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KNOWLEDGE AND PRACTICE OF SUPPLY CHAIN MANAGEMENT OF PHARMACEUTICALS BY HEALTH PROFESSIONALS IN FOUR STATES OF SOUTH-SOUTH, NIGERIA

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ABSTRACT

The importance of logistics and supply chain management cannot be overemphasized for optimal management of pharmaceuticals and other health commodities. The aim of this study was to assess the knowledge of pharmaceutical supply chain management activities and evaluate the forecasting, procurement and inventory management practices of health professionals in four states of South-South region of Nigeria. A cross sectional descriptive study was carried out from February to July 2015 among 150 respondents working in registered practice settings (Hospitals and Community Pharmacies) in Rivers, Bayelsa, Akwa-Ibom and Cross River States of Nigeria. Data collection tool was a pretested questionnaire to assess respondents' knowledge of pharmaceutical supply chain activities and forecasting, procurement and inventory management practices. Data collected were analyzed using Statistical Package for Social Sciences (SPSS) version 20. The respondents had a good knowledge of pharmaceutical supply chain activities. Information used for forecasting included stock on hand, dispensed to user data, issue data and disease prevalence. Procurement practices included tender, local purchase order and medical representatives. Inventory management practices included use of stock card, ledger and computer. The knowledge of respondents to pharmaceutical supply chain activities was good. Several forecasting and procurement and inventory management practices were employed. Observed knowledge deficit and poorly computerized inventory control system is a major drawback which need improvement for satisfactory monitoring.

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INTRODUCTION

Supply chain management (SCM) is the integration of key business processes across the supply chain to create value for customers and stakeholders [1]. Supply chain management in the healthcare system is characterized 'by the information, assets and money essential to purchase and transfer goods and services from the provider to the end user to control costs [2]. A Pharmaceutical Supply Chain (PSC) is

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defined as a 'combination of processes, organizations and operations involved in the development, design and manufacturing of useful pharmaceutical drugs [3]. PSC is a unique supply chain since it has to do with the life and health of individuals [4]. Proper functioning of the PSC ensures that medicines get to the end user. Medicines are an important aspect of health care. Access to medicines is a fundamental human right and one of the key objectives of health systems [5]. The PSC should provide drugs in the right quantity, with acceptable quality, to the right place and patients, at the right time and at an optimal cost so as to be congruent with the objectives of the health system [6]. The PSC consists of various parts namely the supplier, manufacturer, wholesaler and pharmacy or hospital [7-9].

The pharmaceutical supply chain involves four main activities: product selection, quantification and procurement; inventory management, storage and distribution; and serving customers. The whole process is frequently monitored and evaluated [10]. Management support systems comprise planning and administration, organization, financing, information technology and human resources [11]. Access to essential medicines is dependent on a well-functioning supply chain system that transports medicines from the manufacturer to the end-user [10]. The knowledge of healthcare professionals at various stages of the PSC affects its efficiency and effectiveness. Limited studies have assessed the knowledge and practices of health professionals in PSC management in Nigeria. The aim of this study is to assess the knowledge and practices of health professionals in PSC management in four states in South-South region of Nigeria.

METHODS

Study Setting

The study was conducted in hospitals and community pharmacies in Rivers, Bayelsa, Akwa-Ibom and Cross River States in South-South Nigeria. All teaching hospitals, selected general/cottage hospitals and community pharmacies in these states were considered.

Study Design

The study was a cross sectional descriptive survey involving the use of structured questionnaire.

Study Population

The study population was health professionals handling pharmaceuticals and health related commodities working in the study settings. In each setting, the personnel who were responsible for supply chain management of health commodities were the subjects.

Inclusion and Exclusion Criteria

Only consented respondents, who handled, sold and/or dispensed pharmaceutical and health related commodities were included in the study. Non-consenting respondents and those who had not been handling supply chain related matters were excluded from the study.

