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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-067715
Article Type:	Original research
Date Submitted by the Author:	28-Aug-2022
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Keywords:	Adult oncology < ONCOLOGY, Urological tumours < ONCOLOGY, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Delays in Seeking, Reaching, and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

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Keywords: sub Saharan Africa, cancer, delays, seeking care, diagnosis, treatment

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Abstract

Objectives

The cancer burden in sub-Saharan Africa continues to grow. Late presentation and delays translate into poor outcomes. We undertook a systematic review to present a summary of the barriers to cancer control in Sub-Saharan Africa using the three delays framework.

Methods

The search was conducted in PubMed and Embase for articles published between January 1995 and March 2021. The inclusion criteria were solid cancers, Sub-Saharan African countries, and quantitative or mixed method research published in the English language. The exclusion criteria were reviews, conference abstracts, pediatric and hematological cancers, and qualitative research papers.

Findings

Of the 6225 articles identified, 57 studies were included concentrated in Nigeria and Ethiopia. Breast and cervical cancer represented 70%. Most studies were conducted in the hospital setting using a cross sectional survey design. Major issues identified included 1. The indirect and direct costs associated with diagnosis and treatment, 2. Lack of coordination between primary, secondary, and tertiary health care sectors, 3. Inadequate staffing 4. Trust and reliance on traditional healers

Conclusions

Breast and cervical cancers are the focus of most research in SSA. Other high burden cancers are not addressed and this raises concern as the pathways to quality care across cancers is not homogenous. In addition, research continues to focus on 3 or 4 countries, and without greater evaluation of all systems and contexts, gaps will continue to widen. Cognizance of the multiple barriers from developing a cancer to treatment is important for policymakers and experts to build resilient and effective cancer control programs.

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition.[1,2] In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 respectively, cancer is becoming a leading public health problem.[3] There is a growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.[4,5] The system level challenges are heterogeneous across SSA but factors germane to all countries include limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.[5–8]

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment, and post treatment care makes cancer hard to manage in developing nations and ultimately results in high levels of premature mortality.[9] Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized; 2) across prevention, treatment, and palliation; 3) across primary, secondary, and tertiary health care sectors. Additionally, building strong system linkages to coordinate cancer care across primary, secondary, and tertiary sectors within country are generally overlooked and this results in critical delays.[9]

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their specific agendas perpetuating silos of development.[10,11] This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic, and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.[12,13] These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including access to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay.[14] However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain under-researched. In addition, robust study designs need to be employed to provide further insights as part of the system evaluation.

In this review, we used the 'Three Delays' framework to support the synthesis and classification of our research studies focusing on barriers to diagnosis and treatment. The Three delays framework has been used in other health conditions e.g. child and maternal health, and emergency medicine, however, to date it has not been applied to cancer care delivery.[15,16] The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care[17] Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

We undertook a systematic review of the literature on sub-Saharan Africa to identify areas requiring further evaluation according to country, tumour type, and setting to target resources and interventions that reduce disparities.

METHODS

Information sources and search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. The full search strategy and PRISMA diagram are available in Appendix 1 and Figure 2 respectively.

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer.

We excluded studies that included paediatric populations, haematologic malignancies, as well assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis.

Selection process

We used the systematic review tool Covidence.[18] Two reviewers (DL and MM) screened the abstracts and full text articles independently with a third reviewer (AA) to resolve any conflicts. The two primary reviewers extracted and validated the entries independently before merging the outputs.

Data items

Data extracted included the year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated.

Assessment of risk of bias

Taking into consideration the heterogeneous nature of the available literature the risk of bias assessment at selection was based on the principles of a tool developed by Hoy et al.[19] DL, AA and MM discussed the included studies over a series of virtual meetings exploring the validity of each of the included studies: external (population and sampling frame) and internal (direct participant data collection, acceptable subject definition, mode of data collection).

Patient and Public Involvement

Patients and members of the public were not involved in the design, conduct or reporting of the systematic review. We intend for patients to be stakeholders in the subsequent Delphi process that will utilize the results of this review.

RESULTS

Study selection

An initial search identified 6225 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.[20–75] Figure 3 and Table 1 summarizes the characteristics of the included studies.

Country and setting profile

The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%), and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at the national level. Of the remaining studies, two-thirds were conducted at the hospital level (n=38) and a quarter (n=14) were conducted at the regional level.

