

DETERMINANTS OF MEDICINE STOCK OUT IN THE MANAGEMENT OF PRIVATE RETAIL PHARMACIES IN LANG'ATA SUB-COUNTY, NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The study aims at establishing the factors that determine stock outs in retail pharmacies. Stocks held inside a business are dictated by different variables. These variables are particular to retailer, store, class and the commodity. Private drug stores have a tendency to have better accessibility of commonly used pharmaceuticals. Quality affirmation is however an issue in some of the privately owned businesses. The overall purpose of this research was to identify the key drivers of medicine stock out in private local pharmacies in the sub-county of Lang'ata, Nairobi City County, Kenya. The specific objectives were; to establish the influence of product shelf life, product unit price, product prescription frequency and stage at the product life cycle on stock outs of medicines in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. The study was anchored on agency theory and Neoclassical distribution theory. Descriptive research design was used in the study. The population was 77 registered private pharmacies. Out of these, 64 questionnaires were properly filled and returned. This represented an overall successful response rate of 83.12% thereby confirming the validity and reliability of the tool. Quantitative data was gathered using questionnaires. Analysis was done using both descriptive (mean and standard deviation) statistics and inferential (binary logistic regression) statistics. Data was presented using tables and graphs. Through content analysis, qualitative data was

analyzed. Outcomes showed that product shelf life, product prescription frequency, product life cycle and medicine stock out are negatively and significantly related. However, product unit price and medicine stock out are positively and significantly related. From the findings, the study concluded that the product shelf life, product prescription frequency, product unit price and stage at product life cycle had a significant effect on medicine stock out. The study also concluded that most pharmacies only accept goods whose shelf life is short when they have a ready client. From the study it showed that stock out situations will always emanate from the fear of keeping products which expires after a very short period of time. Moreover the study concluded that the pharmacy suppliers requested confirmation for placing an order to restock a product whose unit price has increased. Based on this, the study concludes that the pharmaceutical companies try to produce products which have long shelf-life. The policy makers should utilize the findings to outline policies on medicine stock outs. They are also in position to apply these findings in the formulation of policies viable in addressing medicine stock out challenges. This can be done in relation to regulation of the factors which pose as a threat to medicine stock, an example being product unit price.

Key Words: *medicine stock out, product shelf life, product unit price, prescription frequency, product life cycle*

INTRODUCTION

National projects must ensure that supply chain operators can adequately receive reasonable, quality medicines for treating diseases such as pneumonia, malaria, among others in order to treat regular childhood infections. However, there is little understanding which has not been helped by existing scanty literature on the factors that enhance availability. Network-level accessibility of items is at times required, with the last mile of supply chains for network community case management (CCM) being applied. Understanding and accepting responses to these CCM arrangements may lead to major improvements in the efficiency, scale and impact of the initiatives to reduce mortalities of children. (Marsh, 2008). Even though there is limited evidence defining the supply problems on CCM strategies, studies have already shown that child health services often endure shortages of main products. This implies that supply chain variables may be seriously affecting conditions of those programs. In 14 Central African nations (Robertson, Forte, Trapsida & Hill, 2009). Roberson and others researched the accessibility of vital medicinal products of children's health in the personal and government industries. The conclusions indicate a lack of availability at different stages of the health program, both within the government as well as the private sectors, through a site-analysis of ten drugs. This list of drugs included the drugs used by CCM for child health.

Utilizing a medication accessibility list, the investigation of Pagnoni, Convelbo, Tiendrebeogo, Cousens and Esposito (1997) on network based treatment of possible jungle fever in kids demonstrated a decline in serious intestinal sickness in territories with great medication accessibility. Bhandari and others have prepared access to provisions of ORS and zinc (Bhandari et al., 2008). These discoveries emphasize the requirement for CCM projects to guarantee that their supply administration frameworks are viable at guaranteeing accessibility of basic wellbeing items (USAID Deliver Project Task Order, 2007). As designated by the United Nations (2012) when a pharmacy briefly needs supplies that it should have as per national rules it is said to encounter a stock-out. This is as experienced on account of low and lower-center wage nations in the vicinity of 2007 and 2012. The normal accessibility of chosen fundamental medical supplies was 57% in public facilities and 65.1% in private pharmacies featuring the degree to which this is an issue in numerous developing nations. World health organization, WHO (2010), states that there are vast holes in the accessibility of medicines in both public and private areas, and in addition a wide variety in costs which render basic solutions unreasonably expensive to the needy. The report expresses that contrasted with the private area, bland drugs in the general pharmacies in Kenya are just accessible in 38.1%, and the normal cost is 250% more than the universal reference cost. The same are accessible in 63.3% of private pharmacies and cost by and large around 610% more than the global reference cost.

