

**EVALUATING HEALTH PERSONNEL'S ADHERENCE TO STANDARDS OF
PHARMACEUTICAL CARE IN MANAGING THE STORAGE OF ESSENTIAL MEDICINES
A STUDY OF PUBLIC HOSPITALS IN THE TAMALE METROPOLIS**

Vanderpuije, Leslie NiiOtu 

Ghana Health Service, Tamale-Northern Region, Ghana

Abdul-Razak, Abubakari

Accountancy Department, Tamale Polytechnic, Northern Region, Ghana

kpanvomc@yahoo.com

Abstract

A survey on adherence to Standards of Pharmaceutical Care (SPC) for effective storage of essential medicines was carried out in all 3 public hospitals within the Tamale metropolis. Questionnaires were distributed to 100 healthcare providers and found that between 80-95% of the respondents were aware of all the prescribed standards. Awareness was highest among respondents from the Tamale teaching hospital (91.2%) and also among pharmacists (85%) and physician assistants (70%). Adherence to provisions for storage facilities and tools were high whereas those for a board of survey, stock taking team and training programs were not strictly observed. Adherence to the maintenance of some basic stock management tools and equipment such as thermometers and temperature monitoring charts were also not encouraging although majority of respondents held that functional refrigerators and air-conditioners were available and in use in their facilities. Adherence to the provision of well-equipped storage facility was mostly by the Tamale west hospital (63.2%). In a multiple response set, the study revealed that, only areas such as quality assurance (71%) attract regular training. The study recommended effective implementation of quality assurance policy, intensified education and training on SPCs, supply of appropriate logistics, supportive supervision and monitoring for safe and effective storage of essential medicines.

Key concepts: Pharmaceutical Care, Hospitals, Essential Medicines

INTRODUCTION

Governments all around the globe mostly allocates a substantial proportion of their total health budget to medicines. This proportion tends to be greatest in developing countries, where it may exceed 40% (WHO 2006). In industrialized countries however, escalating costs of health care

have placed evidence-based and efficient management of essential medicines and other health commodities high on the agenda. That is because, efficient medicines management is an essential component of effective and affordable health care delivery system. According to WHO (2002a), essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to disease prevalence, evidence of efficacy, safety and comparative cost-effectiveness. They are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford (ibid).

The emphasis on quality assurance under the Ghana national drugs policy focuses on WHO quantitative indicators for assessing quality assurance in medicines use as well as Good Manufacturing Practices (GMP), product registration, procurement and post marketing surveillance. Yet, very little attention is paid to the management of medicines (that is, essential medicines) through improved adherence to national standards and guidelines even as this can result in heavy financial losses and dire health consequences. The need to develop and strengthen the structures and processes as steps to improve adherence to national standards in the managing the storage of essential medicines will promote effective treatment benefits for patients. Foster et al. (2006) argued that the storage conditions of medicines can affect the physico-chemical quality of medicines such as antibiotics, vaccines, antimalarial drugs etc. Several parameters, such as temperature and humidity have been evaluated in various studies in order to assess their effects on the quality and efficacy of medicinal products.

Medicinal products in the Tamale metropolis are exposed to high temperatures and are prone to deterioration if serious efforts are not taken to introduce the needed quality assurance interventions to preserve their potency through good storage practices and procedures. Whilst the question of health personnel's awareness and knowledge on medicine storage management standards may remain rhetorical in the face of this natural phenomenon of high temperatures, there is thus the need to determine the degree of adherence to pharmaceutical care standards as a basis for further quality improvement to preserve quality and potency in the harsh climatic condition of the metropolis. It is for these reasons that this study specifically focused on the following objectives:

1. To assess health personnel's awareness of Pharmaceutical Cares Standards for safe storage of essential medicines
2. To assess health personnel's adherence to the Pharmaceutical Cares Standards for safe storage of essential medicines and
3. To explore strategies to improve health personnel's adherence to Pharmaceutical Care Standards.

Scope of the Study

The Research was limited to public hospitals within Tamale metropolis. The reason for the scope of the study is because pharmaceutical care standards in managing essential medicines have generally been implemented within public hospitals in Ghana including those within the Tamale metropolis and is therefore appropriate to assess adherence to these standards. Public hospitals within the Tamale metropolis offer convenience of location and ease of accessibility to respondents and that is why the research in Tamale is very appropriate.

Delimitations

With the medicine management function consisting of four principal phases, it is worthy of note that this study does not include concepts of drug selection, procurement and distribution as well as use.

Limitations

A major limitation of the study was inadequacy of existing literature on the subject matter which made it almost difficult to situate the study exactly within the context of existing literature.

Another limitation of the study was the sample size which could be regarded as inadequate for a study on this field. However, it was due to the anticipated difficulty in retrieving many distributed questionnaires which may delay the progress of the study.

Using all three public hospitals in the Tamale metropolis for the study is very representative for the Metropolis however, the findings cannot be extrapolated for the entire country. Inadequate resources in terms of time, finance and transportation also restricted the study to only public hospitals within the Tamale metropolis. The final limitation relates to the use of self-report method of assessment of adherence to pharmaceutical care standards for managing the storage of essential medicines which may have been better assessed by observation although observation will likely influence normal routines.

LITREATURE REVIEW

Very critical in the success of any healthcare delivery system, is the availability of the needed essential medicines and vaccines. However, this may not be sufficient enough to ensure the quality of health delivered, therefore careful selection, procurement, proper storage and distribution, using secure reliable channels, and assurance of rational use and correct dispensing are all critical components of the quality health delivery system. Medicine management functions are thus undertaken in four principal phases, which are interlinked and are reinforced by appropriate management support systems (i.e. tools). From drug selection to drug use, passing through procurement, storage and distribution (MSH/WHO, 1997). According

to Coe and Uselton, (2011), all stages of the medication use processes, that is selection, storage, ordering, dispensing, administration, and monitoring must be appropriately integrated into a comprehensive medication management system. Thus the treatment of a patient in a healthcare system is not an event but a process that permeates through a range of interconnected activities, of which effective drug storage form a critical path. Therefore, any deficiency in these processes within the health delivery system would lead to the provision of substandard drugs to patients which could contribute immensely to treatment failure and poor patient treatment outcomes. According to Petralanda (1997), treatment failure can be improperly attributed to drug resistance when the medicinal product does not meet the qualitative and quantitative requirements. Therefore, any deficiency in these processes within the health delivery system would lead to the provision of substandard drugs to patients which could contribute immensely to treatment failure and poor patient treatment outcomes.

