Factors Influencing Health System Response to Non-Communicable Diseases Management: A Cross-Sectional Study of Public Healthcare Facilities in Wajir County, Kenya

Mohamed Abdirahman Ahmed[1*], Wanja Mwaura-Tenambergen[2], Kezia Njoroge[3]

[1]Kenya Methodist University, P.O. Box, 267-60200, Meru, Kenya
[2]Riara University, P.O Box 49940 - 00100, Nairobi, Kenya.
[3]Liverpool John Moores University, Tithebarn building, 79 Tithebarn street, Liverpool, L2 2ER.

**Corresponding Author's E-mail: mohabahnur@gmail.com*

Abstract

Non-communicable diseases (NCDs) contribute significantly to the global disease burden, accounting for approximately 74% of deaths globally (World Health Organization [WHO], 2023). In Kenya, they accounted for 39% of all deaths, and over 50% of hospital admissions as of 2020 (Ministry of Health [MOH], 2021). Despite these statistics, the health system's readiness and capacity to manage NCDs at the county level, particularly in underserved regions, such as Wajir County, remains inadequately understood. This study investigates the factors influencing the health system's response to NCD management in Wajir County. Utilizing a descriptive cross-sectional survey design, data were collected from 83 in-charges of public healthcare facilities, using a structured questionnaire. Descriptive and inferential statistics, including Chi-square tests and Kendall's Tau-b correlation, were used to analyze data and assess the strength and significance of associations. Results show that workforce capacity, healthcare financing, access to health products and technologies, service delivery, and health information systems significantly impact the responsiveness of the health system. Moreover, leadership, manifested through supervision and guideline dissemination, moderates these relationships significantly (Kendall's Tau-b increased from 0.313 to 0.394 with moderation). The interaction of each factor with leadership policies, supervision, and guidelines yields stronger associations with the NCD response. For example, workforce + policy composite had a Tau-b = 0.180, while financing + policy composite had a Taub-b = 0.178, confirming the moderating effect. This study provides a critical analysis of health systems' systemic barriers, and underscores the importance of strengthening health systems through workforce development, sustainable financing, technological investment, robust data systems, and effective leadership, to achieve national and global NCD targets.

Keywords: *Non-communicable diseases, health systems, healthcare workforce, health financing, service delivery, Wajir County, Kenya.*

IJPP 13(1); 100-113

1.0 Introduction

Non-communicable diseases (NCDs), such as cardiovascular diseases, cancers, diabetes, and chronic respiratory illnesses, have emerged as the leading cause of mortality globally, accounting for 41 million deaths annually (WHO, 2023). Low- and middle-income countries bear a disproportionate burden, with over 86% of premature deaths occurring among people under 70 years (WHO, 2023).

In Kenya, the burden of NCDs is rising, with the Ministry of Health reporting that NCDs contributed to 39% of all deaths, and over 50% of hospital admissions in 2020 (MOH, 2021). Disparities exist across counties, with variations in NCDs prevalence and service accessibility. For instance, diabetes prevalence is as high as 10.7% in some urban areas, while in rural areas, access to screening and treatment remains limited (Mwende, 2024). In addition, according to Kiragu et al. (2022), there are significant inter-county variation in hypertension and diabetes prevalence, reflecting inconsistent health system capacities. For instance, Kwale County has a higher prevalence of asthma, diabetes, and hypertension (30.2%) than Narok County (3.0%). The healthcare system has not been performing up to standards, according to recent studies.

The NCD Countdown indicates that Kenya is falling behind in its objective to lower deaths from non-communicable diseases by 2030. Although Kenya has developed national NCD strategies, implementation at the county level remains a challenge. Health systems in many counties are still structured to respond primarily to communicable diseases, limiting their capacity to handle the complex, long-term care demands of NCDs (Kiarie et al., 2018). According to Wekesa et al. (2022) and Kiarie et al. (2018), preventive services like screening are not widely utilized. For instance, almost half of all adults have never had their blood pressure checked, while 75% of patients with diabetes present themselves late. 80% of cancer patients get their diagnosis after the disease has progressed significantly, leading to less favorable results and higher fatality rates (Wekesa *et al.*, 2022).

