and county governments affects performance of Public Health facilities received a positive (92.4%) and a neutral (7.6%). Respondents were in agreement that, appropriate funding avails the necessary pharmaceuticals and commodities to improve performance of Public Health facilities. A question on whether availability of funds for pharmaceutical procurement had any effect on performance of Public Health facilities received a (88.7%) agreement while

(28.3%) were neutral. However, some respondents noted that, availability of funds does not necessarily translate into improved performance of the health facilities. Some of the funds are usually channeled into non pharmaceuticals or re-budgeted for un-related services translating into dismal performance at the health facilities.

Respondents were also asked to give views on whether cost sharing as a form of a revolving fund had limited effects on performance of Public Health facilities in Mombasa County. A total of (41.5%) agreed while (26.4%) disagreed with ((32.1%) remaining neutral. The results indicate that, cost sharing as a form or a revolving fund has very limited function or effect on performance of health facilities in Mombasa County. Possibly, the cost sharing funds are utilized for a different purpose un-related to procurement processes of pharmaceuticals. Finally, respondents were requested to give their opinion on whether funding for pharmaceutical procurement is well supported by non-governmental organizations. A total of (82.6%) agreed while (11.3%) remained neutral and 1.9%disagreed. The response was skewed in favor of supporting the non-governmental organizations since they only support a limited category of pharmaceuticals for a certain commercial contracts.

3.4.5 Performance of Public Health facilities as affected by tendering processes, skills and training, technology and funding by the national government and other agencies

The questions were to evaluate the dependent variable performance of Public Health facilities in respect to the independent variables tendering processes, skills and training, technology and embracing technology. Respondents towards cost sharing as a means to improving performance of Public Health facilities was only 45.5% as agreeing while 18.9% disagreed. A more positive percentage was shown by respondents on whether availability of skilled manpower improved performance of Public Health facilities with a 98.1% agreeing while only 1.9% was neutral. Well-equipped Public Health facilities as a pre-requisite for better performance received a strong agree at 98.1% and a neutral response of 1.9%. Respondents on embracing technology in Public Health facilities as a pre-requisite for enhanced performance of Public Health facilities indicated positively with a 96.1% and 3.8% as neutral. On whether Public Health facilities are dependent on funding from the donor agencies, national, and county governments in order to achieve enhanced performance, the response was 79.3%agreeing and 20.8% neutral. Finally, respondents were asked whether the national government and the Mombasa county government offers regular seminars and training to impart more skills on the current staff. Those who disagreed were 15.3%, while 51.9% agreed with 48.1% remaining neutral.

3.5 Regression analysis:

In order to test the research objectives, regression analysis was employed. The model equation Y = $\beta_1 X_1$ + Є

explained 71.7 % as measured by the goodness of fit (R-square) in Table 4.7.

The model summary table 4.7 provides the R, R2, adjusted R2, and the standard error of the estimate, which can be used to determine how well a regression model, fits the data. From the table, R squared is the fraction of the variation in dependent variable (Performance of Public Health facilities) that can be accounted for by independent variables i.e. tendering procedures, skills and training, technology and funding by national

government. R-square is the proportion of the variation in the dependent variable (Performance of Public Health facilities) that was explained by variations in independent variables. In this case R-Square shows that 71.70% of variation was explained.

Table 4.9: Overall Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.847	.717	.694	.285

Table 4.10: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	9.875	4	2.469	30.456	.000
	Residual	3.891	48	.081		
	Total	13.766	52			

Predictors; Tendering processes, skills and training, embracing technology and funding

The ANOVA statistics was used to test the fitness of the regression model. The significance F - value of 30.456 (p = 0.000) was obtained. This implied that the regression model obtained was fit and statistically significant therefore can be deemed fit for prediction purposes.

Table 4.11: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.057	.378		2.799	.007
Tendering	.297	.106	.328	2.793	.007
Skills	-.410	.054	-.842	-7.579	.000
Technology	.793	.141	.785	5.632	.000
Funding	.153	.097	.145	1.583	.020

From the regression model in Table 4.11, findings indicated that tendering procedure had (at 95% confidence level, P= 0.05) a P-Value=0.007, a value within the significance level of 0.05. This shows a strong relationship between tendering procedure as a factor influencing Performance of Public Health facilities. Secondly, skills and training had a P-Value=0.000, indicating a strong relationship between skills and training and the Performance of Public Health facilities. Thirdly, embracing technology as a factor influencing Performance of Public Health facilities scored a P-Value=0.000, which again indicating a strong relationship between embracing

technology and the dependent variable, (Performance of Public Health facilities). Finally, funding by national government had a P-Value=0.020, this is also a strong relationship between the factor funding by national government and the dependent variable, Performance of Public Health facilities. This is a clear indication that all the four factors tendering procedures, skills and training, technology and funding by national government strongly influence the Performance of Public Health facilities in Mombasa County. Therefore, Public Health institution should ensure that these variables are improved and maintained for increased and sustainable Performance of Public Health facilities in Mombasa County. Public Health facilities officers in Mombasa County are encouraged to improve on these factors because they can add more value to the Performance of these Public Health facilities.

The regression model in Table 4.11 also revealed that holding all the four factors, (tendering procedures, skills, technology and funding constant, Performance of Public Health facilities would be achieved at unit of 1.057. A unit increase in tendering procedures would cause an increase in Performance of Public Health facilities in the facility by a factor of 0.297, a unit increase in skills and training would cause an increase in Performance of these Public Health facilities in the facility by a factor of -0.410, a unit increase in technology would cause an increase in Performance of Public Health facilities in the facility by a factor of 0.793 and a unit increase in funding by national government would cause an increase in Performance of Public Health facilities in the facility by a factor of 0.153. A negative factor in skills and training can be explained by increased intellectual flight by the newly skilled and trained staff to more lucrative private sectors.

