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An Assessment on the Application of the Porter Diamond Model Aspects within Tuberculosis Treatment Healthcare Facilities in Nairobi County, Kenya

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Abstract:
Strategic management involves formulating and implementing an organization's vision, mission, and objectives, making decisions on resource allocation, and developing appropriate strategies to achieve set goals. Contemporary strategic management theories provide frameworks and models that guide organizations in these processes. One prominent theory is the Resource-based Theory, particularly the Porter Diamond Theory, which is essential for understanding organizational dynamics, competitive strengths, and strategy development across various sectors, including healthcare. The Porter Diamond Theory posits that an entity's competitiveness is influenced by four interconnected factors: Factor Conditions: These include tangible and intangible resources relevant to the organization. Market Demand Conditions: The nature and scope of market demand that shape industry competitiveness. Related and Supporting Industries: The presence of suppliers, manufacturers, and service providers that enhance organizational capabilities. Industry Strategy, Structure, and Rivalry: The conditions within which institutions are created, organized, and managed, influencing their strategic direction and competitive behavior. Strategic management in healthcare supports quality improvement, monitoring, and evaluation by identifying strategic advantages. It enhances leadership, streamlines management, improves decision-making, and elevates the appeal and efficacy of healthcare organizations and workers. Quality healthcare is crucial for disease prevention and improving life quality. However, strategic management practices specific to healthcare, especially for tuberculosis (TB), remain under-explored. TB is a contagious bacterial infection primarily affecting the lungs, caused by Mycobacterium tuberculosis. It spreads through airborne droplets from coughing, sneezing, or breathing, and can also impact the kidneys, spine, and brain. Symptoms include persistent cough, fever, chest pain, fatigue, night sweats, and loss of appetite. TB is one of the most common infections globally, causing significant morbidity and mortality. In 2019, the World Health Organization estimated 10 million TB cases and 1.2 million deaths. Despite global efforts, about 3.6 million people with TB are missed annually by health systems and do not receive needed care. Kenya is among the 30 high TB burden countries, facing significant challenges from multidrug-resistant TB and TB/HIV co-infection. In 2019, Kenya had over 140,000 TB cases, with Nairobi reporting the highest numbers. The Kenya Country TB prevalence report (2016) indicates that TB in the country is higher than estimated, with about half of those who fall ill annually being missed. Direct research on the application of strategic management practices for TB case finding in Kenya is limited. A study adopting a pragmatic design, which incorporates the collection and analysis of both quantitative and qualitative data, was conducted to explore this issue comprehensively. Between April and June 2024, a total of 406 respondents (81% response rate) from 239 TB treatment sites in Nairobi participated. Additionally, four Focus Group Discussions (FGDs) involving 44 respondents were conducted. The study reveals variations in strategy formulation practices across facilities, with differing frequencies of TB performance review meetings, indicating a need for standardization. Total Quality Management (TQM) faces implementation challenges, including high staff turnover, shortages, frequent staff rotations, and resource constraints like insufficient human resources and frequent stock-outs of diagnostic tools and drugs. The involvement of diverse technical teams in TB case-finding activities reflects a collaborative approach to TB control. Findings suggest a need for further investigation into factors influencing the establishment of strategic management committees and highlight areas for increased investment in infrastructure and capacity-building to enhance TB services' sustainability and effectiveness. Addressing inadequate sanitation facilities and other environmental factors is crucial for improving TB case-finding and public health outcomes. Emphasizing community awareness campaigns and enhancing demand for TB services among key population groups is essential. The Government of Kenya plays a central role in TB service supply, necessitating robust supply chain management and strategic planning to ensure consistent access to essential commodities. Tailored strategies, technological integration, and strategic partnerships are vital for enhancing TB case-finding and overall service delivery. The study reccomends to Implement a standardized schedule for TB performance review meetings across all sub-counties to ensure uniformity and consistency in TB management practices. Increase investment in staff training and retention programs to address TQM challenges and resource constraints, enhancing the effectiveness and sustainability of TB services

Keywords: *Strategic management, TB, Nairobi, porter diamond theory*

1. Background

Strategic management involves formulating and implementing an organization's vision, mission, and objectives, making decisions on resource allocation, and developing appropriate strategies to achieve set goals (David, 2011; MM, 2018) with appropriate strategies (Rasouli et al., 2020) and requires analyzing both internal and external environments to help the organization adapt to changes, and focuses on long-term planning to provide overall direction (Andrei et al., 2011; Jin, Zhouying; Bai, 2011; Schmuck, 2022). Additionally, strategic management identifies strengths, weaknesses, opportunities, and threats, making it a key tool for organizational success and goal achievement (Gupta, 2020; Durmaz & Dusun, 2016; Amason, 2011; Puertas et al., 2020).

