RESEARCH ARTICLE

DETERMINATION OF ATTITUDE OF COMMUNITY PHARMACISTS TO MEDICINE INVENTORY MANAGEMENT IN DELTA STATE, NIGERIA

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Abstract

Background: The current global economic recession and harsh practice environment have imposed a demand on community pharmacy to ensure efficient and effective drug stock (inventory) management to enhance cost savings for valuable professional profit advantage.

Objective: This study presents the determination of the attitude of community pharmacists on medicine inventory management.

Methods: A cross-sectional descriptive survey of 125 community pharmacists selected using a simple random sampling method. The primary data were collected with the aid of a pretested semi-structured questionnaire. The sample size was determined using the Taro Yamane's formula for a finite population. The questionnaire comprises three main sections to study the attitude of community pharmacists to medicine inventory management and are designed using simple statements on a Likert-type scale with five alternative responses having weights scores of 0-4. The collected data were subjected to descriptive and inferential analysis with a significance level of 5% using the Statistical Package for the Social Sciences (SPSS) version 21.0 for Windows (SPSS, Chicago, IL).

Results: The response rate was 125 (96.2%) and the questionnaire reliability was 0.97. Most respondents were located in Warri 69 (75.2%), with almost evenly split sex categories with the male 70 (56.0%) being slightly more, age distribution almost bell-shaped with the 30-39 years range being the modal range. Most of the survey respondents were superintendents 98 (78.4%), computer 79 (63.2%) usage in their premises with 67(84.8%) being used for inventory management purposes. Community pharmacists showed a negative attitude (MWA=2.46) towards inventory management with a significant association with the gender respondents (x^2=9.32, *p*=0.01) however, males being more negative than females.

The result shows that the community pharmacists in Delta State had a negative attitude towards inventory management. Adequate training through self-development is highly advocated.

Keywords: Attitude, community pharmacists, medicine inventory management.

INTRODUCTION

Medicine inventory management is a strategic process of tracking the use of medical items used and available within the healthcare organization. It will enable the organization monitor and evaluate periodically, to determine the time of stock out and brink expiration. The negligence of accurate inventory promotes increase cost and unnecessary delay in demand fulfillment to promote delay patient care[1]. This procedure is crucial especially in these periods of economic recession when efforts are tailored towards cost saving strategies to manage systems more efficiently. It has been reported that in many countries 70% of the resources of curative and preventive medicines are wasted due to mismanagement of medicines[2]. Inventory management is the core of pharmaceutical supply and is a key tool towards effective cost reduction in community pharmacy practice critically presenting a strong relationship between sales and customer service[3]. It is defined as the continuous process of planning, organizing and control that aim at minimizing the investment in inventory which maintain a sound balance between holding cost on one aim and purchasing and shortage cost on the other[2]. The process is primarily used to

ensure that assets are properly secured and there is concurrency among all accounting systems. In community pharmacy practice, inventory is a major investment made towards the success of the pharmacy. Adequate inventory management is therefore essential in assuring security inventory which is the firm's single largest asset. It helps to improve work flow and enhances customer's satisfaction[4]. Inventory control is the process of ordering the right goods at the right time with the right quality[5]. Control of inventory is a means of ensuring that the forecasted stocks are adhered to in daily operational processes.

The objective of an inventory control system is to minimize the total running cost. It is reported that it would cost a business more to run out of an item, than to stock extra units of it, as availability and convenience may affect future transactions[2]. Most inventory decisions revolve around replenishment, which involves knowing how much and when to order. This will inform managers how much of a product to re-order, when to re-order and how frequently orders are made. The effective and efficient management of medicine entails close supervision of important drugs, prevention of pilferage and priority in purchase and distribution of drugs[4]. This will help to optimize use of resources and eventually help to improve patient care by ensuring availability of essential drugs and prevent stock-out. It has been reported that a good understanding of different techniques in pharmacy practice positively affected administrative tasks including inventory management[5]. Researchers have generally not focused on the community pharmacists' attitude to inventory management and reports on the field of research are rarely available.

MATERIALS AND METHODS

Study Setting
The study was carried out in Delta State. The locations included Abraka, Agbor, Asaba, Eku, Kwale, Oleh, Ozoro, Sapele, Ughelli and Warri.

Study design
The study employed a cross-sectional design.

Study population
Descriptive survey of 125 out of 157 community pharmacists selected using simple random sampling method of the registered pharmacists of the Pharmacists Council of Nigerian 2016 registration data.