Sampling and Sampling Procedures

A sample size calculator [12] was used to calculate the sample size at 95% confidence level and 5% confidence interval. A minimum sample size of 147 was obtained based on an estimated 238 registered practice settings (Hospital and community pharmacies) and was rounded up to 150. Respondents were sampled from February to July, 2015. Twenty-four respondents were from community pharmacies in Bayelsa State, thirty-six from community pharmacies in Rivers State and fifteen respondents each were from community pharmacies in Akwa-Ibom and Cross River States respectively. Five respondents were from each teaching hospital and ten (10) respondents from selected general/cottage hospitals in Rivers and Bayelsa state and five (5) respondents in Akwa-Ibom and Cross River state respectively.

Data Collection Tools

The research instrument used to collect data was a structured pre-tested questionnaire. The questionnaire consisted of 29 items divided into two parts. Part A was used to obtain the demographic information of the respondents such as gender, profession, education, qualification, and area of practice. Part B included questions on knowledge of supply chain management, forecasting and procurement practices and inventory management practice.

Data Collection Method

The questionnaires were self-administered to the respondents. However, in few respondents, face to face guided interview was employed. These methods enabled the respondent to read and understand the questions before answering them. This facilitated high response rate.

Data Analysis

The questionnaires were analyzed using statistical package for social sciences (SPSS) version-20. Descriptive statistics (frequency and percentages) were used in the presentation of the results.

Ethical Approval

The protocol for the study was approved by the Ethical committee of the Niger Delta University Teaching Hospital (NDUTH), Okolobri, Bayelsa

State with reference number NDUTH/REC/0016/2016.

RESULTS

Demographic Data

Out of the one hundred and fifty questionnaires retrieved, 56.7% were females while 43.3% were males. Majority of respondents (60.0%) were pharmacists. About half (51.0%) of respondents had obtained Bachelor of Pharmacy degree (B. Pharm) while just 8.7% of respondents had Master's degree in Pharmacy (M. Pharm.). The dominant practice groups were respondents in community pharmacy (46.7%) and hospital pharmacy (39.4%). Details are shown in Table 1.

Knowledge of Supply Chain Management

Most respondents understood the various elements of supply chain. The respective proportion in agreement with each element is as follows: servicing customers (94%), forecasting (83.3%), product selection (87.3%), quantification (83.3%), logistic information management system (LIMS) (82%), organization and staffing (85.3%), budgeting (82%), supply planning (82%), supervision (81.3%), procurement (86.7%), quality monitoring (86.7%), inventory management (86%) and monitoring and evaluation (85.3%) respectively. However, remarkable percentages are still ignorant of the concept as revealed in their poor knowledge. Details are shown in Figure 1.

Forecasting Practice

In Rivers State hospital pharmacy 12.7% reported using stock-on-hand data for forecasting while 10% reported using disease prevalence data for forecasting. Similarly in Rivers State community pharmacy, 13.3% used stock-on hand for forecasting while 8% used disease prevalence. In Bayelsa State hospital pharmacy, 12.7% used stock-on-hand for forecasting while 10% used disease prevalence. In Bayelsa State community pharmacy, 16% used stock-on-hand while 8% used disease prevalence for forecasting. In Akwa Ibom hospital pharmacy, 5.3% reported using stock-on-hand for forecasting and 4.7% used dispensed-to-user, while in Akwa Ibom community pharmacy, 7.3% used stock on hand for forecasting and 6.7% used dispensed-to-user data for forecasting. In Cross Rivers State hospital pharmacy, 5.3% used stock-on-hand and 5.3% distribution data, while in Cross Rivers State community pharmacy, 6.7% used stock-on-hand and 6% used distribution data. Other information is as shown in Figure 2.