According to Gbefwi (2004), awareness refers to a recall of information and it is a pre-requisite to appropriate behavioral change and an essential tool in that regard. The linkage between awareness and behavior has been stated in the cognitive behaviour theory, which states that behaviour is mediated through cognition and that awareness is necessary but not sufficient to produce behaviour change (Glanz&Rimer 2001; National Cancer Institute, 2005).Pathman et al. (1996) posits that when physicians comply with practice guidelines, they must first become aware of the guidelines, then intellectually agree with them, and then decide to adopt them in the care they provide, then regularly adhere to them at appropriate times. This assertion is buttressed by Odusanya (2003) who conducted a study on awareness and compliance with universal precautions amongst health workers at an emergency medical service in Lagos, Nigeria, and found that the group of health workers studied had good awareness about exposure risks at work but did not translate their awareness into safe work practices. Alam (2002) however found that, only 61% of the respondents were aware of the standards on precaution among healthcare workers.

Study of Rao et al. (2012) on awareness, practice and management of cold chain at the primary health care centers in Coastal South India revealed that, majority of medical officers had awareness and correct practices in fields like ideal equipment, Oral Polio Vaccine (OPV) administration, vaccine requiring diluents but only 47 (61.8%) medical officers had correct practice of defrosting the deep freezers. To Newton et al. (2006), the use of substandard anti-infective drugs resulting from inappropriate storage condition can cause increased morbidity and mortality, adverse effects due to an excessive dose or the presence of potentially toxic active ingredients or pathogenic contaminants, increased health costs, loss of confidence in the health care system and in the drug regulatory authorities, and finally, the selection of resistant parasites with sub-therapeutic amounts of active ingredient. Foster et al. (2006) also posited

that, proper storage conditions, including minimizing exposure to heat, light, and humidity, are important for some drugs, although most drugs have proved remarkably resistant to poor conditions.

In addition to drug quality, the stability of drugs is another issue to be given careful and serious consideration. As malaria is present mainly in tropical regions, anti-malarials must be able to remain stable in environments of high temperature and humidity. Studies in Tanzania and Rwanda revealed decreased drug release from chloroquine and quinine tablets after 3 months of storage in simulated tropical conditions: 75% relative humidity and 40°C (Kayumba et al, 2004). In Burkina Faso, chloroquine tablets exhibited decreased drug content after 450 days of submission to real storage conditions (Ballereau et al., 1997).

To maintain vaccines perfectly conserved from its manufacture through administration requires an adequate cold chain infrastructure, compliance to standards and effective management (Omilabu et al., 1999; Oyefolu et al., 2007). At the end of the chain, primary health care providers must have adequate knowledge to manage the cold chain (WHO, 2004; Zuckerman, 2006). Inconsistency of critical processes linked to medication storage and writing complete and accurate medication orders have been documented in 30%–31% of hospitals undergoing accreditation scrutiny (Manniello, 2010). A study in Ghana by Agazi and Obuodi (1986) reported that only 64% of the functioning refrigerators were maintained at temperatures required for safe vaccine storage. A report in July 2001 by Strategies for Enhancing Access to Medicines (SEAM) Program indicated only 3 of the 20 facilities surveyed in Ghana reported having insufficient storage area for their medicines. Thirteen had a functioning air-conditioning system and four had a functioning fan; five facilities reported having neither. Sixteen had functioning cold storage (11 with functioning temperature control), but 14 of these did not keep records of temperatures. Assessing adherence to pharmaceutical care standards in essential medicines management thus focuses on analyzing adherence to the structures, systems and process involved in ensuring that patients have access to good quality essential medicines thereby improving or eliminating the factors in the system and processes that make it possible for problems to arise.

Studies by Forster et al. (2006) found that 20% of inventory assets at hospitals are discarded due to product expiry, translating to billions of dollars. Experience at leading organizations has shown much of this expense might be avoided along with optimized inventory levels and better inventory control enabled by global standards. By implementing global standards the healthcare supply chain can reduce product obsolescence by tens of billions of dollars. Foster et al. (2006) further demonstrated that drugs require secure storage in controlled climatic conditions and a reliable method of stock rotation. The FEFO rule (First Expiry, First Out) helps ensure that older stock is used up first. Security is another major consideration:

access to the storehouse must be carefully controlled so that theft and embezzlement are minimized (ibid). They concluded that, correct FEFO stock rotation will ensure that exposure to harsh conditions is minimized and that potency is preserved as much as possible. Ensuring good air circulation and preventing direct water contact are most important.

Primarily, pharmaceutical care standard is a Quality Assurance (QA) tool to enhance the quality of pharmaceutical service delivery within the healthcare system in Ghana. As such, its awareness among health personnel is expected to be high so as to ensure quality healthcare delivery. However, as identified by Glanz and Rimer, (2001), awareness is necessary but not sufficient to produce behaviour change as this may be the case among health personnel.

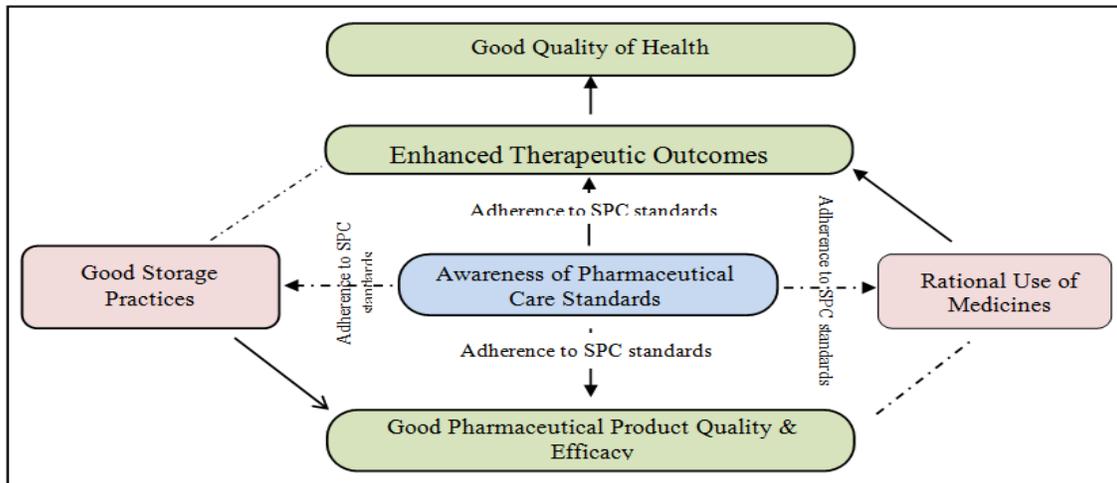
Kai (2009) argued that, in many cases program deficiencies such as lack of trained service providers and other resources can also be traced to inadequate, inappropriate or outdated operational policies. Some others perceived challenges however in the application of quality pharmaceutical care standards for managing essential medicines in hospitals include Non-commitment of top management to medicines quality assurance standards; Lack of requisite institutional structures to facilitate the application of quality pharmaceutical care standards; lack of appropriate training, poor monitoring and supervision.

