

Factors Influencing Utilization of Cancer Health Services Among Newly Diagnosed Adult Cancer Patients Attending Garissa County Referral Hospital, Kenya

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ABSTRACT

Cancer remains a major public health challenge globally and is increasingly contributing to morbidity and mortality in low- and middle-income countries. In Kenya, despite ongoing investments in cancer prevention, diagnosis, and treatment services, many patients continue to present with advanced disease and experience poor treatment outcomes. Utilization of cancer health services is essential for timely diagnosis, treatment initiation, and improved survival. However, evidence on factors influencing utilization of cancer health services among newly diagnosed cancer patients in marginalized regions remains limited. This study assessed factors influencing utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital, Kenya. A convergent mixed-methods cross-sectional study design was employed. Quantitative data were collected from 161 newly diagnosed adult cancer patients using structured questionnaires, while qualitative data were obtained through Focus Group Discussions and Key Informant Interviews. Quantitative data were analyzed using descriptive statistics and multiple linear regression analysis, whereas qualitative data were analyzed thematically. Statistical significance was determined at $p < 0.05$. The study achieved a response rate of 97.0%. The multivariable regression model demonstrated a strong positive relationship between the predictor variables and utilization of cancer health services ($R = 0.699$). The model explained 48.9% of the variation in utilization of cancer health services ($R^2 = 0.489$) and was statistically significant ($F = 50.115$, $p < 0.001$). Health facility and health system factors were significant predictors of utilization ($\beta = 0.316$, $p = 0.001$), while knowledge level and attitude emerged as the strongest predictor ($\beta = 0.502$, $p < 0.001$). Individual factors were not statistically significant after controlling for the other variables ($\beta = 0.025$, $p = 0.796$). Qualitative findings identified treatment costs, transportation challenges, long travel distances, referral delays, limited awareness, and shortages of specialized services as key barriers to utilization. Utilization of cancer health services among newly diagnosed adult cancer patients is primarily influenced by knowledge level and attitude and by health facility and health system factors. Strengthening cancer awareness, improving patient education, enhancing referral systems, expanding access to specialized oncology services, and reducing financial barriers to treatment may substantially improve utilization of cancer health services and ultimately enhance cancer outcomes in resource-constrained settings.

Keywords: Cancer health services, healthcare utilization, cancer care, knowledge and attitude, health system factors, oncology services, newly diagnosed cancer patients, Kenya.

INTRODUCTION

Cancer remains one of the leading causes of morbidity and mortality worldwide and continues to exert substantial

pressure on healthcare systems, economies, and communities. Recent global estimates indicate that approximately 20 million new cancer cases and nearly 10 million cancer-related deaths occurred in 2022, making cancer a major contributor to premature mortality and reduced life expectancy across both developed and developing countries (Bray et al., 2024). The burden of cancer is expected to rise significantly over the coming decades due to population growth, population ageing, urbanization, and increasing exposure to behavioral and environmental risk factors (Bahrami & Tafrihi, 2023). The World Health Organization projects that cancer incidence will continue to increase globally, with low- and middle-income countries expected to experience the greatest increase in both incidence and mortality. Consequently, cancer has emerged as a major public health priority requiring effective prevention, early detection, treatment, and long-term management strategies (World Health Organization, 2023).

Although advances in screening, diagnosis, and treatment have substantially improved cancer survival in many high-income countries, considerable disparities continue to exist in access to and utilization of cancer health services (Bamodu & Chung, 2024). Timely utilization of cancer services is critical because early diagnosis and prompt initiation of treatment significantly improve treatment outcomes, quality of life, and survival rates. However, many patients continue to experience delays in seeking care, obtaining a diagnosis, initiating treatment, and completing prescribed treatment regimens (Neal et al., 2015). Such delays often result in advanced-stage presentation, limited treatment options, increased treatment costs, and poor clinical outcomes. Utilization of cancer health services is therefore increasingly recognized as an important determinant of cancer outcomes and an essential component of effective cancer control programs (World Health Organization, 2024).

The burden of cancer has become particularly pronounced in Sub-Saharan Africa, where health systems are often challenged by resource limitations, inadequate infrastructure, shortages of specialized healthcare personnel, and competing priorities from communicable diseases (Ngwa et al., 2022). According to Bray et al. (2022), approximately 820,000 new cancer cases and more than 550,000 cancer-related deaths occur annually in Sub-Saharan Africa. Unlike high-income countries, a substantial proportion of cancers in the region are diagnosed at advanced stages, reducing opportunities for curative treatment. In addition, many countries continue to face challenges related to inadequate screening programs, weak referral systems, poor access to diagnostic services, and limited availability of specialized oncology care. These challenges have contributed to persistently high cancer mortality rates despite growing investments in cancer control initiatives (Atun et al., 2015).

In many African countries, healthcare utilization patterns significantly influence cancer outcomes. Patients often delay seeking medical attention due to financial constraints, limited awareness of cancer symptoms, cultural beliefs, fear of diagnosis, and inadequate access to healthcare facilities (Bamodu & Chung, 2024). Even after diagnosis, many patients experience difficulties accessing treatment because of transportation challenges, treatment costs, shortages of medicines, and long waiting times. These barriers are particularly pronounced in resource-constrained settings where oncology services remain concentrated in a few urban centers and patients must travel long distances to receive specialized care (Ramashia et al., 2024). As a result, utilization of cancer health services remains suboptimal, particularly among vulnerable populations residing in rural and marginalized regions. Understanding the factors that influence utilization of cancer services is therefore essential for designing interventions that improve access to care, promote timely treatment initiation, and enhance cancer outcomes (Bamodu & Chung, 2024; Ramashia et al., 2024).

