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Adherence to standard treatment guidelines and its impact on stock management

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ABSTRACT

Introduction
There is significant variability in treatment options given to patients with the same clinical condition by medical doctors within the Cameroon Baptist Convention Health Services (CBCHS) despite the existence of Standard Treatment Guidelines (STGs).

Purpose
This work aimed to investigate how adherence to STGs affects stock management within the CBCHS.

Materials & methods
A questionnaire was self-administered to prescribers of Mboppi Baptist Hospital and Bonaberi Baptist Health Centre. Additionally, an interview guide was used at the stock management units to capture indicators related to adherence to STGs. The collected data were analysed using SPSS.

Results
18.2% of the prescribers did not receive the STGs booklet at the point of hire. Among those that received, only 15.9% received some varied form of training. 77.8% appreciated the STGs booklet as a vital tool but paradoxically, 63.9% were only occasional users. The observed exposure to STGs during training was linked to how the prescribers evaluated treatment outcomes when using the CBCHS STGs compared to other sources ($p<0.05$). Being exposed to STGs during training was significantly related to how they appreciated the quality of the recommendations found in the CBCHS STGs ($p<0.05$). However, there was no association between the planned Pharmacy and Therapeutics Committee (PTC) meetings and the ones that held ($p>0.05$) showing that the lone PTC meeting was by chance, thus explaining the haphazard addition of medicines to the Essential Medicines List (EML). The poor adherence to STGs was much linked to varied training backgrounds and a dysfunctional PTC. 56.9% of the participants were not even aware that the PTC existed. The impact of poor adherence to STGs on stock management included expiry, inaccurate needs forecast, and stock-outs of some commodities.

Conclusions
Adherence to STGs within the selected sites is extremely poor with a resultant significant variability in consumption patterns and difficulty in accurately forecasting needs.

INTRODUCTION

Globally, over 10000 pharmaceuticals are available. However, just about 300 to 400 molecules (Essential Medicines) meet the needs of most of the population (Aitken, 2015). These few medicines are selected based on frequent morbidities in the community and are individualised per setting (Mounika et al., 2017). Essential Medicines are usually presented in an Essential Medicines List (EML).

Health Care Professionals (HCPs) are too busy to regularly consult the most recent clinical evidence as they attend to patients. This results in misdiagnosis of certain diseases (Siko & Deventer, 2017). System for Improved Access to Pharmaceuticals and Services (SIAPS, 2015) highlights that to assist the busy HCPs, and to make the most recent clinical evidence available, systematically developed statements (Standard Treatment Guidelines, STGs) are developed. STGs assist practitioners in making clinical decisions for specific clinical circumstances (Management Sciences for Health [MSH] & World Health Organization [WHO], 2007). STGs schedule the preferred management of common conditions.

STGs are developed by a multidisciplinary team – the Pharmacy and Therapeutics Committee (PTC) (Sofat et al., 2019) and are intended to be adhered to unless there is clear justification for a deviation. Careful selection of a limited range of medicines results in a higher quality of care, better management of medicines, and more cost-effective use of the limited health care resources.

There is a multiplicity of medicines with similar or identical therapeutic properties Aitken (2015). Prescribers are faced with this variety of often unaffordable medicines. We, therefore, need a limited range of medicines selected with due regards to Public Health relevance – evidence of efficacy, safety, and comparative cost-effectiveness (Mounika et al., 2017).

For Barraclough & Clark (2015), a limited number of medicines to handle leads to accurate needs forecast, procurement, and distribution practices which ultimately result in Rational Medicines Use (RMU). An accurate needs forecast is required to stock appropriate quantities of medicines (MSH & WHO, 2007). For STGs to be effective as a tool in RMU, prescribers trained from varying backgrounds need to stringently adhere to and use the STGs.

In a typical Low and Medium Country (LMIC) like Cameroon (World Bank Group, n.d.), just eight medical schools train medical Doctors (MedCamer, 2020). The Human resource force from these schools is insufficient to meet national needs, resulting in an acute shortage of medical doctors. As of 2010, Cameroon had 1.1 Medical Doctors to 10000 population (Cameroon Ministry of Health [CMOH]. 2012; WHO, 2012; Knoema, 2020). Cameroonians aspiring to become Medical Doctors get trained in different countries (MedCamer, 2020). characterised by different morbidity and treatment patterns. Upon their return, these Doctors get hired in different health facilities with different common morbidities.

During training, HCPs learn about all the possible treatments that could be used (WHO, 2006) instead of focusing on the best treatment. Treatment options, therefore, depend on the patient, disease, medicines, and practitioner-related factors.