Research design

Two-thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types

Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were

no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were: patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2), and patients and health facility administrators (n=1)

Three delays framework

We synthesized the empirical studies into the three delay areas. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the referenced studies drawing forth the reasons identified as contributing to each type of systems delay. Table 2 provides a summary of the three delays.

Table 1. Study characteristics

First author name	Year	Cancer type	Country	Sample size	Study Design
Gebremariam[31]	2021	Breast	Ethiopia	223	Retrospective
Zeleke[43]	2021	Cervical	Ethiopia	410	Retrospective
Mapanga[28]	2021	Lung	South Africa	27	Delphi process
Nakaganda[26]	2020	Multisite[1]	Uganda	359	Cross-sectional
Tesfaw[60]	2020	Breast	Ethiopia	426	Retrospective
Tesfaw[62]	2020	Breast	Ethopia	371	Cross-sectional
Reibold[22]	2020	Breast	Ethiopia	51	Cross-sectional
Knapp[51]	2020	Breast	Nigeria	609	Retrospective
Leng[59]	2020	Multisite[2]	Nigeria	186	Cross-sectional
Togawa[52]	2020	Breast	Namibia Nigeria Uganda Zambia	1518	Cross-sectional
Swanson[73]	2020	cervical	Uganda	268	Cross-sectional
Foerster[37]	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Cross-sectional
Dereje[42]	2020	Cervical	Ethiopia	212	Cross-sectional
Dereje[41]	2020	Cervical	Ethiopia	231	Cross-sectional
Agodirin[75]	2020	Breast	Nigeria	420	Cross-sectional
Martin[25]	2019	cancer type not specified	Rwanda	73	Cross-sectional
Page[63]	2019	cervical cancer	Kenya	505	Prospective
Low[40]	2019	Multisite[3]	Uganda	100	Cross-sectional
Wambalaba[66]	2019	Multisite[4]	Kenya	1048	Retrospective
Grosse Frie[54]	2019	Breast	Mali	124	Cross-sectional
Yang[38]	2019	Breast	Tanzania	196	Cross-sectional
Schleimer[24]	2019	Breast	Rwanda	151	Retrospective
Foerster[58]	2019	Breast	Uganda Nigeria Namibia	1335	Prospective
Tapera[53]	2019	cervical	Zimbabwe	78	Cross-sectional
Agodirin[57]	2019	Breast	Nigeria	237	Cross-sectional
Rayne[30]	2019	Breast	South Africa	252	Cross-sectional
Subramanian[49]	2019	Breast	Kenya	800	Cross-sectional
Olarewaju[39]	2019	breast	Nigeria	275	Cross-sectional
Ajah[27]	2019	Multisite[5]	Nigeria	95	Cross-sectional
Martei[56]	2019	Multisite[6]	Botswana	286	Retrospective

Herbst[21]	2018	Colorectal	South Africa	162	Retrospective
Anakwenze[47]	2018	Multisite[7]	Botswana	214	Cross-sectional
Moodley[50]	2018	Breast	South Africa	201	Cross-sectional
Joffe [23]	2018	Breast	South Africa	499	Cross-sectional
Awofeso[67]	2018	Breast, Cervical	Nigeria	105	Cross-sectional
Bhatia[64]	2018	Multisite[8]	Botswana	214	Cross-sectional
Oladeji[29]	2017	Multisite[9]	Nigeria	218	Cross-sectional
Jedy-Agba[36]	2017	Breast	Nigeria	316	Case-control
Alatise[55]	2017	colorectal cancer	Nigeria	127	Cross-sectional
Cacala[48]	2017	Breast	South Africa	172	Prospective
Brinton[45]	2016	Breast cancer	Ghana	1184	Cross-sectional
Mlange[61]	2016	Cervical	Tanzania	202	Cross-sectional
Mwaka[70]	2015	Cervical	Uganda	149	Cross-sectional
Long[44]	2015	Multisite[10]	Cameroon	220	Cross-sectional
Pace[34]	2015	Breast	Rwanda	144	Cross-sectional
Tadesse[71]	2015	cervical	Ethiopia	198	Cross-sectional
Dickens[72]	2014	Breast	South Africa	1071	Retrospective
De Boer[69]	2014	Kaposi sarcoma	Uganda	161	Retrospective
Ntirenganya[68]	2014	Breast	Rwanda Sierra Leone	6820	Cross-sectional
Fasunla[46]	2013	Sinonasal Malignancies	Nigeria	61	Cross-sectional
Ibrahim[65]	2011	cervical cancer	Sudan	197	Retrospective
Anyanwu[20]	2011	breast	Nigeria	275	Retrospective
Otieno[32]	2010	Breast	Kenya	166	Cross-sectional
Ezeome[35]	2009	Breast	Nigeria	164	Cross-sectional
Clegg-Lamptey[74]	2009	breast	Ghana	101	Cross-sectional
Ukwenya[33]	2008	Breast	Nigeria	111	Cross-sectional

