

Challenges Facing the Push and Pull Hybrid System in the Supply of Essential Medicines in Gulu, Northern Uganda

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Abstract Essential medicines are supplied to the public health facilities using the pull and push system. In many countries the decision to use the pull, push or combination of both is a policy decision, but Uganda has used each of the supply system individually in past and currently is using a hybrid despite the rampant out-cry of essential medicines stock out. Challenges facing the hybrid supply system need to be examined to advise policy makers on the how efficient the system supplies medicines. A cross-sectional study was carried out in the public health facilities in Gulu to examine the major challenges affecting the hybrid system of medicines supply. A sample of 131 health workers filled a pretested coded questionnaire as respondents and the data were then entered and analysed using SPSS version 15. Approximately 27.7% (n=131) of the respondents reported that the store management in the hybrid system is unsatisfactory and inadequate. Quality of essential medicines supplied in the hybrid system to the public health facilities is unsatisfactory and inadequate as reported by 46.5% of the respondents. Collaborative linkages with the National Medical Stores (NMS) the mandated supplier of essential medicines in the country, is weak (42.9%) and quantification of essential medicines by health workers under the hybrid system is poor (33.3%). Furthermore support supervision in weak and inadequate under the hybrid system (37.6%); and personnel who dispense essential medicines are inadequate (44.3%). Approximately 30.3% patients have poor access to essential medicines. The current hybrid system is riddled with a number of challenges which requires re-dressed in order improve access and availability of essential medicines to the public.

Keywords: essential medicines, push and pull system, public health facilities, Gulu, northern Uganda

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1. Background

Essential medicines are medicines that satisfy the priority health needs of the population of a country. They must be available at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford [1]. Essential Medicines are the fundamental inputs in any public health system [2] and must be available, affordable and accessible. Unavailability and inaccessibility to essential medicines by any one is now considered violation of a fundamental human right [3]. The 1978 Declaration of Alma-Ata (Kazakhstan) identified "provision of essential drugs" as one of the eight elements of primary health care [1].

Each member state of the World Health Organization (WHO) is expected to develop its list of essential medicines and that the medicines in the list should be availability at all health facilities and drug outlets all the

time [4]. Uganda has Essential Medicine List (EMLU) [5] which consists of 604 medicines. However approximately two billion people in the world still lack access to essential medicines, 50% of whom live in poorer parts of Africa and South-East Asia [1], yet 10 million lives could be saved per year by scaling up access to essential drug [1]. In Ethiopia, for instance, the national average of essential medicines unavailability is 99.2 days [6]. In Uganda, lead time from ordering to receiving essential medicines at the health centers is very long at 61.2 days [7] and the medicines are 32-50% unavailable in the public health units [8].

In Uganda currently, essential medicines are supplied using the pull and push system. While the pull system is where the user facilities decide what and how much to order for from NMS, under the push system this is mainly decided at the Ministry of Health on behalf of the user facilities. While the push system is applied at the lower health facilities (health centre [HC] Is and IIs), the pull is applied at the HC IV, general hospitals, regional and national referral hospitals. In many countries the decision

to use the pull, push or combination of both is a policy decision [9,10,11]. Uganda has used each system individually in past but there were rampant out-cries of essential medicines stock outs. Since 2010, Uganda is using the hybrid system, but the challenges faced by this system have not yet been succinctly reported hence the need for more research to inform policy makers on the subject matter.

2. Methods and Materials

Between May and July 2014 a cross sectional study was conducted in the public health facilities in Gulu District, Northern Uganda using a quantitative data collection approach. A total of 131 respondents were recruited from health workers in HC IIs, IIIs and IVs located in Gulu District. The study sought to examine the challenges faced by the current hybrid system, of “pull” or “push”, in supplying and availing essential medicines in the public health facilities of Gulu District, Northern Uganda. A coded pretest questionnaire was used to collect the quantitative data on 5 point scale. The key variables that were appraised consisted of; store management, medicine quality, personnel, funding, support supervision, quantification, and access to essential medicines to determine and examine how they affect the current system of pull and push hybrid supply to public health facilities. Data were entered and analysed using SPSS version 15.

