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Performance Evaluation Of Medical Supplies Transformation To A National Unified Procurement Company In Saudi Arabia: Mixed Methods Study

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Abstract

To assess the level of Beneficiaries` Satisfaction toward the National Unified Procurement Company "NUPCO" for providing and delivering medicine, medical equipment, and supplies to public healthcare facilities, and to explore the benefits,[1] barriers, and factors associated with the transformation of medical supply to the Unified Procurement. Method: A cross-sectional, mixed methods study design was conducted in Riyadh, Eastern, Passim, Al Baha, and Western regions of Saudi Arabia. Result: Importantly, some of the investigated aspects had more desirable outcomes, including timely delivery of items and space in warehouses. However, the findings indicated numerous challenges that NUPCO experiences, such as appropriate assessment and realizing of the actual need or consideration of storekeepers' opinions, as well as differences across regions and facilities used in inventory management with the orders varying in size across different hospitals in the country. Recommendations: Create a foundation for policymakers and healthcare administrators to address and optimize the work of NUPCO, making the medical supply procurement organization function as effectively as possible. This will eliminate some disparities in organizations' availability and ensure that the kingdom healthcare services can be delivered at their highest level.

Background

Saudi Arabia accounts for 60% of the Gulf Cooperation Council (GCC) countries' healthcare expenditures, and the sector remains a top priority for the Saudi Arabian Government. In 2022, it will spend $36.8 billion on healthcare and social development—14.4% of its 2022 budget and the third largest line item after education and military. The Saudi Arabian Government is targeting the healthcare sector for privatization (I.T.A, 2022). The National Unified Company for Medical Supplies (NUPCO) is responsible for centralized government procurement of pharmaceuticals, medical equipment, and supplies for the benefit of all public healthcare facilities. The establishment of a national company for unified purchasing of medicines and medical necessities was approved by the Council of Ministers during its meeting on 27/08/2007 (14/08/1428). The approval comes within an overall economic reform program carried out in the Kingdom of Saudi Arabia through a balanced application of a privatization process for transferring the burden of the economic works carried out by the government to the private sector. The major goal behind the decision is to maintain coordination and integration among government sectors, a matter that necessitates the unification of specifications and standards governing the use of medicines and medical equipment. This study was conducted in Riyadh,

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Eastern, Passim, Al Baha, and Western regions of Saudi Arabia using a cross-sectional, mixed methods study design. The results show considerable perception and experience differences between medical suppliers and NUPCO's performance and its influence on the healthcare system. Most storekeepers in public hospitals were interested in the barriers and shortage of medicines in public hospitals. Thus, the transformation of medical supply to unified procurement needs to resolve the barriers to implementation of the transformation.

METHODS

A cross-sectional study design was conducted in the Riyadh, Eastern, Qassim, Al Baha, and Western regions in Saudi Arabia, from December 2023 to May 2024, to assess the level of Beneficiaries` Satisfaction toward "NUPCO" to provide and deliver medicine, medical equipment, and supplies for public healthcare facilities, using a hand-to-hand questionnaire for the quantitative approach and face-to-face interviews for the qualitative approach. Sample size is n = 385 randomly sampling, and (30) interviewees for the qualitative approach. The collected quantitative data was be descriptive statistics; t-test was done to examine if there is a significant difference in means (SD) for the participants. Chi- square to determine if there is significant association between service provided and Beneficiaries` Satisfaction toward "NUPCO" to provide and deliver the medicine, medical equipment, and supplies for public healthcare facilities. The collected data were analyzed using SPSS, version 20. Atlas.ti8 software was used for the qualitative approach.