1 - Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 - breast, cervical, head and neck, prostate; 3 - KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 - Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 - Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 - cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 - Cervical, breast, head and neck, vulvar, kaposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 - Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 - Uterine cervix, breast, head and neck, prostate, GIT; 10 - skin, breast, colorectal, gynecologic, anal

Table 2. Reasons for delays in 3 frameworks

Reasons for seeking care delay	Reasons for reaching care delay	Reasons for receiving quality care delay
• Anticipated expense of treatment	• Dependence on others for transport	• Absence of multidisciplinary team care
• Anticipated long waiting time at clinic	• Difficulty making appointment or reaching doctor	• Burn out and disinterest of health care workers
• Belief in witchcraft	• Distance	• Cancer not priority
• Busy schedule	• Earlier alternative treatment	• Chemotherapy stock outs
• Denial	• Family responsibilities	• Communication barriers
• Distance	• High cost of prediagnostic costs	• Declining treatment
• Economic impact of taking time off work	• High cost of transport	• Defaulting because of side effects of drugs
• Embarrassment	• Inability to afford clinic visits	• Diagnostic delay
• Family and friends' disapproval	• Lack of knowledge of estimated distance to nearest service	• Failure to come back for follow up diagnostic or treatment appointments
• Fear of being asked to stop habits e.g. smoking	• Lack of money (for transport)	• Failure to find accommodation as outpatients close to treatment centre
• Fear of death	• Lack of navigation in primary care	• Family commitments
• Fear of diagnosis	• Lack of needed caregiver to accompany to facilities	• Fear of treatment (e.g. mastectomy)
• Fear of doctors	• Long investigation time at first contact	• Fear of wasting doctor's time
• Fear of dying	• Misdiagnosis at lower levels	• Few specialists
• Fear of job loss	• Obligations at home	• Financial incapability
• Fear of losing part of body (e.g. breast)	• Time restraints	• High cost of medicines
• Fear of missing family commitments because of treatment	• Turned away from clinics for arriving late	• High patient volume compared to resources
• Fear of telling people of illness	• Was told by health care worker there was no treatment for disease	• Lack of consent
• Fear of treatment	• Work commitments	• Lack of continuity of care by same healthcare workers
• Fear treatment is painful		• Lack of palliative care and counselling services
• Financial incapability		• Lack of pathology and screening services

• Ignorance on available treatment • Ignorance on how to seek healthcare • Lack of awareness of symptoms • Lack of personal initiative • Lack of trust in health system • Low education • No health insurance • No one to look after children • Obligations at home • Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture) • Preference for care abroad • Preference for food supplements/organic foods • Preference for prayers and spiritual intervention • Pregnancy/lactation/menopause • Prior bad experience at health centre of hospital • Prioritising day to day survival over seeking help • Putting others needs first • Secrecy • Stigma • Transport challenges (e.g. cost) • Travelled away from home**(out of comfort zone)		• Lack of smoking cessation clinics • Lack of specific appointments with specialists • Language barrier • Long appointments, waiting periods • Management of pregnancy • Misdiagnosis • No bed space • No relative to care for them during treatment • Not healthy enough to continue treatment • Patients changing mobile numbers so cannot be contacted for further management • Paying out of pocket expenses • Poor collaboration amongst health care workers • Poor nutrition • Poorly trained staff • Power outages • Pre-referral diagnosis not communicated • Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements) • Preference to observe • Surgeon/operating room unavailability • Unavailability of treatment modality • Unwelcoming, demotivated and uncommitted staff turn patients away