It becomes imperative, therefore, to develop evidence-based, regularly updated STGs and enforce their use within the targeted facility since STGs ensure RMU (Kar, 2015). Failure leads to *therapeutic anarchy* (MSH & WHO., 2007), characterised by tremendous diversity among Doctors in the treatment of the most common disease conditions.

This work builds on the concept of STGs, RMU, EML, and Stock Management. The research, therefore, seeks to investigate how adherence to Standard Treatment Guidelines affects stock management within the Healthcare delivery system.

MATERIALS AND METHODS

This research was of causal-comparative design and sought to establish the interrelationship between adherence to STGs and stock management indicators (Salkind, 2010).

Study population

The study population was all employees of the Cameroon Baptist Convention Health Services (CBCHS) who were prescribers (approximately 550 persons).

Sample size and sampling technique

A sample size of 55 prescribers (primarily from Mboppi Baptist Hospital and Bonaberi Baptist Health Centre) was

selected from the population using the purposive sampling technique.

Data collection

Primary data was collected using questionnaires, which were distributed in person to 55 prescribers in the selected facilities from November 16 to 21, 2020. 51 questionnaires were filled and returned (92.73% return rate). However, 7 were rejected because of some inconsistencies in the filling of the questionnaires. Consequently, only 44 questionnaires were included in this study. Additionally, an interview guide was used in the medicines store of the facilities to review stock management indicators that serve as pointers to adherence to STGs.

Data analysis

The data collected were analysed using SPSS (version 25). The significance level was set at 5% ($p<0.05$)

RESULTS

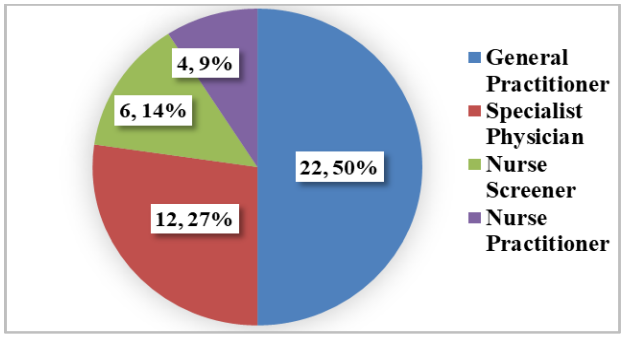
55 Questionnaires were distributed to prescribers. Of these, 51 (92.73%) were filled and returned. However, 7 were rejected because of some inconsistencies in the filling process. Therefore, 44 questionnaires were analysed. The tables and charts below present the results:

Demographic Data

43.2% of the respondents were male and 56.8% female.

The professional affiliations of the respondents are presented in **Figure 1**.

Figure 1
Professional affiliation of the respondents



The years of work experience after leaving medical school and since they joined the CBCHS are presented in **Figure 2** and **Table 1** below.

Figure 2
Years of experience after leaving the school of health personnel or Med-school

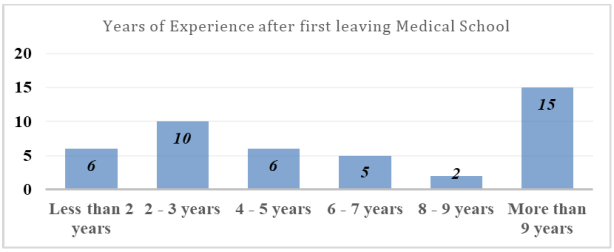


Table 1
Years of service with the CBCHS

Years of service with the CBCHS	Frequency	Percent (%)
< 2 years	11	25.0
2 – 4 years	13	29.5
4 - 6 years	8	18.2
6 - 8 years	4	9.1
8-10 years	0	0.0
> 10 years	8	18.2
Total	44	100.0

Human Resource Hiring Practices undermining the importance of STGs within the CBCHS

As of the time of hiring, 18.2% of the respondents did not receive the CBCHS STGs booklet. Of those that received, only 15.9% of the participants were trained on how to use the CBCHS STGs booklet **(Table 2)**.

Table 2
The setting of training on the use of the STGs

If formally trained, what was the setting of training on use of STG?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Workshop	2	4.5	28.6	28.6
Hiring process	3	6.8	42.9	71.4
During my training	1	2.3	14.3	85.7
Practical Experience	1	2.3	14.3	100.0

93.1% of the respondents who owned a copy of the STGs booklet and were not formally trained on how to use the booklet got acquainted with it as they used it. 6.9% of them were guided by a colleague on how to use the booklet.

How are STGs introduced to the newly hired?