RESULT

Descriptive Analysis of Suppliers (Quantitative)

Table 4.1 presents medical suppliers' demographic characteristics who participated in the study. This includes descriptions by gender, age group, region, occupation, facility type, and the type of inventory. Most participants were male, representing 88.6% of the total sample, compared with 11.4% female participants. In terms of age, 49.4% of the participants were aged between 36 and 45 years and 15.8% were aged between 26 and 35 years. A total of 33.0% of the participants were from Riyadh, followed by the Western region at 13.9%. The storekeepers represented the leading professional group with 33.8% of the total, followed by pharmacists who constituted 16.9% of the total sample. Only 6.5% of the participants were nurses. regarding facility type, 81.0% were a facility to circulate medical supplies, followed by 7.5% of pharmacy facilities. In terms of inventory, medical supplies and medicine were the leading categories at 23.6% and 34.3%, respectively. The following demographic characteristics provide a detailed outline of the participant profile, which is critical to understanding medical suppliers' views and experiences within the study context, as shown in Figure 4.1.

Table 0.1: Demographic Characteristics of Medical Suppliers

Characteristics		Frequency **(n)**	Percentage **(% n)**
Gender	Male	341	88.6
	Female	44	11.4
	Total	**385**	**100**
Age group (in years)	18-25	2	0.5
	26-35	61	15.8
	36-45	190	49.4
	46-59	131	34.0
	60 and more	1	0.3
	Total	**385**	**100**

Regions	Eastern	53	13.8
	Riyadh	127	33.0
	Al Baha	52	13.5
	Western	69	13.9
	Qasim	84	21.8
	Total	**385**	**100**
Occupation	Storekeeper	130	33.8
	Receiving office	30	7.8
	Receiving member	4	1.0
	Pharmacist	65	16.9
	Physician	5	1.3
	Nurse	25	6.5
	Inventory control	2	0.5
	Other	124	32.2
	Total	**385**	**100**
Facility	Medical supplies	312	81.0
	Inventory control	3	0.8
	Pharmacy	29	7.5
	Inpatient	8	2.1
	Outpatient	5	1.3
	Others	28	7.3
	Total	**385**	**100**
Inventory	Medicine	132	34.3
	Medical supplies	91	23.6
	Lab supplies	51	13.2
	Others	63	16.4
	Non applicable	48	12.5
	Total	**385**	**100**

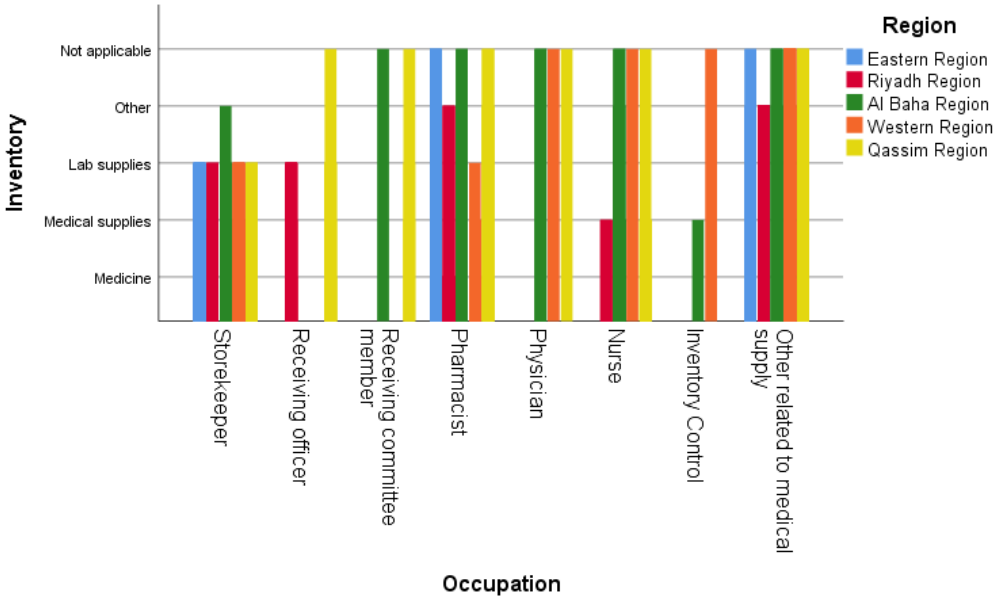

Figure 4.1: Bar plot for inventory by region and occupation.