Conceptual Framework

Awareness and adherence to pharmaceutical care standards by healthcare providers is core to ensuring that patients derive optimum therapeutic benefits through effective treatment to promote good quality of health. The storage of pharmaceutical products in compliance with prescribed standards results in the maintenance and preservation of product integrity of quality and efficacy. These coupled with their rational use will enhance treatment outcomes for patients. The practice standards are defined by the overall National essential medicines management policy framework.

Good pharmaceutical product quality and efficacy are also enhanced by adherence to good storage practices and where there is increased awareness and adherence to the practice standards for rational medicines use culminates in enhanced therapeutic outcomes for patients. Thus awareness and adherence to SPC standards for safe and secure storage as well as appropriate medicines use practices are intended to ensure that medicines reaching the patient are safe, effective and acceptable to the patient. These components have a critical role in improving patient outcomes, by reducing the opportunity for error and promoting prompt action, ensuring that treatment improves for all patients. This is the focus of this study as illustrated on Figure 1.

Figure 1. Conceptual Framework



Note: Author's Own Construct based on National Essential Medicines Policy Environment, January 2014

RESEARCH METHODOLOGY

A cross-sectional survey was employed in this study. It involved the collection of information through the use of self-administered structured questionnaire (quantitative method) to assess respondents on the study objectives. The questionnaire contained both closed and open-ended questions for purposes of flexibility and quick responses.

Population and Sample Size

A survey of the varied practice groups within all the three public hospitals namely; Tamale Teaching Hospital (TTH), Tamale West Hospital (TWH), and the Tamale Central Hospital (TCH) was conducted. The key targets were medical doctors, pharmacists, physician assistants, pharmacy technicians, nurse managers and administrators.

100 respondents of various practice groups comprising pharmacists, medical doctors, physician assistants, nurse managers, pharmacy technicians and hospital administrators were purposively sampled for the study. Whilst the choice of this sampling method ensured maximum convenience in the selection process, the practice groups involved were deemed most necessary since they are the key personnel with responsibility for storage, dispensing and monitoring the use of essential medicines in line with the pharmaceutical care standards. All twenty (20) pharmacists in the public hospitals studied were however researched on and the remaining 80 respondents were chosen across all the other practice groups.

Data collection

Out of the 100 questionnaires administered, 99 were retrieved and analyzed in this presentation for discussion.

Socio biographic profile of respondents

Of the 99 respondents studied, 64.6% were males with tertiary level of education whilst 28.3% were females with tertiary level education. The remaining 7.1% of respondents comprised both male and females with other educational backgrounds below tertiary level. The modal age range was 21-30 years which represented 55.6% of the respondents.

On occupational distribution of respondents, 20.2% of respondents each were medical doctors and pharmacists whilst 10.1% and 4.0% respectively were physician assistants and administrators. It was further revealed that 35.4% of respondents were nurse managers whilst 10.1% were pharmacy technicians.

ANALYSIS AND DISCUSSION

Awareness

In assessing respondents' awareness on SPCs, a five-point Likert scale questions was developed ranging from completely unaware (CU) to completely aware (CA) with which respondents were to show their level of awareness to the standards. The study revealed that, 3.0% of respondents were completely unaware of the provision that the safety, security and quality of medicines are not to be compromised during procurement, transportation and storage. To this provision, 2.0% of respondents also claimed to be unaware whilst 5.1% were found to be uncertain as to whether they are aware or not. On the other hand however, 24.2% of respondents were noted to be aware of the provision whilst 65.7% affirmed that they were completely aware. It implies that, there is considerably high level of awareness among respondents that, the safety, security and quality of medicines should not be compromised under any circumstances.

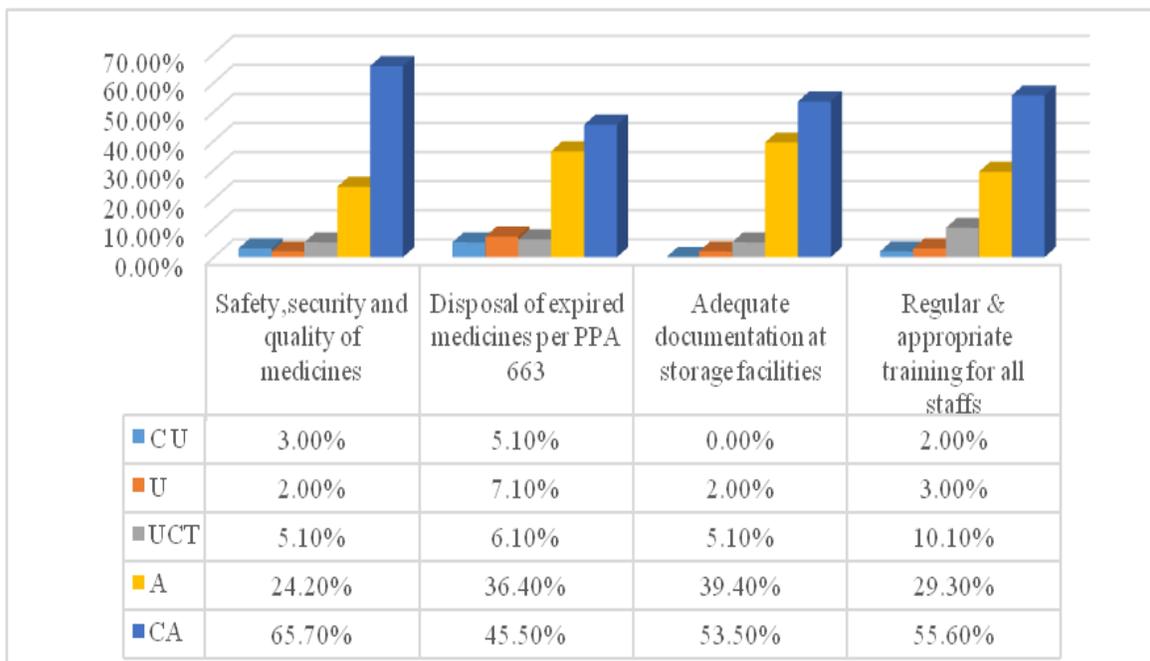
On account of the disposal of all out-of-date medicines and any stock no longer required in accordance with the Public Procurement Act 663 (Act 2003), 5.1% and 7.1% of respondents respectively were noted to be completely unaware and unaware whilst 6.1% indicated to have been uncertain about the provision. Furthermore, 36.4% of respondents asserted to have been aware whilst 45.5% noted to have been completely aware of the need to dispose-off all unserviceable stock and medicines with appropriate security precautions in accordance with the Public Procurement Act. Again, it can be observed that there is high level of awareness of the SPCs in this regard.