Contemporary Strategic management theories are frameworks and models that provide insights and guidance for organizations to formulate, implement, and evaluate their strategies effectively (Bao, 2015; Rosenberg Hansen & Ferlie, 2016). The Resource-based Theory, particularly the Porter Diamond Theory, is prominent for understanding organizational dynamics, competitive strengths, and strategy development in various sectors, including healthcare (Hitt et al., 2016; Barney et al., 2011; Bakan & Doğan, 2012; James & Kvilhaug, 2022; Margaret James, 2022; Wang et al., 2018).

The Porter Diamond theory implies that the competitiveness of an entity is influenced by four interconnected factors which include Factor Conditions: Tangible and intangible resources that are relevant; Market Demand Conditions in shaping the competitiveness of industries; Related and Supporting Industries' presence such as suppliers, manufacturers, and service providers and finally The industry Strategy, Structure, and Rivalry: These factors relate to the conditions within which shape how institutions are created, organized, and managed (Bakan & Doğan, 2012; Foster-Pedley & Lerer, 1999; Margaret James, 2022). To accomplish organizational objectives, organizations must engage in planning, formulating, and executing strategies (Wanyama & Aila, 2022).

Strategic management supports quality healthcare (Surya et al., 2017) and is essential in monitoring and evaluation by identifying strategic advantages to an organization (Madzimure & Mashishi, 2020). Strategic management relies on the healthcare system's ability to be flexible and adaptable in response to potential changes (Barzylovych et al., 2020). It is expected to bolster leadership, streamline management, improve decision-making, and elevate the appeal and efficacy of healthcare organizations and the work of healthcare workers (Nurmeksela et al., 2021).

Strategic management models offer insights into the interconnections among key health determinants, health status, and effective interventions, specifically, the interconnectedness between economic, demographic, and environmental factors, health system dynamics, and their impact on health outcomes (Foster-Pedley & Lerer, 1999). The effectiveness of the current strategic management practices recognizes Monitoring and Evaluation as a critical function in the health fraternity (Netto et al., 1999), with the capacity of healthcare workers as a critical component in implementing strategic management practices (K. et al., 2018; Sychareun et al., 2013; Ugwuibe, 2020). In Turkey, a study conducted to investigate the familiarity of strategic management tools among executives in public and private hospitals reveals a lack of knowledge of the strategic management tools that constitute the basis of strategic management practices (Demir & Ugurluoglu, 2019). In India, (Zhang et al., 2020) in a mobile application feasibility study showed that unified collaborative action is key to quality health particularly Tuberculosis (TB) case detection.

Quality health and care is a process that aids in disease prevention and enhances one's quality of life (Anufriyeva et al., 2022; Cooperberg et al., 2009). However, little is known about strategic management practices in health (Odhiambo & Njuguna, 2021), particularly for Tuberculosis (Belling et al., 2012), which is a recognized health burden (Garnett et al., 2020; Jarde et al., 2022) worldwide. Tuberculosis (TB) is a contagious bacterial infection primarily affecting the lungs, caused by Mycobacterium tuberculosis. It spreads through airborne droplets from coughing, sneezing, or breathing. TB can also impact the kidneys, spine, and brain. Symptoms include persistent cough, fever, chest pain, fatigue, night sweats, and loss of appetite. TB remains one of the most common infections globally, causing significant morbidity and mortality (Deutsch-Feldman et al., 2021; WHO, 2018). In 2019, the World Health Organization estimated 10 million TB cases and 1.2 million deaths. Despite global efforts, about 3.6 million people with TB are missed annually by health systems and do not receive needed care (CDC, 2015).

The End TB Strategy underscores the need for government commitment and strategic management in TB control, focusing on clear goals, high-risk group identification, and patient-centered approaches (Creswell et al., 2013). Kenya is ranked among the 30 high TB burden countries, with significant challenges from multidrug-resistant TB and TB/HIV co-infection. In 2019, Kenya had over 140,000 TB cases, with Nairobi and Kiambu counties reporting the highest numbers. Urban areas like Nairobi have the highest TB burden, contributing significantly to national case numbers (NTLD-P Ministry of Health Kenya, 2019b; Enos et al., 2018).