3. Results

3.1. Biographic Characteristic of Respondents

As depicted in Table 1, the majority of respondents were females (61%) while the male gender made up only 39% giving a female to male ratio of 1.5:1. The sex difference was significant (P value = 0.011). This is attributable to the fact that the largest proportions of respondents were nurses (42%) and most nurses are often of the female gender. Furthermore, a significant proportion of the respondents in the study had a working experience ranging between 6 to 10 years and above while

health workers of less the 5 years experience made up only 27.5% of respondents (P value =0.000). This implies the majority of the respondents had been in service for long therefore had a wealth of information on essential medicines in the unit.

Table 1. Biographic Characteristics of respondents

		Frequency	Percent (%)
Gender	Male	51	38.9
	Female	80	61.1
Years worked in current Position	Less than 5 years	36	27.5
	6-10 years	61	46.6
	11-15 years	15	11.5
Current post	Over 15years	18	13.7
	Missing data	1	0.8
	Head of unit/ in-charge	42	32.1
	Dispenser	8	6.1
Current post	Nurse	55	42
	store manager	4	3.1
	Clinical officer	7	5.3
	Non specific	10	7.6
	Nurse assistant	5	3.8
Total		131	100

3.2. Challenges of Stores Management in the Hybrid System

From Table 2, an average of 60.1% of respondents reported that there is adequate store management and particularly 71.7% of respondents reported that the stores practices first expiry-first out (FEFO) principle when issuing medicines which is a good practice. However, on average 27.7% reported that the store management is poor and inadequate while 15% do not know about store management in the health unit. However, the difference in store management was not statistically significant in the pull compared with the push system (P value 0.672), hence stores management is equally a challenge that affects both systems of supply of essential medicines.

Table 2. Store Management Challenges

Item		Strongly disagree (%) (A)	Disagree (%) (B)	Disagree able (%) (A+B)	Don't Know (%) (C)	Agree (%) (D)	Strongly Agree (%) (E)	Agreeable (%) (D+E)	Total (%)
Stores Management	Medicine stores room is spacious	12.2	22.9	35.1	14.5	31.3	19.1	51.3	100
	Medical store is cleaned daily	2.8	23.6	26.4	10.4	43.4	19.8	63.2	100
	Store practice of first expiry-first out principle in issuing medicines	1.5	5.3	6.8	21.4	24.4	47.3	71.7	100
Average				27.7	14.8			60.1	100

3.3. Challenge of Medicine Quality and Linkage with Suppliers (National Medical Stores NMS) under the Hybrid

According to Table 3, the quality of essential medicines supplied in the hybrid system to the public health facilities exhibited nearly similar proportion (46.5%) of respondent

agreeing that medicine quality in the hybrid system is poor and inadequate while another 40% disagree to that. About 10.7% of health workers issue out expired medicines to patients. Therefore, nearly half of respondents reported poor medicine quality in the hybrid.

Regarding linkages with the NMS the supplier, an average of 42.9% reported that there is weak linkage with the national store while 40.6% reported that there is good

collaborative linkage with the NMS. Furthermore, 62.6% of respondents reported that delivery of medicines do not conform and nor match well with facility orders and 71.8% reported that when medicine is out of stock, the

medical store (NMS) never gives advance notice. Nearly half of respondents confirm the challenge of weak linkage with the national medical store.

Table 3. Medicine quality and Linkage with National Medical Store Challenge

Item	Strongly disagree (%) (A)	Disagree (%) (B)	Disagreeable (%) (A+B)	Don't Know (%) (C)	Agree (%) (D)	Strongly Agree (%) (E)	Agreeable (%) (D+E)	Total (%)	
Medicine quality	We are supplied essential medicine with short expiry dates	19.8	30.5	50.3	9.2	29.0	11.5	40.5	100
	Some medicines are often forced to our unit even if we don't need them	6.1	7.6	13.7	6.9	40.5	38.9	79.4	100
	Our medicine handling in the unit can compromise the quality	9.9	16.8	26.7	17.6	45.8	9.9	55.5	100
	We use expire essential medicines some times	64.9	20.6	85.5	3.8	6.9	3.8	10.7	100
Average			40.0	9.3			46.5		
Linkage with NMS	When a drug is out of stock, the medical store (NMS) give us advance notice	35.9	35.9	71.8	16.0	9.2	3.1	12.3	100
	The NMS often supplies us with what we have not ordered	11.5	23.7	35.2	9.2	36.6	19.1	55.7	100
	There is a long bureaucracy in ordering and receiving essential medicines	5.3	16.0	21.3	34.4	35.1	9.2	44.3	100
	The delivery of medicine conform and matches well with our orders	27.5	35.1	62.6	12.2	22.9	2.3	25.2	100
	The delivery of orders follows the NMS schedule in timely manner	4.6	19.1	23.7	10.7	52.7	13.0	65.7	100
Average			42.9	16.5			40.6	100	