The WHO health system building blocks framework offers a useful lens through which to assess health system responsiveness. These include: service delivery, health workforce, health information systems, access to essential medicines and technologies, financing, and leadership/governance (WHO, 2018). This study applies this conceptual framework to assess the influence of each component on NCD service readiness in Wajir County, a long term marginalized region.

The study concluded that effective NCD management depends on synergistic improvements across interconnected health system components, including an understaffed and undertrained workforce, inadequate and untimely financing, severe shortages of health products and medicines, and suboptimal service delivery marked by fragmented care and poor prevention.

An epidemiological change is taking place in Wajir County, akin to other regions of the nation, with an increase in non-communicable diseases. Information on how health systems in Wajir and other similar counties respond to NCDs management remain sparse, hence, there is limited understanding of the specific determinants

within the health system that influence its effective response to NCD management. This knowledge gap hinders targeted interventions and effective resource allocation, contributing to suboptimal NCD outcomes in the region. Hence, the purpose of this research was to examine the determinants influencing the health system's response to non-communicable disease management in Wajir County, Kenya.

***Research objectives**:*

i. To assess the influence of healthcare workforce capacity on the health system response to NCD management in Wajir County.

ii. To evaluate the influence of healthcare financing on the health system's response to NCDs management in Wajir County.

iii. To determine the influence of availability of health products and technologies to the NCD management in the County.

iv. To assess how healthcare service delivery practices influence health system response to NCDs management.

v. To evaluate the influence of healthcare information management on health system response to non-communicable disease management.

vi. To analyze the moderating role of leadership -supervision and guidelines - on the relationship between the factors and health system response to non-communicable diseases management.

2.0 Materials and Methods

This was a cross-sectional, facility-based study conducted in Wajir County, Northeastern Kenya. The study targeted all 93 operational public health facilities. A total of 83 facilities were included using a census method, with 10 excluded due to pre-testing. The unit of analysis was the healthcare facility, and the respondents were facility in-charges or senior health personnel. A structured questionnaire, designed around the WHO health systems building blocks, was used. It featured Likert-scale items assessing workforce adequacy, availability of diagnostic tools, financing sufficiency, ICT support, and policy use. The tool was pre-tested and reviewed for face and content validity by subject experts. Cronbach's alpha was used to assess internal consistency, with a reliability coefficient of 0.82 indicating acceptable reliability. Content validity was ensured through expert panel review and pilot testing.

Ethical clearance was obtained from the Wajir County Research directorate, KeMU scientific and ethics committee and from the National Commission for Science, Technology and Innovation (Ref: NACOSTI/P/21/8355). All participants provided informed consent, and data confidentiality, and anonymity of respondents was maintained throughout the study. Descriptive statistics were used to summarize demographic data and health system characteristics. Chi-square tests assessed statistical associations. Kendall's Tau-b was used to measure ordinal correlation between independent variables and the health system's NCD response.

3.0 Results and Discussion

The study aimed to systematically investigate the influence of healthcare workforce capacity, healthcare financing, health products and technologies, healthcare service delivery, and healthcare information management on health system response to NCD management in Wajir County. The study achieved a 95% response rate from healthcare facility in-charges in Wajir County, Kenya.

The demographic profile of respondents, as shown in the table 3.1, below, revealed a significant gender disparity, with males constituting 88.6% and females 11.4%. Nurses dominated the professional representation at 83.5%, highlighting their crucial frontline role. Most staff held diplomas (68.4%) and certificates (11.4%), with significant tenure in Wajir County (3-8 years for 74.7% of respondents) and their current facilities (3-5 years for 53.2%).