The Kenya Country TB prevalence report (2016) indicates that TB in the country is higher than had been estimated, with about half of those who fall ill with TB annually being missed (Enos et al., 2018).

According to the NTP Kenya 2019 report, 140,000 people fell ill with TB however, the country notified only 84,000 with an estimated 56,000 people not diagnosed. The report indicates that Nairobi County is the highest contributor to TB notification in Kenya, contributing to over 10% of cases notified annually (NTLD-P Ministry of Health Kenya, 2019a). However, an estimated 40% of the target population is missed annually and, therefore, is likely to spread the disease (Arulchelvan & Elangovan, 2017; CDC, 2022; Musuka et al., 2018). The 2021 Kenya NTLDP TB situation report indicates that Nairobi County is also ranked among the 10 highest TB burden counties in the country; however, in terms of TB performance, the county was ranked number 41 out of 47, an indication of poor performance on TB case finding (NTLDP, 2021) and maintaining successful strategic management over time (Alonazi & Altuwaijri, 2022). Strategic management practices in tuberculosis (TB) case finding involve various components aimed at improving detection rates and subsequently reducing TB transmission (Giyose & Tshotsho, 2015; Holubovska & Vysotskyi, 2020; Ramani, 2010). The specific practices include capacity building and empowering project management (Ershadi et al., 2020; Y. Li et al., 2022).

In Kenya, studies reveal that direct research on the application of strategic management practices for TB case finding is limited. However, insights can be gleaned from studies such as Belling et al. (2012) and J. Li et al. (2017). These studies emphasize the importance of strategic leadership, planning, and coordination in TB service delivery, indicating potential applications within the healthcare context. The main objective of this study was to assess the application of the Porter Diamond Model aspects within tuberculosis treatment facilities in Nairobi County, Kenya.

2. Methodology

The study adopts a pragmatism design that incorporates the collection and analysis of both quantitative and qualitative data to explore the problem at hand comprehensively using a multi-prong approach. The structured questionnaire was the primary tool for respondents, ensuring systematic data collection. Qualitative data was collected through guided focus group discussions and sections of the respondents' open-ended questionnaire.

Data analysis entailed thorough cleanup, coding, and review to address any quality concerns. Findings are presented using frequency tables, percentages, and means, supplemented by visual aids such as pie charts, graphs, and proportions to enhance understanding. Furthermore, chi-square tests have been conducted to ascertain the significance between quantitative variables.

The study area is Nairobi, Kenya's metropolis, with an estimated population of 4.5 million and a daily population of over 6 million within an estimated area of 694.9 Km2. Nairobi is predominantly urban, with about 937 health facilities distributed across 17 sub-counties, which form the total population. The county is estimated at 1.2921° S, 36.8219° E, Geographical coordinates (latitude and longitude). During the 2019 Census, the county had an estimated 4,397,073 population.

The study focuses on a target population of 3,290 comprising 2,604 healthcare workers and 686 non-health technical staff in healthcare facilities located in Nairobi County. Among this population are 501 healthcare workers who work in TB clinics

3. Study Results

During the three-month period between April and June 2024, a total of 406 respondents, representing an 81% response rate of the targeted 501 healthcare workers who work in the 239 TB treatment sites in Nairobi, were reached. Additionally, 4 Focus Group Discussions (FGDs) were conducted, involving a total of 44 respondents.

3.1. Socio-demographic Characteristics

During the period, a total of 241 (59.4) female respondents were reached, as shown below:

Element	Frequency	Percent
Gender		
Female	241	59.4
Male	165	40.6
Total	406	
Age Group		
18 to 25	11	2.7
26 to 35	133	32.8
Above 35	262	64.5
Cadre		
Clinical Officer	262	64.5
Doctor	7	1.7
Lab Staff	9	2.2
Nurse	128	31.5
Education		
Medical College Certificate	11	2.7
Medical College Diploma	213	52.5
Others	33	8.1
University Degree	123	30.3
University Masters	26	6.4
Department		
Administration	55	13.5
CCC	52	12.8
Dermatology Respiratory med	11	2.7
Lab	9	2.2
MCH	11	2.7
OPD	97	23.9
Paediatric outpatient	13	3.2
Special Clinics	22	5.4
TB Clinic	136	33.5

Table 1

3.2. Planning and Implementation of Plans

When asked how often the facility meets to review TB performance including setting for target setting, 169 (41.6%) indicated quarterly, as shown below.