3.4. Quantification Challenges in the Current Hybrid System

From Table 4, 68.7% of the respondents were agreeable that to quantify medicines needed, the dispensing book and stock card are used in the public health facilities but 61.8% reported that they just wait for what national NMS

will supply. On average, 51.8% reported that there is adequate quantification in the current hybrid supply system but 33.3% aver that there is poor quantification in the system and 14.8% do not know about quantification in their health unit. Quantification of essential medicines is still a challenge because only a small majority of health worker reported that it is being done well in their unit.

Table 4. Challenge of quantification in the system

Item	Strongly disagree (%) (A)	Disagree (%) (B)	Disagreeable (%) (A+B)	Don't Know (%) (C)	Agree (%) (D)	Strongly Agree (%) (E)	Agreeable (%) (D+E)	Total (%)	
Quantification	To quantify the drugs needed we use morbidity and demographic data from the register	18.3	9.2	27.5	21.4	31.3	19.8	51.1	100
	To quantify drugs needed we call a meeting and come up with the estimate	35.1	27.5	62.6	9.9	19.8	7.6	27.4	100.0
	To quantify drugs needed we use the dispensing book and stock card	9.2	12.2	21.4	9.9	36.6	32.1	68.7	100.0
	We quantify of drugs using historical consumption data	16.0	18.3	34.3	22.1	26.0	17.6	43.6	100.0
	We are able to calculate our medicine requirement for the unit	12.2	15.3	27.5	14.5	35.1	22.9	58	100.0
	We don't quantify, but gets supply as provided by the national medical stores	12.2	14.5	26.7	11.5	18.3	43.5	61.8	100.0
Average			33.3	14.8			51.8	100	

3.5. Support Supervision Challenge in the Hybrid Supply System

According to Table 5, approximately 71% of respondents agree that support supervision has improved stock management in the public health unit and overall, 51.4% of respondents were agreeable that support

supervision is good and adequate in the public health facilities of Gulu District. However 37.6% reported that support supervision is still inadequate in the current hybrid system and 11.5% do not know about support supervision in the public health facilities. Therefore even if support supervision improves stock management and supports availability of quality medicines, the current system is still faced with a challenge of inadequate

support supervision. When the effect of support supervision was appraised in the two supply systems, it

was not significantly difference in the pull compared to the push system (P-value > 0.05)

Table 5. Support supervision challenge

Item	Strongly disagree (%) (A)	Disagree (%) (B)	Disagreeable (%) (A+B)	Don't Know (%) (C)	Agree (%) (D)	Strongly Agree (%) (E)	Agreeable (%) (D+E)	Total (%)
Monitoring and support supervision is done regularly to ensure drugs are delivered and are available in the unit	9.2	29.0	38.2	6.1	44.3	11.5	55.8	100.0
We often get all the planned support supervision to our unit	13.7	38.2	51.9	13.7	30.5	3.8	34.3	100.0
We get a written and formal feedback from the support supervision	16.0	27.5	43.5	12.2	39.7	4.6	44.3	100.0
Support supervision has improved performance of stock management	7.6	9.2	16.8	12.2	55.0	16.0	71	100.0
Average			37.6	11.5			51.4	

3.6. Challenge of Personnel and Access to Essential Medicine in the Hybrid System

Table 6, shows that 49% of respondents were agreeable that the personnel who dispense essential medicines in the public health facilities under the hybrid of pull and push supply system are adequate and able to manage the medicines well but 44.3% disagree. Notably 70% reported that the health workers who dispense medicines in the out-patient are not trained in pharmacy and medicines management. This has the implied consequence of irrational dispensing of medicines.

On the other hand, 84.7% of all respondents reported that clear instructions are given to patients on the dosage and side effects of essential medicines and 79.4% reported that patients willfully accepts the medicines and takes them. Overall, 60.2% of respondents reported that there is good access to essential medicines in the public health facilities while 30.3% reported poor access and 11.5% do not know anything about access to essential medicines in their facility. However, there was no significant difference in access for the lower health unit (HC IIs & IIIs) compared the higher health unit (HC IVs), P value= 0.314 even when government has endeavored to open at least one health unit per parish.

