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Understanding Implementers' Perceptions on the Prime Vendor System: A Case Study of Tanzania Mainland

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Abstract

Introduction: Access to safe, effective, quality and affordable essential medicines for all is a central component of Universal Health Coverage (UHC). However, the availability of quality medicines in low and middle-income countries is often limited, especially in peripheral health facilities. MSD, as the sole supplier of drugs and medical supplies to all public health facilities, has been facing difficulties that hinder its efficiency in supplying 100% of all facility's needs. Despite significant reforms, including introducing the Prime Vendor System in 2018, challenges persist, leading to regional disparities in commodity availability at the facility level. Successfully establishing an intervention based on PPPs within the public sector in the health commodities supply chain system mostly requires high acceptability by the Government, implementers, and beneficiaries. Furthermore, the effectiveness of any activity is primarily influenced by the participants' attitudes. While most studies have extensively researched the effectiveness of the prime vendor system in bridging the supply chain gap, none have researched implementers' perceptions of the prime vendor system in complementing health commodities. This study seeks to understand the Implementer's perceptions of the prime vendor system implementation.

Materials and Methods: This was a quantitative cross-sectional study. Data was collected from June to September 2023 using the ODK application from 356 respondents from Dodoma, Morogoro, Mtwara, and Mwanza in Tanzania. The data was analysed using SAS version 9.4. Statistical significance was determined at a 95% confidence level.

Results: 77.84% of study participants strongly agreed that involving the private sector in health commodities supply chain management is the best approach to solving supply chain problems. Additionally, 81.53% of all study participants believe that the Prime Vendor System has contributed positively to the improved availability of health commodities at the facility level.

Conclusion: Perceptions regarding the prime vendor system vary across different areas, including its impact on the overall availability of health commodities, streamlining of procurement processes, and the role of the private sector in addressing supply chain challenges within the country. Notably, the level of experience in the workplace emerges as a considerable influence on respondents' perceptions regarding the Prime Vendor System and its implementation nationwide.

Keywords: Prime Vendor System, perception, implementer

Introduction

Access to safe, adequate, quality, and affordable essential medicines for all is a central component of Universal Health Coverage (UHC). However, the availability of quality medicines in low and middle-

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income countries is often limited, especially in peripheral health facilities (Kuwawenaruwa et al., 2020). The availability of medicines and medical equipment is a significant indicator of the quality of health care for most people in the country (Tanzanian-German Programme to Support Health, 2011). However, shortages and stock-outs of medicines are persistent problems in delivering health services in Tanzania.

According to The National Health Policy of 2017, its main objective is to reach all households with essential services to attain the needs of the population, adhering to objective quality standards and applying evidence-informed interventions through resilient systems for health, precisely adequate and accessible quality medicines and health commodities which necessitate proper system supply of medicines and health commodities to health facilities (MoHSW, 2017).

The Medical Stores Department (MSD) was established by Act of Parliament no. 13 of 1993 as an autonomous department under the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) responsible for developing, maintaining, and managing an efficient and cost-effective system of procurement, storage, and distribution of approved medicines and medical supplies required for use by all public health facilities.

MSD, as the sole supplier of medicines and medical supplies to all public health facilities, has been facing difficulties that hinder its efficiency in supplying 100% of all facility's needs (HRSC-2017). Challenges like inaccurate forecasting of medicines needed at facility levels and ineffective systems for fulfilling back-ordered items, so alternative strategies were needed to fill the gap (Kuwawenaruwa et al., 2021).

In Tanzania, the Public Supply Chain System for Health Commodities has evolved from a push system to a pull system. The introduction of the prime vendor system in 20218 complemented all health commodities out of stock and reduced the burden from MSD. Observation shows that continuous monitoring implementation of the prime vendor system in piloted regions revealed that the complementary prime vendor system has effectively increased the availability of essential medicines in public health facilities. Improving commodity availability was the main criterion in 2018. The Government decided to roll out the prime vendor system to all 26 regions of Tanzania's mainland (Wiedenmayer et al., 2019) (Kuwawenaruwa et al., 2020).

Therefore, it is evident that the pharmaceutical supply chain system in these countries has attracted substantial attention focusing on health system strengthening, specifically targeting options of redesigning and optimising the supply chain's performance (Kuwawenaruwa et al., 2021) (Kuwawenaruwa et al., 2020) and (USAID, 2015). Such interventions include expanding funding sources, staff training and re-training, improving supply chain procurement and distribution processes, promoting the responsible use of commodities, and improving data visibility and utilization to make well-informed decisions.

