Human Resources-Related Factors Affecting Medicines Supply Chain Performance, Juba, South Sudan.

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Abstract

Background

Most supply chain systems rely heavily on the capacity of healthcare professionals.

The aim of this study is to assess human resources-related factors affecting the medicine supply chain performance in public health facilities in Juba County.

Methods:

This was a descriptive cross-sectional study. Data collected was analyzed using SPSS-V.23, and the outcomes were interpreted using descriptive and inferential statistics.

Results:

Out of 77 participants, 53% (41) were males and 47% (36) were females, with the majority, 35.1% (27), being in the age group more than 40 years old. Most, 41.5% (32), were nurses, and the least, 5.2% (4) were pharmacists. A high number, 58.4% (45), worked in the pharmacy department. The majority, 41.5% (32), had 1-5 years of experience in the medical supply chain, with the age group of 25-30 years as the highest, 46.8% (15). Most, 41.5% (32), had 1-5 years of experience in the medical supply chain, with males, 71.9% (23) more than females, 28.1% (9). Most of the study's outcomes on the factors related to healthcare provider's performance in the supply chain scored influential rates. The effect of developmental opportunities showed the highest grand mean of 3.7, higher than qualification and quantity.

Conclusions:

The effect of developmental opportunities, reward, qualification and quantity, and employee relations on medicine supply chain performance was influential. It is recommended that these variables can weaken medicine supply chain performance if they are not well taken care of.

Keywords: Human resource, Medicine supply chain, Performance, Juba County, South Sudan.

Introduction

Background

The majority of the supply chain institutions have realized that the performance of the medicines supply chain depends on the performance of the health workforce [1]. For staff to deliver substantially in the supply chain areas, certain aspects such as developmental opportunities, working environment, and policies should be considered [2]. As per the World Health Organization (WHO), human resources for Health need to be increased in number and training, especially in Low and Middle-Income Countries (LMICs). Currently, 1/3 of the population lacks access to essential medicines worldwide in LMICs [3]. The WHO estimates that by 2030, the global needs for health human resources will increase to 80 million professionals. The supply of health professionals is anticipated to be 65 million steadily, leading to a worldwide scarcity of 15 million health professionals by 2030 [4]. To address this shortage, 4 million human resources for Health (HRH) are needed, 1.5 million of them solely in Africa—inadequate human resources for Health cause significant challenges in accomplishing these goals.

For the fulfillment of the targets, suitable health commodities must be made available to the right population by the right workforce at the right time. This clarifies the demand for well-trained and competent health workers in the medicine supply chain [3].

According to the research done in Ethiopia, health workers related issues were discovered to be the most prominent obstacles [5].

The participants of the research done in Mandera County in Kenya by Saleh et al. in 2017 shared what motivated them to continue working. Most (100%) mentioned enhanced wages, professional development, and a working environment with sufficient tools [6].

Getting health professionals with better training to strengthen the medicine supply chain specifically is a challenge because most supply chain activities are given to other health workers who need to be sufficiently trained in the medicine supply chain [3]. To secure sufficient and proper skilful staff in the health facilities, even distribution within South Sudan is necessary to effectively render a basic package of health and nutrition services (BPHNS) [7].

The research addressed the following research questions: (i) To what extent does the reward affect the performance of human resources in the medicine supply chain in the public health facilities in Juba County? (ii) How do the developmental opportunities of human resources affect the medicine supply chain performance in the public health facilities in Juba County? (iii) How does the qualification and quantity of human resources affect the performance of employees in human resources regarding the medicine supply chain performance in the public health facilities in Juba County?

This study aims to generate evidence-based results that will assist the Ministry of Health and policymakers strengthen the country's health system.

Methods of the study

The study used qualitative and quantitative research approaches and a descriptive cross-sectional study design. Primary data were collected using questionnaires from the human resources working at the medicine supply chain in the public health facilities in Juba County, which are pharmacists, pharmacy assistants, nurses, community health workers, and storekeepers depending on the staff assigned responsibilities to run the department dealing with medicine supply chain issues.