Procurement Practices

In Rivers State Hospital Pharmacy, 11.3% of respondents reported using information from Medical Representatives for procurement, 9.3% of respondents used Tenders, while 8.7% used Local Purchase Order (LPO). Similarly, respondents in community pharmacies in Rivers state, 10.0% of respondents reported using tenders and LPOs, while 8.0% used facts from medical representatives. In Bayelsa State, 9.3% of respondents in hospital pharmacies reported using suppliers/retailers for procurement while 8% reported using wholesalers and medical representatives. Similarly, 11.3% of respondents in community pharmacies in Bayelsa State reported using suppliers/retailers while 10.7% used wholesalers. In Akwa-Ibom State hospital pharmacies, 5.3% of respondents reported using tenders, LPOs and medical representatives. Similarly, 9.3% of respondents in community pharmacy reported medical representatives while, 8.7% used LPOs. In Cross River State, 6.7% of respondents in hospital pharmacy reported using medical representatives while 5.3 percent used tender and supplier/retailer. Other details are in Figure 3.

Inventory Management Practice

On rating the delivery distribution of both the hospital and community pharmacy in Rivers State, 12.7% of respondents reported that the delivery distribution was very effective. Similarly, in Bayelsa State, 11.3 percent and 12.7 percent of respondents from both hospital and community pharmacy respectively gave a positive response to the rate of delivery. In the same vein, in Akwa Ibom State, respondents in hospital (4.7%) and community (8%) pharmacy claimed that their delivery distribution is very effective whilst in Cross River State, respondents in hospital (6.7%) and community (6%) pharmacy gave a positive response to the delivery distribution rate as seen in Table 2.

On inventory control system, 10% of respondents in Rivers State hospitals managed their inventory using stock cards, and 2.7% used computer while 8% of respondents in Bayelsa State hospitals used stock card, and 2.7 percent used computer. In Akwa-Ibom State community pharmacies, 6.7% of respondents managed inventory using stock cards, and 0.7% using stock ledger. Other details are seen in Figure 4.

DISCUSSION

The respondents in this study had a good knowledge of pharmaceutical supply chain activities such as serving customers, product selection, quantification procurement and inventory management. Information used for forecasting reported by

respondents included stock on hand, dispensed to user, issue data and disease prevalence. Procurement practices that were reported included tender, local purchase order and medical representatives. Inventory management practices included use of stock card, ledger and computer. However, poorly computerized inventory control system is a major drawback which needs improvement for satisfactory monitoring. Appreciable level of demonstrated ignorance is also a major concern for appropriate intervention.

This study reported that respondents had good knowledge of PSC activities. This is similar to a report by Kanda and Iravo [13] where health professionals handling PSC in their health facilities were reported to have good knowledge of the PSC activities. In contrast, a study by Adzimah et al [14] showed that only respondents in procurement and stores department had satisfactory knowledge of PSC management.

Table 1: Demographic data of respondents; N = 150

Variables	Options	Frequency	Percentage
State	Rivers	50	33.3
	Bayelsa	50	33.3
	Akwa Ibom	25	16.7
	Cross Rivers	25	16.7
Gender	Female	85	56.7
	Male	65	43.3
Profession	Pharmacy	90	60
	Pharmacy Technician	19	12.7
	Nurse	21	14
	Purchasing and supply	7	4.7
	Store keeping	11	7.3
	No response	2	1.3
Qualification	B.Pharm	76	50.7
	B.Sc	16	10.7
	RN	21	14
	M Pharm	13	8.7
	MBA	2	1.3
	WASSCE	15	10
	No response	7	4.7
Working environment	Government	76	50.7
	Private	73	48.6
	No response	1	0.7
Area of practice	Hospital Pharmacy	59	39.4
	Community Pharmacy	70	46.7
	Store keeping in hospital	10	6.7
	Medical representative	7	4.7
	No response	4	2.7