Furthermore, the effectiveness of any activity is primarily influenced by the participants' attitudes. While most studies have extensively examined the impact and effectiveness of the prime vendor system on health commodities availability, few of them have researched Understanding implementers' perceptions of prime vendor system implementation. This study seeks to understand implementers' perceptions of the fidelity of implementing the prime vendor system in Tanzania's Mainland.

Materials and Methodology

Study Design

The research adopts a quantitative cross-sectional design, focusing on four regions on the mainland of Tanzania: Dodoma, Morogoro, Mtwara, and Mwanza. Within these regions, the study encompasses thirteen diverse local government authorities, including Dodoma (Dodoma City Council, Kondoa District Council, Kongwa District Council), Morogoro (Morogoro Municipal Council, Mvomero District Council, Kilosa District Council), Mtwara (Mtwara District Council, Mtwara Municipal Council, Newala Town Council, Masasi District Council), and Mwanza (Magu District Council, Nyamagana District Council, Ukerewe District Council).

Study Population

The study population consisted of purposively selected members from various levels of the health facilities. The population included healthcare workers directly involved in the health commodities supply chain at their facility level and their crucial role in implementing the Prime Vendor system in Tanzania, such as Health facilities in charge, Storekeepers/ Pharmaceutical personnel, and Laboratory personnel per Health facility level.

Sample Size and Sampling

The sample size for this study was determined using Yamane's formula (1967), which considers the study population, marginal error, and confidence level. With a total study population (N) of 3,203 individuals and a chosen marginal error (e) of 0.05, the calculated sample size (n) is 356. Applying the formula, $n = N/ [1 + N (e)^2]$, the calculated sample size (n) is 356. Regarding sampling strategy, regions were purposively selected based on their relevance to the research objectives, including regions with and without medical store department zonal offices and regions with facilities with high health commodity consumption rates. From these regions, councils were chosen randomly, ensuring the representation of rural and urban settings to capture diverse perspectives. This random selection of councils enhances the study's representativeness.

Facilities and individuals were also randomly chosen within these councils, contributing to the inclusivity and generalizability of the study findings. This comprehensive approach ensures that a wide range of experiences and characteristics are represented within the selected regions and councils, thereby improving the validity and reliability of the research outcomes.

Study Approach

The study employed a quantitative research approach. Before data collection, informed consent was obtained, and strict confidentiality protocols were followed. Ethical clearance was secured from the University of Dodoma's Institutional Review Board.

Data collection and data processing

In May 2023, enumerators were trained for three days to ensure the tools' validity, followed by piloting/pre-testing at Chamwino District Council Hospital, Mlowa Barabarani Health Centre, and Manzase Dispensary.

A face-to-face interview was conducted from June to September 2023 with all purposefully selected respondents using a guided and constructive questionnaire containing both open-ended and closed-ended questions. All quantitative data was electronically collected using the ODK application, where data collectors entered the information/data they collected directly into the Tablet using the electronic tool. The ODK application allowed online and offline data entry with GPS coding.

At the end of each data collection day, the data collectors compared the written records with the listening to the voice records. The necessary corrections were made to the typed documents before submitting the electronic data for that day to the supervisor.

Dependent variable

The dependent variable of this study was obtained from a set of thirteen 13 questions that were measured. Each of them had a response indicating whether they strongly disagreed, disagreed, neutral, agreed, or strongly Agreed. Those questions were divided into four areas: the Prime vendor system operational structure, Procurement Procedures under the Prime Vendor System, Managerial and authorisation under the Prime Vendor System, and the Transition period in the Prime Vendor System. The mean score was calculated from those sets of questions; the score had a possible minimum value of 0 and a possible maximum score of 5. The score was then categorised into two categories. Those respondents who scored three or less were coded 0 and regarded to have a negative perception, while those who scored 4 or 5 were coded one and regarded to have a positive perception.

Independent Variables

The independent variables in this study encompass numerous factors: demographic indicators such as sex, age, and education level; professional attributes such as position within the health facility and years of experience; and contextual elements including the type of health facility, region, and mobility-related factors. The study aimed to gain insights into the perceptions and various influencing factors among users of the prime vendor system in this context, thereby gaining a comprehensive understanding of the various regions and local authorities.

