Assessment of Logistics Management in Ghana Health Service

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ABSTRACT

Ghana Public Health Sector runs a three-tier system of managing health commodities. Suppliers, the Central Medical Store, The Regional Medical Store, Service Delivery Points and the transportation system form the supply chain. Ghana Health Service logistics system is centralized and the health care delivery system is decentralized. Logistics management in the health system is crucial. This is because there are instances where medicines and health commodities are not available at the Central Medical Stores and the Regional Medical Stores. Consequently, there is no commodity security at the service delivery points. Upon this backdrop the study seeks to assess the logistics management system in order to bring efficiency in the system. The study adopts a multi-case study approach to assess the practices of logistics management, the causes of inadequacy of logistics and the strengths and weaknesses in Ghana Health Service logistics system. Two categories of participants that is, the key players of health logistics management and end-users were involved in the study. Four variables; finance for procurement of health commodities, evenly distribution of health commodities, effective supervision and constant monitoring and evaluation were found crucial in effective and efficient logistics management. Moreover, it was found that poor procurement planning and budgeting, lack of financial resources for procurement, poor quantification and forecasting, delay in procurement process and order processing, and delay in receiving insurance claims are some of the causes of inadequacy of logistics in the health systems. It is recommended that Ghana Health Service logistics or supply system must receive constant monitoring and evaluation. Further, Ghana Health Service must ensure that there is effective top-down supervision in the system to bring up efficiency. Again, Ghana Health Service and Ministry of Health must ensure enough funds are secured from the government to procure health commodities.

1. Introduction

The world as a whole and Ghana in particular is faced with plethora of health problems ranging from pestilence, poor and inadequate health facilities, lack of logistics for effective and efficient health service delivery, lack of health service providers and many others. These factors have negative influences such as high rate of mortality and poor service delivery at the health sector. However, it is the aim of every country to achieve the MDGs 4, 5 and 6 which are; to reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other diseases respectively. These are the main concerns for both developed and developing nations. In order to achieve these goals, there should be adequate supply of logistics which are needed for efficient and effective service delivery. There should also be proper management of logistics in order to achieve these goals. Logistics bridges the physical and temporal gaps in a global supply chain. Efficient logistics makes a global economy possible, lowering the cost of living for the people of the world. In the name of efficiency, information technology has been adopted to support logistics for many years. According to Hai & Yirong (2002), how to optimize the information flow to leverage the effectiveness and

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efficiency of the whole logistic system is one of the most important areas in which the logistic providers are competing with each other in.

The importance of logistics is predicted to increase. Because the ability to manage procurement, production, and transportation by firms in order to fulfill customer demands will increase. And the use of Logistics Management Information Systems (LMIS) for the management of fast and accurate information flows will become essential in future business environments (Shankar 2001). Health care organisations in all countries are looking for ways to improve operational efficiencies and reduce costs without affecting patient care services (Msimangira, 2010).

Thus, the importance of health logistics cannot be overemphasized. Silve (2009), in his work 'Health logistics is a profession: improving the performance of health in developing countries' quoted WHO's report "Health and MDGs for development" and Task Force on Immunization Meeting, Maputo, (2006) respectively as "We can now prevent or treat most illnesses by using known and inexpensive techniques, the problem lies elsewhere: it consists in providing personnel, medicines, vaccines and information to those in need, at the appropriate time, insufficient quantity, reliable and sustainable manner, and at a cost acceptable".

Health logistics cannot be narrowed to only the function which deals with the use of material resources; it encompasses the efficient coordination and control of the flow of all operations that include personnel, clients, facilities, information and other resources.

The health logistician's role is the use of technical means and material resources available to health systems for efficiency, quality and traceability of health operations.

Most importantly, the Logistics, Clearing and Warehousing Department of Ghana Health Service has this vision statement:
1) Logistics: Our mission is to give our clients a competitive advantage through superior transportation of logistics services. We will meet and exceed our client's expectations of service through timely communications and quality information. We will accomplish our mission through our commitment to provide: Excellent Service, Value added service, continued innovation in management. 2)Warehousing: To ensure regular availability of health commodities delivered to health institutions at affordable prices, capable of responding to the total commodity requirement and as a centre of excellence using best practices in storage and distribution of quality, and safe efficacious health commodities" (Ghana Health Service (GHS), 2012).

