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Factors Affecting Health Infrastructure Conditions for Service Delivery in City Council of Dodoma, Tanzania

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Abstract

The study was conducted in the City Council of Dodoma and involved six primary public health centres, with the aim of assessing the factors affecting the conditions of health infrastructure for service delivery. It adopted a descriptive survey design while simple random sampling was used to obtain suitable respondents. Both descriptive and inferential statistics were used to analyse the collected data. The findings revealed that 62.5% of respondents argued that infrastructure conditions were good while 37.5% said they were bad. Also, 95.8% of respondents disclosed that the effect of improved health infrastructures was an increase in the number of patients being served, improved access to safe and affordable health services (83.3%), and adequate supply and access to essential equipment and drugs (81.9%). Furthermore, the findings indicated that six variables had significant and positive effects on the condition of health infrastructure. The variables are users' competence (p=0.002), infrastructure overuse (p=0.004), non-compliance with terms of use (p=0.009), management quality (p=0.001), technological adoption (p=0.004) and maintenance cost (p=0.000). Nevertheless, the findings show that 75.0% of respondents cited that, among the challenges were unnecessary referrals, underperformance (69.4%), shortage of basic health equipment (63.8%), longer waiting time for the patient (44.4%), overwork and burnout among health workers (40.2%), and the large number of patients over existing health staff and equipment (30.5%). Various factors significantly influence the conditions of health infrastructure in primary health centres, which hinders the smooth delivery of health services. The government, through the Ministry of Health, and in-charge of centres should provide guidance on infrastructure use and instil maintenance behaviour among users

Keywords: Determinants, Health facilities, Infrastructure, Service delivery, City Council of Dodoma

1.0. Introduction

Globally, most of the developed nations, such as the United Kingdom, Canada, Norway and Sweden have some of the best healthcare service delivery models, which are supported by the enactment of universal health coverage, nationalisation of health services and a strong health system (Papanicolas et al., 2018). Jahantigh (2019) evaluated healthcare service quality in Iran and concluded that hospitals were able to

meet patients' expectations in terms of tangibility. However, there were challenges in responsiveness, empathy and security within the primary health centres. Quality service delivery is a vital element of any health system and is considered an integral part of achieving the Sustainable Development Goals (SDGs) (WHO, 2016). Quality primary service delivery in the health industry can be achieved through costly service provision, prompt service delivery, adequate access to health facilities, and ensuring healthcare providers meet their service mandate (Akachi and Kruk, 2017).

One of the key guiding principles for ensuring quality service delivery within the healthcare industry is the promotion of Universal Health Coverage (UHC). UHC ensures that all people can use the promotive, preventive, curative, rehabilitative and palliative health services and that they are of sufficient quality to be effective, while also ensuring that the use of these services does not expose the users to financial hardship (World Health Organization, 2016).

Africa, as a continent, is facing a big challenge in the provision of healthcare, whereby a majority of the poor people do not have access to high-quality healthcare services (Akokuwebe and Adekanbi, 2017). Despite most African countries signing on to the Abuja declaration, which called for nations to allocate at least 15% of their budget to the healthcare sector and to ensure universal health coverage is attained, most of the nations have failed to achieve the minimum requirements (Ahenkan and Osei-Kojo, 2014). In Ethiopia, remarkable achievements in expanding health sector development have been supported by comprehensive strategies aimed at improving investments in the healthcare sector (Croke, 2021). However, failure to reach marginally-alienated groups, poor poverty reduction and education access have still hampered access to quality primary health services (Asefa et al., 2019).

Since independence, Tanzanian health policies have established a clear objective of achieving primary healthcare for all, by designing and implementing initiatives for increasing access to healthcare, including efforts to ensure that a majority of people live within 5 km of health facilities (Shija et al., 2011). The targeted infrastructure development programme for primary health facilities began in 2007, through a 10-year Primary Healthcare Development Programme (2007–2017) (Greenfield, 2014).

Infrastructure development is an important component of a well-functioning healthcare system. Health system infrastructure ranges from physical facilities and information systems to medical equipment and involves the construction of new infrastructure as a strategy to achieve universal health coverage. To provide the quality health services required for universal health coverage, health facilities should be structured to meet healthcare needs and equipped with utilities such as electricity, water and a skilled health workforce, and also to construct or renovate primary health facilities that are able to offer quality

services (World Health Organization, 2017).