Targets Setting					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid		22	5.4	5.4	5.4
	Monthly	143	35.2	35.2	40.6
	Other targets	44	10.8	10.8	51.5
	Quarterly	169	41.6	41.6	93.1
	Weekly	28	6.9	6.9	100.0
	Total	406	100.0	100.0	

Table 2
Source: Author 2024

A chi-square analysis of levels of TB case finding and frequency of meetings reveal a p= <0.001, as shown below.

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	116.662[a]	4	<.001
Likelihood Ratio	124.288	4	<.001
N of Valid Cases	406		
a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 5.31.			

Table 3

When asked how often the facility meets to review TB performance, including review of goals, a total of 205 (50%) indicated monthly, as shown below.

Element	**Frequency**	**Percent**
Monthly	205	50%
Other reviews	44	11%
Quarterly	142	35%
Weekly	15	4%
Grand Total	406	

Table 4

The chart below shows how the sub-counties prioritize and allocate capital investments in Nairobi.

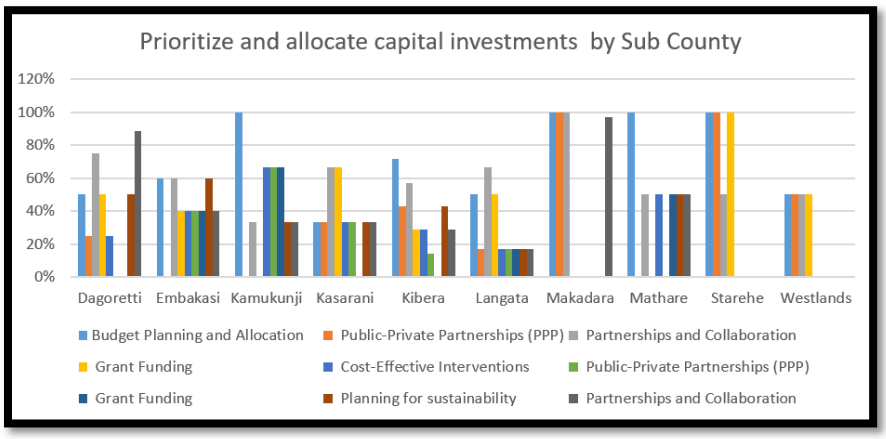

Figure 1: Areas of Prioritization for Capital Investment by Sub-County
Source: Author

Responding to what strategies are employed to enhance demand for TB services among key population groups to promote early detection, diagnosis, and treatment adherence, 384 (95%) indicated that they engage in a community awareness campaign, as shown below.

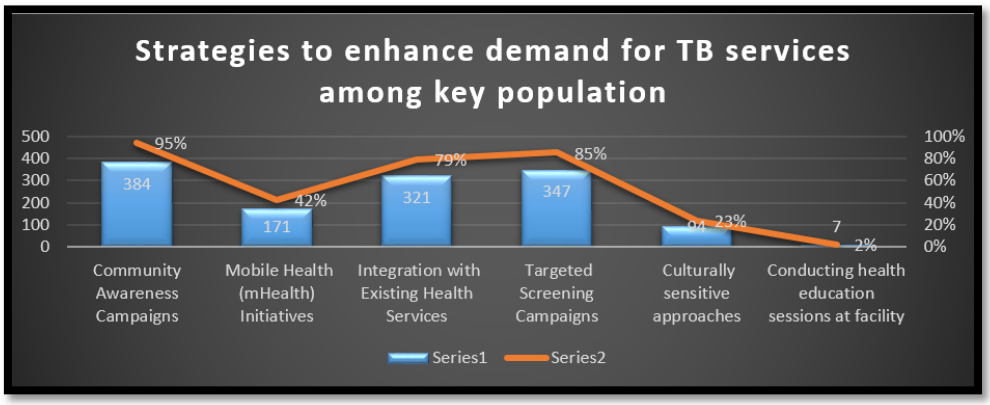

Figure 2: Strategies Used to Enhance Demand for TB Services among Key Population

When asked how often their facility meets to review TB performance, including target setting, 169 respondents (41.6%) indicated that their meetings occur quarterly. Additionally, 143 respondents (35.2%) reported monthly meetings, 28 respondents (6.9%) reported weekly meetings, and 44 respondents (10.8%) reported other frequencies. The Chi-square analysis revealed a significant association ($p < 0.001$) between the frequency of meetings and the levels of TB case-finding, indicating that meeting frequency impacts TB performance review and target setting. Notably, among those who reported high levels of TB cases in Nairobi County, 84.6% indicated monthly meetings, and 71.6% indicated quarterly meetings. These findings suggest that regular performance reviews and target-setting meetings, especially on a monthly or quarterly basis, are crucial for effectively managing and addressing the high TB case levels observed in Nairobi County.