In reality the picture is not painted as the mission portrays. According to Gyimah *et al.*, (2009) one major challenge of national medicines policies is the ability to ensure that their implementation plans include the uninterrupted supply of essential medicines that are safe and efficacious, physically and financially accessible and used nationally. Unfortunately, in some countries especially in Sub-Saharan Africa, the medical supply systems are often unreliable and therefore do not guarantee regular supply of these essential medicines. Since medicines and health commodities in general, form the backbone of all health systems all over the world, there is always the necessity to ensure their quality and regular availability in the right quantities at affordable prices.

In order to ensure regular availability of medicines and health commodities, it is important to integrate all the logistical functions together by organizations in order to ensure effective and efficient logistics management.

Effective and efficient logistics management plays a key role in organizations and the economy. Because logistics plays key roles in every economy, the supply chain partners must coordinate all activities in logistics management to ensure efficiency. Sangeeta and Nadeem, (2004) refer to logistics as the specific functions that need to be carried out by each of the supply chain partners such as selecting products, forecasting demand, ordering and procuring, warehousing and storing, managing inventory, transporting from one level to the next until the commodities reach the clients and managing data in the process.

In health logistics system, the supply chain partners are the manufacturers who are the pharmaceutical companies which supply raw materials, the procurement agents such us the ministries of health, health administrative units, United Nations agencies and others. Distributors are composed of the transporters, the central, the regional and the district medical stores. Financiers are donors or funding agencies. Service

providers also constitute NGOs and Service Delivery Points (SDPs) such as hospitals, health centers and pharmacies. The coordination of these activities by the supply chain partners plays significant roles in organisations and the economy as a whole.

The importance of strategic logistics management in the Ghana Health Service system cannot be overemphasized. Poulin (2007) argues that logistics accounts for a sizeable portion of a hospital's operating budget. Studies have shown that from 30% to 46% of hospital expenses are invested in various logistical activities and that almost half of the costs associated with supply chain processes could be eliminated through the use of best practices.

1.1 Health System in Ghana

Health care in Ghana is provided by the public and private sectors. Most importantly, the Ministry of Health (MOH) exercises the overall oversight control for the whole system, as well as policy formulation, and monitoring and evaluation of progress in achieving set targets. Under the public health system, the Ghana Health Service (GHS) and teaching hospitals basically undertake the service delivery. And they constitute the bulk of the Ministry of Health institutions. Moreover, other bodies are also involved in health service delivery such as the quasi-government institutions and statutory bodies (Adegoke *et al.*, 2008).

Improving the health system in Ghana, Ghana Government undertook health sector reform from 1998-2002 under the Health Sector Support Project (HSSP) and this was supported by the World Bank. Health sector reforms continued under another five-year medium-term health strategy for 2002-2006. A number of health reform initiatives were designed for the implementation of the reform packages. The sector saw decentralization of the administration and the integration of supply systems to improve management efficiency (Bossert *et al.*, 2004). The service delivery system is decentralized as depicted in the five-tier systems, national, regional, and district, sub-district and community level.

The policy framework of the national health care system focuses on the core problems of the country. The government is determined to improve access and equity to essential health care and ensure that the health sector plays an essential role in the national Poverty Reduction Strategy. The strategic objectives are as follows; improving geographical access to primary services and emergency services by placing Health Points with a Community Health Officer in remote rural areas called CHPS Zones(Community based Health Planning and Services), which shall be established country-wide. Other objectives are improving financial access for the financially vulnerable, improving socio-cultural access for priority groups (children, women, elderly, people with chronic diseases and the disabled).

Most communities totally lack access to health facilities. Consequently, the CHPS System is highly supported through the national and regional health administrations of the Ghana Health Service. The establishment of CHPS zones all over the country is a new policy and most sub districts have developed plans to start many CHPS Zones within the coming years.