Data Analysis

In explaining the baseline information of the respondents, fundamental descriptive statistics, including frequencies and percentages for categorical variables and means and standard deviation for non-categorical variables, were computed. Given that the outcome variable had two categories (0=Negative, 1=Positive), A binary logistic regression model was used to assess factors associated with the perception of implementers on the prime vendor system. The model results are regression parameter estimates and odds ratios (OR). The data analysis was conducted using SAS version 9.4, and the significance of all statistical tests was established at a 5% significance level.

Ethical Considerations

The University of Dodoma Ethics Committee granted ethical approval and registration for the study. In addition, The President's Office, Regional Administration and Local Government, and the Ministry of Health in Tanzania granted permission for access to all facilities supporting/implementing the Prime Vendor System within the Regional Secretariat and Local Government Authorities as well as four regional referral hospitals (Mwanza, Dodoma, Morogoro, and Mtwara). Finally, informed consent was obtained from respondents during data collection, and confidentiality was maintained throughout the study.

Results

The study was conducted in all four regions: Dodoma, Morogoro, Mtwara, and Mwanza. A total of 356 respondents were interviewed from health facilities visited; vast numbers of respondents are from Mwanza (27.81%) and Morogoro (27.81%), followed by Mtwara (26.40%) and with a few participants from Dodoma (17.98%).

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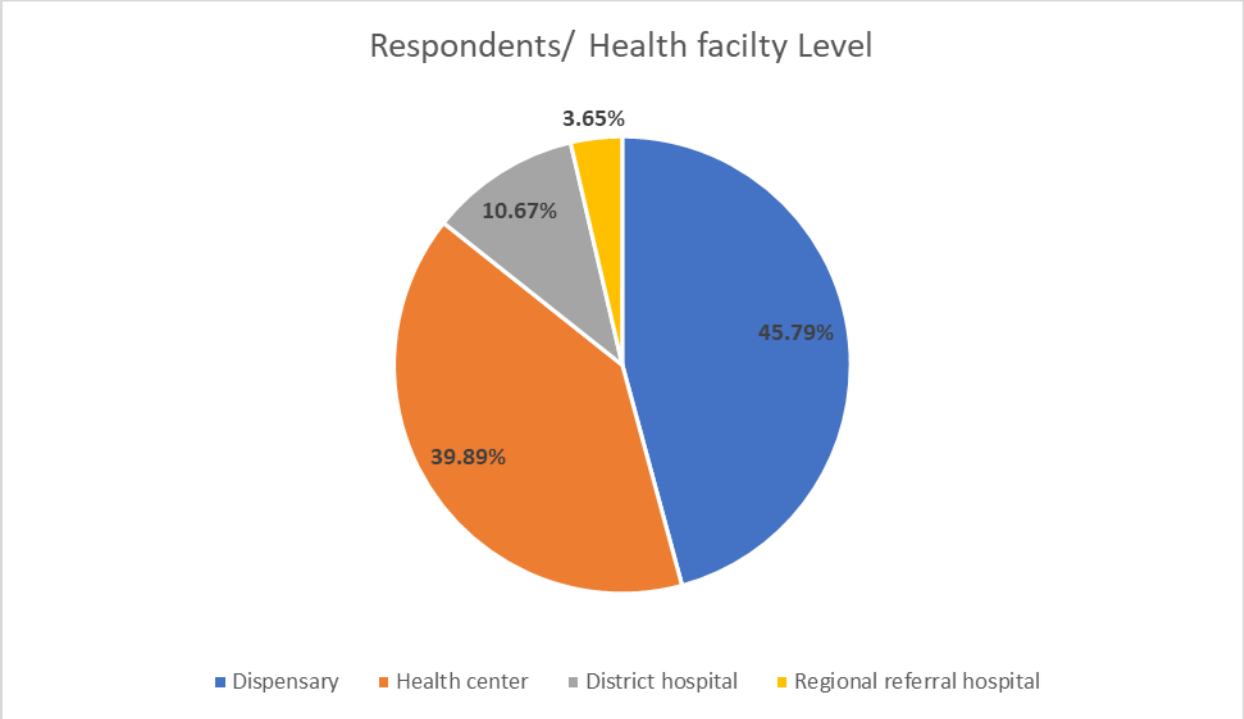
In Tanzania, there is a decline in health facilities when transitioning from lower to upper levels. This trend was particularly evident in my study, where a significant portion of the visited health facilities were dispensaries, in contrast to the Regional Referral Health facilities. This pattern is also mirrored in the distribution of respondents from our results, with the majority coming from dispensaries (45.79%) and health centres (39.89%). A smaller percentage of participants were associated with District hospitals (10.67%), and the least were from Regional Referral Hospitals (3.65%).