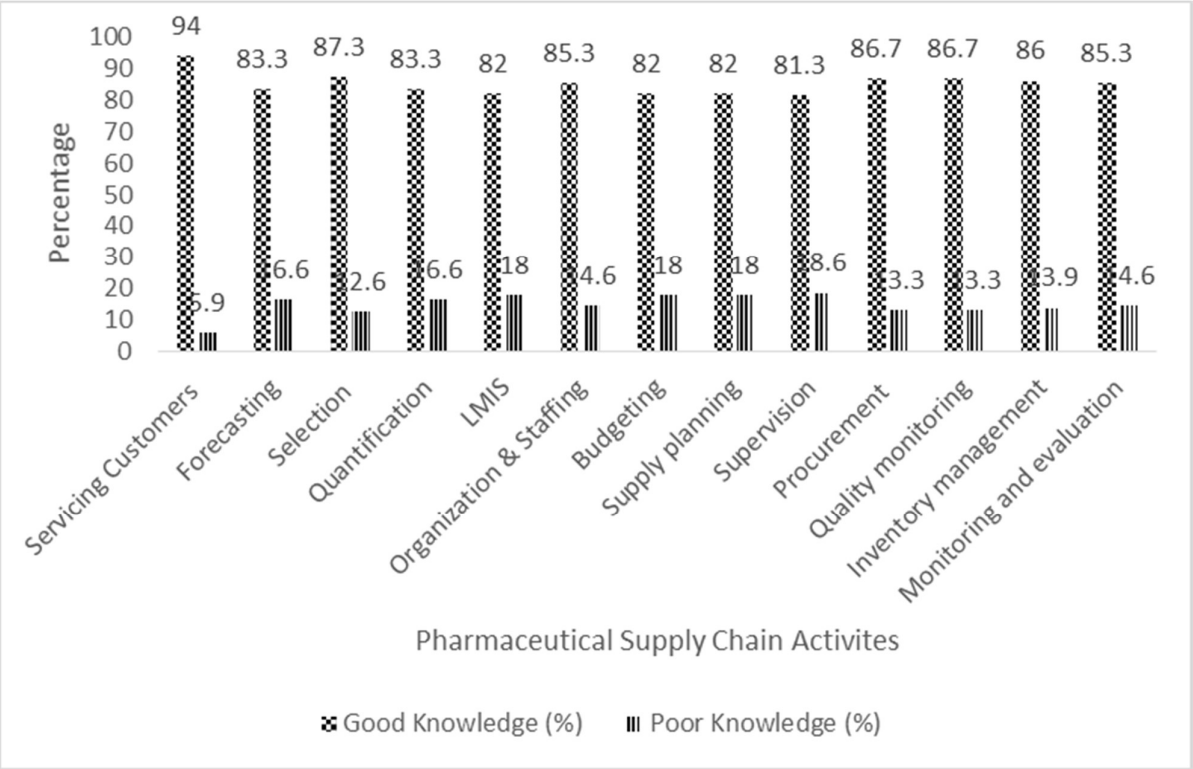

Figure 1: Knowledge of Supply Chain Management