Seeking delay

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which manifested itself as fears, false perceptions and beliefs and embarrassment about cancer.[23,25,28,29,32,34,35,37,39,39,41,48,52,55,57,61,62,64,67,68,70,74,75] There was also a preference for seeking treatment from traditional or faith-based healers.[24,27,29,32–35,39,41,43,45,46,48,52,54,55,62,67,68,74,75] Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)[23,24,26,28,34,35,39,42,48,49,52,53,55,69,74,75]; they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting.[23,28,33–35,39,41,44,48,50,64,70,75] Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment.[28,34,41,43] The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.[23,41]

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs.[20,24–26,29,30,34,37–39,44,47–49,52,53,57,59,68–70,74,75] Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier to the referral of patients.[28,34,42,67,71,75] This was identified as a source of misdiagnosis and underlay the lack of recognition for the urgency of transferring care to tertiary institutions. In one study, participants reported that they had been misinformed at the primary level that their condition was incurable.

Receiving quality care

The paucity of infrastructure, equipment, medication, and human resources needed for cancer care underpinned the barriers to receiving quality cancer care.[25,59,66] Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer.[22,25,28,29,35,53,59] Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing factors that drove patients to alternate medicine or even simply abandon treatment.[28,44,49] In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients.[20,26,28,29,33,39,44,46,49,52,53,58,59,73,74]

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Sub Saharan African countries are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources.[2,13] In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly.[14]

Interpretation

Our systematic review of studies in Sub-Saharan Africa investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered in the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to managing these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.[76,77] Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.[78,79]

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to provide sufficient insights into the underlying factors and system level processes to enable the identification of interventions. Nonetheless they still provide a valuable baseline that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human, or infrastructure). Across all delays, cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport, accommodation, diagnostic tests, and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance.[80] A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).[81]

In seeking care, fear is compounded by the lack of awareness (knowledge) of the disease, availability of services, or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare, appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinders free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could discourage

patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care system with appropriate human resources and infrastructure (diagnostic and treatment). A lack of human resources encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment.

The findings from our study suggest that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and the inability to support diagnostic costs thereby relying on the patient to raise funds.

To see a reduction in cancer mortality in Sub Saharan Africa health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and managing follow up and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind, an effective population approach can be achieved.

Limitations of this systematic review

This systematic review only captured literature in the English language. This means data and experiences of French, Portuguese and Spanish speaking SSA were excluded based on language. The survey and retrospective design of most of the studies introduced the inherent biases of these methodologies.

Implications for policy in SSA

Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions that have different realities. In carrying out this systematic review we provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

Funding
This work was supported by the London School of Hygiene and Tropical Medicine's Wellcome Institutional Strategic Support Fund (grant reference 204928/Z/16/Z)

Notes

Role of the funder
The funder had no role in the design and conduct of the systematic review, analysis of data; preparation, review and approval of the manuscript for publication

Author disclosures
The authors have no potential conflicts of interest

Author contributions
Conceptualization: DCL, AA; Data curation: DCL, MM, AA; Formal Analysis: DCL, AA, MM, SM; Funding acquisition: AA; Investigation: DCL, MM, AA; Methodology: DCL, AA; Project administration: AA; Resources: DCL, AA; Supervision: DCL, AA; Validation: DCL, AA, MM; Visualization: DCL; Writing- original draft DCL, SM, MM, GB, MS, RM, ASS, JS, ADM, AA; Writing – review and editing DCL, SM, MM, GB, MS, RM, ASS, JS, ADM, AA

Disclaimers
No disclaimers

Prior presentations
No prior presentations

Data availability
All data is available in the Covidence app and access can be shared on request.

Ethics approval
Not applicable

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Figure 1. Linkages of 3 delays framework