Responses Analysis

Question seven investigates the link between the MAWARED* and NUPCO systems and the procurement process's effectiveness and efficiency. Responses from the participants raise mixed reactions where many are not sure how MAWARED is adequately linked with the system defined by a notable 43.1% which are familiar. In question 2, one-fourth of the total are not conversant with their information on whether NUPCO is determining actual needs (25.5%). On average, approximately three in ten are not sure if their opinions are considered when setting maximum and minimum limits (29.9%). The accuracy of technical descriptions and item codes between MAWARED and NUPCO are another area where ranging between 33.0% and 26.5% do not know. More so, the participants are rather certain that the required items are delivered on time31.7%, and enough space is available in the warehouses to accommodate disburse quantities 74.5%. Notably, between a maximum of 31.7% and a minimum of 69.9% expressed their concerns over shortages of medicines, lab, x-ray, applicants, medical supplies, and other issues, as shown in Table 4.2 and Figure 4.2. It implies opportunities for improvement.

Table 4.2: Distribution of Research Questions

	Research Study Questions	**% Yes**	**% No**	**% Not Sure**
Q1	Is MAWARED linked to the~~with~~ NUPCO system?	**43.1**	42.1	14.8
Q2	Is the actual need determined by NUPCO?	25.5	**67.0**	7.5
Q3	Is your opinion considered~~taken into account~~ in determining the maximum and minimum~~max and min~~ limits?	29.9	**60.8**	9.4
Q4	Do you know the monthly need electronically?	**44.4**	41.8	13.8
Q5	Is the technical description for items in the NUPCO~~NUPCO~~ system identical to the MOH~~MOH~~ description numbers?	35.6	**37.9**	26.5

Q5	Are item~~items~~ codes in MAWARED identical to~~with~~ NUPCO codes?	24.9	**32.1**	33.0
Q7	Are the ORs~~OR's~~ for items received from NUPCO reversed automatically?	**39.2**	34.5	26.2
Q8	Will the required items from NUPCO be delivered~~delivered~~ on time?	31.7	**35.1**	33.2
Q9	Is the entire order disbursed upon request?	10.4	**62.3**	27.0
Q10	Are the required quantities disbursed to~~for~~ you?	**76.9**	22.3	0.8
Q11	Are the items disbursed by BATCH?	**60.8**	10.4	28.8
Q12	Are you receiving items from NUPCO that are near expiration~~to expiration~~?	**48.3**	22.9	28.8
Q13	Are you using paper forms in case the~~of the~~ auto system is out of service?	19.0	**58.4**	22.6
Q14	Are free items disbursed according to the MOH description?	16.9	**40.5**	21.6
Q15	Do you receive different items from NUPCO than the requested items?	24.2	**42.6**	33.2
Q16	Is your warehouse space suitable for the quantities disbursed?	**74.5**	22.9	2.6
Q17	Is there a shortage~~shortage~~ of medicines, lab, and medical supplies?	**69.9**	5.7	24.4

*MAWARED is the technical system for medical supply in M.O.H. Saudi Arabia.

Table 0.2: Distribution of Research Questions 19

Q19	How satisfied are you with dealing and communicating ~~& communicate~~ with NUPCO?	Extremely satisfied %	Satisfied %	Uncertain %	Unsatisfied %	Not at all satisfied- Extremely~~satisfied - Extremely~~ unsatisfied %
		2.1	26.0	23.6	39.0	9.4

Table 0.3: Distribution of Research Questions 20

	Very poor %	Poor %	Very weak %	Weak %	Average %	Above average %	Good %	Excellent~~Very good~~ %	Excellent %	High excellent %
What~~what~~ is your evaluation of~~about~~ NUPCO performance?	5.5	5.2	9.1	13.8	17.9	15.3	19.7	8.3	3.6	1.6