The trend towards primary healthcare infrastructure in Tanzania raises many questions and interest in understanding the challenges behind the healthcare infrastructure (Kwesigabo, 2019). Public health infrastructure is the underlying foundation that supports the planning, delivery and evaluation of public health activities and practices. A strong public health infrastructure provides the capacity to prepare for and respond to both acute (emergency) and chronic (ongoing) threats to the nation's health (URT, 2018). The World Bank (2020) reports that in an effort to improve access to treatment, the government has stepped up its spending on health infrastructure, including the construction and renovation of hospitals and health centres. These expenditures, however, are unlikely to accomplish that objective in the absence of matching increases in personnel as well as in operating and maintenance budgets.

In the Joint Annual Health Sector Review meeting, responsible ministries in collaboration with the different stakeholders including development partners agreed that there should be a deliberate renovation and construction of some primary health facilities as a strategy to improve the physical status of dilapidated health facility buildings (Ahmed and Mohamad, 2014).

However, despite the various efforts taken by the government to enhance healthcare services in Tanzania, the infrastructure in most public health centres is almost poor. Therefore, the study was aimed at assessing the factors influencing the conditions of health infrastructure for service delivery in the city council of Dodoma.

2.0. Methodology

2.1. Study Area

The study was conducted in the City Council of Dodoma in six primary public health centres, namely Hombolo, Kikombo, Makole, Nkuhungu, Mkonze and changombe. The City Council of Dodoma is located in the Dodoma Region. It is bordered by Chamwino District in the East and Bahi District in the West. It lies between 6°6′46.44″S and 35°49′40.8″E. The City covers a total area of 2,607 square kilometres, a population of 765,179 as per 23 August 2022, National Population Census (URT, 2022). Nevertheless, Dodoma features a semi-arid climate with warm temperatures throughout the year.

2.2. Research design and Data collection

This study adopted a descriptive survey design. According to Kothari and Gaurav (2004), descriptive survey design is a method of collecting information by interviewing and administering questionnaires to a sample of individuals. Both primary and secondary data were used, whereby primary data were collected directly from respondents, while secondary data were collected from published and unpublished documents related to the study topic.

The study involved a total of 72 health workers from selected health centres in the City Council of Dodoma. Through the use of simple random sampling, 12 respondents from each health centre

were selected to represent others in the study.

2.3. Data analysis

Descriptive statistics such as percentage and frequency were used to analyse the demographic data of the respondents, the operational state of health infrastructure in primary health centres and the challenges associated with health infrastructure in health service delivery.

Conditions of different physical infrastructure and equipment were ranked by respondents by stating their status by selecting ranking levels as follows: 1- Very Bad (VB), 2-Bad (B), 3-Average (A), 4- Good (G), 5- Very Good (VG).

Additionally, binary logistic regression was used to analyse factors affecting the conditions of health infrastructure in primary health centres. The dependent variable was the status of healthcare infrastructure at health centres, while the independent variables were as shown in the model;

$$\ln\left(\frac{P(Y,=1)}{1-P(Y,=1)}\right) = a + \beta_1 \text{Users comptence}_i + \beta_2 \text{Technological adoption}_i + \beta_3 \text{Maintainance Cost}_i + \beta_4 \text{Management Quality}_i + \beta_5 \text{Infrastructure over use}_i + \beta_6 Non - compliance\ with\ term\ of\ use_i + \beta_7 \text{Health Policy and statategies} + \beta_8 \text{ Quality of Infrastructure}_i$$

Where:

- P (Y, =1) =Probability of status of health infrastructure
- Y coded as (1=Good 0= Otherwise)
- α=Regression constant
- β_1 and β_8. =Regression coefficients

The assumptions of the binary logistic regression model include linearity, non-perfect multicollinearity, and independent observations. These were taken into account. Prior to making any statistical conclusions, it is imperative to identify any multicollinearity amongst the explanatory variable (Midi et al., 2013). In order to check for multicollinearity, this study used the Pearson correlation coefficient. According to Senaviratna and Cooray (2019), multicollinearity is not an issue because all correlations were less than 0.8. This enables us to proceed with the analysis.