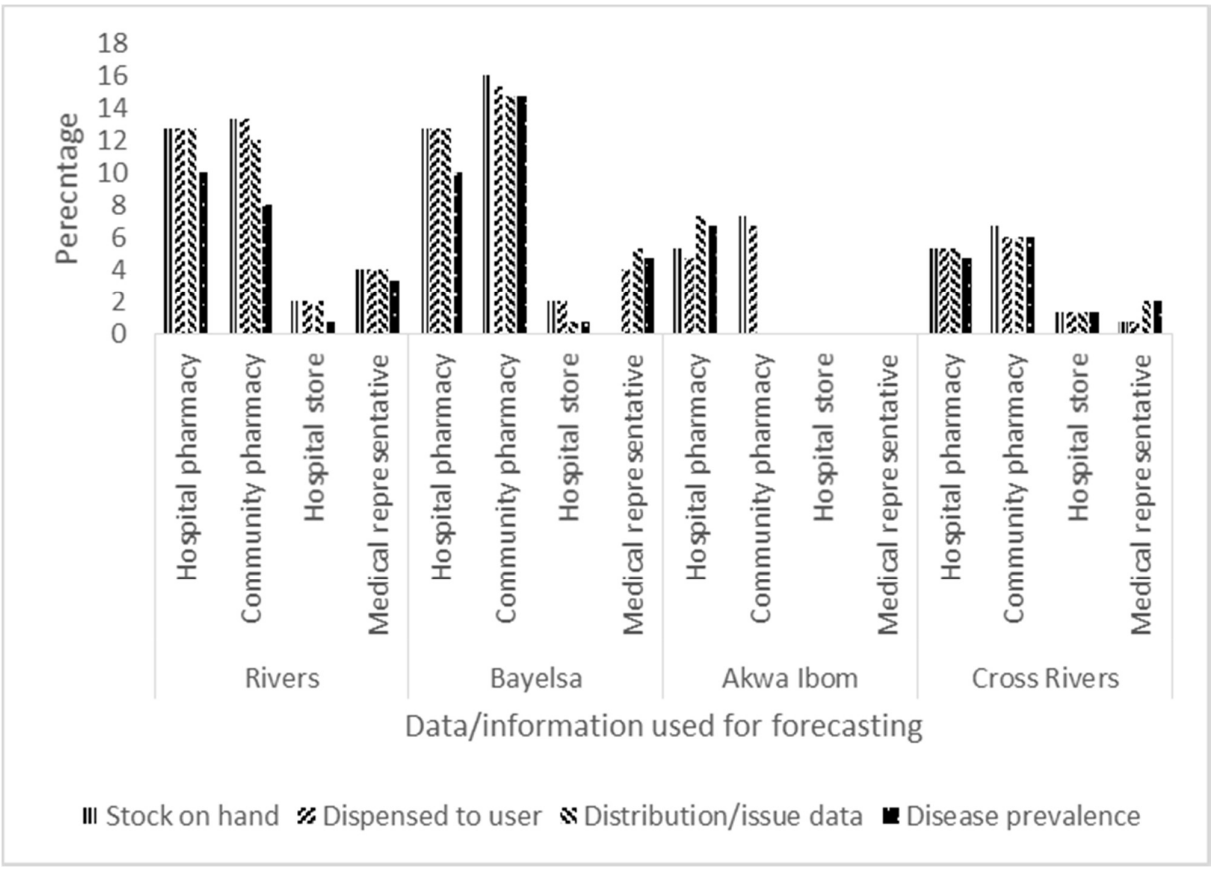

Figure 2: Forecasting Practice in the States and Areas of Practice of Respondents