A Chi-Square analysis was conducted to examine the relationship between the frequency of prioritizing TB activities and the reported level of TB cases in Nairobi County. The crosstabulation results indicated no statistically significant association ($p = 0.061$) between these variables. Among the 406 respondents, 218 (53.7%) reported prioritizing TB activities monthly, with 78.9% of these indicating high levels of TB cases. For those who prioritized quarterly, 129 respondents (31.8%) were observed, with 71.3% reporting high TB levels. Weekly prioritization was reported by 48 respondents (11.8%), and 68.8% of them also noted high TB levels. Meanwhile, 11 respondents (2.7%) prioritized TB activities at other frequencies, all of whom reported high TB levels.

When asked how often their facility meets to review TB performance and make decisions, 158 respondents (39%) indicated quarterly meetings. Insights from Focus Group Discussions (FGD) emphasize the need for regular activity reviews and case finding to identify weaknesses at various administrative levels. One comment highlighted the importance of reviewing strategies every six months to assess and set future directions, underscoring the necessity for consistent and strategic evaluations to enhance TB management and resource allocation.

When asked if the respondent's facility had a strategic plan, the percentage of departments with a strategic plan varied, with Administration and Paediatric Outpatient (100%) indicating yes, while other departments like CCC (85%), Dermatology/Respiratory Medicine (82%), Lab (67%), MCH (91%), OPD (89%), Special Clinics (68%), and TB Clinic (87%) having varied responses. The findings highlight potential areas for improvement in strategic planning for TB management. Probing further on whether the staff had been sensitised on the strategic plan revealed that a majority, 285 (70%), indicated yes.

The discussions from the Focus Group Discussions (FGDs) highlighted significant challenges in implementing TB case-finding plans across various facilities. Key issues included high staff turnover, staff shortages, and frequent rotations and transfers, leading to a lack of continuity and consistency in implementing these plans. Additionally, facilities face resource constraints such as inadequate human resources, financial support, and diagnostic tools, coupled with frequent stock-outs of Active Case Finding (ACF) tools and drugs. These limitations hinder the effective identification and management of TB cases. Insights from FGDs revealed ongoing stigma around TB among healthcare workers. However, efforts like incentivizing best-performing facilities, integrating TB screening into other departments, and leveraging TB Lite for comprehensive screening were noted. However, logistical barriers such as poor documentation, inadequate data collection tools, and transportation problems further complicate these efforts.

The implementation of TB case-finding plans is also challenged by the disparity between public, faith-based, and private facilities, with private facilities lagging in embracing Active Case Finding (ACF). Innovations like the PQE and QI projects have shown promise in identifying missing cases, but their potential impact is limited due to the lack of community-level implementation. Logistical issues, including transport and travel logistics due to facility locations, inadequate training, and insufficient incentives, affect staff motivation and welfare, particularly in Nairobi facilities. Leadership and planning challenges, such as inadequate leadership training, poor strategic planning, and lack of institutional support, exacerbate the difficulties in implementing effective TB case-finding plans. These multiple challenges underscore the need for comprehensive strategies to address both human resource and logistical constraints to enhance TB management and control efforts.

3.3. Labor and Support Systems

The survey results indicate a strong presence of technical teams related to strategic management in the facilities, with all 406 respondents affirming their existence. The clinical support team is the most prominently recognized, listed by 351 respondents (86%). This highlights a significant focus on clinical support within the facilities. Other teams mentioned

include management (233 respondents, 57%), Quality Improvement (QI) (314 respondents, 77%), data review (255 respondents, 63%), diagnostic supply and support (each with 11 respondents, 3%), and IPC/RH (14 respondents, 3%). These figures suggest that while clinical support and QI teams are well established, there is a notable gap in the presence of diagnostic-related and IPC/RH teams.