Kenya continues to experience a growing burden of cancer, which has emerged as one of the leading causes of morbidity and mortality in the country. According to GLOBOCAN (2022), Kenya records approximately 44,726 new cancer cases and 29,317 cancer-related deaths annually. The most common cancers among women include breast, cervical, and esophageal cancers, while prostate, esophageal, and colorectal cancers are predominant among men. The increasing incidence of cancer has generated significant demand for screening, diagnosis, treatment, and palliative care services. However, despite ongoing investments in cancer control, evidence suggests that many patients continue to present with advanced disease and experience poor treatment outcomes. This situation underscores the importance of understanding factors that influence healthcare-seeking behaviour and utilization of available cancer services.

The Government of Kenya has implemented several initiatives aimed at strengthening cancer prevention and treatment services. These include decentralization of chemotherapy services to county referral hospitals, expansion of cervical cancer screening services, installation of diagnostic equipment through the Managed Equipment Services program, and establishment of the National Cancer Institute of Kenya (Ministry of Health Kenya, 2023). These efforts have improved geographical access to cancer services in several counties and contributed to increased availability of oncology care outside Nairobi. Nevertheless, significant challenges remain, particularly in relation to service utilization. Studies conducted in Kenya indicate that many patients continue to experience delays in diagnosis and treatment despite the availability of cancer services, often due to financial constraints, referral inefficiencies, and limited diagnostic capacity (Korir et al., 2023). Furthermore, a substantial proportion of patients fail to complete prescribed treatment regimens because of treatment costs, transportation difficulties, and prolonged treatment pathways, negatively affecting treatment outcomes and survival rates (Korir et al., 2023; Ministry of Health Kenya, 2023).

Healthcare utilization among cancer patients is influenced by a complex interaction of individual, social, economic, and health system factors. Previous studies have identified socio-demographic characteristics such as age, gender, income, educational attainment, marital status, employment status, and place of residence as important determinants of healthcare utilization among cancer patients. Deng et al. (2022), in a nationally representative study conducted in China, reported that income, education level, health insurance coverage, and residential location significantly influenced healthcare utilization and treatment outcomes among cancer patients. Similarly, Myint et al. (2024) found that age, income, employment status, and urban residence were significant predictors of cervical cancer screening uptake among women in the Philippines. These findings suggest that individual characteristics influence both healthcare-seeking behaviour and access to cancer services.

Evidence from Africa similarly demonstrates the importance of individual-level determinants in shaping healthcare utilization. Mensah et al. (2023) reported that socio-economic conditions, social support systems, and rural residence significantly affected access to cancer care among patients in Ghana. Sharma et al. (2021) further established that higher income levels and educational attainment were associated with greater participation in cancer screening programs in Nigeria. In Kenya, Harsch, Weber, Kassaman, Kailemia and Oria (2025) highlighted the role of health literacy in influencing access to breast cancer services among women receiving care in tertiary hospitals. These studies collectively suggest that socio-demographic and economic characteristics influence patients' ability to recognize symptoms, seek healthcare, and navigate healthcare systems.

Health facility and health system factors have also been widely recognized as critical determinants of healthcare utilization. Access to healthcare facilities, availability of specialized services, waiting times, affordability of treatment, quality of care, referral systems, and availability of essential medicines all influence whether patients seek and continue treatment. Afaya et al. (2022), in a systematic review of breast cancer care in Asian countries, identified long waiting times, diagnostic delays, poor geographical accessibility, and inadequate healthcare infrastructure as major barriers to timely diagnosis and treatment. Similar findings have been reported in Sub-Saharan Africa, where health system constraints continue to impede access to cancer care.

Gbernonsi et al. (2021) reported that diagnostic delays, poor service organization, shortages of healthcare personnel, and difficulties accessing specialized care significantly influenced treatment intervals among breast cancer patients in Sub-Saharan Africa. In Tanzania, Rick et al. (2021) found that increased travel times, multiple healthcare visits before diagnosis, and inadequate referral pathways contributed to delayed presentation among cancer patients. Likewise, Jaganathan et al. (2024) demonstrated that patient navigation programs improved timely diagnosis, treatment initiation, and adherence among breast cancer patients in Malaysia. Collectively, these studies highlight the importance of health system responsiveness in facilitating utilization of cancer health services.

Knowledge and attitudes towards cancer have also emerged as important determinants of healthcare utilization. Individuals who possess greater awareness of cancer symptoms, risk factors, screening methods, and treatment options are generally more likely to seek care promptly and adhere to treatment recommendations. Koirala et al. (2021) established a significant association between cancer literacy and participation in cancer screening among

adults in Nepal. Similarly, Shrestha et al. (2022) found that inadequate knowledge regarding cervical cancer contributed to poor screening uptake among women in rural Nepal. In Nigeria, Ari et al. (2023) reported that fear of diagnosis, cultural beliefs, misconceptions regarding cancer, and stigma negatively influenced participation in cervical cancer screening programs.