3.0. Results and Discussion

3.1. Demographic Characteristics of Respondents

The respondents were required to indicate their gender representations and the results as indicated in Table 1 show that 61.2% of respondents were female health staff while 38.8% were male staff. The findings imply that the majority of health workers in the given health centres were female, with most operating in areas/positions such as nurse, matron and clinical officers. This concurs with Khalub et al. (2013). Also, findings show that most (84.7%) of respondents were aged between 26 – 45 years.

The study further analysed the participants' position at the health centre. Findings in Table 1 show that the majority (44.4%) of respondents were nurses-in-charge, followed by clinical officers (27.0%) and laboratory technicians (11.2%). Furthermore, the minority (8.4%) of respondents were

health centres matrons/ patrons, medical doctors (5.5%) and others (3.5%). The findings are an indication that the study was able to capture information from the key intended personnel who were in a position to give out the necessary information needed to achieve study objectives.

Table1: Demographic Characteristics of Respondents

Variable	Frequency	Percent
Sex of Respondents		
Male	28	38.8
Female	44	61.2
Education Level		
Basic certificate	18	25.0
Diploma	29	40.3
Bachelor degree	21	29.2
Masters level	4	5.5
Position		
Nurses	32	44.4
Clinical officers	19	26.4
Matron/Patron	6	8.3
Medical doctor	4	5.6
Laboratory technician	8	11.1
Others	3	4.2
Age of Respondents		
26- 35	34	47.2
36-45	27	37.5
46-55	9	12.5
>55	2	2.8

3.3. The Operational State of Health Infrastructure

3.3.1. Perception of respondents on general condition of health infrastructures and equipment

The study analysed the general condition of health infrastructure for public health centres in the City Council of Dodoma. The respondents were asked to state the overall condition of health infrastructure in their respective centres. The findings in Table 2 revealed that the majority (62.5%) of respondents argued that the general condition of health infrastructure was good while 37.5% said it was bad. The findings concur with those of Tuwei and Tarus (2017), who carried out a study to investigate the effects of health infrastructure on service delivery in Nigeria and those findings showed that health infrastructure was good for service delivery among referral hospitals. Furthermore, they reported that the current health infrastructure, to some extent, supports efficient execution of duties that promote service delivery. Furthermore, Miriti (2016) studied the influence of the infrastructure system of government service delivery on the provision of healthcare in Meru County, Kenya. The findings showed that good health infrastructure among health

centres is vital to enhancing service delivery within the health sector. Ahmed and Mohamad (2014) reported that having a better infrastructure system within the hospital enhanced the attainment of better service delivery.

Table 2: General Condition of Health Infrastructures and equipment

Variable	Frequency	Percentage
Good	45	62.5
Bad	27	37.5
Total	**72**	**100**

3.3.2. Detailed conditions of physical infrastructures and available equipment

The findings show that the status of injection rooms for all health centres was good (79.1%), while others argued that the status was average (12.5%) and very good (8.4%). This implies that the status of injection rooms was almost good in each health centre. Concerning the antenatal clinic, it was found that its status was good (57.8%), average (23.3%) and very good (18.9%). Moreover, the status of pharmacy was good (77.9%), average (12.4%) and very good (9.7%). The majority of respondents disclosed that the status of maternal and child health and family planning rooms was good (57.9%) and a few of them argued that their status was average (32.4%) and very good (9.7%). Furthermore, the findings revealed that the majority (75.7%) of respondents disclosed that the status of laboratories was good, followed by those who revealed that it was average (20.4%) and a few (3.9%) said it was very good.

Regarding the status of the in-charge office, the findings show that the majority (74.6%) of respondents argue that it was in good status, average (20.9%) and very good (4.5%). And the status in toilets for all health centres was found to be average status (79.5%), good (16.5%), bad (2.3%) and very good (1.7%). While the status of waiting areas was at average (67.6%), good (28.7%) and bad (3.7%). The status of the dressing room was in good status (54.3%) and average (45.7%), while the status of the postnatal clinic as identified by respondents was in good status (55.7%), average status (24.9%), and very good status (19.4%).