STATEMENT OF THE PROBLEM

Kenya has confronted the tremendous test of guaranteeing that satisfactory basic medications and supplies are accessible at general pharmacies. Settling this test will require more than specialized arrangements alone. Twaweza (2013) found that 41% of patients revealed that they were not able to get the medicines they required specifically from the public hospital pharmacies. This goes ahead to show the necessity for other providers, (for example, private pharmacies and religious or non-governmental organizations NGO) in relieving the effect of stock-outs at public hospital pharmacies. Private retail pharmacies have a tendency to have better accessibility of common pharmaceuticals, in spite of the fact that they are typically more costly than those accessible at public hospital pharmacies. Some private retail pharmacies have also shown some inadequacies like quality assurance (USAID, 2011). Alongside their higher costs, constrained accessibility of private outlets in provincial regions is a noteworthy constraint to access by poor and helpless persons (GoT-DANIDA, 2009). Studies have been conducted on medicine stock outs. Experts (2013) led an investigation on pharmaceutical stock-out in Uganda, Kenya and Ghana. The examination concentrated on three nations which are Uganda, Kenya and Ghana in this way showing a gap in geographical coverage area. Shango et al., (2014) led an investigation on the challenge to evade anti-malaria pharmaceutical stock-outs in a time of financing accomplices: the instance of Tanzania. The investigation was directed in Tanzania also showing a geographical coverage gap. Bate, Hess and Mooney (2010) led an examination on anti-malarial medication diversion: stock-outs and other general health problems whose gap was that they dwelt on public institutions. The current examination looked to build up the impact of variables affecting Medicine Stock out among Private Retail Pharmacies in Lang'ata sub-county, Nairobi City County, Kenya.

THEORETICAL REVIEW

Agency Theory

The Principal-Agent Theory is an office exhibit made by showcase experts that game plans with conditions in which the key is in position to incite the pro, to play out some endeavor to the focal's leeway, yet not by any stretch of the imagination the agent's. A couple of examinations (Rokkan & Buvik 2003) have included to the written work vital administrator theory. In like manner this speculation is regarded material to this examination since it exhorted the dependent variable which was medicine stock out. The speculation illuminated that the key for this circumstance, the proprietor of the pharmacy, affects his appointed specialists and certification.

Neoclassical Distribution Theory

The neoclassical theory of allocation was first proposed by Clark (1900). The neoclassical allocation theory has the basic notion of earning incomes in the production of products or services and of making its contribution to the general product by evaluating the manufacturing factor. While this fundamental truth was already recognized in the late 19th century, the problem

in separating the contributions of the various parts hindered its development. They are all essential in a certain way to attain the end result: there is no product without labour and total capital manufacturing is minimal. Clark (1900) fixed this problem by his theory of marginal products. The marginal product of an input, say labor, is defined as the extra output that outcomes from adding one unit of the input to the existing combination of productive factors.

Systems Theory

Ludwig Bertalanffy suggested system theory, stressing that the system theory relies on the structure and relation of the components connecting them in a total, instead of limiting an object to its components or components. In order that the whole can execute its components, their components must conduct similarly, so as to culminate in the inability of the individual components. The concept of the system theory shows the availability of essential medicines throughout the country. For ordering, stocking and consuming medical products through data to government health, a cooperative network should be established between all those who operate the Supply Chain legislation, because there would be no problems, such as deceased inventory and government funds waste, if a cooperation network were established entre government health institutions and all participating participants. The theory is vital to this study since it gives insights on how organization systems or way of doing things affects its operations.