11.4% of consultants were not exposed to STGs during their training. 81.8% of the consultants received a copy of the CBCHS STGs booklet at the time of hire. 11.1% and 8.3% of the participants who received the STGs copy claimed that the STGs makes the physician stereotyped to a particular treatment option, and limits the physician from exercising his academic knowledge, respectively

(Table 3). All the consultants who were not presented the STGs booklet affirmed it was a worthwhile document. Only the 18.2% who were not presented with a copy of the CBCHS STGs booklet did not have a copy.

Table 3
Perceived Quality of the STGs

If presented copy of STG on hire, how did you appreciate it?			
		Frequency	Valid Percent
Valid	It is a good tool to assist in prescribing decisions	28	77.8
	Makes the physician stereotyped to particular treatment options	4	11.1
	It limits the physician from exercising his academic knowledge	3	8.3
	Other	1	2.8
	Total	36	100.0

$\chi^2(2, N=36), p=0.009$ (significant at $P<0.05$).

What is the level of adherence to STGs?

63.9% of the consultants who had a copy of the CBCHS STGs booklet occasionally used the booklet as summarized in Table 4.

Table 4
Level of Adherence to STGs

If you have a copy, how often do you use it?				
		Frequency	Valid Percent	Cumulative Percent
Valid	Regularly	12	33.3	33.3
	Occasionally	23	63.9	97.2
	Never	1	2.8	100.0
	Total	36	100.0	

30.6% of the respondents who had the CBCHS STGs book affirmed that the book was of good quality but somewhat have outdated recommendations (Table 5).

Table 5
Quality of Recommendations in the STGs

How do you appreciate the quality of recommendations found in the CBC STG?				
		Frequency	Percent	Valid Percent
Valid	Good quality, up-to-date recommendations	24	54.5	66.7
	Good quality, but somewhat outdated recommendations	11	25.0	30.6
	I have it but I do not use it	1	2.3	2.8
	Total	36	81.8	100.0

All the respondents deviated from the recommendations of the booklet in favour of other references. 36.1% and 63.9% of the respondents who have a copy of the booklet deviated regularly, and occasionally from the STGs, respectively. Table 6 summarized some of the reasons for the deviations.

Table 6
Reasons for deviations from the STGs

What are some of the reasons that cause you to deviate from CBC STG?				
		Frequency	Percent	Valid Percent
Valid	Bad experience in treatment outcomes when the green book recommendations were used	1	2.3	2.8
	Medicines are out of stock, so I use an alternative	23	52.3	63.9
	Medicines were available but I just wanted to try another reference document	3	6.8	8.3
	To use novel medicines proposed by pharmaceutical companies	7	15.9	19.4
	To use the latest evidence	1	2.3	2.8
	Small font size makes it cumbersome to read	1	2.3	2.8
	Total	36	81.8	100.0
Missing	1000	8	18.2	
Total		44	100.0	

75% of the consultants had a generally satisfactory outcome with the use of the CBCHS STGs booklet (Table 7).

Table 7
Treatment Outcomes from the use of STGs

How do you evaluate treatment outcomes when you use the CBC-STG compared to sources?				
		Frequency	Percent	Valid Percent
Valid	Generally Satisfactory Outcomes	27	61.4	75.0
	Fairly Satisfactory outcomes	8	18.2	22.2
	I do not use it, so, I cannot tell	1	2.3	2.8
	Total	36	81.8	100.0

$\chi^2(2, N=36), p=0.015$ (significant at $P<0.05$).

Existence and Role of PTC

34.1% of the respondents agreed that there was a PTC in their facility. Up to 56.8% did not know if their facility had a PTC.

The frequency at which the PTC meets is summarized below (Table 8).

Table 8
PTC and Frequency of Meetings

If there is a PTC within the Hospital, how often does the committee meet?				
		Frequency	Percent	Valid Percent
Valid	Once a year	1	2.3	6.7
	Once in 6 months	2	4.5	13.3
	Every quarter	1	2.3	6.7
	When necessary	2	4.5	13.3
	I do not know	9	20.5	60.0
	Total	15	34.1	100.0
Missing	1000	29	65.9	

Knowledge of the procedure for adding new medicines to, and removing old medicines from, the EML is presented in Tables 9 and 10.