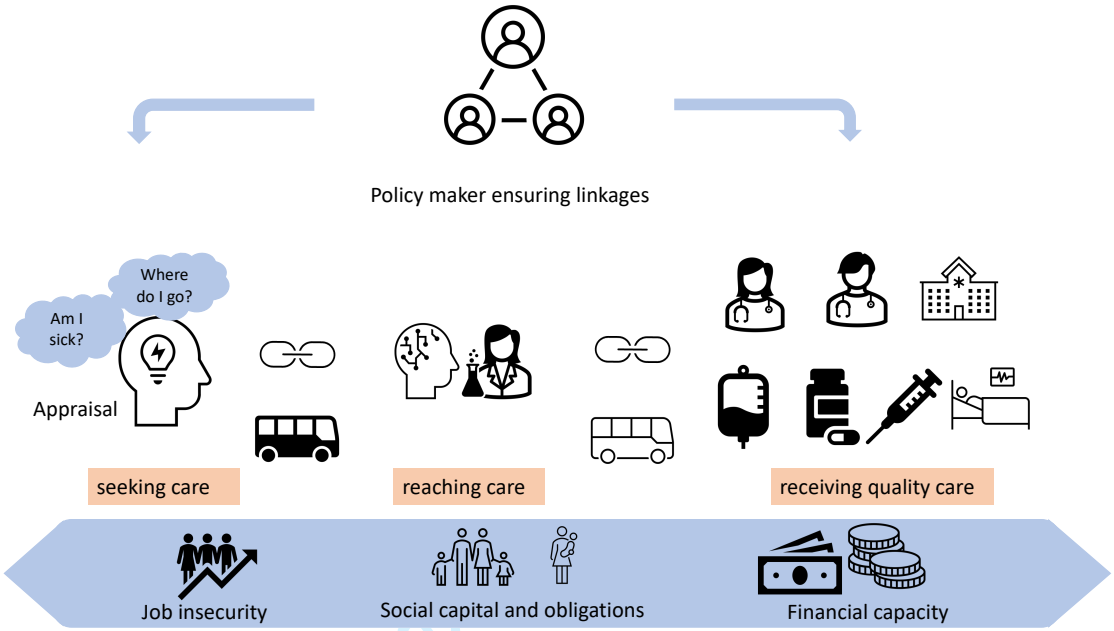


Figure 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

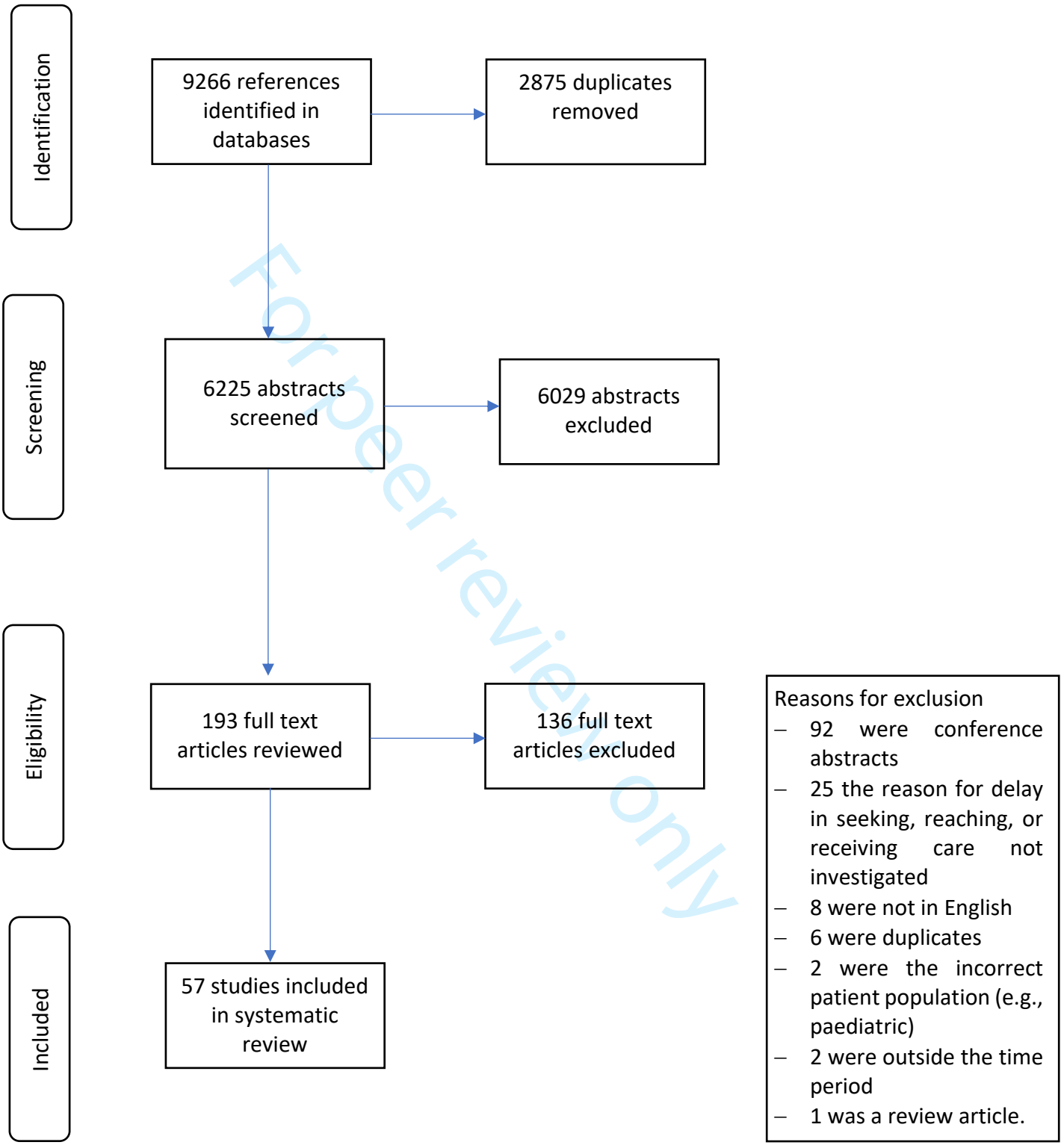
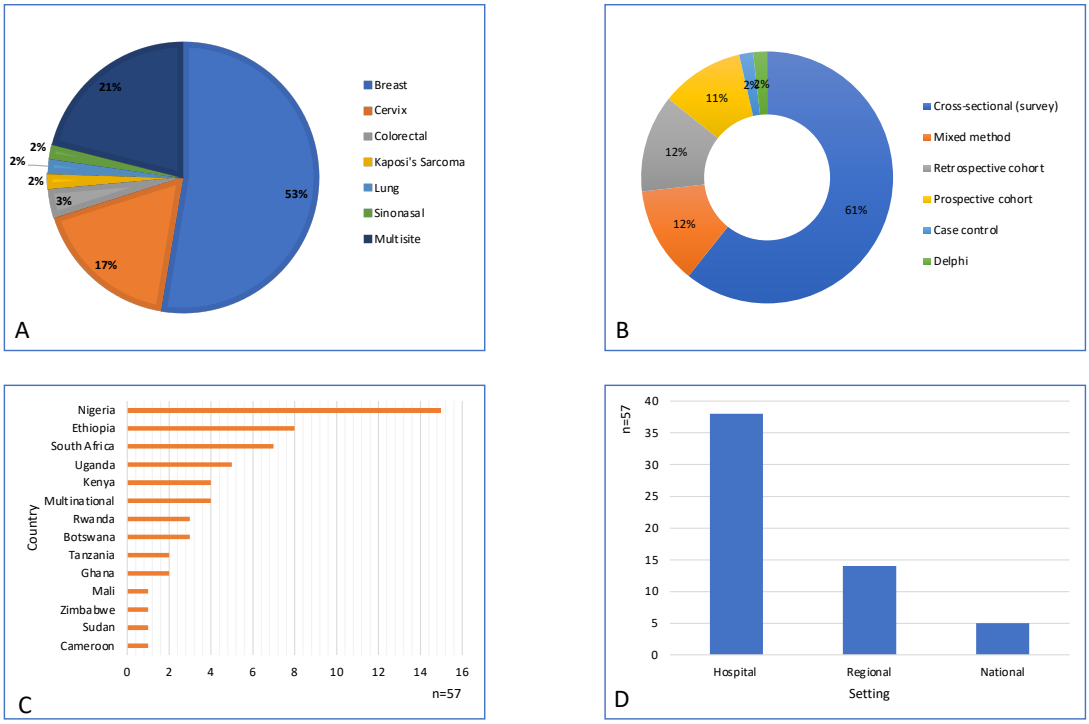


Figure 3. Descriptive characteristics of included studies n= 57, categorized according to A (Tumour type); B (Research design); C (Study country (ies); D (Study setting).