Furthermore, the status of water tanks was average (78.6%), good (15.7%) and bad (5.7%). Additionally, the status of stores was average (47.8%), good (37.7%), very good (12.8%) and bad (1.7%). In terms of ambulance status, the majority (76.8%) of health officials selected good status, followed by average (20.7%) and very good (2.5%). Also, the status of thermometers was very good (51.1%), and good (48.9%). Moreover, the status of blood pressure machines, microscopes and weighing machines was reported by 76.3%, 81.3% and 68.6%, respectively to be in very good status. Generally, the findings imply that the status of the physical infrastructure and equipment available in most of the health centres in the City Council of Dodoma were in good status to influence the effective provision of health services for the seeker. The study findings are in line with Musinguzi et al. (2018) who reported that the status of physical

infrastructure and equipment within health centres is a key to strengthening the performance of health systems among Nigerian healthcare workers. They argue that the good status of physical infrastructure and equipment plays a key role in influencing an employee's motivation levels, job satisfaction and teamwork. Furthermore, they found that good status on physical infrastructure and equipment in Nigeria leads to increased motivation, improves job security and satisfaction, and consolidates teamwork among healthcare workers.

Also, Sarto and Veronesi (2016) found a significant relationship between the status of physical infrastructure and equipment available in the health centres and positive firm outcome. Further, the study found that infrastructure status positively influences both work performance and outcomes.

Table 2: Condition of Physical Infrastructures and Available Equipment

Name of Infrastructure/ Equipment	Status Rate (%)					
	VB	B	A	G	VG	Total
Injection room	0	0	12.5	79.1	8.4	100
Antenatal clinic	0	0	23.3	57.8	18.9	100
Pharmacy	0	0	12.4	77.9	9.7	100
MCH/FP room	0	0	32.4	57.9	9.7	100
Laboratory	0	0	20.4	75.7	3.9	100
In-charge office	0	0	20.9	74.6	4.5	100
Toilets	0	2.3	79.5	16.5	1.7	100
Waiting area	0	3.7	67.6	28.7	0	100
Dressing room	0	0	45.7	54.3	0	100
Postnatal clinic	0	0	24.9	55.7	19.4	100
Water Tanks	0	5.7	78.6	15.7	0	100
Store	0	1.7	47.8	37.7	12.8	100
Ambulance	0	0	20.7	76.8	2.5	100
Thermometers	0	0	0	48.9	51.1	100
BP machines	0	0	0	23.7	76.3	100
Microscope	0	0	0	18.7	81.3	100
Weighing machine	0	0	0	31.4	68.6	100

Working environment

The health officials were presented with statements on the conditions of the work environment. They have been known to significantly influence work relationships, promote well-being, collaboration and determine employee health. Therefore, in this study, aspects such as management, social-cultural issues, economic issues and environmental health were addressed

among health workers. Respondents were required to show their level of agreement with the given statements. The opinion was measured on a likert scale of which; 1- Strongly Disagree (SD), 2- Disagree (D), 3-Neutral (N), 4- Agree (A) and 5- Strongly Agree (SA).

The opinion was measured on a Likert scale. The findings in Table 4 show that the majority (47.7%) of respondents agreed with the statement that there is effective collaboration between professionals, followed by those who strongly agreed (40.3%), while others were neutral (12.0%). Furthermore, most (49.5%) of respondents agreed with the statement that working incentives are provided on time among health workers, while others were neutral (23.7%) and a few strongly agreed (19.0%) with the given statement. This implies that in most health centres in the City Council of Dodoma, working incentives are provided on time among health workers. These findings are related to Bech and Lawi (2016), who reported that effective relationships between professionals and a comfortable working environment in the public sectors have influenced the quality of the provision of public services in Tanzania.

The study further analysed the respondent's perception of whether the management team within the health centres actively delegated duties to staff to boost morale. The findings in Table 4 show that the majority (62.4%) of respondents agreed with the given statement and 37.6% strongly agreed. This implies that management teams within the health centres actively delegated duties to staff to boost morale among health centres. The findings are supported by Hoff et al. (2014), who reported that instituting a quality working environment leads to improved morale among employees and significantly improves service delivery.

Moreover, the finding reveals that the majority (45.8%) of respondents agreed with the statement that the management ensures that all staff are given opportunities to enhance their task fulfilment and others strongly agreed (39.5%) while 14.7% of respondents were neutral with the given statement. In addition, the majority (76.8%) of health workers agreed with the statement that the government has recruited qualified staff that ensures effective task accomplishment, while others strongly agreed (15.4%) and a few (7.8%) were neutral. This implies that there were qualified health staff within the health centres to perform the identified tasks in their positions.