Figure 1: Respondents Interviewed per Health Facility Level



Demographic Results of Respondents

All 356 intended respondents (100% of the sample) participated throughout the data collection process. Notably, a substantial proportion of the participants were females, accounting for 181 (50.84%), while males constituted 175 (49.16%) in the study. Most respondents fell within the 30-34 age range, comprising 33.71% of the total. Subsequently, individuals aged 35-39 constituted 20.79%, and those above 45 accounted for 19.10%. In contrast, a smaller % of participants, 8.71%, belonged to the 40-44 age group.

During data collection, we aimed to interview the Health Facility in charge, the storekeeper, and Laboratory personnel at each health facility. The findings across all visited health facilities revealed that 41.85% were Health Facility In charge, followed by Storekeepers at 32.58%. A smaller percentage, 25.56%, represented Laboratory personnel, as many of the observed dispensaries lacked standard laboratories. The results noted that most respondents had no upper level of education; only 3.37% had a master's degree, 14.61% had a first-degree mean, 55.06% had a diploma, and 26.97% had a certificate (See Table 1).

Table 1: Demographic results

Demographic Results			
Variable	**Frequency**	**Percentage (%)**	**Mean ±SD**
Sex			
Male	181	50.84	
Female	175	49.16	
Total	**356**	**100.00**	
Age category			36.74±8.33
<30	63	17.70	
30-34	120	33.71	
35-39	74	20.79	
40-44	31	8.71	
45+	68	19.10	
Education level			
Certificate	96	26.97	
Diploma	196	55.06	
Degree	52	14.61	
Master	12	3.37	
Position in this health facility			
The Health Facility In charge	149	41.85	
Storekeeper/ Store In – Charge	116	32.58	
Laboratory Personnel	91	25.56	

General Information of respondents

Table 2 shows that among the interviewed respondents, the majority had 5 – 9 years (40.17%) of experience as government officials working as healthcare workers. Half of the interviewed respondents (59.27%) had transferred from one working station to another during their working period. Most transferred once (56.40%) or twice (22.27%), while 40.73% had never transferred to any station since their employment.

Table 2: General Information of respondents Interviewed.

General Information of Respondents			
Variable	**Frequency**	**Percentage (%)**	**Mean ±SD**
Experience			9.72±7.30
<5	66	18.54	
5-9	143	40.17	
10-14	85	23.88	
15+	62	17.42	
She was never transferred from one working station.			
No	145	40.73	
Yes	211	59.27	
How many Times? (n=211)			
1	119	56.40	
2	47	22.27	
3	17	8.06	
4	28	13.27	

Throughout the data collection process, the study aimed to assess implementers' perceptions of the Prime Vendor system; we used the Likert scale to measure implementers' perceptions of various aspects: the prime vendor system's operational structure, procurement, procurement procedures

under the prime vendor system, Managerial and authorisation under the prime vendor system, and Transition period. All these aspects will conclude how the implementers perceive the prime vendor system and the factors that drive their influence.

The perception of implementer on Prime Vendor System operational structure

From the Table below. Most prime vendor systems are perceived positively in the prime vendor structure. 77.84% of respondents strongly agreed that involving the private sector (for example, prime vendor) was the best approach to solving problems in the supply chain, and 81.53% of respondents agreed that the prime vendor system contributed to an increase in the availability of health commodities.

Additionally, 80.97% of respondents strongly agreed that since establishing the prime vendor system, the community/clients have built trust and started to seek health services at public health facilities. All respondents strongly agreed that the structure of the prime vendor system enables the reduction of all bureaucratic activities, making the supply chain system smooth and transparent (78.98%) and reducing unnecessary use of funds (54.26%). When asked if the availability of huge debts from health facilities to the prime vendor could affect its performance, half of the respondents (58.52%) strongly agreed that that factor could probably cause the prime vendor's sometimes poor performance.