Table 3.1

Summary of the Demographic Characteristics of the Respondents

Demographic Information	Category	Frequency	Percentage
Gender	Male	70	88.6
	Female	9	11.4
Current Professional Qualification	Clinical Officer	11	13.9
	Nurse	66	83.5
	Administrators	2	2.5
Highest Level of Education	Certificate	9	11.4
	Diploma	54	68.4
	Higher Diploma	4	5.1
	Bachelors	12	15.2
Period Worked in Wajir County	<2Yrs	4	5.1
	3 to 5 Yrs	29	36.7
	6 to 8 Yrs	30	38.0
	9 to 11 Yrs	9	11.4
	> 11 Yrs	7	8.9
Period Worked at Facility	<2Yrs	22	27.8
	3 to 5 Yrs	42	53.2
	6 to 8 Yrs	10	12.7
	9 to 11 Yrs	4	5.1
	> 11 Yrs	1	1.3

Healthcare Workforce Capacity and Health System Response.

Table 3.2

Rating of Staff Adequacy, Staff Training, and Job satisfaction

	Statements	Rating	Frequency (n)	Percent (%)	Mean
1	The level of staff numbers in the facility	Very Poor (1)	10	12.7	
		Poor (2)	35	44.3	
		Fair (3)	25	31.6	2.43
		Good (4)	8	10.1	
		Excellent (5)	1	1.3	
2	The level of Staff training on NCDs for the last two years in the County	Very Poor (1)	11	13.9	
		Poor (2)	47	59.3	
		Fair (3)	18	22.8	2.16
		Good (4)	3	3.8	
		Excellent (5)	0	0	
3	The level of Job Satisfaction	Strongly Dissatisfied (1)	7	8.9	
		Dissatisfied (2)	14	17.7	
		Neither (3)	30	38	3.01
		Satisfied (4)	25	31.6	
		Strongly satisfied (5)	3	3.8	

The results of the study in table 3.2 reveals that 57% of respondents perceive staff adequacy as "poor and below", with a mean of 2.4. It is evident from the results that the majority 73.2% of the respondents had rated the provision of training on NCD management by the County as poor. This suggests a workforce not only numerically insufficient, but also critically undertrained for the evolving burden of NCDs. While 35.4% reported job satisfaction, a substantial proportion experienced dissatisfaction 26.6%, or neutrality 38.0%, hinting at underlying issues such as heavy workloads, lack of resources, and limited career progression.

As shown in Table 3.3, the study revealed that there is significant positive correlation (Tb = 0.138, p = .010) between healthcare workforce capacity and NCD management efficiency, aligning with global health literature emphasizing the centrality of a skilled and sufficient workforce to health system functionality. Theoretically, this reinforces the WHO Health Systems Framework's emphasis on human resources as a foundational building block. In a national context, Kenya, like many Sub-Saharan

African countries, grapples with health workforce shortages and mal-distribution (Indiazi, 2021, (Miseda et al., 2017). The study findings reveals a severely constrained healthcare workforce in Wajir County, characterized by critical staff inadequacy, training deficits in NCD management, and moderate job satisfaction levels. This directly undermines the county's ability to mount an effective NCD response.

Table 3.3

Correlation Matrix between the variables

Factors	Pearson Chi-Square	df	Asymp. Sig.	Kendall's Tau-b Value
Healthcare Workforce Capacity	20.051	8	.010	.138
Healthcare Financing	17.034	4	.002	.154
Health Products and Technologies	22.304	12	.034	.050
Healthcare Service Delivery	18.064	8	.021	.041
Healthcare Information Management	15.481	8	.050	.118
Policies and Guidelines	20.112	10	.028	.158

Healthcare Financing and Health System Response

Table 3.4

The availability and timeliness of funds

Item description	Ratings	Frequency (n)	Percent (%)	Mean
Adequacy of funds received	Highly inadequate	6	7.6	2.1646
	Inadequate	55	69.6	
	Fair	17	21.5	
	Adequate	1	1.3	
Timeliness of disbursed funds	Highly not on Time	7	8.9	2.1899
	Not on Time	50	63.3	
	Fair	22	27.8	
The Facility generates its funds	Yes	9	11.4	1.8861
	No	70	88.6	