When asked about their membership in these teams, 362 respondents (89%) confirmed their participation, with a majority belonging to the clinical support team (290 respondents, 71%). This further underscores the prominence of clinical support activities within the facilities. Membership distribution in other teams includes management (141 respondents, 35%), Quality Improvement (221 respondents, 54%), data and performance (146 respondents, 36%), and IPC (25 respondents, 6%). The high engagement in clinical support and QI teams indicates a prioritization of these areas, whereas the lower participation in IPC and diagnostic teams suggests a need for increased focus and resources to strengthen these critical aspects of TB management.

3.4. Strategic Management Support Systems – Human Resources

The study results indicate that a majority (89%) of respondents confirmed the presence of a strategic management committee within their facilities. The committees are composed of various members, with clinical officers (86%) and nurses (77%) being the most frequently cited members, followed by HRIOs (72%), doctors (51%), community health practitioners (CHPs) (5%), and lab staff (3%). This composition highlights a strong involvement of clinical and nursing staff in strategic management, which is crucial for effective TB case finding and management. However, the relatively low representation of lab staff and CHPs suggests potential areas for improvement in the multidisciplinary approach required for comprehensive TB management. Despite the presence of these committees, the survey reveals a significant staffing issue, with only 14% of respondents indicating they have enough staff to support TB activities. Notably, in facilities with high TB cases, 82.1% reported inadequate staffing, compared to 88.8% in facilities with average TB cases. A Chi-Square analysis comparing the levels of TB cases with staff adequacy shows no significant correlation ($p = 0.111$), implying that staffing shortages are a widespread issue regardless of TB case levels. This staffing shortage is critical, as it directly impacts the ability to implement effective TB case finding and management with the need for targeted efforts to address staffing shortages.

To address workforce shortages, maintaining high-quality care and efficient service provision in healthcare facilities was mentioned in FGDs. According to the respondents, task shifting was the most commonly suggested solution, with 50% advocating for redistributing tasks among existing staff to maximize efficiency and utilize available skills effectively. Additionally, 37% recommended employing volunteers to bolster the workforce, while 11% supported recruiting interns to fill gaps and provide additional support. A small percentage (2%) mentioned other strategies, such as seeking support from external partners. These approaches reflect a pragmatic response to immediate workforce shortages, leveraging existing resources and community support to maintain service delivery.

In tackling skill gaps, an overwhelming 91% of respondents favored on-the-job training as a primary method to enhance the capabilities of their staff, ensuring that employees acquire the necessary skills while performing their duties. This hands-on approach would allow for continuous learning and immediate application of new knowledge, which is essential in dynamic healthcare settings.

Meanwhile, 34% of respondents highlighted the importance of specialized training programs to address specific skill deficits that on-the-job training might not cover comprehensively. Notably, none of the respondents indicated competitive staff retention as a strategy, suggesting that current efforts may be insufficient or that there is a greater focus on immediate, actionable training solutions over long-term retention strategies. This indicates a potential area for improvement in workforce management, where enhancing retention efforts could provide a more sustainable solution to both skill gaps and workforce shortages.

3.5. Capital and Related Support Systems

The survey results provide insight into the county's priorities for capital investments aimed at enhancing service delivery. A significant majority of respondents (75%) indicated that commodities are the top priority for capital investments. This focus on commodities likely reflects the immediate and essential need for medical supplies and equipment to maintain effective healthcare services. Following this, 47% of respondents noted technology investments, highlighting the importance of modernizing healthcare infrastructure to improve service efficiency and patient outcomes. Investments in infrastructure were also significant, with 37% of respondents indicating it as a priority, suggesting a need for improved healthcare facilities. The remaining areas, including capacity building (3%), salaries (3%), and seminars and workshops (5%), were less prioritized. This distribution suggests that while workforce development and continuous education are recognized, the immediate emphasis is on tangible resources and technological advancements.

Regarding the strategic approaches employed in managing financial resources and accessing external funding opportunities for TB service delivery, a majority (83%) of respondents highlighted the importance of budget planning partnerships and collaboration. This approach underscores the reliance on strategic financial management and the necessity of partnerships to secure additional funding and resources. Effective budget planning ensures that available resources are allocated efficiently, while partnerships and collaborations open avenues for external support, vital for sustaining and enhancing TB service delivery. This strategic approach indicates a proactive stance in addressing financial challenges and optimizing resource utilization to improve healthcare outcomes in the county.