Within the Kenyan context, limited awareness of cancer symptoms and treatment options continues to contribute to delayed healthcare seeking and poor utilization of cancer services. Studies have shown that many patients seek medical attention only after symptoms become severe, often resulting in diagnosis at advanced stages. In addition, misconceptions regarding cancer causation and treatment remain common in some communities, further discouraging timely utilization of formal healthcare services. Improving cancer knowledge and addressing negative attitudes therefore remain important strategies for enhancing healthcare utilization and improving outcomes among cancer patients.

Garissa County presents a unique context for examining utilization of cancer health services. The county is geographically vast, predominantly rural, and characterized by dispersed settlements, limited specialist healthcare services, and relatively low levels of health literacy. Although the establishment of a cancer treatment centre at Garissa County Referral Hospital has improved access to oncology services, studies continue to report increasing cancer cases and persistent challenges in treatment access and utilization. Previous research in Garissa has largely focused on cancer prevalence, clinical presentations, and treatment outcomes. However, limited empirical evidence exists regarding factors influencing utilization of cancer health services among newly diagnosed cancer patients in the county.

The current study was therefore undertaken to assess the influence of individual factors, health facility and health system factors, and knowledge and attitudes on utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. By identifying the determinants of healthcare utilization within this context, the study sought to generate evidence that can inform interventions aimed at improving access to cancer care, enhancing treatment adherence, and ultimately reducing cancer-related morbidity and mortality in northeastern Kenya.

MATERIALS AND METHODS

Study Design

This study employed a convergent mixed methods cross-sectional design integrating quantitative and qualitative approaches to assess factors influencing utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. The mixed methods approach was considered appropriate because utilization of cancer health services is a multifaceted phenomenon influenced by individual, social, cultural, economic, and health system factors that cannot be fully understood through quantitative methods alone. The quantitative component generated measurable evidence regarding the magnitude and direction of relationships between the study variables, while the qualitative component provided deeper insights into patients' experiences, perceptions, and contextual factors influencing healthcare utilization. The concurrent collection and analysis of quantitative and qualitative data enabled triangulation of findings and enhanced the validity and comprehensiveness of the study.

Study Area

The study was conducted at Garissa County Referral Hospital (GCRH), the main referral facility in Garissa County located in northeastern Kenya. Garissa County covers approximately 44,736 square kilometers and had a population of 841,353 according to the 2019 Kenya Population and Housing Census. The county borders Wajir County to the north, Isiolo County to the northwest, Tana River County to the west, Lamu County to the south, and Somalia to the east. The population is predominantly of Somali origin, with pastoralism serving as the major economic activity alongside trade, formal employment, and agro-pastoral livelihoods. Garissa County Referral Hospital serves as the primary referral center for specialized healthcare services within the region and receives referrals from Garissa, Wajir, Mandera, Tana River, and neighboring counties as well as patients from Somalia.

The hospital hosts a cancer treatment unit and palliative care services, making it the principal facility providing oncology services in northeastern Kenya. The facility was selected because it manages a substantial number of newly diagnosed cancer patients and provides an appropriate setting for investigating factors influencing utilization of cancer health services.

Study Population

The target population comprised newly diagnosed adult cancer patients attending Garissa County Referral Hospital for diagnosis, treatment, follow-up, or supportive care services during the study period. For the purpose of this study, a newly diagnosed cancer patient referred to an individual aged 18 years and above whose cancer diagnosis had been confirmed through histopathological examination and who had recently initiated cancer-related care and treatment services. The study also included healthcare workers involved in cancer diagnosis, treatment, counseling, referral, and management who participated as key informants in the qualitative component.

Inclusion and Exclusion Criteria

Participants were eligible for inclusion if they were aged 18 years and above, had a confirmed histopathological diagnosis of cancer, were receiving care at Garissa County Referral Hospital, and were willing to provide informed consent. Patients were required to be physically and mentally capable of participating in the interview process. Healthcare workers selected as key informants were required to have direct involvement in cancer care services at the hospital and possess sufficient experience to provide meaningful information regarding utilization of cancer health services. Patients who were critically ill, unable to communicate effectively, or unwilling to participate were excluded from the study. Individuals without confirmed cancer diagnoses were also excluded.

Sample Size Determination

The quantitative sample size was determined using Fisher's formula for estimating proportions in cross-sectional studies. The formula considered the expected prevalence of the study outcome, desired confidence level, and acceptable margin of error. An adjustment was made to account for potential non-response. The final sample size was considered adequate to provide sufficient statistical power for detecting significant associations between the independent variables and utilization of cancer health services. For the qualitative component, purposive sampling was used to recruit participants for Key Informant Interviews and Focus Group Discussions. Data collection continued until sufficient information power was achieved and no substantially new themes emerged from subsequent interviews and discussions.

Sampling Procedure

Systematic random sampling was employed for the quantitative component of the study. The sampling interval was determined by dividing the estimated number of eligible cancer patients expected during the study period by the required sample size. The first participant was selected randomly from the initial eligible patients attending the oncology clinic. Thereafter, every k th eligible patient was recruited until the desired sample size was attained. Where a selected participant declined participation or failed to meet inclusion criteria, the next eligible patient was approached. For the qualitative component, purposive sampling was used to identify participants capable of providing rich and relevant information regarding cancer health service utilization. Key informants included healthcare professionals directly involved in cancer care, while Focus Group Discussion participants were selected from newly diagnosed cancer patients receiving services at the hospital. Two Focus Group Discussions comprising six to eight participants each were conducted to explore experiences, perceptions, and challenges related to utilization of cancer services.