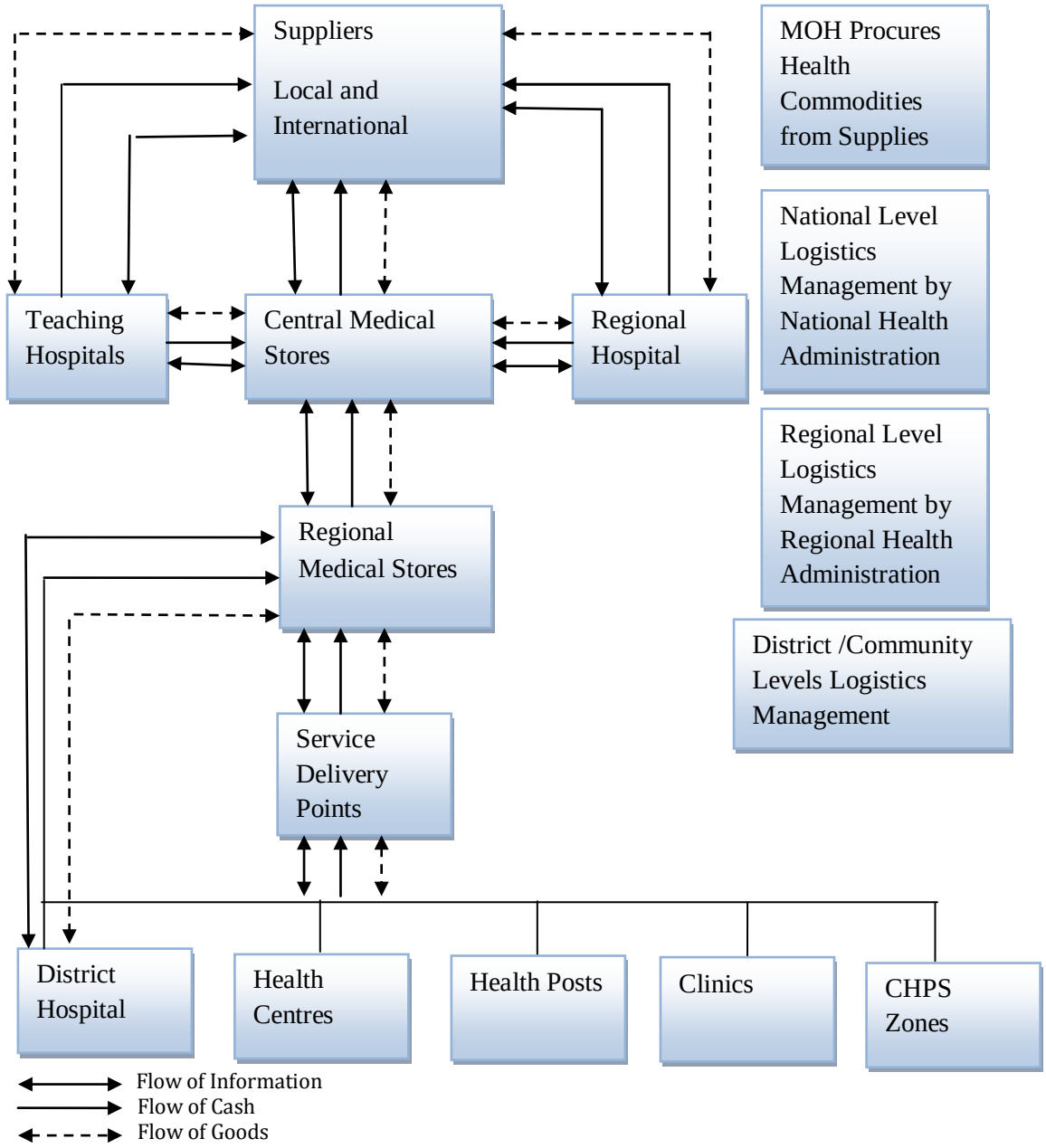
The decentralization policy was accompanied by a comprehensive transport policy for regional, district, sub-district and community level of health care. Transport is an indispensable resource and plays a significant role of the delivery of health services. The Transport Management System of the Ghana Health Service covers five components. These policy frameworks are operational management, information management, people management, and fleet management. In addition, guidelines for procurement, operation, maintenance, disposal and replacement are put in place and well communicated to the regional and district levels. Thus, ensuring the delivery of efficient health services, a transport office is established at the regional level (Heyen-Perschon, 2005). In spite of the establishment of the transport policy at the regional, district, sub-district and community level of health care, much has not been achieved in the transport system. The situation is deplorable when it comes to health care at the community level.

1.2 Ghana Health Service Logistics System

The health commodity supply chain in the public sector in Ghana is constituted by the Central Medical Store, and a network of Regional Medical Stores (RMS) in each of the ten administrative regions of the country. Drugs and supplies, including contraceptives, are managed through this supply chain to health facilities throughout the country. When the Ministry of Health procures medical supplies, The Central Medical Store is responsible for the receipt, storage and distribution of all the supplies. The Central Medical Store supplies the lower levels of the tier. Health facilities are expected to get their supplies from the appropriate Regional

Medical Stores, depending on their geographical location. Vaccines are managed a little differently through a network of cold storage warehouses in all the regions and refrigerated facilities. These are mostly located at the same place as the Regional Medical Stores. Each Regional Medical Store is managed by the respective Regional Health Administration (RHA), and it provides a supply service to health facilities in the region (Bossert *et al*., 2004). In exceptional cases, The Teaching Hospitals and The Regional Hospitals, after obtaining approval from Ministry of Health, procure their supply directly from the suppliers. They also procure their supplies from the Central Medical Store. Fig.1 shows the supply chain structure of the Ghana Health Service.