77.2% of respondents described government funds as "inadequate and below," with a mean of 2.16, and 88.6% of facilities generated no funds internally. The perception of untimely fund disbursement further exacerbates this dire financial situation as confirmed by 72.2% of respondents. This directly impacts the availability of health products and technologies (e.g., medicines, diagnostics) and the ability to invest in workforce training and ICT infrastructure. The weak positive and significant correlation

(Tb = 0.154, p = 0.002) between healthcare financing and NCD management efficiency, despite its statistical significance, indicates that while more funds improve response, the current levels are so low that even marginal increases yield positive, though limited effects.

This finding critically interrogates the government's commitment to NCDs, suggesting that while NCDs are a growing burden, funding allocations do not reflect this priority. Globally, sustainable health (more so NCD) financing remains a major challenge, particularly in low- and middle-income countries (LMICs) (Msanya et al., 2020; Kairu et al., 2021), where health budgets are often dominated by infectious diseases. The lack of internal revenue generation capacity further limits autonomy and sustainability, mirroring challenges faced by many public health facilities dependent on central government transfers (Indiazi, 2021). Healthcare financing in Wajir County is inadequate and untimely, severely crippling the health system's ability to procure essential resources and sustain NCD management initiatives.

Health Products, Technologies, and Health System Response

Table 3.5

Response on the Availability of NCD screening, Diagnostic Tests and Medicines

Ratings	Completely unavailable		Somewhat unavailable		Neither available nor unavailable		Some-what available		Completely available	
	%	f	%	f	%	f	%	f	%	f
The Level of availability of Screening & diagnostic tests (cancer, CVD & DM) in the facility	44.73	35	21.96	17	10.13	8	17.70	14	5.50	5
The Level of availability of Medicines (Cancer, CVD & DM)	63.7	50	11.4	9	7.6	6	15.6	12	1.7	1

The findings in table 3.5 indicate that the majority of the respondents (44.7%) reported NCD (Cancer, CVD & DM) screening/diagnostic tests as "completely unavailable". The situation with tracer medicines is equally dire, with 63.7% reporting cancer medicines as "completely unavailable". This paints a picture of a health system ill-equipped to even diagnose, let alone manage, common NCDs effectively.

A statistically significant positive correlation (Tb = 0.050, p = .034) implies that increased availability of these products improves NCD management, but the relatively low strength of this correlation suggests that simply

having products is insufficient if other systemic barriers, such as inadequate financing, untrained staff, or ineffective service delivery models are not simultaneously addressed. This aligns with a systems thinking approach, where isolated improvements often have limited impact. Nationally and globally, access to essential NCD medicines and technologies is a major equity challenge, particularly in rural and remote areas, where supply chain weaknesses and high costs create insurmountable barriers. Wajir County is grappling with a severe and systemic shortage of essential NCD screening tools, diagnostic tests, and tracer medicines, creating restricted access in the continuum of NCD care.

Healthcare Service Delivery and Health System Response

Table 3.6

NCDs risk assessment, health promotion, and quality of treatment

Ratings	The extent of NCD risk assessment and health promotion			The quality of NCD treatment services offered?		
	Frequency (n)	Percent (%)	Mean	Frequency (n)	Percent (%)	Mean
Very Poor	7	8.9		0	0	
Poor	45	57		30	38	
Fair	25	31.6		38	48.1	
Good	2	2.5		11	13.9	
Very Good	0	0		0	0	
Total	**79**	**100.0**	**2,2785**	**79**	**100.0**	**2.7595**