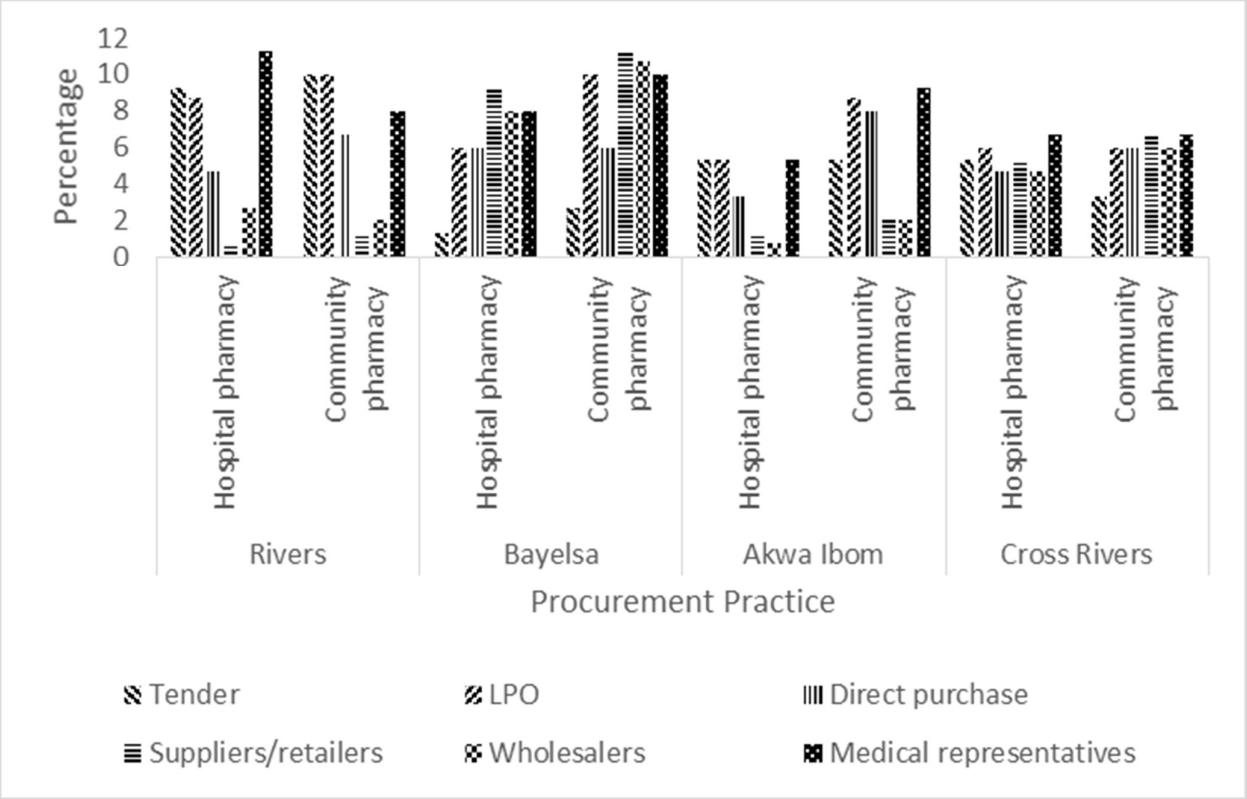

Figure 3: Procurement Practices in hospitals and community pharmacies

Table 2: Inventory Management Practice in Hospitals and Community Pharmacies Practice; N = 150

State	Area of Practice	Inventory Management Practices	
		How do you rate the Delivery Distribution of your facility?	
		Positive Response N(%)	Negative Response N(%)
Rivers	Hospital Pharmacy	19 (12.7)	2 (1.3)
	Community Pharmacy	19 (12.7)	1 (0.7)
Bayelsa	Hospital Pharmacy	17 (11.3)	2 (1.3)
	Community Pharmacy	19 (12.7)	6 (4.0)
Akwa Ibom	Hospital Pharmacy	7 (4.7)	1 (0.7)
	Community Pharmacy	12 (8.0)	2 (1.3)
Cross River	Hospital Pharmacy	10 (6.7)	-
	Community Pharmacy	9 (6.0)	1 (0.7)
Total	Hospital Pharmacy	53 (35.3)	5 (3.3)
	Community Pharmacy	59 (39.3)	10 (6.7)

Positive Response = Excellent, Very Effective, & Good; **Negative Response** = Fair & Poor