Fig.1: The supply chain structure of Ghana health service



Source: Author's Own Construct, 2013

Logistics deals with the movement part of the supply chain. The movement part has to deal with the three flows; the flow of information, the flow of cash and the flow of goods. Information flow is very vital because if information does not flow first there will be no flow of cash nor goods.

1.3 Causes of Inadequacy of Logistics in Health Service Delivery System

There remains a substantial controversy as to whether the decentralization of the administration of the health sector and the centralization of the logistics system for public health would not have a negative impact on the effective and efficient management of logistics. Thus, in these systems, effective coordination is needed for the integration of administration within the sector and the supply systems to improve management efficiency. However, it is believed that the system lacks effective coordination.

Bossert *et al.*, (2004) study on the health logistics systems in Ghana revealed that greater decision space was related to better performance for financing, planning and budgeting; and worse performance was related to procurement, inventory control, storage, logistics management information systems, training, and client contact. In the authors' view, logistics systems can be effectively decentralized for some logistics functions while others should remain centralized.

Similarly, the report by USAID/DELIVER (2011)in Addis Ababa showed that the information needed for stock status in order to make vital decisions about procurement and resupply of drugs, and to ensure accountability and transparency was very essential for effective and efficient logistics management. However, the report indicated that the information was not always easily available or well organized leading to overstock, stock-outs, and expiry of drugs.

The major concern, therefore, is that; how can effective and efficient logistics management be ensured in a decentralized administration system and the centralized logistics system of public health in Ghana?

The supply and availability of health commodities including affordable essential drugs, vaccines and contraceptives depends on effective and efficient logistics systems to move essential commodities down the supply chain to the service delivery point and, ultimately, to the end user. According to Bates *et al.* (2000) cited in Bossert *et al.* (2003), in many developing countries, including Ghana, logistics systems for public health facilities have been centralized. And the major logistical functions namely planning, forecasting, procurement, warehousing and the distribution of essential drugs, contraceptives and vaccines are performed by the central ministry offices. These systems have been notoriously inefficient and in many cases incapable of providing adequate supplies on a timely basis. In order to improve upon the system, experts in logistics have developed new approaches to make these logistics systems more effective and efficient. However, most of these experts concentrate on initiatives that retain central control and focus on developing better skills and systems at the central level and assuring that standard methods are used throughout the system so as to ensure effective and efficient logistics management.

There is also some controversy of the management of Health Insurance claims which poses the problem of shortage of drugs and consumables in the health facilities. An article featured in the Ghanaian Chronicle entitled 'Healthcare Management in Ghana: A perspective', mentioned that

'Some hospitals do not have certain drugs in stock because they provide at a loss, considering that they are supposed to run as an entity with little or no government support. In some instances, consumables like gloves and intravenous cannulae are unavailable, as petty cash has to be redirected elsewhere, to enable other sections of the hospitals to run' (Ghanaian Chronicle, 12th Nov., 2010).

1.4 Strengths and Weaknesses in the Health Service Delivery System

Gyimah *et al.* (2009) carried out an in-depth assessment of the status of medicines supply management system in the public sector in Ghana. The research revealed the strengths and weaknesses in the system. The strengths the researchers uncovered in the medicines supply management system were that there was the presence of the procurement Law, ACT 663 to guide procurement and supplies in the country, well defined distribution network, and good infrastructure for central level warehousing. On the other hand, the researchers saw the following as the weaknesses in the medicines supply management system. National Essential Medicines list was outdated and procurement guidelines have not been widely disseminated. Other findings were; weaknesses in forecasting and quantification due to lack of coordination between the central and the periphery, lack of guidelines and rules to facilitate the process of engaging and monitoring

suppliers, information for quantification and forecasting was not forthcoming from the facility level to the central procurement unit for decision making. The rest of the findings were; lack of guidelines and rules of engagement for suppliers, most facilities have internally developed stock control systems but there was the need for standardization for effective management, several of the lower level facilities did not have the optional storage and handling equipment and no standardized structural plan have been developed to ensure adequacy of storage conditions, the scheduled delivery system that was proposed has not been implemented and regular monitoring and supervision of drug supply management activities was not carried out at all levels. These weaknesses within the logistics management system have negative impact in the system such as poor cost control in the health system and the quality of care delivered to the public will be largely affected.