Sample size
Sample size of 130 was comprised randomly determined using Taro Yamane's formula for finite population calculated with a confidence interval of 95%.

$$n = \frac{N}{1 + Ne^2}$$

n – sample size
N - population size
e – margin of error
* 95% confidence level and e=0.05,
Using the PCN 2016 data, Population=157
n=sample size, N=Population size, e=the acceptable sample error.

Inclusion/exclusion criteria
All registered community pharmacists were included whether licensed for the year or not but those in community pharmacies not registered with the Pharmacists' Council of Nigeria (PCN) were excluded from the study.

Instrument used
Primary data were employed and collected with the aid of a pretested semi-structured questionnaire. The questionnaire comprises three main sections in line the study objectives and designed using simple statements on a Likert-type scale with five alternative responses having weighting scores of 0-4. The collected data were analyzed using descriptive and inferential statistics at 5% level of significance.

Validity and reliability of instrument
This was achieved by adapting model(s) from literature and seeking judgment of project supervisor and other experts (senior academicians) in the field. Cronbach alpha values (Appendix 1) were then computed to determine the internal consistency of the items in each section of the instrument with section on the knowledge, skill and competencies giving Cronbach alpha values.

Ethical approval
Ethical approval was obtained from the Institute of Public Health, Obafemi Awolowo University Ile-Ife, Osun State. No IPH/OAU/12/856 of 23rd October, 2017. This was attached to the protocol and submitted to Delta State Ministry of Health ethics committee for approval.

Methods of Data Analysis
The questionnaires were manually checked for accuracy of the data, and then analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0 for Windows (SPSS, Chicago, Illinois). The analysis included frequencies of discrete variables. Responses of "strongly disagree", "disagree", "agree" and "strongly agree" with weighing scores of 1, 2, 3 and 4 respectively are taken to imply "nil", "little", "moderate" and "high" level of attitude respectively. The method employed in which all the respondents were categorized into four groups based on their responses to questions asked on their attitude to inventory management. Given that eighteen (18) questions were asked to assess attitude, the highest obtainable score is 72 (all 4s were "strongly agree" responses) and the lowest obtainable score is 0 (all 0s were neutral responses). Respondents were divided into four categories based on aggregate scores. Scores of 0 - 36, were taken to indicate negative attitude while aggregate scores of 37-72 were taken to imply positive attitude. Data obtained for this section were analysed using median statistic for the individual items. Inferential statistics of selected variables SPSS (v. 21) was used to run chi-square tests of association for the selected variables.

Weighted average calculations

$$WA = \frac{fsd.xsd + fd.xd + fa.xa + fsa.xsa}{xsd + xd + xa + xsa}$$

RESULTS AND DISCUSSION

Table 1 shows the demographic profile of the respondents indicating a significant proportion 94 (75.2%) of the community pharmacies were located in Warri and Asaba, the two largest cities in the State. The respondents were almost evenly split between the two sex categories with the male 70 (56.0%) being slightly more. The age distribution is almost bell-shaped with the 30-39 years range being the modal range. A majority of 92 (73.6%) of respondents hold B. Pharm/B.Sc as their highest educational qualification. Few of 5 (4.0%) of the respondents have an M.Sc./M. Phil and minuscule 1 (0.8%) of the respondents had a

Ph.D. degree. Approximately one-tenth of the 11 respondents (8.8%) were fellows of the West African Post Graduate College of Pharmacists. The majority of 101 (80.8%) of the respondents were full-time resident pharmacists and the majority of 98 (78.4%) were superintendent pharmacists. The largest proportions were 82 (65.6%) of respondents less than fifteen years in practice. Table 2 shows that the proportion 32 (25.6%) of those having website reported that they were hosted by internet hosting companies. Computer usage in community pharmacy practice was reported by large percentage (63.2%) of the respondents. Of these, majority (84.4%) used computer for inventory purposes.

Table 1: Demographic characteristics of community pharmacists in Delta State.

Variable	Location	Frequency (%)
Community pharmacist location	Warri	69 (55.20)
	Asaba	25 (20.00)
	Ughelli	12 (9.60)
	Sapele	7 (5.60)
	Eku	4 (3.20)
	Agbor	2 (1.60)
	Kwale	2 (1.60)
	Oleh	2 (1.60)
	Ozoro	1 (0.80)
	Abraka	1 (0.80)
	Total	125
Age	Less than 20	3 (2.40)
	20-29	23 (18.40)
	30-39	45 (36.00)
	40-49	20 (16.00)
	50-59	21 (16.80)
	60 and above	13 (10.40)
	Total	125
Year of Practice	5 and Below	45 (36.00)
	6-10	22 (12.60)
	11-15	15 (12.00)
	16-20	7 (5.60)
	Above 30	19 (15.20)
	Total	125

Table 2: Availability and usage of computers and internet facility by community Pharmacists in Delta State.