Furthermore, the findings revealed that within health centres, environments are good for the workers' health at the centre, whereby the majority (81.2%) of respondents agree with the statement and 16.5% of them strongly agreed. Additionally, 37.2% of respondents strongly agreed with the statement that there is enough working equipment to promote effective provision of health services to the seeker, while 35.8% of them strongly agreed, a few (23.3%) were neutral and 3.7% disagreed. These findings are similar to those of Adjei and Mensah (2016), who reported that a comfortable working environment results in low levels of stress among employees in an organisation, resulting in high satisfaction levels. However, stressful working conditions, such as heavy workloads, result in low levels of satisfaction, therefore reducing levels of employee commitment. This study conceptualised the work environment in terms of the availability of physical facilities, organisational environment and organisational culture.

Also, Banuri and Philip (2016) reported that the working environment for public services is inherently related to performance outcomes. They argue that employees will not give 100% of their efforts if they are not satisfied with the working environment for public services. The drive to accomplish a particular task may result from intrinsic or extrinsic motivators and is significantly associated with the realisation of increased innovation and organisational goals. Intrinsic motivators such as the opportunity for growth, achievement and advancement and challenging tasks increase the level of motivation among employees. Therefore, in relation to this study, it was found that, to a large extent, the working environment was favourable for the health workers to perform their duties.

Table 3: Working Environment

Statement	SD	D	N	A	SA
There is effective collaboration between professionals	0	0	12.0	47.7	40.3
Working incentive are provided on time, among health workers	0	7.8	23.7	49.5	19.0
The management team within the health centre actively delegates duty to staff to boost morale	0	0	0	62.4	37.6
The management ensures that all staff are given opportunities to enhance their task fulfilment	0	0	14.7	45.8	39.5
The government has recruited a qualified staff that ensures effective task accomplishment	0	0	7.8	76.8	15.4
Working environment are good for your health at the centre	0	0	2.3	81.2	16.5
There is enough working equipment to promote effective provision of health services to the seeking.	0	3.7	23.3	35.8	37.2

*The number are presentenced by %

Note: Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A) and Strongly Agree (SA).

The study further analysed the effect of improved health infrastructure and equipment on service delivery. The findings in Table 5 show that the majority (95.8%) of respondents reveal that, among the effects of improved health infrastructure, some service delivery increased the number of patients being served within the health facility, improved access to safe and affordable health services within the community (83.3%), adequate supply and access to essential equipment and drugs in the health facilities (81.9%), health facilities have put in place an effective decision support mechanism for patient management (58.3%) and clear emergency preparedness and response mechanisms within the health facility (50.0%). This implies that the quality of health infrastructure and equipment present in health centres in the City Council of Dodoma has stimulated the performance and quality of health services provided in the health facility. These findings agree with Miriti (2016) who reported that having a better infrastructure system within the hospital enhanced improvements in the number of patients being served within the health facility, commitment to staff members and increased performance of health workers to cover their responsibilities and duties.

Table 4: Effect on Service Delivery

Effects	Frequency	Percentage*
Clear emergency preparedness and response mechanisms	36	50.0
Improve the number of patients being served	60	95.8
An effective decision support mechanism for patient management	42	58.3
Improved access to safe and affordable health services	59	83.3
Adequate supply and access to essential equipment and drugs in the health facilities	69	81.9

*Based on multiple response

3.4. Factors Affecting Conditions of Health Infrastructure

The findings from Table 6 indicated that out of eight variables in the model, six of them had significant and positive effects on the conditions of health infrastructure.

Moreover, the result revealed that there is no significant effect of health policies and strategies or the quality of infrastructure on health infrastructure. Furthermore, variables included in the model were reasonably good predators for the identified factors (Nagelkerke R^2= 0.60).

Users' competence

The results in Table 6 indicated that users competence among health professionals and health seekers has a positive and significant effect on health infrastructure (β=2.703, p<0.05). This implies that the lower level of user's competence, the higher the damage to health infrastructure and vice versa. The findings are in line with Ikenye (2021), who reported that there is a positive and significant effect on competence and healthcare infrastructure in Kiambu County.

Infrastructure over-use

Furthermore, the findings reveal that infrastructure overuse has a statistically significant (β=5.271, p<0.05) effect on health infrastructure. The odds ratio shows that a one-unit increase in infrastructure over-use will be expected to affect the condition of health infrastructure and equipment by 2.055, given that other variables in the model are held constant. This implies that most health infrastructures are affected by more uses than required. The results concur with Oyekale (2017) who reported that the status of health infrastructure in service delivery was affected by public infrastructure overloading, physical facilities and organisational culture in Africa.