Data Collection Methods and Instruments

Quantitative data were collected using a structured interviewer-administered questionnaire developed based on the study objectives and literature review. The questionnaire contained sections covering socio-demographic

characteristics, individual factors, health facility and health system factors, knowledge and attitudes toward cancer, and utilization of cancer health services. Qualitative data were collected using semi-structured Key Informant Interview guides and Focus Group Discussion guides. The guides were designed to explore perceptions regarding accessibility of cancer services, barriers to healthcare utilization, experiences with cancer diagnosis and treatment, referral processes, treatment costs, and recommendations for improving cancer service delivery. The instruments were pretested in a similar healthcare setting to assess clarity, relevance, and appropriateness of questions. Feedback obtained during the pretest informed refinement of the tools prior to the main study.

Data Management and Analysis

Completed questionnaires were checked daily for completeness and consistency before data entry. Quantitative data were coded and entered into Statistical Package for Social Sciences (SPSS) version 26 for analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize participant characteristics and study variables. Bivariate linear regression analysis was conducted to examine the relationship between each independent variable and utilization of cancer health services. Variables found to be statistically significant at the bivariate level were entered into a multivariable linear regression model to determine their independent contribution to utilization of cancer health services while controlling for the effects of other variables. Statistical significance was assessed at the 95% confidence level using a p-value threshold of less than 0.05. Qualitative data from Key Informant Interviews and Focus Group Discussions were audio-recorded, transcribed verbatim, and analyzed using thematic analysis. The transcripts were reviewed repeatedly to achieve familiarization with the data. Codes were generated and organized into categories, which were subsequently grouped into broader themes reflecting factors influencing utilization of cancer health services. Qualitative findings were integrated with quantitative results during interpretation to provide a more comprehensive understanding of the study findings.

Ethical Considerations

Ethical approval for the study was obtained from the relevant institutional ethics review committee prior to commencement of data collection. Permission to conduct the study was obtained from Garissa County authorities and the management of Garissa County Referral Hospital. Participation in the study was voluntary, and written informed consent was obtained from all participants before enrollment. Participants were informed about the purpose of the study, expected benefits, potential risks, and their right to withdraw at any stage without penalty. Confidentiality and anonymity were maintained throughout the study by assigning identification codes instead of recording participants' names. All study records were stored securely and accessed only by authorized members of the research team. The study adhered to internationally accepted ethical principles governing research involving human participants.

RESULTS

A total of 161 newly diagnosed adult cancer patients participated in the study, representing a response rate of 97.0%. This response rate exceeded the minimum threshold generally recommended for survey research and provided adequate statistical power for the regression analyses. A multiple linear regression model was fitted to determine the combined influence of individual factors, health facility and health system factors, and knowledge level and attitude on utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. Unlike the bivariate analyses, the multivariable model examined the independent contribution of each predictor while controlling for the effects of the other variables included in the model.

The model summary results demonstrated a strong positive relationship between the combined predictor variables and utilization of cancer health services ($R = 0.699$). The coefficient of determination ($R^2 = 0.489$) indicated that the three predictor variables collectively explained 48.9% of the variation in utilization of cancer health services. The adjusted R^2 value of 0.479 showed that the model retained substantial explanatory power

even after adjusting for the number of predictors included in the analysis. These findings suggest that almost half of the observed variation in utilization of cancer health services among respondents could be explained by differences in individual factors, health facility and health system factors, and knowledge level and attitude.

Table 1: Model Summary of the Multivariable Regression Model

Regression Statistic	Value
Multiple R	0.699
R Square	0.489
Adjusted R Square	0.479
Standard Error	0.321
Observations	161

The overall regression model was statistically significant ($F = 50.115$, $p < 0.001$), indicating that the combination of predictor variables significantly improved the prediction of utilization of cancer health services compared with a model containing no predictors. The highly significant F-statistic confirmed the suitability and reliability of the fitted model for explaining variations in utilization of cancer health services within the study population.

Table 2: Analysis of Variance (ANOVA) for the Multivariable Regression Model

Source	df	SS	MS	F	p-value
Regression	3	15.458	5.153	50.115	<0.001
Residual	157	16.142	0.103		
Total	160	31.600			

The regression coefficient estimates revealed important differences in the independent contribution of the three predictor variables. Individual factors did not significantly predict utilization of cancer health services after controlling for the influence of health facility and health system factors and knowledge level and attitude ($\beta = 0.025$, $p = 0.796$). Although individual factors had demonstrated a significant relationship with utilization in the bivariate analysis, their effect disappeared in the multivariable model. This finding suggests that the influence of demographic and socioeconomic characteristics may operate indirectly through knowledge-related factors and healthcare system characteristics rather than exerting an independent effect on utilization.

Health facility and health system factors remained statistically significant predictors of utilization of cancer health services ($\beta = 0.316$, $p = 0.001$). The positive coefficient indicates that improvements in healthcare accessibility, affordability, service availability, staffing levels, treatment resources, and quality of care were associated with increased utilization of cancer health services. These findings demonstrate that the healthcare environment continues to play a critical role in determining whether newly diagnosed cancer patients access and utilize available treatment services.