3.5.1 Correlation among Variables

Correlation analysis was used to examine the association among variables. Correlation coefficient is a measure of linear association between two variables. Values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1indicates that two variables are perfectly related in a positive linear sense; a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables[25]

The findings of these analyses are represented in Table 4.10.The results showed that there existed a strong positive significant correlation between the four predictor variables used in this study except skills and funding. All Pearson's coefficient of correlation reported is significant at level 0.01. (The coefficient ranged from0.167 to 0.733).

The bivariate correlation analysis between the dependent variable and the independent variables was run. The aim was to determine the nature and strength of association between each of the independent variables and the dependent variable. The correlation result was that there was a strong positive correlation between each of the independent variables and the dependent variable, performance of public health facilities. Tendering processes had the highest positive correlation coefficient (r = 0.529) with performance of Public Health facilities. Funding was second with a strong positive correlation coefficient of (r =0.511). Technology was third with a strong positive correlation coefficient with (r=0.489) while skills and training was least with (r=-0.094).

Table 4.12: Pearson's Correlations between independent variables

		Tendering	Skills & training	Technology	Funding
Tendering	Pearson Correlation	1	.528	.733	.485
	Sig. (2-tailed)		.000	.000	.000
	N		53	53	53
Skills & training	Pearson Correlation		1	.702	.167
	Sig. (2-tailed)			.000	.233
	N			53	53
Technology	Pearson Correlation			1	.443
	Sig. (2-tailed)				.001
	N				53
Funding	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

Correlation is significant at the 0.01 level (2-tailed).

Table 4.13: Pearson's Correlations between dependent variable and dependent

		DEPENDENT	TENDERING	SKILLS & TRAINING	TECHNOLOGY
DEPENDENT	Pearson Correlation	1	.529	-.094	.498
	Sig. (2-tailed)		.000	.504	.000
	N		53	53	53

Correlation is significant at the 0.01 level (2-tailed).

3.6 Discussion

3.6.1 Tendering procedure

The first objective was to establish effects of tendering procedures used in pharmaceutical procurement processes on the performance of Public Health facilities in Mombasa County: the findings indicated that tendering procedure had (At 95% confidence level, P= 0.05) a P-Value=0.007, a value within the significance level of 0.05. This shows a strong relationship between tendering procedure as a factor influencing Performance of Public Health facilities

3.6.2 Skills and training

To evaluate the effects of skills and training on the personnel involved in pharmaceutical procurement processes, on the performance of Public Health facilities in Mombasa County: skills and training had a P-

Value=0.000, indicating a strong relationship between skills and training and the Performance of Public Health facilities

3.6.3: Embracing technology

The third objective was to study the effects of embracing technology in organizations involved in procurement processes in Mombasa County on performance of Health facilities. The results showed that embracing technology as a factor influencing Performance of Public Health facilities scored a P-Value=0.000, which again indicating a strong relationship between embracing technology and the dependent variable, (Performance of Public Health facilities).

3.6.4: Funding for procurement processes

Finally the fourth objective was to establish the role of funding by the National Government, County government and other donor agencies on pharmaceutical procurement processes on performance of Public Health facilities in Mombasa County. The results showed that funding had a P-Value=0.020, this is also a strong relationship between the factor funding by national government and the dependent variable, Performance of Public Health facilities.

4. Conclusion

The general objective of this study was to evaluate the effects of pharmaceutical procurement processes on the performance of Public Health facilities in Mombasa County. The research therefore, established that all the four factors that were studied, that is,

I. Tendering procedures,
II. Skills and training,
III. Technology and
IV. Funding by donor agencies, Mombasa County and the national government strongly influence the performance of Public Health facilities in Mombasa County.

Therefore, Public Health institution should ensure that these variables are improved and maintained for increased and sustainable Performance of Public Health facilities in Mombasa County. Public Health facilities officers in Mombasa County are encouraged to improve on these factors because they can add more value to the Performance of these Public Health facilities.

5. Recommendations

Based on the findings of this study the researcher recommends the following; Majority of the respondents indicated that

i) Tendering procedures for pharmaceutical requirements are adequately covered by the public procurement

and disposal Act, 2005 of Kenya. It is therefore recommended that stakeholders in the industry recognize and appreciate this by ensuring that this trend is improved and maintained.

ii) On the account of skills and training the result showed that skills and training improves procurement decisions leading to better performance of Public Health facilities in Mombasa County. Public Health facility managers are advised to periodically review and evaluate training programs so as to come up with programs that are suitable for the industry.

iii) Technology is one of the key primary indicators in performance of Public health facilities. Majority of the respondents indicated that lack of modern technology in procurement processes affects performance of Public Health facilities in Mombasa County. Stakeholders are advised to embrace technology so as to realize both short term and long term goals.

iv) The study further found out that funding for pharmaceutical procurement is well supported by non-governmental organizations for those pharmaceutical commodities that are under their contract terms. It is therefore recommended that good governance and accountability be appreciated and recognized. Funding by the various agencies to manage pharmaceutical procurement processes should be coordinated in order to avoid essential pharmaceuticals and commodities stock outs. Funding through KEMSA for centralized procurement is recommended to avoid haphazard procurement processes. Management of Public Health facilities in Mombasa County and policy makers should adopt a team work involving skilled procurement personnel and other stakeholders in order to improve on performance of Public Health facilities. Health workers require equipment and pharmaceuticals as well as payment of salaries on time to motivate overall performance.

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