Variable	Category	Frequency (%)
Community pharmacy has website	No	93 (74.40)
	Yes	32 (255.60)
	Total	125
CP's Website's host	CP itself	10 (31.30)
	Internet hosting company	22 (68.70)
	Total	32
Computer usage in CP premises	Yes	79 (63.20)
	No	46 (36.80)
	Total	125
Computer for inventory purposes	Yes	67 (84.80)
	No	12 (15.20)
	Total	79

CP= Community pharmacy

Table 3 presents the responses of the community pharmacists to items employed for measuring attitude to inventory management. Sixty three (50.4%) of the respondents strongly agreed Median (Mdn=4) to only two of the items which are "IM practices enhances availability of stock" (WA=3.28) and "Inventory management (IM) activities should be a regular issue in

CP" (WA=3.14).whereas respondents agreed (Mdn=3) to ten of the items and 'disagree' to four of the items.
The mean of the weighted averages for the attitude items was computed as 2.46 (Approximately 2) which implies that the community pharmacists' attitude to inventory management was negative.

Table 3: Attitude of community pharmacists towards inventory management in Delta state.

Variables		N(%)	SD(%)	D(%)	A(%)	SA(%)	Mdn	WA
		0	1	2	3	4		
Inventory management (IM) activities should be a regular issue in CP	f(%)	20(16.0)	0(0.0)	0(0.0)	27(21.6)	78(62.4)	4	3.14
I see IM as a professional responsibility	f(%)	21(17.0)	0(0.0)	4(3.2)	51(40.8)	49(39.2)	3	2.86
I see IM as a managerial responsibility	f(%)	24(19.2)	1(0.8)	5(4.0)	49(39.2)	46(36.8)	3	2.74
I consider training in inventory management necessary	f(%)	16(12.8)	0(0.0)	0(0.0)	60(48.0)	49(39.2)	3	3.01
I have undergone training in IM before	f(%)	39(31.2)	4(3.2)	21(16.8)	30(24.0)	31(24.8)	3	2.08
I will avail myself of opportunity in IM if provided	f(%)	7(5.6)	0(0.0)	1(0.8)	70(56.0)	47(37.6)	3	3.20
*Time constraint prevent IM in community Pharmacy	f(%)	24(19.2)	4(3.2)	40(32.0)	42(33.6)	15(12.0)	2	1.84
*Complexity prevents IM In CP	f(%)	37(29.6)	10(8.0)	29(23.2)	33(26.4)	16(12.8)	2	2.15
*Energy source for is a Barrier to IM	f(%)	15(12.8)	8(6.4)	14(11.2)	54(43.2)	34(27.2)	3	1.33
*Although IM is Necessary but impossible	f(%)	26(20.8)	13(10.0)	44(35.2)	33(26.4)	9(9.2)	2	2.11
*IM practices consume too much time	f(%)	24(19.2)	5(4.0)	38(30.4)	37(29.6)	21(16.8)	2	1.79
*Poor business performance bares IM	f(%)	20(16.0)	16(10.0)	35(28.0)	35(28.0)	19(15.2)	3	1.54
IM practices enhances availability of stock	f(%)	9(7.2)	0(0.0)	1(0.8)	52(41.6)	63(50.4)	4	3.28
IM improves sales in a CP	f(%)	22(17.6)	3(2.4)	11(8.8)	51(40.8)	38(30.4)	3	2.64
IM improves profit in CP	f(%)	25(20.0)	3(2.4)	2(1.6)	51(40.8)	44(35.0)	3	2.69
IM facilitates customer's satisfaction in a CP	f(%)	18(14.4)	0(0.0)	4(3.2)	60(48.0)	43(34.4)	3	2.88
Mean of weighted average (MWA)								2.46

SA= Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree, WA= Weighted Average, Mdn= Median, f= frequency, %= percentage. CP= Community pharmacy, *Scores for items denoting negative attitude reversed.

Table 4 represents the effects of some of the demographic variables on the community pharmacists' attitude to inventory management. The computed result show that the community pharmacists' attitude to inventory management was significantly affected by only the sex of the respondents (x^2=9.32, p=0.01) and the male were more negative than the females. The actual sample size of this study is slightly larger than the calculated sample size, and therefore it can be said that it is sufficient to make the results of this study generalizable to the population of all pharmacists in the study area.