Also, the study sought respondents' awareness on the provision that, the storage facilities for medicinal products must have adequate documentation on activities undertaken to make room for easy identification of mix-ups, errors and ensure traceability. This enquiry also revealed that 2.0% of respondents were unaware of the provision whilst 5.1% were uncertain. However, 39.4% responded to have been aware of the provision whilst 53.5% affirmed to have

complete awareness. These responses also depict the trend of high awareness of the standards among the respondents’.

Furthermore, the pharmaceutical care standards also provided that all staffs involved in the handling of medicines shall be regularly and appropriately trained in safe and secure handling of medicines; and to this effect, 2.0% and 3.0% of respondents respectively were noted to have been completely unaware and unaware whilst 10.1% remained uncertain about their awareness of the provision. On the other hand, 29.3% of respondents indicated ‘aware’ whilst 55.6% showed complete awareness of the provision. These positions again illustrates a high level of awareness of the SPCs among respondents. This is illustrated in Figure 2.

Figure 2. Extent of Respondents’ Awareness on SPCs for Managing Essential Medicines



Awareness of the Standards among the Various Hospitals

In an attempt to relate respondents’ awareness to their specific hospitals, of the 68.7%, 19.2% and 12.1% respondents drawn in that order from the Tamale Teaching Hospital (TTH), Tamale West Hospital (TWH) and Tamale Central Hospital (TCH), it was revealed that, 64.7% and 73.7% of respondents from TTH and TWH respectively claim complete awareness of the pharmaceutical care standards (SPCs) while 58.3% from TCH also claim complete awareness. Regarding respondents who have fair awareness of the standards, 26.5% came from TTH while 15.8% and 25% also came from TWH and TCH respectively. With respondents who claim no awareness (unaware) of the standards, all (2.9%) came from TTH.

Finally, 2.9% of respondents who reported to be completely unaware of the standards came from TTH whilst 5.3% came from TWH. No respondent from TCH was completely unaware of the of the SPC standards. These findings confirm that the awareness of the standards is greatly held among all the three (3) facilities in the Tamale metropolis however, the Tamale Teaching Hospital which has the vision of becoming the centre of excellence for quality tertiary healthcare, medical education and research in the region did not demonstrate highest awareness of the SPCs amongst the others. A relatively high proportion of respondents from TWH were found to have complete awareness of the standards. This is shown in Table 1.

Table 1: Awareness of the SPCs among Hospitals

Hospitals		Safety, Security & Quality not Compromised					Total
		Completely Unaware	Unaware	Uncertain	Aware	Completely Aware	
TTH	Count	2	2	2	18	44	68
	% of Total	2.9%	2.9%	2.9%	26.5%	64.7%	100%
TWH	Count	1	0	1	3	14	19
	% of Total	5.3%	.0%	5.3%	15.8%	73.7%	100%
TCH	Count	0	0	2	3	7	12
	% of Total	.0%	.0%	16.7%	25.0%	58.3%	100%
Total	Count	3	2	5	24	65	99
	% of Total	3.0%	2.0%	5.1%	24.2%	65.7%	100.0%

Awareness among Professions

Regarding the level of awareness among the various professions of the facilities, it was realized that there is high awareness of the SPCs among the various professions (that is 65.7% + 24.2%). However, about 5.0% of respondent across the professions reported no awareness of the standards. From Table 2, it could be held that awareness of the SPCs is highest among pharmacists and physician assistants. However, awareness of the SPCs was found to be moderate among nurse managers and pharmacy technicians. Medical doctors and administrators had poor awareness of the standards. This positions nonetheless depicts the trend suggested by WHO (2004) that, more than 50 percent of all medicines are prescribed, dispensed, or sold inappropriately, while 50 percent of patients fail to take their medicines correctly. Table 2 depict only 55.0% of medical doctors, 62.8% of nurse managers and 60% of pharmacy technicians are completely aware of the provision that the safety, security and quality of medicines are not to be compromised during procurement, transportation, storage and use. Nonetheless, the above finding did not concur with the position of Bamigboye and Adesanya (2006) who found higher healthcare awareness among nurses and administrators.

Table 2: Awareness of the SPCs among Professions

Professions		Safety, Security & Quality not Compromised					Total
		Completely Unaware	Unaware	Uncertain	Aware	Completely Aware	
Medical Doctor	Count	1	1	2	5	11	20
	% of Total	5.0%	5.0%	10.0%	25.0%	55.0%	100.0%
Pharmacist	Count	0	0	0	3	17	20
	% of Total	.0%	.0%	.0%	15.0%	85.0%	100.0%
Physician Assistance	Count	0	0	0	3	7	10
	% of Total	.0%	.0%	.0%	30.0%	70.0%	100.0%
Administrator	Count	0	0	0	2	2	4
	% of Total	.0%	.0%	.0%	50.0%	50.0%	100.0%
Nurse Manager	Count	1	1	2	9	22	35
	% of Total	2.9%	2.9%	5.7%	25.7%	62.9%	100.0%
Pharmacy Technician	Count	1	0	1	2	6	10
	% of Total	10.0%	.0%	10.0%	20.0%	60.0%	100.0%
Total	Count	3	2	5	24	65	99
	% of Total	3.0%	2.0%	5.1%	24.2%	65.7%	100.0%

Adherence

This section of the report seeks to establish respondents' level of adherence to pharmaceutical care standards regarding the storage of essential medicines.