Results in table 3.6 indicate that a vast majority of respondents (65.9%) rated NCD risk assessment and health promotion as "poor and below," indicating a profound lack of proactive, population-level interventions. The quality of NCD treatment was largely rated as "fair" (48.1%) or "poor" (38%). While 64.6% of facilities reported referring NCD cases. This means that there are many referrals of NCD patients to various referral facilities due to one reason or another (Dodd et al., 2019). The positive and significant relationship (Tb = 0.041, p = .021) between healthcare service delivery and NCD management efficiency underscores that improving these aspects directly enhances the system's response. This aligns with the WHO's service delivery building block, emphasizing accessible, equitable, and quality care. The challenges in Wajir reflect broader issues in primary healthcare strengthening in Kenya, where NCD services

are often fragmented and reactive rather than integrated and preventive. This study revealed significant deficiencies in NCD risk assessment, health promotion, and treatment quality, which significantly impede effective service delivery.

Healthcare Information Management and Health System Response

Table 3.7 presents findings on the health information infrastructure in Wajir County.

Table 3.7

Responses to Health Information Management

Item Description	Ratings	Frequency (n)	Percent (%)	Mean
The level of support for ICT infrastructure development	Very Poor	5	6.3	
	Poor	54	57	
	Fair	22	27.8	2.4177
	Good	5	6.3	
	Very Good	2	2.5	
Quality assurance is done regularly	Strongly disagree	5	6.3	
	Disagree	25	31.6	2.8987
	Neutral	27	34.2	
	Agree	17	21.5	
	Strongly agree	5	6.3	
Availability of computerized disease registry	Yes	16	20.3	1.8101
	No	62	78.5	
	I don't know	1	1.3	

The results indicated that only 7 (8.8%) of the respondents rated the support of ICT infrastructure to the facilities as good and very good, while 59 (63.3%) of respondents rated the ICT infrastructure as poor and below. Moreover, the existence of a computerized disease registry in the county was found to be low, with only 16 (20.3%) of the study participants acknowledging its presence, while 62 (78.5) % denying it. Table 7 depicted that most of the respondents 27(34.2%) were undecided or not sure on whether or not the health department regularly undertakes quality assurance on the health information system in the County, 25(31.6%) disagreed, and 17(21.5%) agreed. The rudimentary state of healthcare information management, characterized by inadequate ICT infrastructure and weak quality assurance, severely compromises data-driven decision-making and effective NCD response.

There is a significant positive correlation (Tb = 0.118, p = .050) between healthcare information management and NCD management efficiency. This confirms that better data leads to better outcomes. This is a fundamental aspect of health systems strengthening, enabling evidence-based

policymaking and targeted interventions. The situation in Wajir is typical of many underserved areas in Kenya and globally, where digital health initiatives are nascent or lacking. The reliance on manual systems is inefficient, prone to errors, and limits the ability to track disease trends or patient progress effectively.

NCD Health System Response

The dependent variable, NCD management efficiency, was measured through cost-effectiveness, improved health outcomes, and avoidance of financial impoverishment. Table 3.8 shows the level of availability of health insurance services cover for NCDs patients in Wajir County.

Table 3.8

The level of availability of health insurance services Cover for NCDs patients in the county.

Item description	Ratings	Frequency (n)	Percent (%)	Mean
The level of agreement with the statement: "NCD patients are getting better, healthier, and productive in their lives.	Strongly disagree	13	16.5	
	Disagree	46	58.2	
	Neutral	20	25.3	2.0896
	Agree	0	0	
	Strongly Agree	0	0	
The level at which the NCDs management rides on other financially endowed health programs in this facility.	Very Low	12	15.2	
	Low	46	58.2	
	Fair	21	26.6	2.1139
The level of availability of health insurance services for NCD patients in the county	Completely unavailable	22	27.8	
	Somewhat unavailable	40	50.6	
	Neither available nor unavailable	14	17.7	
	Somewhat available	3	3.8	
	Completely Available	0	0	1.9747

The most critical finding is that a large proportion of respondents 59(74.7%) disagreed with the statement that NCD patients are "getting better and healthier." This is a glaring indicator of the failure of health system to achieve its fundamental objective for NCDs. The 25.3% who were unsure also suggest a lack of clear outcome monitoring. The majority of the respondents (73.4%) perceive as low the NCD services ride to other financially endowed disease programs (such as HIV/AIDS or maternal health programs). This implies limited integration and points to the severe funding deficits. The finding that a significant majority of NCD patients in Wajir County are *not* improving, coupled with low health insurance coverage and over-reliance on other disease programs, underscores a deeply

inefficient and inequitable NCD management system.