According to Schneller (2006) cited in Rossetti (2008), inventory management and distribution in the health care industry has been traditionally considered as an area of low value. However, recent studies have shown that tremendous cost savings and potential revenue can be generated with the enhanced management of distribution and inventory. It was estimated that a hospital could reduce its total expenses by at least two percent through inventory management and distribution of finished medical materials. This represents a percentage of total expenses not just the amount providers spend on supplies and pharmaceuticals.

The research carried out by Gyimah *et al.* (2009) was to determine the current status of medicines supply management system in the public sector in Ghana. They carried out an in-depth assessment of the procurement and supply systems of public health facilities at the national, regional, district and sub-district levels. The research did not look at the supply system at the community level which also forms the fifth tier of the public health decentralization system.

In addition, the assessment did not include the end users in the study. According to Sangeeta and Nadeem (2004), the ultimate goal of any supply chain management or the logistics cycle is to serve customers. They showed that logistics system provides excellent customer service by fulfilling the six rights: procuring the right goods, in right quantity, in the right condition, delivered to the right place, at the right time, for the right cost. To add more, Gyimah *et al.* (2009) used two main criteria in the selection of the study regions. These criteria are; socio-economic profile and agro-ecological zones and the region's implementation of new policies in the supply chain and its service structure in terms of health outputs. The regions selected for the study were Greater Accra Region, Eastern region, Volta Region, Central Region, Ashanti Region and Upper West Region. Brong Ahafo Region was not included in their study.

1.5 Effective Logistics System in the Health Service Delivery System

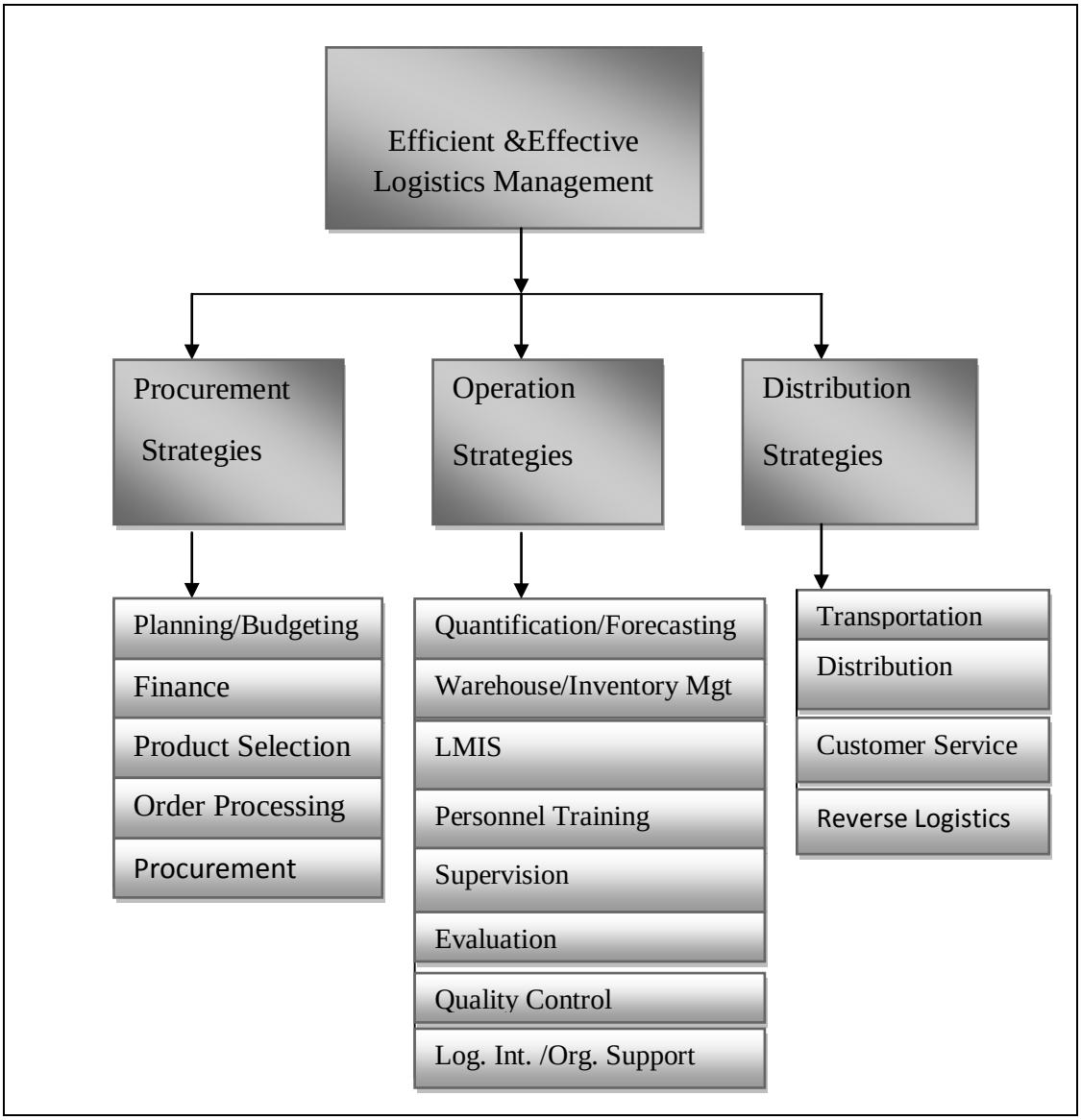
According to Gyimah *et al.*, (2009), the means of effective and efficient logistics management are the use of logistics management information systems, identifying financial resources for procurement streamlining distribution systems, and supply chain operations, and enhancing forecasting and procurement planning. An effective procurement management process ensures the availability of the right drugs in the right quantities at reasonable prices, and at recognized standards of quality. Bossert *et al.* (2000) argued that Logistics Management Information Systems (LMIS) are seen by logistics experts as an essential tool for effective logistics systems. Without good information on needs and inventory, it is difficult for each level to perform its other functions well. That is information must flow before goods can also flow. USAID/DELIVER (2011) reiterated that the goal of effective health logistics system is much larger than simply making sure a product gets where it needs to go. Ultimately, the goal of every public health logistics system is to help ensure that every customer has commodity security. Thus, commodity security is realised when every person is able to obtain and use quality essential health supplies whenever he or she needs them. Efficient and effective supply chain is a critical part of ensuring commodity security; financing, policies, and commitment are also necessary. Effective supply chains not only help ensure commodity security, they also help determine the success or failure of any public health program. Poulin (2007) argues that support processes, such as health logistics management, is an excellent target in reviewing health care practices to improving hospital operations and strengthening their efficiency and effectiveness. This is because such support processes do not necessarily have a direct impact on the quality of care provided. But the goal of which is to effectively and efficiently manage health logistics in order to deliver medical supplies and pharmaceutical products to the final consumer who is the patient. Poulin emphasized that improved operations will result in better cost control in the health system and at the same time maintaining the quality of care delivered to the public. Rossetti (2008) explains that multi-echelon inventory management refers to the management of inventory and coordination of distribution process in more than one level of the supply chain network. Rossetti added