Questionnaires were used to collect data from the respondents in the public health facilities after approval of the document by the state ministry of health obtained with directives to the state authorities to facilitate the study process in Juba County. The data was analyzed using Statistical Package for Scientific Studies (SPSS-V.23) and the outcomes were displayed as descriptive statistics using percentage, frequency, mean, and standard deviation. Inferential statistics was used, and any $p < 0.05$ was considered statistically significant.

The individual questions and overall mean for each were calculated. For more straightforward interpretation of the results of the study, a five-point Likert scale was used extracted from Zinabu and Mitik [8], as shown below:

Weighted Average	Result	Result Interpretation
1.00-1.79	Strongly Disagree	Very uninfluential
1.80-2.59	Disagree	Un influential
2.60-3.39	Neutral	Neutral/do not know
3.40-4.19	Agree	Influential
4.20-5.00	Strongly Agree	Very Influential

Ethics approval and consent to participate.

This research ethical clearance was obtained from Research Ethical Review Board (RERB) at the National Ministry of Health (46/09/2021-MOH/RERB). Informed consent was attained from each participant and individuals not willing to participate were allowed to do so.

Results

Table 1: Showing distribution of sex, qualifications, department and duration of work of the 77 participants against their ages in Juba City, 2021.

S/N	Variable	Age groups					Total	p value
		<25yrs	25-30yrs	31-34yrs	35-40yrs	>40yrs		
		N (%)	N (%)	N (%)	N (%)	N (%)		
1	**Sex**							
	Male	1(2.4)	17(41.6)	6(14.6)	7(17.1)	10(24.4)	41(53)	
	Female	3(8.3)	4(11.1)	6(16.6)	6(16.6)	17(47.2)	36(47)	0.031
2	**Qualification of participant**							

	Community health Worker	1(11.1)	1(11.1)	2(22.2)	2(22.2)	3(33.3)	9(11.7)	
	Nurse	3(9.4)	7(21.8)	4(12.5)	5(15.6)	13(40.6)	32(41.5)	0.66
	Clinical officer	0(0)	10(43.5)	3(13.0)	3(13.0)	7(30.4)	23(29.8)	
	Pharmacy assistant	0(0)	3(33.3)	1(11.1)	2(22.2)	3(33.3)	9(11.7)	
	Pharmacist	0(0)	0(0)	2(50)	1(25)	1(25)	4(5.2)	
3	**Department of the participant**							
	Warehouse	0(0)	0(0)	1(20)	1(20)	3(60)	5(6.5)	
	Pharmacy	2(4.4)	15(33.3)	6(13.3)	7(15.5)	15(33.3)	45(58.4)	
	Nutrition	0(0)	0(0)	2(40)	1(20)	2(40)	5(6.5)	
	Laboratory	1(12.5)	1(12.5)	3(37.5)	0(0)	3(37.5)	8(10.4)	0.030
	Theatre	0(0)	3(60)	0(0)	1(20)	1(20)	5(6.5)	
	Finance	0(0)	1(50)	0(0)	1(50)	0(0)	2(2.6)	
	Not indicated	1(14.3)	1(14.3)	0(0)	2(28.6)	3(42.8)	7(9.1)	
4	**Number of yrs in medical supply chain**							
	Above 15yrs	0(0)	0(0)	2(14.3)	2(14.3)	10(71.4)	14(18.2)	
	11-15yrs	0(0)	2(25)	1(12.5)	1(12.5)	4(50)	8(10.4)	
	6-10yrs	0(0)	1(7.7)	1(7.7)	3(23.1)	8(61.5)	13(16.8)	0.007
	1-5yrs	2(6.3)	15(46.8)	6(18.7)	6(18.7)	3(9.4)	32(41.5)	
	1-12months	2(20)	3(30)	2(20)	1(10)	2(20)	10(12.9)	

Out of 77 participants, 53% (41) were males and 47% (36) females with majority, 35.1% (27) of age group more than 40 years; p=0.030. Most, 41.5% (32) were nurses and the least, 5.2% (4) were pharmacy; p=0.66. However, the highest number, 58.4% (45) worked in the department of pharmacy and the least, 2.6% (2) in department of finance; p=0.030. Interestingly, the majority, 41.5% (32) had 1-5 years' experience in medical supply chain with age group of 25-30 years as the highest,46.8% (15); and the least, 10.4% (8) with 11-15 years, age group more than 40 years; p=0.007.