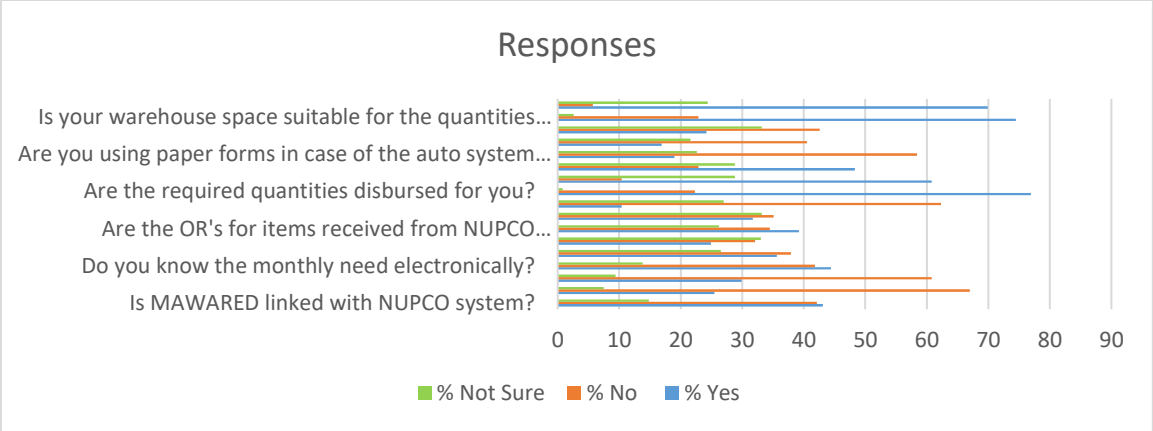

Figure 4.2: Clustered Bar of Responses to the Research Question

The cross-table between regions and Q17 item, Shortages in medicine, lab, and medical supplies, points to noticeable differences in shortages reported from different regions of Saudi Arabia, as shown in Table 4.7 and Figure 4.5. The most salient is Riyadh, where shortages were confirmed by 79 respondents. The Eastern and Western regions also suffered from severe shortages, with 38 and 60 confirmed shortage cases, respectively. In contrast, there were considerably fewer reported cases of shortages in the Al Baha and Qassim regions. The chi-square test results coincide with the aforementioned elaborations and show a highly significant relationship between regions and shortages. It underlines the importance of the targeted approach to the region's characteristics and the gaps between provisions of essential medical items. Thus, both quantitative and qualitative data obtained in this study support the need for tailored interventions to secure equal access to health care in all parts of the country.

Table 0.4: Cross Table Between Regions and Q17

		Eastern Region	Riyadh Region	Al Baha Region	Western Region	Qassim Region	Total
Is there a shortage~~shortage~~ of medicines, lab, and medical supplies?	Yes	38	79	33	60	59	269
	No	0	18	4	0	0	22
	shortage in some items	15	30	15	9	25	94
Total		53	127	52	69	84	385