that these ideas were first implemented in the retail and manufacturing industry. However, the resent trends in efficient distribution, such as the just-in-time (JIT) deliveries and reductions in the amount of inventory held, has caused many industries, including the health care industry to focus more on strategizing their supply chain in an effort to be more competitive while still meeting the needs of their customers. These changes are more evident in the health care industry. This is because it is an industry that has not traditionally seen distribution and inventory management as a competitive advantage.

1.6 The conceptual framework

The conceptual framework of this study is based on the relationship between dependent and independent variables. The study attempts to assess the relationship between efficient and effective logistics management and procurement, operation and distribution strategies in the health system of Ghana Health Service. Figure 2 shows the conceptual framework.

Fig. 2 Conceptual framework of efficient and effective logistics management



Source: Author's Own Construct, 2013

III METHODOLOGY

2.0 Methodology

Quantitative method of data collection was used. Quantitative data helps present, describe, and examine relationship between variable and trends in the data collected from the respondents using questionnaire. A multiple case study approach was adopted for the study. The research participants were made up of two groups, key players in health logistics management and the end-users. Purposive sampling was used to select the key players including the Director, pharmacists, administrators, procurement officers, store managers, accountants, disease control officer, nutrition officer, public health nursing officer, and medical superintendent. Census study was employed on the end-users who were made up of clinician and clinician assistants, nurses and midwives, anaesthetist, health service planning officer, and community health nursing officers. Data were gathered from both primary and secondary sources. SPSS was used to analyze the data. Correlation and regression analysis were carried out.