Non-compliance with term of use

The results in Table 6 point out that non-compliance with terms of use of health equipment and infrastructure has a significant effect on health infrastructure (β=31.247, p<0.05). This implies that ignoring the terms of use recommended for specific infrastructure and equipment by users, affects the quality and condition of public infrastructure. According to the WHO (2016), there are seven major components that affect the infrastructure of health care facilities in Africa. Among others, unawareness in terms of uses and directives for some health infrastructure

was reported. Hence, it lowers the standards of health service delivery.

Management quality

The findings revealed that management quality has a significant and positive effect on the condition of health infrastructure (β=3.968, p<0.05). The odds ratio shows that a one-unit increase in quality of management will be expected to affect the status of health infrastructure and equipment by 5. 853, given that other variables in the model are held constant. This implies that the higher the quality of infrastructure management, the better the infrastructure and vice versa. These findings concur with those of Ikenye (2021), who ran ANOVA tests to examine the statistical significance between management capabilities and the status of health infrastructure. The findings showed an F-calculated = 15.449> (f-critical) and Sig = .000<.05. These results showed there is a positive and significant relationship between management capabilities and the status of health infrastructure in Kenya. Also, Koech and Were (2016) reported that facility management is responsible for cultivating the culture of the organisation, thereby playing a key role in promoting the quality of health infrastructure. Similarly, he summarised that management structure has a direct influence on the status of health infrastructure. While Sarto and Veronesi (2016) found a significant relationship between clinical management and positive firm outcomes, the study determined that clinical management positively influences both health infrastructure development and social outcomes and Kakemam and Goodall (2019) found that hospitals with good management perform significantly better than those with poor management.

Technological adoption

It is believed that there is a positive association between new technological adoptions and health infrastructure. The model output (β=5.271, p<0.05) supports that expectation and shows the positive effect and significant association between technological adoption and health infrastructure. This implies that changes in technology in the use of health infrastructure and equipment may lead to damage or reduced performance of the identified infrastructure. Similarly, Manzar (2017) asserts that most countries have rapidly adopted new technologies in operating health-related activities and the use of such systems has increased due to their impact on improving patient safety as well as delivering high quality services at a lower cost and more efficient service delivery. Therefore, the adoption of new technologies come with new skills and new conditions. Hence, if the users do not have perfect skills on the new adopted technology, it will have a direct or indirect effect in the specific infrastructure or equipment.

Maintenance cost

Results show that maintenance costs have a positive and significant (β=2.873, p<0.05) effect on health infrastructure. Also, findings show that if maintenance costs increase by one unit, the condition of health infrastructure will be expected to change by 4.053, while other independent variables in the model are held constant. Maintenance is a very

crucial aspect of medical facilities. Determining which maintenance plan is best for each piece of equipment is the first challenge. When prioritising maintenance tasks, patient safety, intrinsic maintenance requirements, and importance to the organisation's mission are frequently the main considerations (Jamshidi et al., 2015; Mahfoud et al., 2016). According to Cruz and Rincon (2012), the chosen strategy's implementation calls for a variety of resources, including people, materials, money, and documentation. These needs are assessed through the use of multi-dimensional models. Rani et al. (2015) investigated the connection between maintenance expenses and policies put in place in Malaysian healthcare institutions. Customer satisfaction and maintenance strategies have a small but statistically significant correlation, according to survey results. Mwanza and Mbohwa (2015) assessed the efficiency of maintenance procedures applied in South African public hospitals. They stated that both a manpower shortage and faulty equipment scheduling systems caused a high percentage of equipment unavailability. Groves (2019) revealed that having a clear budget on maintenance costs within hospitals will lead to sustainable health care infrastructure and encourage hospital staff to undertake their duties and responsibilities with a positive attitude. Correspondingly, Berta and Daniel (2020) indicated that having independent maintenance costs for the health infrastructure, the improving status of health equipment and motivated staff motivation and willingness to serve efficiently, the correlation tests indicated there is a strong positive and significant effect of the organisational maintenance budget on healthcare infrastructure.