Adherence to Safe Storage of Essential Medicines

Towards effective management of essential medicines at the storage level, it is required that a suitably constructed storage facility should be provided for hospitals to ensure maintenance of the safety, security and quality of medicinal products. To this provision, 3.0% of respondents' disagreed somewhat to its existence whilst 3.0% also indicated not to have known anything about the existence of such a facility. Furthermore, 36.4% of respondents agreed somewhat whilst 57.6% strongly agreed to have a suitably constructed storage facilities in place for the effective and appropriate storage of medicinal products.

Further to the provision of a suitably constructed storage facility, there is also the provision to ensure that it is well equipped with necessary tools and materials to ensure the appropriateness of the storage facility. Whilst 2.0% of respondents disagreed somewhat to indicate that, the storage facilities at their hospitals are not well equipped to enhance safety, security and quality of medicinal products, 4.0% reported not to know anything about this status. However, 36.4% and 57.6% of respondents respectively agreed somewhat and strongly that the storage facilities at their hospitals are well equipped for effective storage.

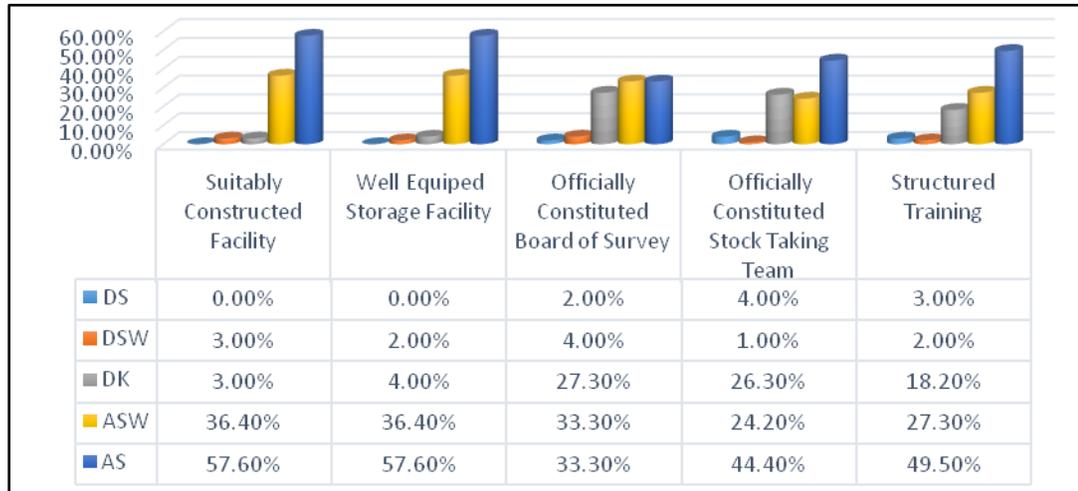
On the note of an officially constituted board of survey which is expected to be formed in accordance with the Public Procurement Act 2003 (Act 663) to manage the disposal of expired medicines, 2.0% and 4.0% of respondents respectively disagreed strongly and somewhat which denotes non-existence of such a board whilst 27.3% claimed not to know anything regarding the existence or otherwise of a board of survey. On the other hand 33.3% of respondents agreed somewhat whilst another 33% agreed strongly to the statement which indicated that, there is a well constituted board of survey in place in accordance with the PPA 2003 (Act 663).

Also regarding the existence of an officially constituted stock taking team for the conduct of inventory or physical count of all medicines on quarterly basis with reports, 4.0% and 1.0% of respondents respectively disagreed strongly and somewhat whilst 26.3% of respondents claimed ignorance of the existence of such a team. Also worth noting is that, 24.2% of respondents agreed somewhat to the existence of a well constituted stock taking team whilst 44.4% of respondents agreed strongly.

Finally, the standards provided that a well-structured training should be held regularly for all staffs involved in handling medicines towards the safe and secure storage of medicines and to this provision, there was a 5.0% disagreement made up of 3.0% strong disagreement and 2.0% fairly disagreement. Whilst 18.2% of respondents claim ignorance of the existence of any such programme, 27.3% and 49.5% respectively agreed somewhat and strongly to the statement to imply that there is a well-structured training programme on safe and secure storage of medicines.

Notwithstanding the minor cases of disagreement with the existence and provision of some facilities in accordance with the standards, it could be upheld from the responses that the provisions regarding storage facility, equipment, staffs and appropriate boards and teams are in place with the necessary regular training for the personnel involved. This is therefore in confirmation of SEAM (2001) finding that only 3 out of 20 surveyed facilities suffer insufficient storage area for their medicines. However, the case of ignorance about the existence and provision for storage facilities and equipment with the necessary teams and boards among some personnel may imply their ineffectiveness and/ or inappropriateness regarding their conditions (that is, even if they exist). This may however suggests the possibility of the presence of potentially substandard drugs which may lead to potential treatment failures in the healthcare delivery process. It further confirms the position of Newton et al. (2006) that, the use of substandard anti-infective drugs resulting from inappropriate storage condition can cause increased morbidity and mortality, adverse effects due to an excessive dose or the presence of sub-standard active ingredients. This is illustrated in Figure 3.

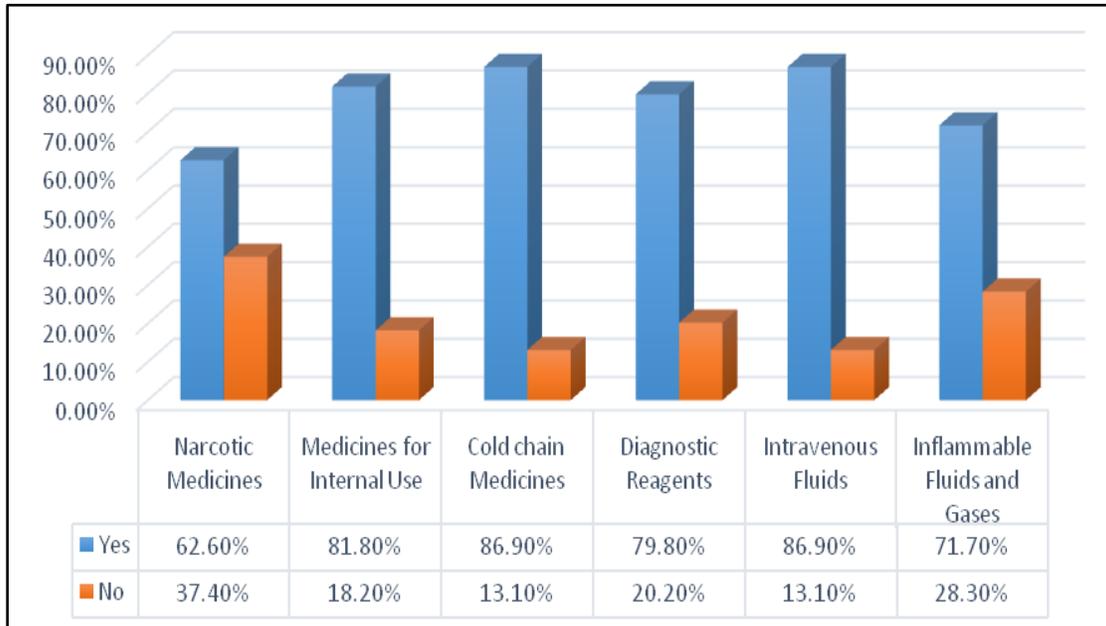
Figure 3. Safe and Secure Storage of Essential Medicines