Knowledge level and attitude emerged as the strongest predictor of utilization of cancer health services in the final model ($\beta = 0.502$, $p < 0.001$). The positive coefficient indicates that respondents with higher levels of cancer-related knowledge and more positive attitudes toward cancer care were significantly more likely to utilize available cancer health services. The magnitude of the coefficient suggests that knowledge and attitude exerted the greatest independent influence among all predictors included in the model.

Table 3: Multivariable Regression Coefficients

Variable	β	SE	t	p-value
Constant	0.647	0.325	1.989	0.049
Individual Factors	0.025	0.097	0.259	0.796

Health Facility and Health System Factors	0.316	0.093	3.421	0.001
Knowledge Level and Attitude	0.502	0.100	5.043	<0.001

The fitted regression equation was expressed as:

$$Y = 0.647 + 0.025X_1 + 0.316X_2 + 0.502X_3$$

where Y represents utilization of cancer health services, X_1 represents individual factors, X_2 represents health facility and health system factors, and X_3 represents knowledge level and attitude. The model indicates that, holding all other variables constant, a one-unit improvement in health facility and health system factors would increase utilization of cancer health services by 0.316 units, while a one-unit improvement in knowledge level and attitude would increase utilization by 0.502 units. The coefficient for individual factors was not statistically significant. The multivariable regression analysis demonstrated that knowledge level and attitude and health facility and health system factors were the only significant independent predictors of utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. Knowledge level and attitude emerged as the strongest predictor, followed by health facility and health system factors. These findings suggest that interventions aimed at improving cancer awareness and attitudes, alongside strengthening healthcare systems and service delivery, are likely to produce the greatest improvements in utilization of cancer health services.

The qualitative findings from Key Informant Interviews and Focus Group Discussions largely corroborated the quantitative results and provided deeper insight into the factors influencing utilization of cancer health services among newly diagnosed adult cancer patients. Three major themes emerged from the analysis, namely knowledge and attitudes toward cancer care, health facility and health system barriers, and financial challenges affecting treatment access and continuity.

Consistent with the quantitative findings where knowledge level and attitude emerged as the strongest predictor of utilization of cancer health services ($\beta = 0.502$, $p < 0.001$), participants repeatedly emphasized that inadequate awareness regarding cancer symptoms, treatment options, and the benefits of early treatment contributed to delayed healthcare seeking and poor utilization of services. Several participants reported that they initially attributed cancer symptoms to less serious illnesses or relied on alternative remedies before seeking professional medical care.

“When the symptoms started, I thought it was something that would go away on its own. I did not know it could be cancer. By the time I came to the hospital, the disease had already progressed.” (FGD Participant)

Similarly, a healthcare provider observed:

“Many patients come here very late because they do not recognize the early signs of cancer. Some only seek treatment when the pain becomes severe or when they can no longer continue with their daily activities.” (KII Respondent)

These findings suggest that knowledge deficits and misconceptions regarding cancer continue to influence healthcare-seeking behaviour and treatment utilization among newly diagnosed cancer patients.

The significance of health facility and health system factors in the multivariable model ($\beta = 0.316$, $p = 0.001$) was also supported by qualitative evidence. Participants highlighted several healthcare system challenges, including long travel distances, referral delays, shortages of specialist personnel, prolonged waiting times, and occasional unavailability of essential medicines and diagnostic services.

A participant from a remote area stated:

“Coming to Garissa for treatment is not easy. Sometimes transport is expensive and I have to postpone my appointments because I do not have money to travel.” (FGD Participant)

Healthcare providers similarly acknowledged systemic barriers affecting service utilization:

“We have improved cancer services over the years, but there are still challenges with staffing, referral systems, and access to some specialized services. These challenges sometimes delay treatment for patients.” (KII Respondent)

The qualitative findings therefore reinforce the importance of strengthening healthcare infrastructure and service delivery mechanisms to improve access to cancer care. Although financial factors were assessed under broader health facility and health system factors, they emerged as a distinct and recurring theme across interviews and discussions. Participants frequently reported difficulties meeting the costs associated with transport, investigations, medications, and follow-up appointments.

One participant remarked:

“The biggest challenge is money. Even when treatment is available, there are transport costs, tests to pay for, and other expenses that make it difficult to continue treatment.” (FGD Participant)

A healthcare provider echoed similar concerns:

“Some patients miss appointments or discontinue treatment because of financial difficulties. The burden of cancer treatment can be overwhelming, especially for families with limited income.” (KII Respondent)

These findings demonstrate that financial barriers continue to undermine optimal utilization of cancer health services despite improvements in service availability. The qualitative findings complement the quantitative results by demonstrating that inadequate cancer knowledge, negative perceptions regarding cancer, health system limitations, and financial constraints remain key barriers to utilization of cancer health services. The convergence of findings from both components of the study strengthens confidence in the conclusion that improving cancer awareness and strengthening healthcare systems are critical strategies for enhancing utilization of cancer health services among newly diagnosed adult cancer patients.