Table 2: Showing distribution of qualifications, department and duration of work of the 77 participants against their sex in Juba City, 2021.

S/N	Variable	Sex		Total	p value
		Male (N) (%)	Female (N) (%)		
1	**Qualification of participant**				
	Community health Worker	7(77.8)	2(22.8)	9(11.7)	
	Nurse	8(25)	24(75)	32(41.5)	0.000
	Clinical officer	19(82.6)	4(17.4)	23(29.9)	
	Pharmacy assistant	6(66.7)	3(33.3)	9(11.7)	
	Pharmacist	1(25)	3(75)	4(5.2)	
2	**Department of the participant**				
	Warehouse	4(80)	1(20)	5(6.5)	
	Pharmacy	22(48.9)	23(51.1)	45(58.4)	
	Nutrition	3(60)	2(40)	5(6.5)	
	Laboratory	5(62.5)	3(37.5)	8(10.4)	0.601
	Theatre	3(60)	2(40)	5(6.5)	
	Finance	0(0)	2(100)	2(2.6)	
	Not indicated	4(57.1)	3(42.)	7(9.1)	
3	**Number of yrs in medical supply chain**				
	Above 15yrs	5(35.7)	9(64.3)	14(18.2)	

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11-15yrs	4(50)	4(50)	8(10.4)	0.005	
6-10yrs	2(15.4)	11(84.6)	13(16.9)		
1-5yrs	23(71.9)	9(28.1)	32(41.5)		
1-12months	7(70)	3(30)	10(13.0)		

From the 77 participants in this study, the majority, 41.5% (32) of nurses were mostly females, 75% (24) than males, 25% (8) with least, community health workers and pharmacy assistant as 11.7% (8) each; males,77.8% (7) community health workers and 66.7% (6); p=0.000. Although the majority, 58.4% (45) were working in pharmacy, most, 51.1% (23) were females; p=0.601. However, majority, 41.5% (32) had an experience of 1-5years in medical supply chain with males, 71.9% (23) more than females, 28.1% (9). The least, 10.4% (4) was 11-15 years experienced with equal gender, 50% (4) each; p=0.005

Table 3: The effects of reward on HRH on medicine supply chain performance

Variable: The effects of reward on HRH on medicine supply chain performance	Mean	SD
1. Motivation of HRH improves the medicine supply chain performance in terms of increasing reliability, flexibility, and reducing lead time and cost	3.89	1.6
2. Retention of HRH improves the medicine supply chain performance in terms of increasing reliability, flexibility, and reducing lead time and cost.	3.11	1.31
3. Benefits of HRH improves the medicine supply chain performance in terms of increasing reliability, flexibility, and reducing lead time and cost	3.62	1.48
4. Conducive working Environments of HRH improves the medicine supply chain performance in terms of increasing reliability, flexibility, and reducing lead time and cost	3.83	1.57
Grand mean of the effects of reward on HRH on medicine supply chain performance	**3.61**	**1.49**

The effects of reward on HRH on medicine supply chain performance

The response of the participants (3.89) corresponds to scale 4 which agreed with the statement Motivation of human resources for health improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability, flexibility, and reducing lead time and cost.

The respondents gave neutral feedback (3.11) to the statement retention of human resources for health improves the medicine supply chain performance in public facilities in Juba County in terms of increasing reliability, flexibility, and reducing lead time and cost is a clear indication that most of them did not stay long in the health facilities.

The response of the participants (3.62) agreed with the statement benefits of human resources for health improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability, flexibility, and reducing lead time and cost.

The participants agreed (3.83) with the statement conducive working Environments of human resources for health improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability, flexibility, and reducing lead time and cost. The majority of the participants responded positively with the statements only one statement got neutral response which indicated that health workers do not stay long in the medicine supply chain in the public health facilities.