The significant positive relationship between all factors and the health system response (Tb = 0.313, p = 0.005), which strengthened even after moderation (Tb = 0.394, P = 0.000), confirms the interconnectedness of these components. It implies that comprehensive interventions addressing workforce, financing, products, service delivery, information, and leadership are essential for improving NCD outcomes.

Moderating Role of Leadership - Support Supervision and Guidelines

Leadership, the moderating variable, was measured through support supervision and the availability and utilization of clinical guidelines.

Table 3.9

Response of leadership – Support supervision & the utilization of NCDs prevention and management guidelines

Item description	Ratings	Frequency (n)	Percent (%)	Mean
The level of utilization of NCD prevention and management guidelines in the county?	Very Low (1)	17	21.5	
	Low (2)	46	58.2	
	Neither/Neutral (3)	16	20.3	1.9873
	High (4)	0	0.00	
	Very High (5)	0	0.00	
The level of NCDs as a component in the support supervision done by the County health management team?	I don't know (1)	6	7.6	
	Not at all (2)	33	41.8	
	Hardly (3)	33	41.8	2.7089
	Sometimes (4)	7	8.9	
	Most of the Time (5)	0	0.0	

Results in Table 3.9 reveal a significant deficiency in the availability and utilization of NCD management guidelines, with 79.7% reporting low availability. This points to a fundamental gap in policy implementation and clinical standardization. The results in Table 3.9, depict that 33 (41.8%) of the respondents indicate that NCDs was not at all and hardly a component of the CHMT's support supervision agenda in the County.

Support supervision and guidelines utilization moderate the relationship between individual independent variables and NCD management efficiency, as shown in the table 3.10 below.

Table 3.10

Moderating Effect of Supportive Supervision and Guidelines

	Health System Response			
Composite Variables	**Pearson Chi-Square (x2)**	**df**	**Asymp. Sig.**	**Kendall's Tau-b Value**
Healthcare Workforce Capacity + Supportive Supervision & Guidelines Composite variable	39.323	16	.001	.180
Healthcare Financing + Supportive Supervision & Guidelines Composite variable	44.268	16	.000	.178
Health Products and Technologies + Supportive Supervision & Guidelines Composite variable	25.311	18	.117	.129
Healthcare Service Delivery + Supportive Supervision & Guidelines Composite variable	30.112	16	.017	.185
Healthcare Information Management + Supportive Supervision & Guidelines Composite variable	17.818	16	.335	.192

Overall, leadership also has a significant positive effect on all factors collectively, reinforcing its pivotal role as an enabling factor within the health system. The alarming finding that a significant majority of NCD patients in Wajir County are not improving, coupled with low health insurance coverage and an over-reliance on other disease programs, underscores a deeply inefficient and inequitable NCD management system. In summary, the study revealed that leadership plays a moderating role in strengthening the links between key health system inputs (workforce, financing, and service delivery) and NCD management efficiency in Wajir County.

4.0 Conclusion

The findings highlight that effective NCD management depends on synergistic improvements across interconnected health system components, including an understaffed and undertrained workforce, inadequate and untimely financing, severe shortages of health products and medicines, and suboptimal service delivery marked by fragmented care and poor prevention. These issues are worsened by a weak health information system, undermining data-driven decisions and accountability. Leadership support, supervision, and clinical guideline utilization are critical moderators that could amplify improvements in workforce capacity, financing, and service delivery; but their current deficiency represents a major systemic failure. Consequently, the NCD system fails to improve health outcomes, lacks financial protection through insurance, and struggles to integrate with other programs.