3.0 Overview of the study area and facilities

The study covered the major public health facilities in Kintampo North Municipality and the Regional Medical Store (RMS) in Sunyani. The Municipal Capital, Kintampo, is about 130KM away from the regional capital by road and it lies east of the Brong Ahafo Regional Capital, Sunyani. The Municipal has a surface area of about 5,108km^2; it occupies a land area of about 12.9% of the total land area of Brong Ahafo Region (39,557km^2). It has a population of about 112,145. The Municipality has one Hospital which performs curative functions, 7 sub-districts, and each sub-district has a health facility. There are three Diagnostic Health Centres and three Community Health Centres. There are also 12 CHPS compounds which provide basic preventive and curative health care services at the community levels.

4.0 RESULTS AND DISCUSSIONS

4.1 Practices of logistics management in Ghana Health Service

Table1 shows correlation between logistics supply system and evenly distribution of health commodities.

Table 1Correlation between logistics supply system and evenly distribution of health commodities

		Logistics supply system or policy is effective and efficient	Even distribution of health commodities
Logistics supply system or policy is effective and efficient	Pearson Correlation	1	.350**
	Sig. (2-tailed)		.006
	N	60	60
Even distribution of health commodities	Pearson Correlation	.350**	1
	Sig. (2-tailed)	.006	
	N	60	60

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

Source: Author's Field Survey, 2013

Table 1 shows the relationship between effective and efficient logistics supply system or policy and even distribution of health commodities. This meant that there was a little correlation between effective and efficient logistics supply system or policy and even distribution of health commodities ($r = 0.35$). Further, it meant 35% prediction of evenly distribution of health commodities of effective and efficient supply system of health logistics management. Thus in order to ensure effective and efficient health logistics supply system, Ghana Health Service must work on evenly prediction of health commodities distribution.

Table 2 multiple regression results of procurement strategy and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.366	.422		5.604	.000
	Procurement planning and budgeting	-.279	.171	-.274	-1.628	.109
	Financial resources for procurement	.387	.162	.427	2.393	.020
	Product selection tailored to particular needs	-.011	.135	-.011	-.082	.935
	Need recognition and order placement	.095	.158	.104	.605	.548
	Regulation of procurement	-.177	.129	-.197	-1.374	.175

a. Dependent Variable: Procurement strategy

Source: Author's Field Survey, 2013

The multiple regression models for the dependent and the independent variables are given as follows;

$$y_1 = 2.37 - (0.279 \times pb) + (0.387 \times fr) - (0.11 \times ps) + (0.095 \times np) - (177 \times rp)$$

Table 2 shows five predictor variables, namely, regulation of procurement (rp), procurement planning and budgeting (pb), product selection (ps), need recognition and order placement (np), and financial resources for procurement (fr) as against dependent variable, procurement strategy (y_1). It clearly showed that only the independent variable financial resource for procurement, contributed significantly to the model at the level of 0.05. The model has a mean value of 2.37 when all variables are kept constant. This meant that if all other variables go zero, then financial resources for procurement of health commodities will increase the mean by 0.387. Further, 1% increase in financial resource will cause 0.387 increases in efficiency of the health logistics system. The result showed that financial resource for procurement of health commodities was crucial in effective and efficient logistics management in the health supply system.

Table 3 multiple regression results of operations strategy and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.649	.635		2.597	.012
	Quantification	.119	.178	.111	.667	.508
	Forecasting	.026	.155	.029	.167	.868
	Inventory management on FEFO basis	.014	.138	.017	.105	.917
	Logistics management information system	-.229	.179	-.189	-1.278	.207
	Qualified logistics and supply officers	5.769E-5	.160	.000	.000	1.000
	Effective supervision	.475	.182	.459	2.604	.012
	Constant evaluation	-.467	.170	-.507	-2.742	.009
	Quality control	.229	.167	.211	1.369	.177
	Logistics integration and organisational support	.181	.143	.185	1.270	.210

a. Dependent Variable: Operational strategy

Source: Author's Field Survey, 2013

The multiple regression models for the dependent and the independent variables is given as follows;

$$y_2 = 1.65 + (0.119 \times qu) + (0.026 \times fo) + (0.014 \times im) - (0.229 \times lm) +$$

$$(5.769 \times qls) + (0.475 \times ef) - (0.467 \times ce) + (0.229 \times qc) + (0.181 \times ls)$$

Table 3 shows nine predictor variables, namely, quantification (qu), forecasting (fo), inventory management on FEFO basis (im), Logistics Management Information Systems (lm), qualified logistics and supply officers (qls), effective supervision (ef), constant evaluation (ce), quality control (qc), and logistics integration and organizational support (ls) as against dependent variable, operational strategy (y_2). It clearly showed that only two of the independent variables; effective supervision and constant evaluation, contributed significantly to the model at the levels of 0.05. The model has a mean value of 1.65when all variables are kept constant.