Table 3: Perception of implementors on Prime vendor system operational structure

Variable	1	2	3	4	5
Involving the Private sector in the supply chain and establishing a Prime vendor is the best approach to solving problems in the supply chain and increasing the availability of medicines.	16(4.55)	17(4.83)	10(2.84)	35(9.94)	274(77.84)
The establishment of prime vendors in various regions has contributed to the availability of health commodities.	6(1.70)	6(1.70)	11(3.13)	42(11.93)	287(81.53)
Since establishing the Prime vendor system, the community/clients have built trust and returned to the health facility.	5(1.42)	7(1.99)	14(3.98)	41(11.65)	285(80.97)
The Prime vendor system cut down all Bureaucratic activities and has made the process of procuring health commodities smooth and transparent	1(0.28)	4(1.14)	28(7.95)	41(11.65)	278(78.98)
The existence of PVS has reduced unnecessary use of Funds	12(3.41)	32(9.09)	59(16.76)	58(16.48)	191(54.26)
Huge debts from health facilities affect the performance of Prime vendor System	23(6.53)	20(5.68)	35(9.94)	68(19.32)	206(58.52)

Note: 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree and 5 – Strongly Agree

The perception of Implementers on procurement procedures under the Prime Vendor system

During the study, we wanted to see respondents' perception of procurement procedures under the prime vendor system: The majority of the respondents, 169(48.01%), preferred the prime vendor system rather than the quotation system for the procurement of health commodities at public health facilities, 166(47.16%) strongly disagree that there are times health facility procure outside the prime vendor system when they face out of stock from medical store departments.

Additionally, most respondents believed that the prime vendor system was performing well in the procurement process: 112(31.82%) strongly agreed that the prime vendor could deliver health commodities within the agreed lead time. It confirmed that the health facilities could pay the prime vendor for health commodities within the agreed time.

Table 4: Perception of Implementors on Procurement Procedures under the PVS

Variable	1	2	3	4	5
Health facilities prefer the Prime vendor system more than the Quotation system for the procurement of health commodities	22(6.25)	33(9.38)	97(27.56)	31(8.81)	169(48.01)
At times, health facilities tend to purchase Health commodities from outside the prime vendor system	166(47.16)	74(21.02)	25(7.10)	47(13.35)	40(11.36)
The PV has been able to deliver Health commodities within the agreed lead time	26(7.39)	68(19.32)	60(17.05)	86(24.43)	112(31.82)
Health facilities can pay for the health commodities to the PV within the agreed timeline	6(1.70)	35(9.94)	80(22.73)	87(24.72)	144(40.91)

Note: 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree and 5 – Strongly Agree

Implementers' perceptions of the Prime vendor system's managerial, authorisation, and transition aspects.

Half of the respondents firmly (192, 54.55%) said that the council Health service board/Council coordination committee supports them regarding all matters of the prime vendor system. Additionally, 199(72.73%) strongly agreed that having more than one prime vendor is the best approach to improving the availability of medicines at our health facilities.

Table 5: Perception of Implementers on managerial and authorisation of prime vendor system and transition of Prime vendor system

Variable	1	2	3	4	5
Managerial and authorisation of the Prime vendor system					
The Council Health Service Board/ Council Coordination Committee supports you on all matters regarding the Prime vendor system	6(1.70)	3(0.85)	92(26.14)	59(16.76)	192(54.55)
The transition period in PVS					
Having more than one Prime vendor is the best approach in improving the availability of medicines at Health facility	9(2.56)	7(1.99)	44(12.50)	36(10.23)	256(72.73)

Note: 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree and 5 – Strongly Agree

Factors associated with the perception of implementers on Prime Vendor System

As presented in the methodological section, binary logistic regression was used to assess factors associated with the perception of implementers on prime vendor system results in Table 5. It was observed that the perception of implementers on the prime vendor system was significantly associated with years of experience (p=0.0012), region (p=0.0013), and knowledge (p=0.0109). Concerning years of experience, it was shown that implementers who had 5 to 9 years of experience were significantly more likely to have positive perceptions on prime vender system as compared to those with experience of less than five years (AOR=3.29, p=0.0012), the same those who had 10 to 14 years of experience, whereby those respondents who had 10 to 14 years of experience were significantly more likely to have positive perceptions on prime vender system as compared to these with less than five years (AOR=2.74, p=0.0258).

Regarding region, those respondents from Dodoma were significantly more likely to have positive perceptions of the prime vendor system as compared to these from Mwanza (AOR=3.46, p=0.0013), and those implementers from Morogoro were significantly more likely to have positive perceptions of prime vendor system as compared to these from Mwanza (AOR=2.13, p=0.0193). Concerning respondents' knowledge with adequate knowledge, they were significantly more likely to have positive attitudes than those with inadequate knowledge (AOR=1.86, p=0.0109). Other factors like respondents' sex, age, education level, position in the health facility, type of health facility, and ever transferred from one facility to another were not significantly associated with the perception of implementers on the prime vendor system (Table 6).