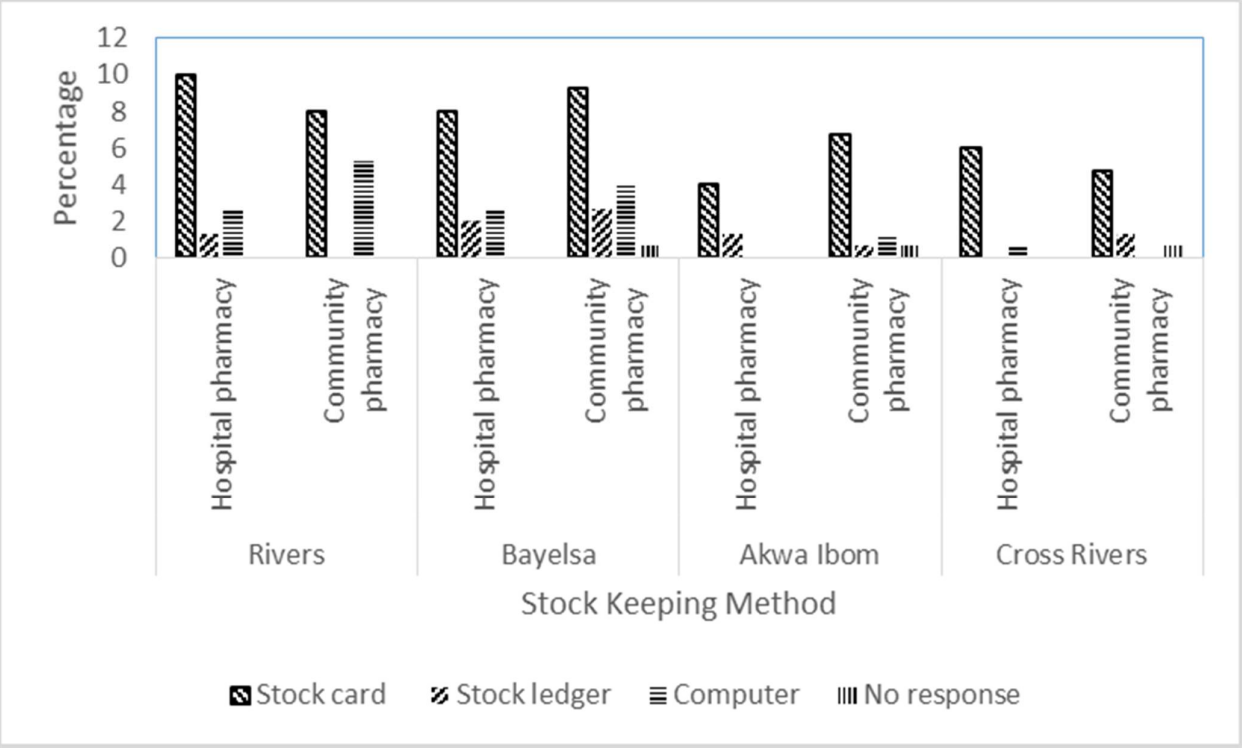

Figure 4: Stock keeping methods in hospitals and community pharmacies

Forecasting influences the performance of a PSC [15]. It is an important practice that helps decision makers ensure accurate planning and inventory control [16]. Studies reported that effective forecasting practices result in effective PSC [16,17]. The present study reported that respondents in the four states in both hospital and community pharmacies utilized information from various sources; stock-on-hand, dispensed to user, distribution/issue data and disease prevalence to forecast. The study reported variability in responses of procurement methods from respondents in the different states including tenders, local purchase order, direct purchase and purchase from medical representatives. This is similar to study reported by Adzimah et al [14] where different methods of procurement were used including sole sourcing, emergency tendering, and open tender and medical representatives. Kanda and Iravo [13] also placed a premium on procurement practice as it affected efficiency of supply chain of drugs in the Kenyan public health facility.

A total of 74.6% of respondents in both community pharmacy and hospitals across the four states rated drug delivery distribution in their facilities as excellent, very effective or good. In order for these facilities to develop an efficient supply chain management programme, it is a requirement to have a collaborative process management with the various pharmaceutical representatives, wholesalers or manufacturers [14].

A study by George and Elrashid [16] reported that good inventory control results in effective PSC . Inventory management of pharmaceutical products is important in healthcare delivery [18]. Improper management can affect patients' health and lead to economic losses, while proper inventory management leads to lower costs and better service [19]. The goal of inventory management of pharmaceuticals is to guarantee the availability of drugs and to decrease pharmaceutical costs [20]. The frequent use of stock cards to manage health products was observed in this study. This is similar to what Mohammed et al [21] reported where use of stock cards were still in place. In contrast, a study by Vian and Bates [22] reported the use of more developed computerized system, particularly those involving the use software for improved management of logistics as well as a number of comprehensive assessment tools and indicator sets for evaluating drug supply system.

CONCLUSION

The knowledge of PSC activities among the respondents was good. Forecasting, procurement

and inventory management of pharmaceuticals was being practiced in hospitals, community pharmacies in the four states where the study was conducted. Training of staff involved in PSC activities will improve the quality of PSC activities being carried out. Poor usage of computerized systems needs to be improved upon.

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