Table 9
Procedure for adding new Medicines to the EML

What is the procedure for adding new medicines to the essential medicines list?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	When need is expressed, the medicine is immediately added	1	2.3	2.3	2.3
	The proposal is made to the procurement & supply chain officer who effects the addition as soon as possible	2	4.5	4.5	6.8
	The proposal is made through PTC, after review of the need and critical appraisal of existing literature adds EML	8	18.2	18.2	25.0
	The proposal is made to the pharmacist who adds the medicines to the essential medicines list	2	4.5	4.5	29.5
	Proposal is tabled to the PCT of the CBCHS, after review and critical appraisal of the supporting evidence adds to EML	1	2.3	2.3	31.8
	I am not too sure of the procedure for addition	30	68.2	68.2	100.0
	Total	44	100.0	100.0	

Table 10
Procedure for removing old Medicines from the EML

What is the procedure for removing medicines from the essential medicines list (EML)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The proposal is made to the procurement & supply chain officer who effects the removal as soon as possible	1	2.3	2.3	2.3
	The proposal is made through the PTC, after review of the need and critical appraisal base on literature	8	18.2	18.2	20.5
	The proposal is made to the pharmacist who removes the medicines from the essential medicines list	2	4.5	4.5	25.0
	Proposal is tabled to the PCT of the CBCHS, after review of need and critical appraisal of the supporting evidence	1	2.3	2.3	27.3
	I am not too sure of the procedure for removal	32	72.7	72.7	100.0
	Total	44	100.0	100.0	

What impact does adherence/non-adherence to STGs have on stock management?

Table 11 highlights the activities and influence of the PTC on the management of pharmaceuticals within the hospitals.

Table 11
PTC Activities

	Projected	Realised
PTC Meetings held in 2020	4	1
Number of medicines that have been added to the essential medicines list from January to November 2020	2	10
Number of medicines that have been added to the essential medicines list as recommended by individuals	0	8

$\chi^2(3, N=4)$, **p=0.05** (not significant at *p*-0.05).

The different cadre of personnel influenced the addition of medicines into the EML **(Table 12)**.

Table 12
Responsibility for adding new medicines into the EML

	Number of Medicines they each influenced to be added
Pharmacist	4
Chief Medical Officer	1
Ophthalmologist	2
Internist	1

Some salient challenges related to the management of the EML

The medicines stores manager identified a couple of challenges related to management that can be traced back to changing prescription patterns as a result of non-adherence to the STGs:-

- Medicines used for an alternative indication to limit expiry
- Medicines expire due to changing prescription patterns
- Medicines returned to Central Store for redistribution to limit expiry
- Too many medicines to purchase with a limited budget
- Difficulty in quantifying newly added medicines.

It was found that some medicines expired, and their expiry can be traced to changing prescription patterns **(Table 13)** with their corresponding values.

Table 13
Expiry Traceable to STGs Usage

	Quantity	Value at Cost	Total Value in Local Currency (FCFA)	Total Value in USD
Quinine 600mg injection	52	200	10 400	$17,63
Erythromycin 125mg/5ml Oral Suspension	30	800	24 000	$40,68
Vitamin B Complex tablets	5000	10	50 000	$84,75
Ranitidine 300mg tablets	10000	75	750 000	$1 271,19
Total			834 400	$1 414,24

Some medicines were identified as being on the danger list of expiration. For these, the cause can be traced back to changing prescribing patterns. As such, they were, and some are being, used for alternative indications **(Table 14)**.

Table 14
At-Risk of Expiry due to Changing Prescription Patterns

	Quantity	Value at Cost	Total Value in local Currency (XAF)	Total value in USD ($)
Amikacin 500mg injection	500	1700	850 000	$1 440,68
Imipenem 500mg/Cilastatin 500mg	35	7500	262 500	$444,92
Ibuprofen 400mg tablets	25000	10	250 000	$423,73
Diclofenac 50mg tablets	20000	20	400 000	$677,97
Total			1 762 500	$2 987,29

The observed exposure to STGs during training was linked to how the prescribers evaluated treatment outcomes when using the CBCHS STGs compared to other sources **(X^2 (2, N = 36), p = 0.015)**. Being exposed to STGs during training was significantly related to how they appreciated the quality of the recommendations found in the CBCHS STGs **(X^2 (2, N = 36), p = 0.009)**.

There was no association between the planned PTC meetings and the ones that held **(X^2(3, N=4), p=0.05)** showing that the lone PTC meeting was by chance, thus explaining the haphazard addition of medicines to the EML.

DISCUSSION

We observe a *diseased* health system with multiple pathologies and multiple risk factors. The following causes of poor adherence to STGs account for this *diseased health state*, some of which are modifiable, while others are not:

Poor human resource hiring practices

The mere existence of STGs within a health system does not guarantee their use. The majority of respondents received a copy of the STGs at the point of hire but over 80% did not receive any form of training on how to use the document. Ayinbuomwan & Isah (2019) found a low level of awareness on STGs in the setting of Nigerian hospitals m with lack of training. For STGs use to be effective there must be a plan to systematically train all newly hired personnel on its use.