Conclusively, based on Zinabu and Mitiku [8], suggestion for interpretation of mean value with a range of 3.40-4.19 considered as influential, hence, the effect of reward on HRH on medicine supply chain performance accounts a grand mean value of 3.61, thus, its role is influential.

Table 4: The effect of developmental opportunities on HRH on medicine supply chain performance

The effect of developmental opportunities on HRH on medicine supply chain performance	mean	SD
1. Capacity building (training and development on skill and knowledge) provided to HRH improves medicine supply chain performance in terms of increasing reliability.	4.02	1.64
2. Capacity building (training and development on skill and knowledge) provided to HRH improves medicine supply chain performance in terms of increasing flexibility.	3.61	1.48
3. Capacity building (training and development on skill and knowledge) provided to HRH improves medicine supply chain performance in terms of increasing responsiveness (reduce lead time).	3.61	1.46
4. Capacity building (training and development on skill and knowledge) provided to HRH improves medicine supply chain performance in terms of reducing cost.	3.57	1.47
Grand mean of the effect of developmental opportunities on HRH on medicine supply chain performance	**3.70**	**1.51**

The effect of developmental opportunities on HRH on the medicine supply chain.

The feedback rendered by the participants (4.02) comply with the statement capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability.

The results obtained (3.61) from the study agreed with the statement capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County in terms of increasing flexibility.

The respondents agreed (3.61) with the sentence capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain

performance in public health facilities in Juba County in terms of increasing responsiveness (reduce lead time).

The participants' response (3.57) agreed positively with the statement Capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County in terms of reducing cost. As per the responses given by the participants, they affirmed that capacity building is crucial for human resources for health to deliver optimum services in the medicine supply chain.

Conclusively, based on Zinabu and Mitiku [8], suggestion for interpretation of mean value with a range of 3.40-4.19 considered as influential, hence, the effect of developmental opportunities on HRH on medicine supply chain performance accounts a grand mean value of 3.70, thus, its role is influential.

Table 4: The roles of qualification and quantity of HRH in the medicine supply chain performance

The roles of qualification and quantity of HRH in the medicine supply chain performance	mean	SD
1. The qualification and quantity of HRH improves the medicine supply chain performance in terms of increasing reliability.	3.71	1.52
2.The qualification and quantity of HRH improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing flexibility	3.54	1.45
3.The qualification and quantity of HRH improves the medicine supply chain performance in terms of increasing responsiveness (reduce lead time)	3.44	1.41
4. The qualification and quantity of HRH improves the medicine supply chain performance in terms of decreasing cost.	3.33	1.37
Grand mean of the roles of qualification and quantity of HRH in the medicine supply chain performance	3.50	1.44

The roles of qualification and quantity of human resources for health in medicine supply chain performance

The participants responded positively (3.71) with the statement that the qualification and quantity of HRH improves the medicine supply chain performance in terms of increasing reliability. The results reached (3.54) agreed with the sentence the qualification and

quantity of HRH improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing flexibility.

Conclusively, based on Zinabu and Mitiku [8], suggestion for interpretation of mean value with a range of 3.40-4.19 considered as influential, hence, the effect of qualification and quantity of HR on medicine supply chain performance accounts a grand mean value of 3.50, thus, its role is influential.

Table 5: The roles of employee relation on HRH in medicine supply chain performance.

The roles of employee relation on HRH in medicine supply chain performance.	Mean	SD
1. Policies of HRH improve the medicine supply chain performance in terms of increasing reliability.	3.81	1.55
2. Ethical behaviors of HRH improve the medicine supply chain performance in terms of increasing flexibility.	3.62	1.66
3. Social connections of HRH improves the medicine supply chain performance in terms of increasing responsiveness (reduce lead time).	3.55	1.46
4. Social connections of HRH improve the medicine supply chain performance in terms of decreasing cost.	3.19	1.29
Grand mean of the roles of employee relation on HRH in medicine supply chain performance.	3.54	1.49

The roles of employee relations on HRH in the Medicine Supply Chain Performance

The participants agreed (3.81) with the statement: Policies of human resources for health improve the medicine supply chain performance in public health facilities in Juba City regarding increasing

reliability. The results (3.62) obtained by the respondents complied with the statement: Ethical behaviors of human resources for health improve the medicine supply chain performance in public health facilities in Juba City in terms of increasing flexibility.