A – Tumour type; B – Research design; C – Country; D - Setting

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 2-4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 4
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 4
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 5
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 5
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 5
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Page 5
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	N/A
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	N/A
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/A
Study characteristics	17	Cite each included study and present its characteristics.	Page 5 Table 1
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	N/A
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Page 6-7
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 6-7
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Page 6-7
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 7-9
	23b	Discuss any limitations of the evidence included in the review.	Page 9-10
	23c	Discuss any limitations of the review processes used.	Page 9-10
	23d	Discuss implications of the results for practice, policy, and future research.	Page 10
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	N/A
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 11
Competing interests	26	Declare any competing interests of review authors.	Page 11
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 11

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71For more information, visit: http://www.prisma-statement.org/

BMJ Open

Delays in Seeking, Reaching and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-067715.R1
Article Type:	Original research
Date Submitted by the Author:	25-Jan-2023
Complete List of Authors:	Lombe, Dorothy; Te Whatu Ora Health NZ MidCentral, Radiation Oncology Mwamba, Monde; ZAMBART Msadabwe, Susan; Cancer Diseases Hospital Bond, Virginia ; London School of Hygiene & Tropical Medicine and ZAMBART, Social Science Simwinga, Musonda; Zambart Ssemata, Andrew Sentoogo; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Muhumuza, Richard; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Seeley, Janet; London School of Hygiene and Tropical Medicine, Department of Global Health &Development Mwaka, Amos; Makerere University CHS, Department of Medicine Aggarwal, Ajay; King's College London
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Global health
Keywords:	Adult oncology < ONCOLOGY, Urological tumours < ONCOLOGY, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Delays in Seeking, Reaching and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

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Keywords: sub Saharan Africa, cancer, delays, seeking care, diagnosis, treatment

Word count: 3130

Abstract

Objectives The burden of cancer in sub-Saharan Africa (SSA) continues to grow. Late presentation and delays in diagnosis, and treatment, consistently translate into poor outcomes. The aim was to amalgamate the factors influencing diagnostic and treatment delays of adult solid tumours in SSA

Design and settings We undertook a systematic review of the literature to present a summary of the barriers to optimal cancer control in SSA using the three delays framework.

Methods The search was conducted in PubMed and Embase for articles published between January 1995 and March 2021. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. Inclusion criteria were all solid cancers, SSA countries, quantitative or mixed method research and publications in the English language. Quality of studies was assessed with ROBINS-E tool.

Findings 57 studies were included. 40% from Nigeria and Ethiopa. Breast and cervical cancer represented 70%. Most studies were conducted in the hospital setting. Forty-three studies were evaluated having a high risk of bias at preliminary stages of quality assessment. Fourteen studies met the criteria for full assessment and all totaled to either high or very high overall risk of bias across 7 domains. The major issues identified included the indirect and directs costs; lack of coordination between primary, secondary and tertiary health care sectors; inadequate staffing and trust and reliance on traditional healers.

Conclusions Robust methodological research to inform policy on the barriers to seeking, reaching and receiving quality cancer care in SSA is absent. The focus of most research is on breast and cervical cancer. Research outputs are concentrated in few countries Multiple barriers are present for individual patients from symptom appraisal of cancer to its treatment. It is imperative that we investigate the complex interaction of these factors to build resilient and effective cancer control programs.

Strengths and limitations of this study

- The study interrogated 2 layers of factors (context and delays) by considering the '3-Delays Framework'
- The study conformed to the appropriate methodology of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance
- The quality of the studies included studies was largely poor but rigorous assessment of risk of bias across 7 domains allowed deduction key study findings that are a useful steppingstone for further investigation

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition.(1,2) In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 people respectively, cancer is becoming a leading public health problem.(3) There is growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.(4,5) The system level challenges are heterogenous across SSA but factors germane to all countries includes limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.(5–8)

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment and post treatment care makes cancer hard to manage in developing nations and ultimately result in high levels of premature mortality.(9) Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized(10); 2) across prevention, treatment, palliation(11); 3) across primary, secondary and tertiary health care sectors(12). Additionally, building strong system linkages to coordinate cancer care across primary, secondary and tertiary sectors within country are generally overlooked and this results in critical delays.(9)

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their own specific agendas perpetuating silos of development.(13,14) This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.(15,16) These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including accessibility to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay.(17) However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain under-researched. In addition, robust study designs need to be employed to help compare results between studies and provide further insights as part of the system evaluation.

In this review we used the 'Three Delays' framework to support the synthesis and classification of our research studies focusing on barriers to diagnosis and treatment. The Three delays framework has been used in other health conditions e.g. child and maternal health, emergency medicine however, to date it has not been applied to cancer care delivery.(18,19) The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care(20) Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

The aim of this investigation was to identify common factors influencing diagnostic delays of adult solid tumours and highlight areas that require further study whether that be specific countries, tumour types or settings, in order to help target resources and inform interventions that reduce cancer survivorship disparities globally.