Availability and Use of Separate Compartment for EMs

Standards for Pharmaceutical Care require the use of separate compartments to ensure the maintenance of the safety, security and quality of pharmaceutical products. To this provision therefore, the researchers sought to ascertain whether separate compartments really existed for some of such products and this revealed 62.6% and 81.8% respectively responding 'Yes', there is a separate compartment for narcotic medicines and medicines for internal use whilst 37.4% and 18.2% responded otherwise. Regarding cold chain medicines and diagnostic reagents, 86.9% and 79.8% of respondents respectively indicated they have separate compartments whilst 13.1% and 20.2% indicated otherwise. The study also found 86.9% and 71.7% respectively of respondents with separate compartments for intravenous fluids and inflammable liquids whilst 13.1% and 28.3% do not. From the above positions, it could be inferred that public hospitals in the Tamale metropolis have separate compartments for storage of some of the medicinal products as prescribed by the pharmaceutical care standards for safety and security reasons. It is however worth noting also that, the hospitals do not also have separate compartments for some of the prescribed medicines as revealed by significant number healthcare personnel responses. This indicates some level of non-adherence to the standards and may perhaps be the result of inadequate or lack of appropriate storage facilities in some hospital units/departments for the prescribed medicinal products.

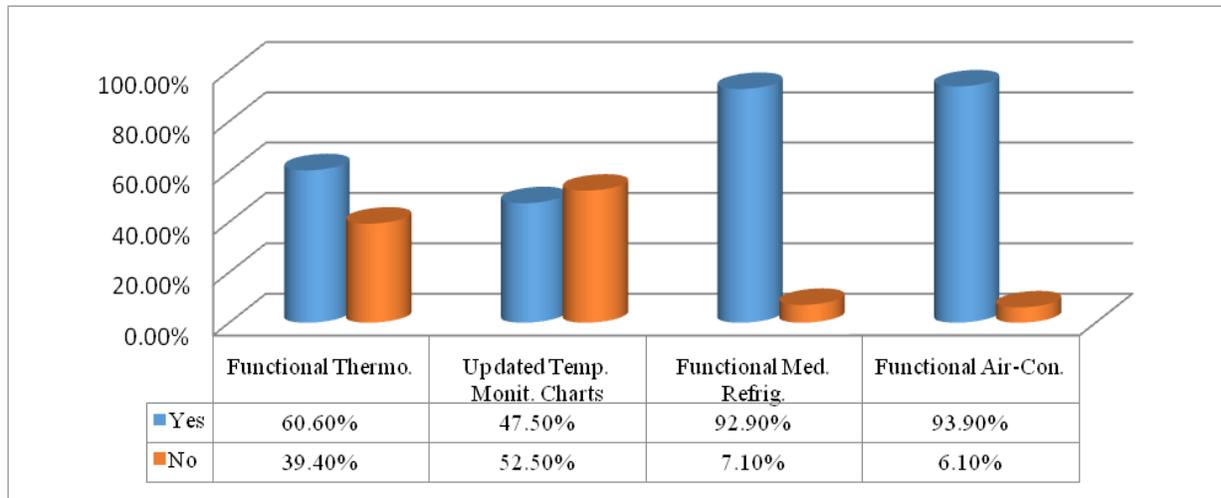
Figure 4. Availability and Use of Separate Compartments for Storage of EMs



Equipment and Charts in Storage Facilities

In an enquiry to determine the availability and use of some equipment and charts in managing the storage of medicinal products, the study found 60.6% of respondents identifying the existence and use of functional thermometers whilst 39.4% could not identify their existence and use at the storage facilities. Furthermore, it was found that only 47.5% of respondents noted to have updated temperature monitoring charts in their storage facilities whilst 52.5% did not. These findings relates well with the SEAM report (2001) that 14 out of 20 facilities surveyed did not keep records of temperatures. Whilst this position shows a weak adherence to the standard, 92.9% of respondents however indicated the existence of functional medicine refrigerators whilst 7.1% noted otherwise. Also, 93.9% of respondents reported the existence of functional air-conditions at the storage facilities whilst 6.1% reported otherwise. These findings however contradicts those reported by Agazi and Obuodi (1986) that only 64% of the functioning refrigerators in Ghana were maintained at temperatures required for safe vaccine storage. This implies that, some standards are strictly upheld by the hospitals whilst others are weakly upheld posing threats to the quality, efficacy and safety of medicines. Adherence to the use of thermometers and temperature charts would ensure medicines are maintained within the prescribed temperature range for optimum potency and efficacy level. Observed weaknesses in adherence to the standards could possibly stem from ineffectiveness and malfunctioning of established authority or body within the system (hospitals) which is responsible for enforcing adherence to the standards. The data is illustrated in Figure 5.

Figure 5. Equipment and Charts at Storage Facilities



Basic Stock Management Books

As provided for by the pharmaceutical care standards, some basic stock management books and vouchers are expected to be kept and used at the storage facilities of public hospitals in the Tamale metropolis. To assess the level of adherence to this provision therefore, the respondents were asked to indicate the extent of agreement or otherwise to the availability and use of these basic books by their hospitals and this revealed 2.0% of respondents (for each) disagreed strongly and somewhat with assertion that their hospitals keep stores ledger books which indicated a 4.0% disagreement. Also, 14.0% of respondents reported not to have known whether their stores department maintains stores ledger books.