Table 6: Binary logistic regression for factors associated with the perception of implementers on the prime vendor system.

Variable	Negative	Positive	Unadjusted analysis		Adjusted analysis	
	n (%)	n (%)	OR [95%CI]	p-value	AOR [95%CI]	p-value
Sex						
Male	67(36.61)	116(63.39)	1.03[0.67, 1.59]	0.8971		
Female	63(37.28)	106(62.72)	ref			
Age category						
<30	29(46.77)	33(53.23)	ref		Ref	
30-34	47(38.84)	74(61.16)	1.38[0.75, 2.57]	0.3035	0.97[0.48, 1.95]	0.9236
35-39	19(27.14)	51(72.86)	2.36[1.14, 4.87]	0.0205	1.43[0.60, 3.41]	0.4151
40-44	13(41.94)	18(58.06)	1.22[0.51, 2.91]	0.6586	0.73[0.25, 2.15]	0.5641
45+	22(32.35)	46(67.65)	1.84[0.90, 3.75]	0.094	1.38[0.51, 3.74]	0.5293
Education level						
Certificate	40(43.01)	53(56.99)	ref		Ref	
Diploma	70(36.08)	124(63.92)	1.34[0.81, 2.21]	0.2591	1.04[0.60, 1.81]	0.8882
Degree	15(28.85)	37(71.15)	1.86[0.90, 3.85]	0.0939	2.01[0.89, 4.57]	0.0936
Master	5(38.46)	8(61.54)	1.21[0.37, 3.97]	0.7562	1.25[0.34, 4.56]	0.7314
Position in the health facility						
In charge	50(33.33)	100(66.67)	ref			
Laboratory	45(39.13)	70(60.87)	1.29[0.78, 2.13]	0.3298		
Storekeeper	35(40.23)	52(59.77)	0.96[0.54, 1.69]	0.8743		
Experience						
<5	35(52.24)	32(47.76)	ref		ref	
For 5 – 9	44(31.43)	96(68.57)	2.39[1.31, 4.34]	0.0043	3.29[1.59, 6.75]	0.0012
For 10 -14	29(35.37)	53(64.63)	1.99[1.03, 3.87]	0.0395	2.74[1.13, 6.66]	0.0258
15+	22(34.92)	41(65.08)	2.04[1.01, 4.13]	0.048	2.34[0.83, 6.59]	0.1062
Type of health facility						
Dispensary	66(41.25)	94(58.75)	ref			
Health center	49(34.27)	94(65.73)	1.35[0.84, 2.15]	0.2116		
District hospital	13(33.33)	26(66.67)	1.40[0.67, 2.93]	0.3662		
RR hospital	2(20.00)	8(80.00)	2.81[0.58, 13.7]	0.2005		
Region						
Dodoma	16(24.62)	49(75.38)	2.76[1.38, 5.51]	0.0039	3.46[1.63, 7.35]	0.0013
Morogoro	27(28.13)	69(71.88)	2.31[1.27, 4.19]	0.0061	2.13[1.13, 4.02]	0.0193
Mtwara	41(43.62)	53(56.38)	1.17[0.66, 2.06]	0.5976	1.29[0.69, 2.38]	0.4175
Mwanza	46(47.42)	51(52.58)	ref		ref	
Ever transferred						
No	58(39.19)	90(60.81)	ref			
Yes	72(35.29)	132(64.71)	1.18[0.76, 1.83]	0.455		
Knowledge						
Inadequate	68(44.74)	84(55.26)	ref		ref	
Adequate	62(31.00)	138(69.00)	1.80[1.16, 2.79]	0.0084	1.86[1.15, 3.01]	**0.0109**

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Discussion

Following the nationwide implementation of the prime vendor system in Tanzania, there has been a notable increase in the availability of health commodities at healthcare facilities, leading to greater transparency and visibility within the supply chain system. Despite the positive impact observed in the supply chain, it became necessary to evaluate the perceptions of implementers regarding various aspects of the prime vendor system. This evaluation encompassed operational structure, procurement procedures, managerial and authorization processes, and the transition to the prime vendor system.