3.6. Infrastructure

The infrastructure ratings provided by respondents reveal key insights into the strengths and weaknesses of different facilities. The laboratory infrastructure received a high average score of 4.2, indicating general satisfaction with laboratory facilities across the county. Similarly, the TB treatment facility was rated very positively, with an average score of 4.3, suggesting that the facilities for treating TB are well-regarded. Both the diagnosis and screening areas received solid scores of 3.8, indicating adequate but potentially improvable conditions. In contrast, the availability of wards received a notably low average score of 2.4, highlighting a significant area of concern and indicating a shortage or inadequacy of ward facilities.

The ratings varied significantly across sub-counties, reflecting disparities in infrastructure quality. Kasarani stood out with the highest rating for the availability of wards, scoring 4.0, suggesting better ward facilities compared to other sub-counties. Makadara emerged as a top performer across multiple categories, achieving the highest possible score of 5.0 in the screening area, diagnosis area, TB treatment facility, and laboratory. This indicates exceptional infrastructure quality for TB-related services in Makadara. Starehe was noted for high scores in diagnosis equipment, suggesting a strong focus on diagnostic capabilities. Embakasi also performed well in the TB treatment facility category, indicating a particular strength in this area. These ratings highlight the need for targeted improvements in infrastructure, particularly in ward availability, while also showcasing areas of excellence that could serve as benchmarks for other sub-counties. The variation in ratings underscores the importance of addressing infrastructure disparities to ensure consistent and high-quality TB care across all regions.

The study results reveal significant challenges related to natural resources within the facilities. Among the respondents, 170 (42%) identified inadequate sanitation facilities as a major issue, highlighting a critical area that needs attention to improve overall hygiene and prevent the spread of infections, including TB. Air pollution and clean water sources were also notable concerns, cited by 118 (29%) and 103 (25%) of respondents, respectively. These environmental factors can cause health issues and complicate the delivery of healthcare services. Other challenges included inadequate Infection Prevention and Control (IPC) measures (6%), limited space (5%), lack of designated waiting areas for patients (2%), and poor lighting (1%). The Chi-Square analysis, with a p-value of 0.227, indicates no statistically significant association between the identified challenges and specific factors within the facilities. This suggests that the issues related to natural resources are widespread and not confined to particular variables or subgroups within the survey population.
Additionally, when asked about the impact of natural resource depletion or contamination on TB case finding in the community, a significant majority of respondents (234, 58%) indicated that it has a substantial impact. This underscores the importance of addressing environmental issues as part of a comprehensive approach to TB management. Poor sanitation, air pollution, and lack of clean water not only affect overall health but also hinder effective TB case-finding and treatment efforts. Improving these natural resources is essential for creating a healthier environment that supports both patients and healthcare providers in the fight against TB.

The Chi-Square analysis conducted on the relationship between the department and the adequacy of sanitation facilities yielded a highly significant result ($p < 0.001$). This indicates that there is a strong association between the department in a healthcare facility and the perception of sanitation adequacy among respondents. Across the departments examined, significant variations were observed in the distribution of responses regarding sanitation conditions. The analysis, based on 406 valid cases, showed Pearson Chi-Square and Likelihood Ratio values of 81.349 and 104.371, respectively, with 9 degrees of freedom. The overall findings robustly support the conclusion that departmental differences play a crucial role in perceptions of sanitation adequacy within the facility.

3.7. Demand Conditions

Responding to strategies employed to increase demand for TB services among key population groups for early detection, diagnosis, and treatment adherence. A significant, 384 individuals (95%) reported engaging in community awareness efforts. Subsequent Chi-Square analysis across sub-counties yielded a p-value of .242, indicating no statistically significant variation in strategies utilized among different areas.

The study results reveal several key strategies implemented to improve the affordability, accessibility, acceptability, and monitoring of TB services among the surveyed populations. Regarding affordability, a significant majority (76%) of respondents reported conducting outreaches, compared to a smaller proportion (24%) indicating the use of cost waivers. This suggests a reliance on community engagement and education to address financial barriers to TB care. In terms of accessibility, the predominant strategy reported was conducting outreaches (91%), followed by special clinics (37%), free services (9%), and radio talk shows (3%), indicating a multifaceted approach to reaching diverse population segments. Similarly, to enhance acceptability, 91% of respondents emphasized conducting outreaches, while special clinics were utilized by 37%, highlighting efforts to tailor services to community needs and preferences.