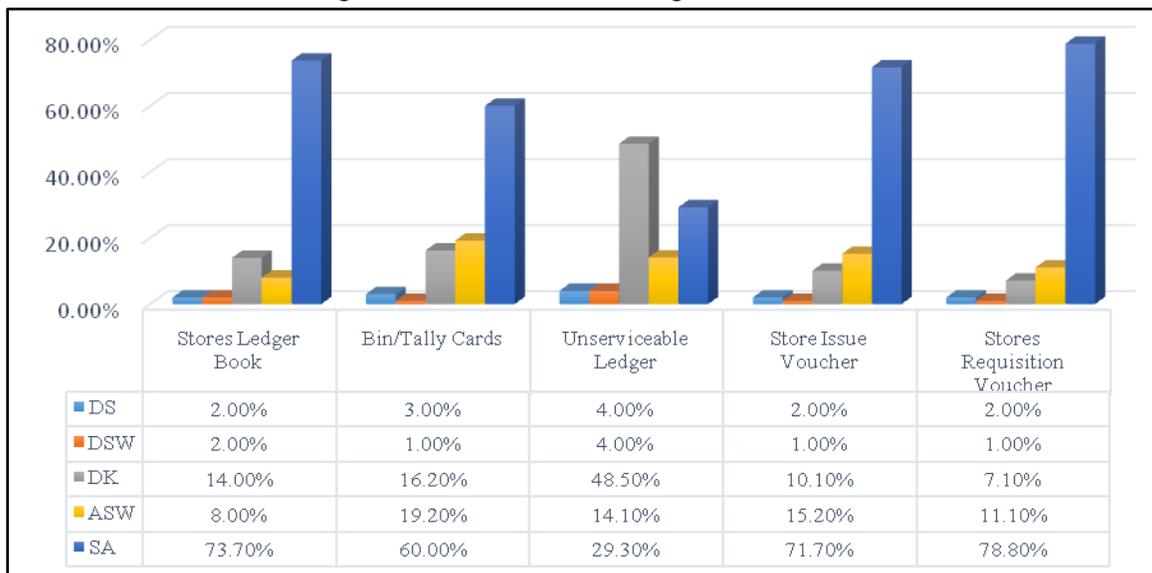
However, 8.0% and 73.7% of respondents respectively agreed somewhat and strongly to the assertion which suggests that most of the hospitals maintain stores ledger books. This is illustrated in Figure 6.

Related to the above enquiry, the study also posited that all hospitals maintain bin/tally cards at their stores departments and this revealed 3.0% and 1.0% of respondents respectively disagreeing strongly and somewhat to the assertion whilst 16.2% of respondents represented their ignorance of bin/tally cards. It further revealed that 19.2% and 60.0% of respondents respectively agreed somewhat and strongly to the assertion to imply that, their stores departments maintain bin/tally cards. Also, 4.0% of respondents (for each) disagreed strongly and somewhat with the assertion that their stores departments maintain unserviceable ledger books whilst 48.5% of respondents interestingly contended not to have known anything about the existence of unserviceable ledger. On the other hand, 14.1% and 29.3% of respondents respectively also agreed somewhat and strongly that their stores departments maintain unserviceable ledger books as shown in Figure 6.

In relation to the maintenance of stores issue voucher, 2.0% and 1.0% of respondents respectively disagreed strongly and somewhat which suggests that, their stores department does not maintain issue vouchers. A section of respondents represented by 10.1% indicated their ignorance of issue vouchers whilst 15.2% and 71.7% respectively agreed somewhat and strongly with the assertion that their stores departments maintain issue vouchers. This is shown in Figure 6. Finally, the study also sought to ascertain the existence of stores requisition vouchers and it was found among 3.0% of the respondents that, their stores do not maintain requisition books whilst 7.1% do not know about its existence. However, 11.1% and 78.8% of respondents agreed somewhat and strongly to the assertion on the existence of requisition voucher at their hospitals.

Thus, although hospitals to a large extent maintain the basic books and vouchers as prescribed by the pharmaceutical care standards, however, disagreements as held by some health personnel represent irregularities and inefficiencies attributable to the system and in extreme cases, absence of some basic books. This is illustrated in Figure 6.

Figure 6. Basic Stock Management Books



Challenges

Whilst the responses among healthcare personnel depicts weaknesses in adherence and compliance with the stipulated provisions of the pharmaceutical care standards, there is the need to determine what factors account for such flaws in managing the storage of essential medicines as per the standards.

To this end, the study found 12.1% and 8.1% of respondents respectively disagreeing strongly and somewhat with the assertion that lack of institutional quality assurance policy is responsible for the weaknesses in adherence to standards in managing the storage of essential

medicines. Whilst 24.2% of respondents showed uncertainty about this view, 23.2% and 32.3% of respondents respectively agreed somewhat and strongly to the assertion. This implies that lack of institutional policy is one of the challenges confronting managing effective storage of essential medicines in public hospitals in the Tamale metropolis. Whilst this position of respondents somehow contradicts their earlier responses that regular training programs on quality assurance and pharmaceutical logistics and supply chain management are held by the facilities towards effective management of storage of essential medicines, the latter responses may possibly imply some element of ineffectiveness of the training programmes, as it may not actually have yielded the needed results and impact.

On a similar note, 27.3% and 22.2% of respondents respectively disagreed strongly and somewhat with the proposition that lack of appropriate and adequately trained health staff is responsible for the ineffective adherence to management of essential medicines storage. To this position, 10.1% of health staff showed indecision whilst 18.2% and 22.3% of respondents respectively agreed somewhat and strongly. It implies that, the problem is not caused entirely by lack of adequately trained health staff but may have its contributions indirectly towards the problem.

SUMMARY AND CONCLUSION

There is high level of awareness on pharmaceutical care standards among various respondents from all the hospitals researched which is a good basis, though not necessarily conclusive, for adherence to the standards to promote effective medicines storage for improved patient care.

Since medication management is not only the responsibility of the pharmaceutical service but also of managers and other clinical care providers in the medical, nursing, pharmaceutical and administrative departments, their awareness of SPC standards is critical in ensuring they participate collaboratively to develop, implement and monitor institutional policies and procedures in providing safe medication storage practices for optimal quality of care, treatment, and services. Thus, sustaining the awareness level of these health professionals on the pharmaceutical standards coupled with adherence to the standards is crucial to effective storage of essential medicines in public hospitals.

Adherence to pharmaceutical care standards for safe storage of medicines is not fully complied with in the public hospitals researched. Non-adherence to safe storage provisions will result in sub-standard medicines with defective potency and efficacy being prescribed for patients. These issues need to be addressed urgently to ensure medicines maintain their prescribed quality for improved healthcare delivery and patient treatment outcomes.