DISCUSSION

This study examined the combined influence of individual factors, health facility and health system factors, and knowledge level and attitude on utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. The multivariable regression model demonstrated that health facility and health system factors and knowledge level and attitude were significant predictors of utilization of cancer health services, while individual factors lost statistical significance after controlling for the influence of the other variables. The model explained approximately 48.9% of the variation in utilization of cancer health services, indicating that these factors collectively play a substantial role in determining healthcare utilization among newly diagnosed cancer patients. The findings provide important insights into the relative importance of patient-related and healthcare system factors in influencing access to and utilization of cancer services within a resource-constrained setting.

Individual Factors and Utilization of Cancer Health Services

The study found that individual factors did not significantly influence utilization of cancer health services after controlling for health facility and health system factors and knowledge level and attitude. Although individual factors had demonstrated a significant relationship with utilization in the bivariate analysis, their effect disappeared in the multivariable model. This finding suggests that demographic and socioeconomic characteristics may not exert an independent influence on healthcare utilization but instead operate indirectly

through other mechanisms such as knowledge acquisition, perceptions regarding healthcare, and interactions with the healthcare system.

The findings differ somewhat from studies conducted in other settings where individual characteristics remained significant predictors of healthcare utilization. Deng et al. (2022), in a nationally representative study conducted among cancer patients in China, reported that income level, educational attainment, health insurance status, and residential location significantly influenced healthcare utilization patterns and treatment outcomes. Similarly, Myint et al. (2024) found that age, marital status, income level, employment status, and urban residence significantly predicted uptake of cervical cancer screening services among women in the Philippines. These studies concluded that socio-demographic characteristics directly affect healthcare access through their influence on affordability, information access, and healthcare decision-making.

However, the findings of the current study suggest that once patients have entered the healthcare system and have been diagnosed with cancer, structural and informational factors become more influential than demographic characteristics. This interpretation is supported by Mensah et al. (2023), who observed that while socio-demographic characteristics initially appeared important in determining healthcare access among cancer patients in Ghana, broader healthcare system barriers often exerted a stronger influence on actual service utilization. Similarly, Sharma et al. (2021) reported that although income and education influenced cancer screening participation in Nigeria, utilization of treatment services was more strongly determined by healthcare accessibility and availability of services.

The loss of significance observed in the present study may also reflect the nature of the study population. All respondents had already received a confirmed cancer diagnosis and had initiated some level of interaction with cancer services. Consequently, differences in demographic characteristics may have become less important than factors influencing continuity of care, treatment adherence, and sustained utilization of available services. These findings imply that interventions focusing exclusively on demographic targeting may have limited effectiveness unless accompanied by strategies addressing healthcare system barriers and improving patient knowledge regarding cancer care.

Health Facility and Health System Factors and Utilization of Cancer Health Services

Health facility and health system factors remained statistically significant predictors of utilization of cancer health services in the multivariable model. The positive regression coefficient indicates that improvements in service availability, accessibility, affordability, staffing, treatment resources, and quality of care are associated with increased utilization of cancer health services. This finding highlights the critical role that healthcare systems play in facilitating access to diagnosis, treatment, and follow-up care among cancer patients.

The findings are consistent with existing literature demonstrating that health system characteristics significantly influence cancer care utilization. Afaya et al. (2022), in a systematic review of breast cancer care in Asian countries, reported that geographical accessibility, availability of treatment services, waiting times, and referral efficiency were major determinants of healthcare utilization. Women residing in areas with limited healthcare infrastructure experienced substantial delays in diagnosis and treatment initiation, ultimately affecting treatment outcomes. Similar observations were made in the present study, where respondents frequently reported challenges related to transportation, distance, waiting times, and treatment accessibility.

The significance of health facility and health system factors is further supported by findings from Gbernonsi et al. (2021), who examined diagnostic and treatment intervals among breast cancer patients in Sub-Saharan Africa. Their study identified shortages of healthcare personnel, poor referral systems, delayed diagnoses, and limited treatment infrastructure as key barriers to timely cancer care. These barriers contributed significantly to delays in treatment initiation and reduced utilization of available services. The current study similarly found that healthcare system constraints continued to influence healthcare utilization even after accounting for patient-level characteristics and knowledge-related factors.

The findings also support those of Rick et al. (2021), who investigated barriers to cancer care in Tanzania and reported that long travel times, multiple healthcare visits before diagnosis, and fragmented referral pathways were strongly associated with delayed presentation and reduced healthcare utilization. In Garissa County, geographical challenges are likely to play a particularly important role given the vast distances, dispersed settlements, and limited availability of specialized healthcare facilities. Although Garissa County Referral Hospital has improved access to oncology services within the region, many patients still face substantial logistical and financial barriers when seeking care.

Qualitative findings from the current study further reinforced the importance of healthcare system factors. Participants consistently identified treatment costs, transportation expenses, long travel distances, referral delays, and shortages of specialist services as barriers to utilization. Healthcare providers similarly acknowledged that resource limitations and increasing patient numbers occasionally affected service delivery. These findings demonstrate that strengthening healthcare systems remains a critical requirement for improving cancer service utilization and achieving better treatment outcomes.

The significance of health facility and health system factors also has important policy implications. It suggests that investments aimed at strengthening oncology infrastructure, increasing specialist staffing, improving referral systems, enhancing medicine availability, and expanding financial protection mechanisms may substantially improve utilization of cancer health services. Such interventions are likely to be particularly beneficial in underserved regions where access barriers remain substantial.