The participants' response (3.55) supported the statement: Social connections of human resources for health improve the medicine supply chain performance in public health facilities in Juba City in terms of increasing responsiveness (reducing lead time). The results (mean of 3.19) obtained by the respondents are neutral, neither agreeing nor disagreeing with the statement: Social connections of human resources for health improve the medicine supply chain performance in public health facilities in Juba City by decreasing cost. According to the participants' responses, policies, ethical behaviors, and social connections play pivotal roles in the medicine supply chain performance in the public health facilities in Juba County, except statement number four, which is neutral. This proved that participants are not involved in the procurement activities.

Conclusively, based on Zinabu and Mitiku [8], the suggestion for the interpretation of mean value with a range of 3.40-4.19 is considered influential; hence, the roles of employee relation on HRH on medicine supply chain performance accounts for a grand mean value of 3.54. Thus, its function is significant.

Discussions

This study was conducted to unveil factors related to healthcare professionals that interfere with the medicines supply chain performance in public health facilities in Juba County. The research concentrated mainly on those factors directly connected to the objectives.

Most participants acknowledged that human resources-related factors (reward, developmental opportunities, qualification and quantity, and employee relations) influence the medicines supply chain performance. Although all the factors showed effective rates, developmental opportunities' grand mean range is the highest while the qualification and quantity range is the lowest. The significant factors highlighted in the current study concur with those identified by the survey done by M. Kasonde & P. Steele [2]. The study done in Ethiopia [5] corroborates the significance of developmental opportunities in the public supply chain domain. In current research, the qualification and quantity of health workers are slightly low, confirming the shortages in LMICs [4]. The development of healthcare professionals in the supply chain started to gain popularity globally, which is a clear indication that the majority of those working in the supply field need to be more knowledgeable, competent, and sufficient to operate the system [3].

Human resources remain essential for health organizations delivering health services [9] to communities. Nevertheless, many factors affect employee performance in the form of employee and employer relationships, working conditions, training opportunities, institutional policies and procedures for employee reward, etc. Consequently, reward plays a crucial role in improving performance, including the medicine chain in a health system. The reward has a management system composed of intrinsic, extrinsic, nonfinancial, and financial rewards.

Intrinsic rewards are psychological prizes that can be either title and promotion, praise and appreciation, responsibility and authority, education, participation in decisions, vacation time, flexible working hours, recognition, etc., while extrinsic rewards rely on salary increments, bonuses, commissions, etc. [10]. This typically assists organizations to retain and motivate employees to achieve high performance. In this study, we have found that rewards for health workers play an influential role in performance on the medical supply chain. The respondents gave neutral feedback (3.11) to the statement that retention of human resources for health improves the medicine supply chain performance in public facilities in Juba County in terms of increasing reliability, flexibility, and reducing lead time and cost is a clear indication that most of them did not stay long in the health facilities.

The participants' response (3.62) agreed with the statement that the benefits of human resources for health improve the medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability and flexibility and reducing lead time and cost.

The participants agreed (3.83) that conducive working Environments of human resources for health improve the medicine supply chain performance in public health facilities in Juba County, increasing reliability and flexibility and reducing lead time and cost. The majority of the participants responded positively to the statements. Only one statement got a neutral response, which indicated that health workers only stay short in the medicine supply chain in public health facilities.

It contributes to a grand mean value of 3.61. According to Zinabu and Mitiku [8] criteria, this suggests that our mean value, which falls within the range of 3.41 to 4.19, is to be considered influential.

Some studies [11,12] demonstrated that reward is an influential tool, being intrinsic or extrinsic type, in minimizing uncontrolled absenteeism, late arrival, and negligence to duty, and discouraging early departure. Furthermore, it has a positive impact on employee performance. While intrinsic reward improves health workers' performance [13], especially at youth or early employment age, extrinsic reward becomes more vital as their ages increase in service. In contrast, Manzoor et al. [10] indicated that employees prefer to be given cash benefits instead of recognition for their work. Steele and colleagues noted that employee compensation was found to be influential in attracting and retaining employees in their institutions. The authors have raised concerns that the need for benchmarking salary ranges and salary market analyses has hurt staff turnover in the six health supply chain organizations studied.