Institutional Theory

This theory is one of the traditional approaches which are used to examine components of procurement (Tukamuhabwa, 2012). The theory adopts a sociological perspective to explain organizational structures and behavior (Dunn & Jones, 2010). Scott (2004) indicates that three elements exist: legislative, normative and social behavioral organizations. The legislative pillar concentrates on the application of regulatory rules, laws and processes. On the other side, the regulatory pillar addresses standards and values based on personal adherence. A prevalent knowledge (prevalent faiths and the symbols, joint knowledge) forms the cultural-cognitive pillar. This theory is pertinent to this investigation since it supports the dependent variable (medicine stock out). According to the theory, failure to consider staff professional qualifications and capabilities always result in poor procurement operations and thus resulting to medicine stock out. The theory was therefore important in explaining the institutional arrangements (organizational structures) responsible for stock out in private retail pharmacies.

Product Shelf Life and Stock Outs

The Grocery Manufacturers of America (GMA) (2002) conducted a worldwide study on retail out of stock. During the study, 661 retail outlets were examined in 29 different countries, 32 consumer goods categories were examined and 71,000 consumers surveyed worldwide. One of the findings was that the overall average rate of out of stock was 8.3%. The study also established that consumer responses to OOS can be grouped into five responses namely not purchasing the item, substituting item with a different brand, buying item at another store,

substituting item with the same brand and finally delaying purchase. Although the study was centered on retail outlets, the fact that the commodities are not medicinal makes the outcomes inconclusive with retail pharmacies. The study by Kärkkäinen (2003) refers to expanding productivity but failed to address the determinants of medicine stock out in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. In particular it did not look at product unit price and how it influences medicine stock outs, how product prescription influences medicine stock out, how Stage at the Product Life Cycle influences Stock Outs and how Product Shelf Life influences Stock Outs. This are the gaps addressed by this study.

Product Unit Price and Stock Outs

In Kenya, Kimeu (2014) performed a survey on cost legislation, item stocking policies and market share. The motivation behind this study was to set up the connection between value control, stocking methodologies and piece of the overall industry for Oil promoting organizations in Kenya. The study was guided by the accompanying targets in particular; the impact of value direction on item stocking procedures and the connection between value control, item stocking and piece of the overall industry for Oil Marketing organizations in Kenya. The study received a cross-sectional review (registration) outline where the essential information was gathered utilizing a survey as the controlling as key instrument. The examination focused on thirty five (35) enlisted oil firms associated with importation and advertising of oil items in Kenya (according to PIEA list). The respondents in the particular firms were supply/warehouse administrators who are proficient in oil industry business particularly on stocks issues. The managing Secondary information utilized was Acts of Parliament identified with the oil part and right now in activity. The study reaction rate was 90%. The study discovered that value direction affects the stocking methodologies for Oil promoting organizations in Kenya. The overview additionally uncovered that there exist a connection between value control and pieces of the pie for Oil promoting organizations in Kenya however not statistically significant.

Product Prescription Frequency and Stock Outs

Verhoef, Franses and Sloot (2005) undertook an investigation on the effect on customer inventory responses of brand equity and hedonic levels of products. The study tried to explore the effect of brand value and the hedonic level of the item on shopper stock-out reactions. Utilizing an example of Dutch customers separated more than eight item gatherings and eight retail chains, the investigation tried the theories and found that shoppers were more faithful to high-value brands than to low-value marks on account of a stock-out circumstance. In hedonic item gatherings, customers will probably change to another store. Buyers of high-value marks in hedonic item bunches were, contrasted with buyers of high-value marks in utilitarian item gatherings, less slanted to delay the buy yet will probably change to another thing by that brand.

Stage at the Product Life Cycle and Stock Outs

Youssar and Berrado (2017) undertook a survey on Product Life Cycle Management in Morocco for Effective Supply Chain Strategies. As designated by the examination item life cycle isn't frequently utilized as an apparatus of basic leadership in store network administration. In the mid twenty-first century, item life cycle administration rose as another worldview for assembling organizations. It empowers organizations to deal with their items over their life cycles from the most punctual thought for an item until the finish of its life. It encourages an organization to be responsible for its items over their life cycle. The outcomes can be not kidding if an organization loses control as it may influence both the client and the organization itself. The examination likewise exhibited the effect of item life cycle on store network management. The think about inferred that it is vital to adjust the methodologies of inventory network administration utilizing the item life cycle keeping in mind the end goal to best fit human services mission and performing artists' targets.