Table 6. Personnel and Access to Essential Medicines in the hybrid system

Item	Strongly disagree (%) (A)	Disagree (%) (B)	Disagreeable (%) (A+B)	Don't Know (%) (C)	Agree (%) (D)	Strongly Agree (%) (E)	Agreeable (%) (D+E)	Total (%)	
Personnel	There are adequate health workers to manage distribution of essential medicines to patients in the unit	15.3	38.2	53.5	3.8	34.4	8.4	42.8	100
	The persons who dispense medicines in the out-patient are trained in pharmacy and drug products	34.4	35.1	69.5	6.9	19.8	3.8	23.6	100
	The staffs at the drug dispensing are trained in handling and forecasting medicines	11.5	29.0	40.5	6.1	42.0	11.5	53.5	100
	The health facilities workers are able to use the ordering guidelines	3.8	9.9	13.7	10.7	52.7	22.9	75.6	100
Average			44.3	6.8			48.9	100	
ACCESS	Essential medicines are always available to the patients	7.6	33.6	41.2	6.1	45.0	7.6	52.6	100.0
	No geographical barriers exist in accessing essential medicine in our health unit	13.7	19.1	32.8	7.6	36.6	22.9	59.5	100.0
	Clear instruction is given to patients on the dosing and side effects	10.7	4.6	15.3		45.0	39.7	84.7	100.0
	If the medicine is out of stock, patients can afford to buy the medicines from outside	18.3	38.9	57.2	17.6	18.3	6.9	25.2	100.0
	Patients willfully accepts the medicines and takes them	.8	4.6	5.4	15.3	49.6	29.8	79.4	100
Average			30.3%	11.5%			60.2%	100	

4. Discussions

Currently the government of Uganda is using the hybrid system of pull and push concurrently to supply essential

medicines to the public health facilities of HC IVs, and HC IIs, IIIs that is the higher level and lower level health facilities respectively [11,12,13] but many challenges exist and could affect availability of medicines in the health units.

4.1. Stores Management Challenge

Approximately 27.7% respondents aver that stores management is poor and inadequate, and few do not know anything about store management in their unit. Similar to this study, Kenyan store management was also found to be inadequate by 25% in Faith Based Health Services [14]. Poor store management could be attributable to inadequate and poorly trained personnel. According to the MOH in 2009) [15] inadequate staffing by appropriate personnel in records and stores management at HC IIs and HC IIIs make it difficult to keep records for planning. Furthermore, lower health units tend to be unattractive for employment and coupled with the government ceiling of employment of health workers, store tend to be managed by nursing aids. While support this position, Mueller *et al*, in 2011 [16] noted that supplies of essential medicine require training in stores management, inventory, monitoring and support supervision to guarantee that drugs are delivered at the health facility. The importance for personnel in stores was emphasized when Tumwine *et al*, in 2010 [13] aver that in stores, stock cards should be available and they should be well up-dated. The finding of this study of inadequacy in store in the hybrid system shows that it is still a challenge yet it provides data used for ordering and ensuring availability of essential medicines.

4.2. Challenge of Medicine Quality and Linkage with Supplier National Medical Stores (NMS)

Whereas 46.5% of respondents reported that there is poor medicine quality in the hybrid system, MOH and USAID/SURE in 2011, [18] also found that poor medicines quality is prevalent in the country because contents of the kits are often inappropriate and unsuitable for the health centers and in some cases the essential medicines were undersupplied. While agreeing with poor quality, SURE in 2010 [19] found that medicine orders are often only partly fulfilled by NMS and sometime it delivers items reportedly not ordered. Poor medicine quality relate to receiving and issuing of the wrong medicines, poor batch number display, counterfeit medicines, water entering the boxes containing medicines, supply of short expiry date medicines and use of expired medicines. The report by 10.7% of health workers that they sometimes issue out expired medicines to patients is deplorable. Poor quality medicines put the user at risk of drug resistance, increased drug side effect and drug poisoning, and prolonged ailment. These contravene the very principal on which essential medicine was developed [1].