Developmental opportunities for human resources in health involve capacity building in terms of training, skills development, and knowledge in the medicine supply chain to improve performance by increasing reliability, flexibility, responsiveness, and cost reduction. This can be achieved by developing human resources for supply chain management, which is vital for sustaining the healthcare

County in terms of increasing flexibility.

system. WHO survey report of 2021 on the state of the health workforce in the WHO African region stressed that the health workforce is the mainstay of every health system and is critical in the provision of quality health services, improving population health, ensuring universal health coverage, and achieving the Sustainable Development Goals [14]. The report further reaffirmed the Global Strategy on Human Resources for Health, workforce 2030, that health systems can only function well when they have sufficient well-trained, competent, responsive, motivated, productive, and equitably distributed health staff. The International Pharmacy Federation has highlighted the need for human resources for supply chain management by linking a lack of pharmacy personnel to inequalities in access to medicine and a shortage of pharmacy personnel and medicines [15].

The feedback rendered by the participants (4.02) complies with the statement that capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County in terms of increasing reliability.

The results obtained (3.61) from the study agreed with the statement that capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba The respondents agreed (3.61) with the sentence capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County in terms of increasing responsiveness (reduced lead time).

The participants' response (3.57) agreed positively with the statement that Capacity building (training and development on skill and knowledge) provided to human resources for health improves medicine supply chain performance in public health facilities in Juba County regarding reducing cost. As per the participants' responses, they affirmed that capacity building is crucial for human resources for health to deliver optimum services in the medicine supply chain. Our study has shown that the effect of developmental opportunities on human resources for health on supply chain performance accounts for a grand mean value of 3.70. According to Zinabu and Mitiku [8] criteria, this is considered influential because it falls within the range of 3.40-4.19. A study [16] from Uganda has highlighted the long-term impact of the capacity of health workers in medicine supply chain management in terms of stock management, storage management, and ordering and reporting to be positively correlated with improving their performance in service delivery in the public sector. This was achieved by the Ministry of Health's introduction of a multipronged supervision, performance assessment, and recognition strategy (SPARS).

Case Studies done by Steele and colleagues among six health supply chain organizations.

illustrated that 50% of respondents conducted training needs analysis in their organizations, while 35% stressed that training needs analysis does not lead to developing a training strategy or plan in their organizations. The authors found that support for communities of practice plays a crucial role in employees' continuous professional and leadership development. It is worth mentioning that there is an East Africa Community Regional Center of Excellence for Vaccine Immunization and Health Supply Chain Management. This is based in Rwanda and aims to develop competent experts at different levels of supply chain management. Students are received from the East African Community member states and beyond.

In the Asian and Pacific region, one paper [17] has also recognized the role of training competent staff as a cornerstone in delivering efficient and effective supply chain focusing on skills that include product forecasting, inventory management, and analysis, price negotiations with suppliers, and local customs clearance procedures, financial management, distribution planning and contract management and monitoring.

The roles of qualification and quantity of human resources for health improve medicine supply chain performance in terms of reliability, flexibility, and cost reduction, as well as increasing responsiveness (reducing lead time). Few studies have been conducted on the capacity of supply chain management. One review (People that Deliver) [18] has shown fragility in the skills needed to quantify health products, make proper requests for products, receive and store products, and record inventories correctly. Consequently, there need to be more logisticians specialized in supply chain management, and hence, their performance is carried out by clinicians, pharmacists, or drivers (People who deliver). WHO/AFRO initiative describes a supply chain logistician as capable of planning, administering, and coordinating logistics activities of health programs, structures, medical and technical equipment maintenance, managing supply chain, supporting logistics for health emergencies and humanitarian operations, etc. To strengthen the quality and the number of human resources for health in the medicine supply chain, the review suggested modalities like training, whether pre-service or distance, task shift, outsourcing supply chain, establishing logistics management units, etc, could improve the supply chain. Furthermore, there is a need to develop career pathways for logistics to progress in their profession and earn good wages as they become more experienced and aged.