Operation structure: Most respondents strongly agreed with the best operational structure of the prime vendor system, which they perceive as a complementary system of the medical store department. Respondents noted that since the national rollout of prime vendors, the availability of health commodities has increased, and both respondents strongly agreed with that. This confirms that the prime vendor system is the best approach to filling the gap in stock from the Medical Store. However, some factors can hinder the performance of the prime vendor, such as huge debts from health facilities, and this was confirmed by 52.58% of respondents who firmly agreed with that statement. The challenge of huge debts from health facilities still exists in some areas that affect the performance of the prime vendor, but this issue was not much assessed during this study.

Procurement procedures: The study found that most implementers, specifically 48.01% who strongly agreed, favoured the prime vendor system over the quotation method. This preference stemmed from several factors, including the lengthy steps involved in the quotation method, lack of transparency within the system, non-standardized pricing leading to procurement uncertainties, and concerns about potential audit issues while using the quotation method. Also, 31.82% strongly agreed that all consignments from the prime vendor were delivered within the agreed time, and 40.91% of respondents strongly agreed that they could pay the prime vendor whenever they ordered.

This confirms that the prime vendor system procurement procedures are transparent and dependable in improving the performance of the supply chain. Despite many respondents affirming their ability to pay for health commodities, complaints regarding outstanding debts from health facilities persist. Additionally, prices of certain health commodities through the prime vendor system are notably higher than those offered by the Medical Stores department. The paper-based system poses challenges for implementers, adding to the complexity of procurement processes within the prime vendor system. Furthermore, a lack of education among some implementers remains a significant challenge, hindering their effective system utilisation.

Managerial, authorisation and transition of Prime vendor system: 54.55% of respondents strongly agreed that the council, including the CHMTs, offers support whenever challenges arise while using the prime vendor system. At the district level, district pharmacists and district laboratory technologists are regarded as pivotal figures within the prime vendor system. Furthermore, 72.75% strongly agreed that having more than one regional prime vendor optimises the system's performance. Respondents highlighted that this approach alleviates the distribution burden on individual regional prime vendors and reduces the lead time for delivering health commodities.

Factors associated with the perception of implementers of the Prime Vendor System: Several factors are reported to influence the implementation of the Prime Vendor System, including good governance, contract management and compliance with prime vendors, acceptability of intervention by implementers in the regions and councils, and implementers' knowledge of the scheme.

However, this study found that evaluating the characteristics of implementers at a personal level, age, and years of experience positively impacts implementers' perceptions of the central supplier system. Nonetheless, the literature suggests that providing internal and external support to the PVS from the conception of the initial idea up to the implementation level is very crucial to meeting the required objectives as far as supply chain management and availability of health commodities are concerned (Ghana Ministry of health, 2012), (Kuwawenaruwa et al., 2020 and 2021).

Moreover, it is being reported that the careful selection of prime vendors is mandatory to ensure effective implementation of the system to meet its intended objectives, the major one being increased availability of health commodities for uninterrupted health service delivery at the points of care (Mathew et al., 2013) and (Shayo, 2021).

Conclusion

Perceptions regarding the prime vendor system vary across different areas, including its impact on the overall availability of health commodities, streamlining of procurement processes, and the role of the private sector in addressing supply chain challenges within the country. Notably, the workplace experience level significantly influences respondents' perceptions regarding the Prime Vendor System and its implementation nationwide.

List of Abbreviations

CHMT	Council Health Management Teams
CMTs	Council Management Teams
DHIS2	District Health Information System
eLMIS	electronic Logistics Management Information System
ERP	Enterprise Resource Planning
GPS	Global Positioning System
ILS	Integrated Logistics System
IMPACT	Information Mobilized for Performance Analysis and Continuous Transformation
IRB	Institutional Review Board
MoH	Ministry of Health
MSD	Medical Stores Department
ODK	Open Data Kit
PORALG	President's Office Regional Administration and Local Government
PVS	Prime Vendor System
RHMT	Regional Health Management Teams
RS	Regional Secretary
SAS	Statistical Analysis Software
TMDA	Tanzania Medicines and Medical Devices Authority

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Authors contributions
MM developed the proposal and study design and participated in planning, data collection, and interpretation. MM was the principal investigator in all four regions visited and supervised the data collection process. MM contributed to the training and management of data collection. Research Assistants managed data entry and data analysis. RM and MM supported planning and organising logistics. MM drafted the manuscript for input by the other authors. All authors read and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

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