Regarding linkages with the NMS, it was observed that there is weak linkage with the national store by 43% of respondents. Collaborative linkage between the health facility and the supplier (NMS) is pivotal in ensuring efficient supply chain management of essential medicines. Many researchers have found that weak linkage exist between the health units with NMS separately [13,19,20]. Weak linkage lead to lack of conformity of quantity delivered to quantity ordered by as reported by [21]. Weak and poor collaboration with NMS could undermine supply chain management and availability of quality essential medicines unless something is done.

4.3. Essential Medicines Quantification Challenge in the Current Hybrid System

Overall, 33.3% of respondents aver that there is weak quantification in the hybrid system and a few do not even know about quantification in their health unit. In fact quantification is important because it is a strong predictors of essential medicines availability in a health facility hence the 33.3% rate of poor quantification in the current system raises concern. The MOH in 2009 [15] and SURE in 2010 [22] also found poor quantification of the essential medicines in HC IIs and IIIs. Poor quantification and lack of training in quantification by health workers was also reported by Bukuluki *et al*, in 2013 [11]. Quantification requires use of dispensing book and stock card, meetings with prescribers, forecasting, knowledge of minimum stock levels and knowledge of lead time. To improve and come up with adequate quantity along the budget line, facilities need to have meeting with the dispensers, prescribers, stores managers and head of sections. Despite that, other researchers found that many of the health workers lacked adequate training in medicines quantification and do not know all the required documents in medicines procurement [11].

4.4. Challenges of Support Supervision in the Hybrid Supply System

The study observed further that support supervision is inadequate and ineffective in the current hybrid system by 37.6%. Assessing it as a challenge, Tumwine *et al*, (2010) [13] reported that support supervision is inadequate and is not being effectively implemented due to lack of manpower and poorly communicated findings; with no documentation. However according to Mueller, *et al*, (2011) [16] and NMS Pharmacy Division (2013) [23] support supervision guarantees that drugs are delivered at the health facility and improves stock management, storage management, ordering and reporting, prescribing and dispensing practices.

4.5. Challenges of Personnel and Access to Medicines in the Hybrid System

Approximately 44.3% of personnel who prescribe and dispense essential medicine in the public health facilities under the hybrid system are inadequate and lack training in pharmacy and medicines products management, use of medicine ordering guidelines forms. Like in this study, other researchers have also found similar problem with health personnel, for example, in Kenya, up to 38% of essential medicines personnel are not trained and qualified dispenser [14]. In Uganda, 45% of district level staffs lack medicine logistic training and most districts in the country have no trained pharmacists or pharmacist technicians [22]. Attesting to lack of training amongst health workers, it was found that many health workers do not know all the required documents in medicines procurement [11]. To exacerbate the challenge of personnel further, absenteeism level among health workers is very high [24]. Indeed lack of personnel with appropriate training complicates forecasting, quantification, ordering and managing even the available medicines and medicinal products.

From this study, poor access to essential medicines in the public health facilities was noted to be 30.3% and is

similar to the WHO, (2004) [25] findings that about 30.0% of the world's population do not have access to the essential medicines. The MOH, in 2009 [15] however found lack of access in 45.0% of patients who visit the public health facilities. The difference poor access rate could be attributable to variation in sample size, study design, study period, geographical location and timing of the study. However, there was no significant difference in access for the two systems of push at the lower health unit (HC IIs & IIIs) and the pull for the higher health unit. Many factors contribute to a lack of access to medicines in developing countries: tattered health systems, insufficient numbers of health workers, weak regulatory regimes, and poor procurement and supply systems. As a challenge, other authors have supported the notion that poor access and lack of affordability of essential medicines exist in the pull and push as a hybrid [16,26,27].

5. Conclusions and Recommendations

5.1. Conclusions

Most of the respondents in the study were health workers awash with experience and knowledge about essential medicines parameters and factors affecting its availability in the public health facilities. The current hybrid is faced with challenges in poor quantification, support supervision, inadequate personnel, poor stores management and weak linkage with NMS that could affect availability, quality and access to essential medicines in Gulu District.

5.2. Recommendations

Considering that the hybrid system has not fully achieved the desired results of ensuring the availability of essential medicines in all health facilities at all times, there is need for the government of Uganda to revisit the issue. Considering that the findings presented here are from one district, there is need for more research covering other districts in the country to ascertain whether the problem cuts across the country or not. A comparative review of the achievements of the pull, push, and the hybrid systems may need to be undertaken to further explore how best the problem of unavailability of medicines can be addressed.

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