RESEARCH METHODOLOGY

Descriptive research design was used in this study. The research embraced descriptive design since the aim of the research was to collect quantitative information describing particular determinants for the medicine stock out. The target population of the study was 77 procurement staff from the 77 registered private pharmacies within Lang'ata sub-county. Lang'ata sub-county was selected since the pharmacies located in this geographical area comprise of a wide spectrum of target clients from the informal settlements of Kuwinda to the middle class residents of Karen. Census approach was used since the target population was small and thus all the 77 private retail pharmacies. Data was gathered primarily by means of organized questionnaires with questions both closed and open ended. Data collected was entered in excel and then transferred into SPSS version 22 for further analysis. It was encrypted, tabled and evaluated from the properly ordered questionnaires. The descriptive statistics of research variables and inferential statistics were used to evaluate the connection between dependent and independent variable. The descriptive statistics included mean and standard deviation and inferential statistics. Qualitative data from open ended questions was analyzed using content analysis. Data was presented using graphs and tables. A logistic regression model was used to test the hypotheses.

$$\text{logit}z = \ln \frac{P}{1-P}, \text{where } z = \beta_0 + \beta_1 x_{i1} + \beta_1 x_{i2} + \beta_1 x_{i3} + \beta_1 x_{i4} + \varepsilon$$

x_i and β_i are, respectively, the i th dimension of medicine stock out that is hypothesis to the influence of determinants and the associated coefficient, while p is the probability of stock out associated with x_i ; ε ' is the error term.

Where: Z= Stock outs; X_1 =Product Shelf Unit; X_2 =Product Unit Price; X_3 =Product Description Frequency; X_4 =Stage at the product Life cycle

RESEARCH RESULTS

The study first objective was to determine the influence of product shelf life on medicine stock out in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. There was a significant association between product shelf life and medicine stock out. Furthermore, the results of the questionnaire were backed up by accounts agreed to by most of the participants. The results of the regression showed that the shelf life of a commodity has a beneficial and substantial impact on medicines. The study second objective was to determine the influence of product unit price on medicine stock out in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. According to the outcomes, there is a significant association between product unit price and medicine stock out. This is also backed by the results of the regression, which showed the beneficial and substantial impact of item cost on the supply of medicines.

The third objective of the study was to determine the influence of product prescription frequency on medicine stock out in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. The findings revealed that there was a significant association between product prescription frequency and medicine stock out. The findings were also supported by the statements in the questionnaire which majority of the respondents agreed. This was also supported by the regression outcomes which revealed that product prescription frequency has a positive and significant effect on medicine stock out. The fourth objective of the study was to determine the influence of the stage at product life cycle on medicine stock out in private retail pharmacies in Lang'ata sub-county, Nairobi City County, Kenya. The findings revealed that there was a significant association between stage at product life cycle and medicine stock out. The findings were also supported by the statements in the questionnaire which majority of the respondents agreed. This was also supported by the regression outcomes which revealed that the stage at product life cycle has a positive and significant effect on medicine stock out.

The researcher conducted a logistic regression to establish the likelihood of medicine stock based on the product shelf life, product unit price, product prescription frequency and stage at the product life cycle. Table 1 shows the model summary.

Table 1: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	132.088	0.78	0.86

From the findings, the explained variation in the dependent variable ranges from 78% to 86%. This shows that our independent variables have big influence on whether there is medicine stock or not.

The SPSS also generated the variables in the equation output. Table 2 shows the summary of the regression coefficients output. Regression of coefficients outcomes in table 2 revealed that

product shelf life (p = .03) product unit price (p= .003) product prescription frequency (p =.008) and stage at product life cycle (.006) all added significantly to the prediction of medicine stock. According to the regression outcomes the odds of medicine stock increased with increased in product shelf life (OR 25.76, LL = 0.333, UL 1.306). These findings were consistent with that of Woensel, Donselaar, Broekmeulen and Fransoo (2007) who found that product shelf life have a positive impact on medicine stick out.