Chi-Square test = 37.731**, p<0.001

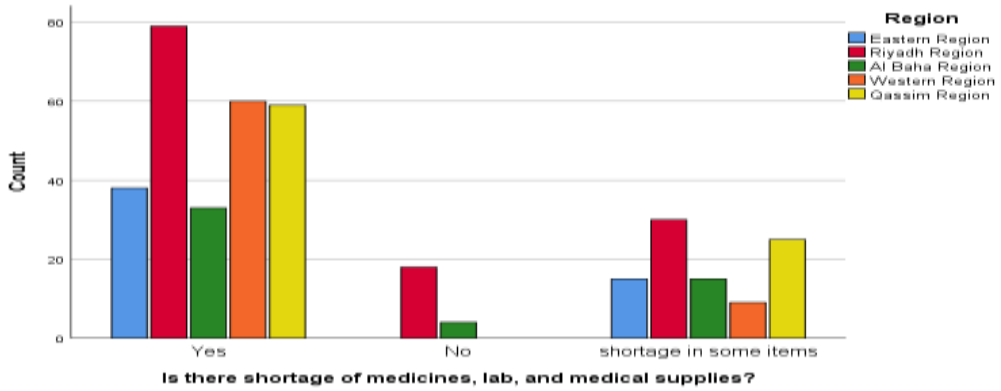

Figure 0.1: Regions by Q17 Distribution

To identify the main factors of drug shortage and its impact on patient care. The multinomial logistic regression analysis for Q17, which is on whether there are shortages in medicines, lab, and medical supplies, shows that both affirmative and negative responses have several significant predictors in Table 4.14. For those who report shortages, the predictors are not significant at conventional levels. However, for non-shortages, most predictors are significant. The fact that most of the regions that have been considered in the model have positive coefficients means that the reference category is less likely to report non-shortages on the three supplies. Similarly, the male gender, as indicated by the positive value of this coefficient, is substantially more likely to report no shortages in these supplies than the female gender. This confirms the first two rounds of analysis. For older people, some levels of occupation and other demographic variables are also significant. This means that regional, demographic, and occupational effects have a defining role in determining whether there is a shortage or no shortage in medicines, lab, and medical supplies. This is essential because it underscores the fact that interventions and support systems must be tailored to address the different needs of different people and groups in the healthcare system.

Table 0.5: Multinomial Logistic Regression Analysis for Q17

Is there a shortage~~shortage~~ of medicines, lab, and medical supplies?[a]		B	Std. Error	Wald	df	Sig.	Exp(B)
Yes	Intercept	.483	.942	.263	1	.608	
	Region	.083	.090	.866	1	.352	1.087
	Gender	.759	.514	2.186	1	.139	2.137
	Age	-.252	.189	1.785	1	.181	.777
	Occupation	.061	.049	1.550	1	.213	1.062
	Facility	-.056	.089	.395	1	.530	.946
	Inventory	.062	.103	.363	1	.547	1.064
No	Intercept	3.511	1.756	4.001	1	.045	
	Region	-.907	.348	6.803	1	.009*	.404
	Gender	3.190	.798	15.969	1	.000**	24.277

	Age	-1.527	.375	16.632	1	.000**	.217
	Occupation	-.482	.166	8.392	1	.004*	.618
	Facility	.202	.283	.511	1	.475	1.224
	Inventory	-.480	.294	2.666	1	.102	.619

The Pearson's correlations result between Q20 and Q1 to 19 help in understanding outcomes deeply, concerning what may be influencing the storekeepers' evaluations altogether in Table 4.15. Many correlations are significant, such as those between Q20 and whether the actual need is determined by NUPCO. Other correlations are as follows: The details in the disbursement process show that whether required quantities have been sent and whether items have been sent in batch are some of the things that help to explain storekeepers' evaluations. Notably, all the correlations that have negative coefficients include whether the provider is being informed by NUPCO of its performance, satisfaction with dealing with NUPCO, satisfaction with the provider's communication to NUPCO, and material cost of the items sent to me in the last quarter. The results show that poor evaluations of NUPCO, based on storekeepers' satisfaction, are related to dissatisfaction with NUPCO's communications and operations. Based on the observations above, any strategy to improve NUPCO's performance would not be effective in the absence of addressing storekeepers' evaluations based on communications and other unmet concerns.

Table 0.6: Pearson's Correlations Between Q20 (Performance) and Q1–19~~Q1 to 19~~

Pearson's correlation	What~~what~~ is your evaluation of~~about~~ NUPCO performance?
Is MAWARED linked to the~~with~~ NUPCO system?	-0.054
Is the actual need determined by NUPCO?	-.254**
Is your opinion considered~~taken into account~~ in determining the maximum and minimum~~max and min~~ limits?	-.374**
Do you know the monthly need electronically?	-.332**
Is the technical description for items in the NUPCO~~NUPCO~~ system identical to the MOH~~MOH~~ description numbers?	-.147**
Are item~~items~~ codes in MAWARED identical to~~with~~ NUPCO codes?	-0.025
Are the ORs~~OR's~~ for items received from NUPCO reversed automatically?	-.177**
Will the required items from NUPCO be delivered~~delivered~~ on time?	-.162**
Is the entire order disbursed upon request?	.157**
Are the required quantities disbursed to~~for~~ you?	.321**
Are the items disbursed by BATCH?	-.411**
Are you receiving items from NUPCO that are near expiration~~to expiration~~?	-0.077