Knowledge Level and Attitude as Predictors of Utilization of Cancer Health Services

Knowledge level and attitude emerged as the strongest predictor of utilization of cancer health services in the multivariable regression model. The positive coefficient indicates that respondents with higher levels of cancer-related knowledge and more favorable attitudes toward cancer care were significantly more likely to utilize available healthcare services. The magnitude of the regression coefficient demonstrates that knowledge and attitudes exerted a stronger independent influence on utilization than either individual factors or health facility-related factors.

This finding is consistent with extensive literature highlighting the importance of health literacy, awareness, and perceptions in influencing healthcare-seeking behavior. Koirala et al. (2021) found a significant association between cancer literacy and participation in cancer screening programs among adults in Nepal. Individuals with greater understanding of cancer symptoms, risk factors, and treatment options were more likely to engage in preventive healthcare behaviors and seek medical attention promptly when symptoms developed. The authors concluded that improving cancer literacy represents a critical strategy for enhancing utilization of cancer services.

Similarly, Shrestha et al. (2022) reported that inadequate knowledge regarding cervical cancer contributed to poor screening uptake among women in rural Nepal. Women who possessed accurate information regarding cancer prevention and treatment demonstrated more positive attitudes toward screening and healthcare utilization. These findings closely mirror those of the current study, where respondents with greater awareness and more positive attitudes were significantly more likely to utilize cancer treatment services.

The findings are also supported by Ari et al. (2023), who examined care-seeking behavior among women participating in cervical cancer screening programs in Nigeria. The study found that fear of diagnosis, misconceptions regarding cancer, social stigma, and cultural beliefs negatively affected participation in screening programs. Conversely, positive attitudes toward healthcare and confidence in treatment effectiveness increased the likelihood of healthcare utilization. Similar patterns emerged in the current study, where qualitative findings indicated that misconceptions regarding cancer and inadequate awareness often contributed to delayed healthcare seeking.

Within the Kenyan context, the findings are consistent with observations by Harsch et al. (2025), who emphasized the importance of health literacy among women receiving breast cancer care. Their study

demonstrated that patients who possessed greater understanding of their disease were better able to navigate healthcare systems, engage with healthcare providers, and adhere to treatment recommendations. The current study similarly found that knowledge and attitudes significantly influenced healthcare utilization even after controlling for healthcare system factors.

The strong influence of knowledge and attitudes observed in the present study may be explained by their role in shaping health-related decision-making. Individuals who recognize symptoms early, understand the importance of timely treatment, and believe in the effectiveness of available services are more likely to seek care promptly and adhere to treatment recommendations. Conversely, misconceptions, fear, stigma, and inadequate awareness may contribute to delayed presentation, missed appointments, and treatment discontinuation. As a result, knowledge and attitudes function as important mediating factors between healthcare availability and actual utilization of services.

The qualitative findings provide additional support for this interpretation. Several participants reported that they initially underestimated the seriousness of their symptoms or lacked adequate information regarding available cancer services. Others indicated that fear of diagnosis or uncertainty regarding treatment outcomes delayed their decision to seek care. These experiences demonstrate how knowledge and attitudes directly influence healthcare-seeking behavior and utilization of cancer services.

Implications of the Findings

The findings of this study suggest that improving utilization of cancer health services requires interventions targeting both healthcare systems and patient knowledge. While expansion of oncology infrastructure remains essential, improvements in service availability alone may not be sufficient if patients lack adequate awareness regarding cancer symptoms, treatment options, and the importance of early healthcare seeking. Similarly, awareness campaigns may have limited effectiveness if healthcare systems are unable to provide accessible and affordable services.

The findings therefore support a dual strategy involving healthcare system strengthening and cancer education initiatives. Community-based awareness programs, patient navigation services, healthcare provider education, and strengthened referral systems may collectively improve utilization of cancer services and contribute to earlier diagnosis and improved treatment outcomes. Such interventions are particularly important in underserved regions such as Garissa County, where geographical and socio-economic barriers continue to affect access to specialized cancer care.

Overall, the study demonstrates that knowledge level and attitude and health facility and health system factors are the primary determinants of utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. Addressing these factors provides a practical pathway for improving healthcare utilization and enhancing cancer outcomes within the region.

CONCLUSION

This study examined the factors influencing utilization of cancer health services among newly diagnosed adult cancer patients attending Garissa County Referral Hospital. The findings demonstrated that utilization of cancer health services is influenced by multiple interrelated factors operating at both the patient and health system levels. The multivariable regression model explained approximately 48.9% of the variation in utilization of cancer health services, indicating that the study variables provided substantial explanatory power in understanding healthcare utilization among the study population. Although individual factors initially appeared important in the bivariate analyses, they did not maintain statistical significance after controlling for the influence of health facility and health system factors and knowledge level and attitude.

The study established that health facility and health system factors significantly influence utilization of cancer health services. Factors related to service availability, accessibility, affordability, quality of care, referral systems, staffing levels, and treatment resources were found to play an important role in determining whether patients

utilize available cancer services. These findings suggest that healthcare utilization is not solely dependent on patient characteristics but is strongly influenced by the ability of the healthcare system to provide accessible, responsive, and patient-centered services. Persistent barriers such as treatment costs, transportation challenges, referral delays, and shortages of specialized services continue to limit optimal utilization of cancer care services among newly diagnosed patients.