Table 2: Regression of Coefficients

Statement	B	S.E.	Wald	df	Sig.	OR	95% C.I for EXP (B)	
							Lower	Upper
Product shelf life	-3.249	1.5	4.689	1	0.03	25.76	0.333	1.306
Product unit price (1)	3.19	1.058	9.093	1	0.003	24.278	0.295	0.805
Product prescription frequency (1)	-3.179	1.206	6.944	1	0.008	24.011	0.751	2.275
Stage at product life cycle (1)	-3.861	1.405	7.554	1	0.006	47.534	0.275	0.909
Constant	-10.338	2.968	12.13	1	0	0		

The outcomes further revealed that the odds of having medicine stock were 24.278 greater for product availability as opposed to product price (OR =24.278, LL = 0.295, LU = 0.805). The result was consistent with Kimeu (2014) whose findings designated that the manufacturers’ product price determined the stocks level of medicine. High cost of manufacturing leading to increase in prices limited the amount retailers can purchase and stock medicine. The table further designated that the odds for medicine stock were 24.011 greater for product prescription as opposed to frequency of restocking (OR = 24.011, LL = 0.751, LU = 2.275). This echoed the findings by Kimeu (2014) who found that rate of product prescription highly influenced the medicine stock. Additionally, the outcomes revealed that the odds of medicine stock were greater by 47.534 for product knowledge as opposed to training new product (OR 47.534, LL =0.275, LU = 0.909). These findings agree with that of Youssar and Berrado (2017) who argued that product life cycle can be used to determine the medicine stock out.

Following the study results, perishable products are difficult to manage due to their random weights, lack of specific UPC codes for different product variations, and different forms of sale (e.g., raw, semi-prepared, fully prepared), to name a few. The pharmacist usually categorizes the medicine in terms of shelf life which explains why it is more likely for retailers to have stock with long shelf life as compared to those with short shelf life. Therefore, it is useful for retailers to know how consumers decide which drug products to stock less and which to stock more. Additionally, hospitals and doctors have a tendency to prescribe certain type of drugs. Therefore, retailers are more likely to store drugs which are more prescribed as opposed to those which are

less prescribed. In this regard, it is not a matter of drug restocking but a matter of drug demand hence stock is influenced by demand of the drugs. In addition, in health economics consumers have no choice but to buy and take the prescribed medicine. Hence, the retailing drug price have less influence on the drug stock. In that regard, the manufacturer price has significant influence on the medicine stock. The higher the price the less the stock which also depends on other factors such as retailer capital.

CONCLUSIONS

Based on the findings above the study concluded that product shelf life, product unit price, product prescription frequency and stage at product life cycle have a positive and a significant effect on medicine stock out. The study also concluded that most pharmacies only accept goods whose shelf life is less than 3 months when they have a ready client hence the stock out situations will always emanate from the fear of keeping products which expires after a very short period of time or alternatively stock very limited stocks. Hence, stock out situations will always emanate from the fear of keeping products which expires after a very short period of time or alternatively stock very limited stocks. Moreover the study concluded that the pharmacies suppliers inform them for confirmation for placing an order to restock a product whose unit price has increased. Moreover the study concluded that the pharmacies suppliers inform them for confirmation for placing an order to restock a product whose unit price has increased.

The study also concluded that most firms accept stocking completely new products if there is a return policy on unsold quantities with the supplier. In addition the study concluded that the firm stocks products whose prescriptions are rare only in cases where they have a ready client.

The study also concluded that there are instances when suppliers do not have stocks of completely new products. The study also concluded that where a product is available in different pack sizes, most firms stock the one that offers minimum unit price.

RECOMMENDATIONS

Based on the research findings, the study recommends that firms need to be critical on the shelf life of the pharmaceutical products. This may still be secure, but quality is no longer assured because of that item which passes its shelf duration. Additionally, waste is reduced by using stock rotation, which includes shifting products from the store to the retail department and then to the front of the store the most likely to be bought before the end of their shelf-life. It also lowers penalties for the sale of outdated products and decreases loss of money. The study also recommended that it is vital to adjust the methodologies of inventory network administration utilizing the item life cycle keeping in mind the end goal to best fit human services mission and performing artists' targets. The study also recommended that the firms to have products which have been in the market for long in stock since the product are successful; its production has grown, is widely available and matures. The demand for the product is not obsolete, resulting in faster purchase.

The study also recommended for the regular restocking of products whose prescriptions are frequent this was because buyers tend to be , more faithful to high-value brands than to low-value marks on account of a stock-out circumstance. In case off lack of prescribed products, customers will probably change to another store. The policy makers should utilize the findings to outline policies on medicine stock outs. They are also in position to apply these findings in the formulation of policies viable in addressing medicine stock out challenges. This can be done in relation to regulation of the factors which pose as a threat to medicine stock for example product unit price.

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