Similarly, it meant that if all other variables go zero, effective supervision will increase the mean by 0.475 while constant evaluation will decrease the mean value by 0.467. Further, 1% increase in supervision will result in 0.475 increases in efficiency of the logistics system. While 1% increase in constant evaluation will also result in a proportionate decrease in efficiency by 0.467. Again, these two variables; effective supervision and constant evaluation are critical in ensuring effective and efficient health logistics management. Therefore, Ghana Health Service needs to take effective supervision and constant evaluation as priority in health logistics management so as to ensure effective and efficient supply system.

Table 4 multiple regression results of distribution strategy and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.846	.545		3.386	.001
	Means of transporting logistics	.180	.155	.172	1.159	.252
	Medical Stores own means of transport	.140	.137	.158	1.017	.314
	Facilities own means of transporting logistics	-.018	.172	-.019	-.102	.919
	Medical Stores and Facilities have means of transporting logistics	-.124	.188	-.118	-.659	.513
	Medical Stores and facilities hire transport for collection and distribution	-.018	.124	-.020	-.142	.887
	Even distribution of health commodities	.294	.145	.323	2.034	.047
	Return goods handling	-.246	.148	-.243	-1.665	.102
	Customer service	.071	.150	.075	.476	.636
	Commodity security	-.002	.146	-.002	-.012	.991

a. Dependent Variable: Distribution strategy

Source: Author's Field Survey, 2013

The multiple regression models for the dependent and the independent variables are given as follows;

$$y_3 = 1.85 + (0.180 \times mtl) + (0.140 \times mst) - (0.018 \times fmt) - (0.124 \times bmt) -$$
$$(0.018 \times mfh) + (0.294 \times edc) - (0.246 \times rgh) + (0.071 \times cus) - (0.002 \times cse)$$

Table 4 shows nine predictor variables, namely, means of transporting logistics (mtl), medical stores own means of transport (mst), facilities own means of transport (fmt), medical stores and facilities have means of transport (bmf), medical stores and facilities hire transport (mfh), even distribution of health commodities (edc), return goods handling (rgh), customer service (cus) and commodity security (cse) as against dependent variable, distribution strategy (y_3). It clearly showed that only one of the independent variables; even distribution of health commodities, contributed significantly to the model at the level of 0.05. The model has a mean value of 1.85when all variables are kept constant. This meant that if all other variables go zero, then evenly distribution of health commodities will increase the mean by 0.294. Again, 1% increase in an even distribution of health commodities will result in 0.294 increases in effectiveness and efficiency of the logistics system. The result showed that evenly distribution of health commodities was a prerequisite for effective and efficient logistics management in the health supply system. As such, Ghana Health Service must also ensure that health commodities are evenly distributed in the health supply system to ensure that service delivery points at the various levels of the five tier system (national, regional, district, sub-district and the community levels) of health service delivery system maintain commodity security.

CONCLUSION

Every country is concerned in achieving the Millennium Development Goals (MDGs) 4, 5 and 6 which are; to reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other diseases respectively. It is an indisputable fact that without adequate health logistics these goals cannot be achieved. Moreover, effective and efficient management of health logistics is very crucial in achieving the goals. The research sought to examine the practices of heath logistics management and identify the major practices

which can bring effectiveness and efficiency in the health supply system and ensure health commodity availability in order to maintain high service level in the health sector.

After undertaking this study, it was revealed that effective and efficient health logistics management in the health supply system depends on four essential factors. Firstly, financial resource for the procurement of health commodities is very important. It is imperative that health institutions secure enough funds to procure health commodities to make health delivery more efficient and effective. Secondly, the study revealed that effective and efficient logistics management in a centralized health supply system is influenced by effective supervision. Thus effective supervision from top-down the supply chain and the entire health care delivery system is vital to ensuring efficiency in the health commodity supply system. Thirdly, constant monitoring and evaluation was also seen as another predictor variable for effective and efficient logistics management in the health supply system. As such, health logistics managers must ensure that health supply system receives constant monitoring and evaluation.

Last but not least, the study showed that evenly distribution of health commodities within the supply system also brings about effectiveness and efficiency in health logistics system. the only means by which commodity security can be ensured. Thus, financial resource, supervision, monitoring and evaluation and evenly distribution of health commodities are crucial in getting effective and efficient logistics management in the health sector.

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