Regarding monitoring and evaluation, a majority of respondents (83%) indicated the use of data review platforms, reflecting a commitment to data-driven decision-making in assessing demand and service delivery effectiveness. Performance charts were also widely employed (80%), underscoring the importance of visual representations in tracking TB service metrics. Quarterly reports were utilized by 66% of respondents, providing regular updates on service performance and enabling timely adjustments to strategies. In terms of specific indicators used for monitoring TB service demand and outcomes, the TB case detection rate was cited by 86% of respondents, emphasizing the focus on early detection efforts. Performance charts were again significant, mentioned by 71% of respondents, while 54% utilized TB outcome indicators to gauge treatment effectiveness and patient outcomes. These findings highlight comprehensive approaches to monitoring, evaluating, and improving TB service delivery, underpinned by community engagement, data utilization, and targeted service adaptations to enhance accessibility and acceptability among diverse populations.

3.8. Related and Supporting Industries

In Related and Supporting Industries, the study results highlight several critical insights into the supply, management, and strategic aspects of TB service delivery within the facilities. When queried about the suppliers and distributors of TB service commodities, a significant majority (86%) identified the Government of Kenya (GoK) as the primary supplier, with county governments, partners, and non-GoK entities playing smaller roles (6%, 6%, and 3% respectively). The most commonly supplied items were TB drugs (72%), followed by diagnostic tools (28%), indicating a primary focus on essential treatment and diagnostic support.

Regarding the stability of commodity supplies, opinions were divided, with 48% of respondents expressing dissatisfaction and 39% reporting satisfaction, including 12% strongly disagreeing with supply stability. To strengthen commodity supplies, several recommendations were proposed, including ensuring stable and timely procurement processes, adequate budgeting, early planning, and effective stock management to prevent shortages and minimize wastage. Respondents also stressed the importance of capacity building, decentralization of procurement, and implementing a demand-supply approach to maintain consistent availability of TB commodities.

In terms of procurement practices, 55% indicated non-competitive processes, while 45% reported competitive procurement practices, suggesting varying approaches across facilities. Concerning organizational structure, 73% noted differences between facilities, with a significant portion (56%) believing these differences slightly hinder strategic management implementation, while 37% felt they significantly affect success. Leadership support for TB case-finding initiatives was widely acknowledged, with 88% affirming active leadership involvement. However, concerns about frequent leadership changes (90% reported annual changes) impacting service delivery were prevalent among 76% of respondents.

The integration of technological advancements into strategic management practices was recognized as pivotal by 45% of respondents, contributing significantly to competitive advantages in TB case finding. Moreover, strategic alliances and partnerships were highlighted as crucial for innovation and competitive positioning, with engagements ranging from non-profit organizations (23%) and local health authorities (21%) to international organizations (19%) and the private sector (22%). These partnerships were underscored during discussions, emphasizing their role in supporting active case-finding initiatives and strengthening community health worker programs.

4. Conclusion

The study reveals that the strategy formulation practices vary across facilities, with different frequencies of TB performance review meetings, suggesting a need for standardization to ensure consistent and effective TB management. Total Quality Management (TQM) faces implementation challenges, including high staff turnover, shortages, frequent staff rotations, and resource constraints such as insufficient human resources and frequent stock-outs of diagnostic tools and drugs. The involvement of diverse technical teams in TB case-finding activities reflects a collaborative approach to TB control.

The findings indicate a need for further investigation into factors influencing the establishment of strategic management committees and suggest areas for increased investment in infrastructure and capacity-building to enhance TB services' sustainability and effectiveness. Addressing inadequate sanitation facilities and other environmental factors is crucial for improving TB case-finding and public health outcomes. Emphasizing community awareness campaigns and enhancing demand for TB services among key population groups is essential. The Government of Kenya (GoK) plays a central role in TB service supply, necessitating robust supply chain management and strategic planning to ensure consistent access to essential commodities. Tailored strategies, technological integration, and strategic partnerships are vital for enhancing TB case-finding and overall service delivery.

5. Recommendations

This study recommends implementing a standardized schedule for TB performance review meetings across all sub-counties to ensure uniformity and consistency in TB management practices, alongside increased investment in staff training and retention programs to address Total Quality Management challenges and resource constraints, thereby enhancing the effectiveness and sustainability of TB services.

6. References

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