The participants responded positively (3.71) with the statement that the qualification and quantity of HRH improves the medicine supply chain performance in terms of increasing reliability. The results reached (3.54) agreed with the sentence that the qualification and amount of HRH improves the medicine supply chain performance in public health facilities in Juba County in terms of increasing flexibility.

From the analysis of our study, the grand mean value of 3.50 is within the mean range of 3.41-4.19. Zinabu and Mitiku [8] cite this as influential.

The roles of Employee Relations on HRH in the medicine supply chain performance

Although policies like ethical behaviors, anti-harassment, etc., and social connections within employee relationships on human resources for health can improve medicine supply chain performance in terms of flexibility and decrease of cost, responsiveness (reduce lead time) is increased. This all contributes to the betterment of the working conditions. The working environment is supported by creating opportunities for employees to express their options and develop connections. This can be strengthened by the organization's lifestyle, which includes the development of policies for ethics, anti-corruption, anti-fraud, anti-discrimination, sexual harassment, whistleblower, and health and safety. In addition to this, policies to protect and provide equal employment opportunities for women, minority groups, and people with disabilities. Furthermore, policies for ensuring a positive working environment include providing a healthy workplace, medical insurance, free health checks, registering near incidents, providing personal protective equipment to staff, and providing employees with the necessary tools and equipment to excel in their work.

The participants agreed (3.81) with the statement: Policies of human resources for health improve the medicine supply chain performance in public health facilities in Juba City in terms of increasing reliability. The results (3.62) obtained by the respondents complied with the statement: Ethical behaviors of human resources for health improve the medicine supply chain performance in public health facilities in Juba City in terms of increasing flexibility.

The participants' response (3.55) supported the statement: Social connections of human resources for health improve the medicine supply chain performance in public health facilities in Juba City in terms of increasing responsiveness (reducing lead time). The results (mean of 3.19) obtained by the respondents are neutral, neither agreeing nor disagreeing with the statement: Social connections of human resources for health improve the medicine supply chain performance in public health facilities in Juba City by decreasing cost. According to the participants' responses, policies, ethical behaviors, and social connections play pivotal roles in the medicine supply chain performance of public health facilities in Juba County, except for statement number four, which is neutral. This proved that participants are not involved in the procurement activities. Conclusively, based on Zinabu and Mitiku's [8] suggestion for the interpretation of mean value with a range of 3.40-4.19 considered as influential, hence, the roles of employee relation on HRH on medicine supply chain performance accounts for a grand mean value of 3.54. Thus, its role is influential.

Conclusion

In the current research, most human resources-related factors (reward, developmental opportunities, qualification and quantity, and employee relation) in the medicines supply chain performance were influential. However, the grand mean of developmental opportunities was slightly higher than the qualification and quantity. This study indicated the impact of the factors on the supply chain performance. For apparent intervention, there should be a mechanism to measure the effect.

Limitations

Due to uneven distribution of health workers convenience sampling technique was used which didn't implement specific statistical formula in determining the sample size. Answering of the questionnaires based on the free will of the healthcare practitioners which affected collection time. The study was limited to public health facilities excluding the private sector within Juba County. Hence, generalization of the study is not possible to other counties within the country.

Though the survey results managed to discover how influential the factors are to the healthcare workers in the supply chain are, didn't disclose the extent to which they affect performance. Further study should be conducted to know the measure the impact on performance with larger participants from all sectors.

Ethical Standards

The authors of this research declare there was an ethical clearance obtained from the Research ethics board (RERB) of the Ministry of Health under the code (46/09/2021-MOH/RERB). Informed consent was obtained from all the participants.

Conflict of interests: The authors have no conflicts of interest to declare.

Contributions

SY developed research proposal, data collection and drafting the manuscript; KS and JL analysed the data, formulated and finalised manuscript writing and editing; SM and KC did proof reading and editing. All authors read and approved manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author at a reasonable request.

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