5.0 Recommendations

Wajir County must prioritize NCDs by strengthening leadership support supervision, ensuring clinical guideline use, and enhancing healthcare worker training to address staffing gaps and gender imbalances. Increased and timely NCD funding, alternative financing mechanisms, and transparent disbursement are critical, alongside intensified public awareness for early screening and healthier lifestyles. Expanding health insurance coverage and financial protection for NCD patients is urgent. Future research should assess infrastructure resilience, supply chain robustness, and community health workers' roles in NCD management, as well as analyzing political and policy dynamics influencing NCD prioritization and resource allocation at county and national levels.

References

Dodd, R., Palagyi, A., Jan, S., Abdel-All, M., Nambiar, D., Madhira, P., Balane, C., Tian, M., Joshi, R., Abimbola, S., & Peiris, D. (2019). Organisation of primary health care systems in low- and middle-income countries: Review of evidence on what works and why in the Asia-Pacific region. *BMJ Global Health, 4*(Suppl 8), e001487. https://doi.org/10.1136/bmjgh-2019-001487

Indiazi, J. S. (2021). *Devolved Healthcare Financing and Delivery of Health Services Among Public Health Facilities in Western Counties* [Master's Thesis, University of Nairobi]. http://erepository.uonbi.ac.ke/handle/11295/157284

Kairu, A., Orangi, S., Mbuthia, B., Ondera, J., Ravishankar, N., & Barasa, E. (2021). Examining health facility financing in Kenya in the context of devolution. *BMC Health Services Research, 21*(1), 1086. https://doi.org/10.1186/s12913-021-07123-7

Kiarie, H., Gatheca, G., Ngicho, C., & Elizabeth, W. (2018). *Lifestyle diseases – An Increasing cause of Health loss*. Ministry of Health Policy Brief. http://guidelines.health.go.ke:8000/media/Revised_Non_Communicable_Disease_Policy_Brief_-May2018_.pdf

Kiragu, Z. W., Rockers, P. C., Onyango, M. A., Mungai, J., Mboya, J., Laing, R., & Wirtz, V. J. (2022). Household access to non-communicable disease medicines during universal health care roll-out in Kenya: A time series analysis. *PLOS ONE, 17*(4), e0266715. https://doi.org/10.1371/journal.pone.0266715

Ministry of Health, Kenya. (2021). *National Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2021/22–2025/26*. https://www.iccp-portal.org/system/files/plans/Kenya-Non-Communicable-Disease-NCD-Strategic-Plan-2021-2025.pdf

Miseda, M. H., Were, S. O., Murianki, C. A., Mutuku, M. P., & Mutwiwa, S. N. (2017). The implication of the shortage of health workforce specialist on universal health coverage in Kenya. *Human Resources for Health, 15*(1),

80. https://doi.org/10.1186/s12960-017-0253-9

Msanya, D., Mwaura-Tenambergen, W., Oluoch, M., & Alloyce, J. P. (2020). Factors Influencing Job Satisfaction among Health Workers in Tanzania: A Case of Kilimanjaro Christian Medical Centre Referral Hospital. *International Journal of Professional Practice*, *8*(1), 13–27. https://doi.org/10.71274/ijpp.v8i1.59

Mwende, N. (2024). *Nyeri County engages Community Health Promoters to combat the high prevalence of Non-Communicable Diseases*. Maarifa Centre. https://maarifa.cog.go.ke/county-initiatives/nyeri-county-engages-community- health-promoters-combat-high-prevalence-non#_ftn1

Wekesa, P., Owuor, K., & Cullen, C. B. (2022). County Health Leadership Practices and Readiness for Noncommunicable Disease Services in Kenya. *Annals of Global Health*, *88*(1), 58. https://doi.org/10.5334/aogh.2673

World Health Organization (2023). *NCD Key Facts*. https://www.who.int/southeastasia/healthtopics/noncommunicable-diseases on 23rd June 2023