The major challenges confronting adherence to pharmaceutical care standards for effective storage of essential medicines in public hospitals in the Tamale metropolis include lack of

institutional quality assurance policy, non-availability of SPC manuals, lack of training on SPC manual and on safe and effective storage practices. These constitute institutional inefficiencies which can compromise the quality of healthcare delivery for patients. There is thus the need to develop appropriate strategies and implement needed interventions to improve compliance and cost-effectiveness in medicines storage. This is because pharmaceuticals comprise a very major component of National healthcare budgets and therefore, their effective management through compliance to the required standards of practice will lead to significant cost containment as well as ensuring patients derive the needed therapeutic benefits from the effective storage of these medicines

Suggestions from healthcare staffs towards addressing the challenges include education and training of health staffs on the need to know and comply with the storage standards in medicines management. Also Government support with needed logistics, monitoring and supportive supervision on adherence to the practice standards will ensure the safe and secure storage of essential medicines in all public hospitals in the Tamale metropolis.

There are many possible approaches for policy-makers and health system managers to encourage improved storage of essential of medicines in public hospitals. In this paper, we have recommended five approaches that we think and believe would establish a sound, broad-based programme for safe storage of essential medicines leading to better quality of care delivery and improved cost effectiveness.

RECOMMENDATION

Based on the findings of the study, the following recommendations are made to improve awareness and adherence to pharmaceutical care standards for managing the safe and secure storage of essential medicines in public hospitals of the Tamale metropolis. Towards increasing healthcare provider awareness on the SPCs, a comprehensive quality assurance program emphasizing application of pharmaceutical care standards should be developed in all public hospitals. Such program, among other things, should include basic adherence measures in managing the storage of essential medicines which include education and training of critical health care providers; Identification of hazards and risks of poor medicines storage; Routine practices essential to safe storage; Effective work practices and procedures such as monitoring and documenting storage temperature, and use of inventory control cards etc. The government should further develop policies and strict implementable measures to ensure functional institutional QA teams that would comprise representatives of relevant departments and will ensure compliance to SPC standards by critical health care providers in hospitals. Knowledge of the standards should be improved among Health Care Providers (HCPs) by providing the SPC manuals and guidelines to HCPs at the health facilities; Training and re-training them on SPC

practices and guidelines that are relevant to their job. These approaches will help institute mandatory awareness of the necessary pharmaceutical care standards among all HCPs towards ensuring quality of healthcare delivery public hospitals in the metropolis.

The study revealed failure of public hospitals to adopt and effectively implement National medicines QA policies and programmes as part of institutional action plans. These appear to have been severely compromised leading to challenges with adherence to practice standards for safe and effective medicines storage. However, there is a legal framework for a comprehensive quality assurance program which is mostly in place through the Food and Drugs Law 305B of 1992.

The objective of Quality Assurance standards under the Ghana drugs policy is to ensure that medicines available for use in Ghana are safe, effective and meet approved specifications and standards. The quality of service is to be in accordance with standards of professional regulatory bodies such as the Standards for Pharmaceutical Care (SPC) for Public health Facilities in Ghana, and Ministry of Health (MOH) quality of service guidelines. The Ministry of Health and the Ghana Health Service (GHS) are therefore called upon to ensure adoption and strict enforcement of the National quality assurance Policy on essential medicines for institutional compliance to improve adherence to the practice standards in public hospitals. Effective Implementation of the quality assurance policy for drugs management would promote the safety, security and quality of medicines for improved patient outcomes as well as curbing the escalating health budget resulting from non-compliance.

Majority of the respondents in this survey in various departments are youthful with less than 10 years working experience within their respective hospitals or health sectors. The study revealed ignorance on the availability of SPC manual. While a significant proportion of respondents agreed to a structured training programme in place there seem to be little or no training for healthcare staff on the use of the manual and other training aspects aimed at effective medicines storage practices. Lack of appropriate training and facilitative supervision for health personnel have compromised on quality standards for the safe storage of essential medicines in the hospitals surveyed. MOH and GHS must promote needed awareness on the availability of the SPC manual and provide education and training on the use of the Manual as well as make it widely available to all Regional Health Directorates and departments of hospitals to improve their use. Hospital Management Teams must incorporate periodic refresher training for healthcare staffs in their yearly action plans to strengthen adherence to the standards. Availability and use of the SPC manual would equip healthcare staffs with the needed capacity, skills and awareness to effectively manage the storage of essential medicines for improved patient outcomes. Governments and policy makers can help to ensure that already scarce

financial resource on pharmaceuticals is well spent by making sure that sufficient funds are allocated to essential medicines storage training activities.

Study revealed significant challenges in Logistics support such as provision of SPC manuals and appropriate thermometers for monitoring storage temperature. The non-availability and use of these essential tools would promote non-adherence to the practice standards. Institutional Management Teams and MOH/GHS must ensure the development and implementation of policy interventions to ensure drugs are properly stored according to prescribed standards and guidelines.

It can be inferred from the findings of the study that even where healthcare staffs complied somewhat with the practice standards, the facilities lacked the necessary systems and mechanisms to facilitate periodic supervision and monitoring of health staff to further improve their performance. Lack of supportive supervision and monitoring can result in an inadequate and substandard healthcare delivery thereby compromising on maximization of treatment benefits for improved patient outcomes in many hospital settings.

The key message for policy-makers and Regional Health Directorates is that there is a need to establish simple functional systems to monitor key pharmaceutical care indicators for Institutional and system-wide strengthening. Several sets of pharmaceutical care indicators have already been developed and tested. Policy-makers and managers should select a few locally appropriate indicators and collect them on a regular basis in order to be able to respond in a timely way to negative changes. A good supportive supervision and monitoring systems implemented on a regular basis is an effective method of providing the necessary guidance and support to healthcare staffs towards the delivery of effective quality healthcare through adherence to National standards of practice.

SCOPE FOR FURTHER STUDIES

The need for harmonization and standardization of key pharmaceutical activities for efficiency and improved quality of service cannot be overemphasized. Hence further studies would be beneficial to establish adherence to SPCs in the use of essential medicines to establish the safety and effectiveness of medicines therapy regimen. Such standard procedures and practices would improve uniformity and consistency in service provision through the application of pharmaceutical knowledge, standards and skill to maximize drug therapy.

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