Table 4: Effects of demographic characteristics on community pharmacist's attitude towards inventory management in Delta state.

		CP's level of Attitude towards Inventory Management			Total	x^2 (df)	p-value
		Neutral	Negative	Positive			
Sex	Female	25(64.1)	9(36.0)	21(34.4)	55(40.0)	9.315	0.009*
	Male	14(35.9)	16(64.0)	40(65.6)	70(56.0)	(2)	
	Total	39(100)	25(100)	61(100)	125(100)		

*test is significant at $p< 0.05$

From the sample size and reliability coefficient of the pre-test, as well as the high Cronbach alpha value of the internal consistency obtained, this study meets the requirements of internal and external validity and is thus generalizable to the study population. Some pharmacists complained of busy schedule in the filling of questionnaire. This resulted in repeated visits to community pharmacies before collection of filled questionnaire is achieved. There is need for pharmacist to imbibe the culture to volunteer information freely[6]. Community pharmacies are usually established to meet organizational goals. This strategy normally includes but not limited to the location, organizational operational processes and resources available.

The location of pharmacies in a city is a reflection of the economic viability of the city. This was reported in the situation of the urban location of pharmacies in Ghana[6]. Warri is a petroleum industrial city of Delta State. It is not therefore surprising that Warri had the highest number of pharmacies in the State. The capital city of the State, Asaba is expected to attract large number of pharmacies. In this study, Asaba which is the capital city recorded the second highest number of pharmacies. It could be deduced that the economic value of oil rather than political content influenced Warri attracting high numbers of pharmacies. While Asaba determines the polity of the State, Warri determines the economy. Moreover, it could be deduced from this study that the low number of pharmacies in Asaba is an indication of superintendent pharmacists are not resident in the city of practice (Register and Go syndrome "R and G") a practice that have negatively impacted community pharmacy practice in Nigeria. The fact that there were more male community pharmacists than females is contrary to the reported ratio of 60:40 in favor of female pharmacists in Great Britain in 2011 in the number of pharmacists generally investigated[7] . It could be deduced from this study that the female pharmacists are not very interested in community pharmacy because of the management task required for the community pharmacy practice. Moreover, the male community pharmacists bear the financial burdens of the family and are more likely to be involved in community pharmacy which has more managerial demands.

The majority of community Pharmacists having no website implied poor knowledge and negative attitude to inventory management which is indicated in the low awareness of inventory management procedures the problem of inabilities to use inventory models[7]. This is in conformity with the report of Roper *et al.*, that healthcare staff lacks responsibilities to inventory management that promotes a manner of time and time that is not beneficial to healthcare provision[8] compromising medical services quality[9].

The negative attitude towards inventory management displayed by community pharmacists is reinforced by the time it takes to implement the inventory management process as in the case of community pharmacists' participation in public health activities[10]. The challenges of evaluating essential medicines in developing countries and sub-Saharan Africa can be related to the gap in inventory management resulting from negative attitudes of community pharmacists[11,12]. A positive attitude is expected to ensure proper use of tools to enhance inventory management. Male community pharmacists may be more positive than their female counterparts due to pharmacists being more aggressive in their practices[13,14].

Limitation of the study

The study excludes the use of mathematical computational models of inventory management.

CONCLUSIONS

The study showed that the attitude of community pharmacists in Delta State towards inventory management was generally negative which led to suboptimal practice. This will seriously reinforce the barriers to the comprehensive concept of a global assessment of basic medicine. The negative situation can be resolved through adequate training of community pharmacists through self-development of the status of community pharmacists to provide better practice. The Board of Pharmacy's mandatory continuing professional development (MCPD) will go a long way in meeting this need if focus is fully placed on inventory management in the scheduled training program units. Individuals can also embark on the training offered through the many training in communication techniques by the available IT consultants. The presence of various inventory management tools (softwares) can also be tools used to enable inventory management in community pharmacies.

AUTHOR'S CONTRIBUTION

IGHORODJE AE: design, resources, data collection and processing. **OLA-OLURUN O:** supervision, data analysis, critical review. **OSEMENE KP:** supervision, critical review. All the authors reviewed the results and approved the final version of the manuscript.

DATA AVAILABILITY

The datasets generated during this study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST

The authors report no conflict of interest. The authors alone are responsible to the content and writing of this article.

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