The findings further demonstrated that knowledge level and attitude represent the strongest determinants of utilization of cancer health services. Patients with higher levels of cancer-related knowledge and more positive attitudes toward cancer treatment were significantly more likely to utilize available healthcare services. This finding highlights the critical role of health literacy, awareness creation, and patient education in promoting timely healthcare seeking, treatment adherence, and continuity of care. The results suggest that patients who understand cancer symptoms, treatment options, and expected outcomes are better positioned to make informed decisions regarding healthcare utilization and are more likely to engage actively in their treatment journey.

Overall, the study concludes that improving utilization of cancer health services among newly diagnosed adult cancer patients requires a comprehensive approach that simultaneously addresses healthcare system barriers and patient-level knowledge deficits. While investments in infrastructure, equipment, specialist staffing, and referral systems remain essential, equal attention should be directed toward strengthening cancer awareness and patient education initiatives. Interventions that improve both healthcare system performance and patient understanding of cancer are likely to yield the greatest improvements in utilization of cancer health services and ultimately contribute to better treatment outcomes and survival among cancer patients in Garissa County and similar settings.

RECOMMENDATIONS

The findings of this study indicate that improving utilization of cancer health services among newly diagnosed adult cancer patients requires interventions that address both patient-related and health system-related barriers. Given that knowledge level and attitude emerged as the strongest predictor of utilization, county and national health authorities should strengthen cancer awareness and health education initiatives aimed at improving public understanding of cancer symptoms, risk factors, screening opportunities, treatment options, and the importance of early healthcare seeking. Community-based awareness campaigns, patient education programs, and targeted health promotion activities should be expanded, particularly in rural and underserved communities where delays in diagnosis and treatment remain common. In addition, healthcare providers should integrate structured counseling and patient education into routine oncology care to enhance treatment literacy, address misconceptions, reduce fear associated with cancer diagnoses, and promote adherence to prescribed treatment plans.

The study further established that health facility and health system factors significantly influence utilization of cancer health services. Consequently, policymakers and healthcare administrators should prioritize strengthening oncology service delivery through improved access to specialized cancer care, increased availability of trained healthcare personnel, efficient referral systems, reduced waiting times, and uninterrupted access to essential medicines and diagnostic services. Efforts should also be directed toward reducing the financial burden associated with cancer care by expanding health insurance coverage, strengthening financial protection mechanisms, and establishing patient support programs that address treatment, transportation, and follow-up costs. Such interventions would improve access, enhance continuity of care, and ultimately increase utilization of cancer health services among newly diagnosed cancer patients.

Strengths and Limitations of the Study

A major strength of this study was the use of a mixed methods approach, which allowed quantitative findings to be complemented and enriched by qualitative insights obtained from Focus Group Discussions and Key Informant Interviews. The integration of multiple data sources enhanced the credibility and comprehensiveness of the findings. Additionally, the high response rate achieved in the study minimized the risk of non-response

bias and strengthened the reliability of the results. However, several limitations should be considered when interpreting the findings. The cross-sectional nature of the study limited the ability to establish causal relationships between the predictor variables and utilization of cancer health services. The study was also conducted at a single referral hospital, which may limit the generalizability of the findings to other healthcare settings. Furthermore, some information was obtained through self-reporting, making it susceptible to recall bias and social desirability bias. Despite these limitations, the study provides valuable evidence regarding factors influencing utilization of cancer health services among newly diagnosed adult cancer patients in a resource-constrained setting.

Implications for Policy and Practice

The findings of this study have important implications for cancer control policy and healthcare service delivery in Kenya. The prominence of knowledge level and attitude as predictors of utilization suggests that investments in infrastructure alone may not be sufficient to improve cancer outcomes unless accompanied by effective patient education and awareness initiatives. Healthcare planners should therefore integrate health promotion and community engagement strategies into cancer control programs. The findings further emphasize the need for continued strengthening of oncology services within county referral hospitals and other decentralized healthcare facilities. Improving healthcare accessibility, affordability, and service quality has the potential to increase utilization of cancer health services and improve treatment outcomes among patients. Policy interventions aimed at reducing financial barriers and strengthening referral pathways may be particularly beneficial in geographically marginalized counties such as Garissa.

Areas for Future Research

Future studies should employ longitudinal designs to examine how healthcare utilization patterns change throughout the cancer treatment continuum and to establish causal relationships between predictor variables and utilization outcomes. Longitudinal research would provide a more comprehensive understanding of treatment adherence, continuity of care, and long-term healthcare utilization among cancer patients. Further research should also investigate additional factors not included in the current model that may influence utilization of cancer health services, including cultural beliefs, social support systems, psychological factors, health insurance dynamics, and community-level determinants. Comparative studies involving multiple healthcare facilities and counties would also enhance understanding of contextual differences in cancer healthcare utilization across Kenya.

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Declarations

Ethical Approval and Consent to Participate

Ethical approval for the study was obtained from the relevant institutional ethics review committee prior to commencement of data collection. Written informed consent was obtained from all participants before participation in the study.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

The authors conceptualized the study, collected data, conducted the analysis, and drafted the manuscript. The supervisors provided technical guidance, reviewed the manuscript, and contributed to interpretation of findings. All authors reviewed and approved the final manuscript.

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