Are you using paper forms in case the~~of the~~ auto system is out of service?	0.085
Are free items disbursed according to the MOH description?	-0.098
Do you receive different items from NUPCO than the requested items?	.281**
Is your warehouse space suitable for the quantities disbursed?	-0.034
Is there a shortage~~shortage~~ of medicines, lab, and medical supplies?	.109*
If YES, what causes~~is the cause of~~ the item~~items~~ shortage?	0.000
How satisfied are you with dealing and communicating~~& communicate~~ with NUPCO?	-.691**

** Sig at p <0.001 and * Sig at p <0.05

Qualitative Data Analysis

Thematic analysis is the method for recognizing trends or themes in the sense of qualitative data "(Braun & Clarke 2006). In this study, thematic analysis assembled three themes from the participants' interviews with relevant questions.

a. Benefits of the Transformation of Medical Supply to Unified Procurement

The interviewees were asked about their opinions on the benefits of the transformation of medical supply to unified procurement. There were different opinions among interviewees concerning the benefits. seven interviewees were interested in the benefits of the transformation of medical supply to unified procurement. Nineteen participants reported that the benefits would be feasible and useful. Therefore, interviewees felt negatively about the transformation of medical supply to unified procurement. Illustrative quotations appear below.

1. Sustainability,
2. Avoiding waste and leakage of medicines from public pharmacies and governmental medical supply warehouses
3. Local content,
4. Integrated services,
5. Strategic ideal warehouses
6. Transferring items between regions

b. Barriers to the Transformation of Medical Supply to Unified Procurement

The primary aim of this study is to explore barriers to the transformation of medical supply to unified procurement. Henceforth, the research focused on the responses of 30 interviewees who shared their views concerning the barriers to the transformation of medical supply to unified procurement. From the analysis of the first interviewee, the respondent underlined that medical

supplies in the governmental hospitals are suffering from drug shortage, quantity of the delivered items, and receiving expired medical items, especially in large hospitals.

1. Delayed delivery,
2. Lack of availability,
3. Lack of medications
4. Important vs. stagnant
5. Lack of knowledge and experience
6. Specialization of workers
7. Mix medical items with each other
8. Life- threatening items, near expiry,
9. No linked systems, no delivery by batch

c. Factors Associated with the Transformation of Medical Supply to Unified Procurement

The interviewees were asked "what are the factors associated with the transformation of medical supply to the unified procurement. There were several different factors stated that could affect the transformation of medical supply to the unified procurement.in Saudi Arabia. Eighteen interviewees spoke about negative factors associated with the transformation of medical supply to unified procurement.

1. Relying on operational processes
2. Non-specialized regional administration
3. Quantity of delivered items,
4. Lack of awareness of important items
5. Storage of expired medications
6. Double systems are not linked,
7. Lack of workers
8. Executive administration not specialized.

Conclusion

Overall, this study conducted a comprehensive evaluation of the transformation of medical supply procurement to NUPCO in Saudi. Using mixed methods, this paper successfully addresses research questions and objectives by examining different stages of the evaluation. Through surveys and analyses, the study sheds light on multiple aspects of the described process, such as beneficiaries' satisfaction and whether they benefit from the change, barriers and factors contributing to shortages, and others. The results show considerable perception and experience differences between medical suppliers and NUPCO's performance and its influence on the healthcare system. Importantly, some investigated aspects had more desirable outcomes, including timely delivery of items and space in warehouses. However, the findings indicated

numerous challenges that NUPCO experiences, such as appropriate assessment and realizing of the actual need or consideration of storekeepers' opinions, as well as differences across regions and facilities used in inventory management with the orders varying in size across different hospitals in the country.

In addition, because correlations were found between the evaluations of NUPCO's overall performance and the features mentioned earlier, communication issues between NUPCO and storekeepers or internal problems seem to be one of the major gaps in NUPCO's work. The results create a foundation for policymakers and healthcare administrators to address and optimize the work of NUPCO, making the medical supply procurement organization function as effectively as possible. This will eliminate some disparities in organizations' availability and ensure that the kingdom healthcare services can be delivered at their highest level.

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