For those that received some form of training on how to use the STGs, the varied nature of the setting of training indicates personal initiative of the lead person at the point of hiring, rather than an established institutional policy to systematically train newly hired employees on STGs use.

Divergence in training backgrounds

Ayinbuomwan & Isah, (2019) found a close association between adherence to STGs among medical practitioners and the institution where the medical degree was obtained, participation in postgraduate education, and their additional qualifications.

Newly hired physicians with little or no exposure to STGs shadow older physicians to gain experience. Kowarski (2020) highlights this crucial learning process between Premeds and the senior physician and the influence the latter has on the former. If a newly hired employee shadows an occasional user, this process becomes counterproductive.

The work style (including deviation from STGs) and attitude of the senior physician replicate in the junior during work shadowing. Occasional deviation from an STG for justifiable reasons like stockouts of preferred therapies is acceptable. However, occasional usage poses a major problem to the Healthcare system.

High practitioners turnover

More than 50% of respondents have worked with the CBCHS for less than 4 years. Thus, at any moment, old Doctors were leaving the organisation and new ones were being recruited. Ayinbuomwan & Isah, (2019) established that demographic characteristics of practitioners such as age and number of years after graduation influence awareness and utilisation of guidelines. From this, it is observed that at every moment, the already irrational prescribers were replicating their practice on the newly hired in the process of work shadowing. This exposed the health system to a perpetual problem that needs to be tackled from various fronts within the shortest possible time to harmonise practice.

A nearly outdated STG

To adhere to an STG, the users must appreciate it as a valuable and up-to-date document. The STGs in use in the CBCHS is the 2018 edition, barely 2 years of existence. However, there is no statement of the next revision of the STGs or the frequency of updating. Any scientific publication, especially in the rapidly evolving healthcare sector needs periodic revision to stay abreast with the latest evidence (NHSRC, 2020). According to Ayinbuomwan & Isah, (2019), STGs are updated regularly – every 2 years, to reflect changes in accepted treatment strategies.

Influence of pharmaceutical companies

Pharmaceutical companies propose new medicines that manifest slight variations and offer negligible therapeutic advantage (if any) to the medicines that are currently found in the EML. Practitioners easily yield to the pressure from these companies and prescribe for patients to buy elsewhere. This explains why 19.24% of respondents deviate from the existing STGs to use novel medicines proposed by Pharmaceutical Companies. These findings are in line with those obtained by Wood et al (2017) that gifts from Pharmaceutical companies are associated with a higher proportion of branded medicines of higher cost out of the EML.

A dysfunctional PTC

The majority of the respondents knew neither of the existence of a PTC in the hospital nor its composition and function. According to Matlala et al (2017), functions of the PTC include *inter alia* ensuring RMU, pharmacovigilance, formulary management, and dissemination of decisions. Practitioners who are ignorant of its existence do not know its use. In a normally functional health system, the composition of the PTC is well known. This way, the correct procedure is being followed to add to, or remove medicines from, the EML.

An interplay of these complex phenomena results in therapeutic anarchy (tremendous diversity among medical doctors in the treatment of the most common disease conditions) (Rosenberg et al, 2017).

From the stock management view-point, having lost $1,414 with $2,987 at risk, all traceable to deviations from STGs, we can imagine the impact this practice exerts on an already financially-burdened health system. This situation is quite similar to the findings by Kidane & Samrawit (2018) who traced medicines expiry to deviation from STGs.

CONCLUSIONS

From this research, adherence to STGs within the selected sites was extremely poor as reflected by the number of occasional users of the STGs. Despite appraising the existing STGs as being of good quality and up to date, users still deviate from their use. Reasons for the considerable deviation from the recommendations of the STGs ranged from poor human resources hiring practices to lack of training on the use of STGs, high employee turnover, a dysfunctional PTC, nearly outdated STGs, and the influence of Pharmaceutical Companies.

The consequences of this phenomenon revolve around managerial, financial, and clinical concerns. Managerial consequences are a mainly poor and inaccurate forecast of needs for health commodities. The financial impact is losses due to expiry as well as stock-outs from inaccuracies in forecasts. The use of medicines for alternative indications to limit expiry reflects clinical consequences, which again compounds the problem of irrational medicines use.

This research focused only on the CBCHS health facilities situated within the cosmopolitan town of Douala. Other institutions of the CBCHS were not considered. For these research findings to be more grounded, a multicentric study of the CBCHS Health Facilities on adherence to STGs is crucial.

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Conflict of Interest: None declared.

OrCID iDs: Nil identified.

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