Table 5: Factors Affecting Condition of Health Infrastructure

Variable	B	S.E.	Wald	df	Sig	Exp (β)	95.0% C.I. for EXP(β)	
							Lower	Upper
Users Competence	2.703	.866	9.737	1	.002	.067	.012	.366
Infrastructure over use	5.271	1.813	8.450	1	.004	2.055	.000	.180
Non-compliance with term of use	31.247	4.123	26.79	1	.009	3.720	.678	3.880
Management Quality	3.968	1.215	10.67	1	.001	5.853	4.890	571.318
Technological Adoption	5.271	1.813	8.450	1	.004	.005	.000	.180
Maintenance Cost	2.873	.806	5.410	1	.000	4.053	.009	.315
Health policy and Strategies	.965	1.447	.667	1	.570	2.149	.153	30.089
Quality of infrastructure	.156	.891	.031	1	.861	.856	.149	4.910
Constant	17.659	3.897	20.538	1	.000	.000		

Nagelkerke R^2= 0.60

3.5. Challenges Associated with Health Infrastructure in Health Service Delivery

The study also analysed the challenges that service providers, associated with healthcare infrastructure, face in delivering health services. The service providers (health officials) cited several areas where their efforts to provide

health services to patients pose a significant challenge.

The findings in Table 7 show several challenges occurred due to poor health infrastructure in the efforts to provide health services for patients. The majority (75.0%) of health officials cited that among the challenges were unnecessary referrals given to patients, and others indicate under performance among health workers (69.4%) as the challenge associated with poor health infrastructure, while 63.8% of them indicate a shortage of some basic health equipment within health centres. For instance, autoclaves, amenities such as maternity facilities for expectant mothers were the challenges that occurred most in their centres. Furthermore, the challenges observed were longer waiting time for the patient to get service (44.4%), overwork and burnout among health workers (40.2%) and the large number of health staff seeking staff over health staff and equipment present (30.5%). These findings are supported by Groves (2019) who reported that health care workers face a variety of challenges in performing their responsibilities depending on the condition of health infrastructure, which can compromise the quality and effectiveness of the health services received by clients. These barriers can arise from not knowing how to complete the responsibility, being unable to complete the responsibility due to contextual or structural barriers or lacking the desire to complete the task. Similarly, Mugo (2017) indicates that a major challenge caused by insufficient infrastructure is the increased work load among health workers. He found a laboratory with 3 machines for Pathology, Electrolyte and Haematology, served by one staff member who took approximately 300 samples in a day. This usually leads to burnout and over-working. Furthermore, Okumu (2018) disclosed that among the challenges associated with poor health infrastructure in Kenya was an inadequate number of staff, which leads to overwork and burnout. Additionally, other challenges reported were road transport, particularly during the heavy rainy season, lack of ambulance services for emergency referral, lack of basic equipment, lack of doctor services to intervene in serious cases that easily lead to death and poor data recording due to insufficient staffing at the health facility.

Table 6: Challenges Observed

Variables	Frequency	Percentage *
Unnecessary referrals	54	75.0
Shortage of some basic health equipment	46	63.8
Longer waiting time for the servicing patient	32	44.4
Under performance of health workers	50	69.4
Over work and burn out	29	40.2
The large number of patients over health staff and equipment	22	30.5

*Multiple response

4.0 Conclusion and Recommendations

4.1. Conclusion

Various factors significantly influence the conditions of health infrastructure in primary health centres, such as users' competence, infrastructure over use, non-compliance with terms of use, management quality, technological adoption and maintenance cost. This situation hinders the smooth delivery of health services. Challenges associated with health infrastructure in health service delivery were reported in aspects of underperformance among health workers, unnecessary referrals given to patients, shortage of some basic health equipment such as autoclaves, amenities especially maternity facilities for expectant mothers, longer waiting time for the patient to get service, overwork and burnout among health workers and a large number of health seekers over health staff and equipment.

4.2. Recommendations

The study recommends that the government, through the Ministry of Health, should further ensure the sustainability and improvement of all health infrastructures within primary health centres by facilitating more budget for infrastructure maintenance, formulation of infrastructural development plans to the health centres to maintain the standards and quality of health service delivery among health seeking. The government, through the Ministry of Health, and in-charge of centres should provide guidance on infrastructure use and instill maintenance behaviour among users of infrastructure. This will prolong useful life of infrastructure for the provision of good- quality health services in public facilities.

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