METHODS

We undertook a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. The PRISMA diagram is illustrated in Figure 2

Search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021.The full search strategy is in the supplementary material as Appendix 1

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer. We excluded studies that included paediatric populations, haematologic malignancies, as well

assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis and treatment pathways. Haematological malignancies have been excluded because the pathways of referral, detection, management and prognosis are very different compared to solid organ malignancies and would require a separate evaluation.

Study selection
Two reviewers (DL and MM) screened the abstracts and full text articles with a third reviewer (AA) to resolve any conflicts. We utilized the systematic review tool Covidence to screen, extract and validate data.(21)

Data abstraction and synthesis
The two primary reviewers extracted and validated the entries together before merging the outputs. Data extracted included year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated ,reasons for delay and primary outcomes.

Quality assessment was interrogated with ROBINS-E tool by DL and AA.(22)

Patient and public involvement
Patients and members of the public were not involved in the design, conduct or reporting of the systematic review.

RESULTS

Study characteristics
An initial search identified 6391 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.(23–78) The full data extraction output is included in the supplementary material in Appendix 2.

Country and setting profile
The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%) and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at national level. Of the remaining studies, two thirds were conducted at the hospital level (n=38) and a quarter (n=14) being conducted at regional level.

Research design
Two thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types
Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were: patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2) and patients and health facility administrators (n=1)

Assessment of study quality

Fourteen cohort studies met the eligibility for a full assessment. The scores across the domains are illustrated in Figure 3. The exposure and outcome characteristics are included in the supplemental material as Appendix 3. Two cohort studies did not require full interrogation as preliminary assessment of bias by asking the following three questions placed them in the very high-risk category i) Did the authors make any attempt to control for confounding? ii) Was the method of measuring exposure inappropriate? iii) Was the method of measuring the outcome inappropriate? The remaining 40 were surveys. However, all the studies provided valuable insights that we used in the narrative synthesis. A similar finding on data quality from this region has been highlighted before in a contemporary systematic on the routes to diagnosis of symptomatic cancer in SSA.(79) Figure 3 illustrates the different domains and proportions of bias across the studies. For the studies that were assessed comprehensively all of them had an overall judgement of high or very high risk of bias. In most studies the patient related confounders (age, marital status and socioeconomic status such as income and education level were collected as variables but not controlled for appropriately. Health systems factors were poorly accounted for in statistical analysis plans.

Three delays framework

We synthesized the empirical studies into the three delay areas seeking, reaching and receiving quality cancer care. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the how the various studies addressed the components of the three delays framework.

Table 1. Three delays Framework distribution of studies

First author name	Year	Cancer type	Country	N	Setting	Design	3 delays
Gebremariam(34)	2021	Breast	Ethiopia	223	Regional	Retrospec	C
Zeleke(46)	2021	Cervical	Ethiopia	410	Hospital	Retrospec	A
Mapanga(31)	2021	Lung	S. Africa	27	Regional	Delphi	A, B, C
Nakaganda(29)	2020	Multisite[1]	Uganda	359	Hospital	Survey	A, B, C
Tesfaw(63)	2020	Breast	Ethiopia	426	Regional	Retrospec	A, C
Tesfaw(65)	2020	Breast	Ethopia	371	Regional	Survey	A, C
Reibold(25)	2020	Breast	Ethiopia	51	Hospital	Survey	C
Knapp(54)	2020	Breast	Nigeria	609	Hospital	Retrospec	A, B
Leng(62)	2020	Multisite[2]	Nigeria	186	Hospital	Survey	A, B, C
Togawa(55)	2020	Breast	Namibia Nigeria Uganda Zambia	1518	Hospital	Survey	A,C
Swanson(76)	2020	cervical	Uganda	268	Hospital	Survey	C

Foerster(40)	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Hospital	Survey	A, B, C
Dereje(45)	2020	Cervical	Ethiopia	212	Regional	Survey	A, C
Dereje(44)	2020	Cervical	Ethiopia	231	Regional	Survey	A, B
Agodirin(78)	2020	Breast	Nigeria	420	Regional	Survey	A, B, C
Martin(28)	2019	cancer type not specified	Rwanda	73	National	Survey	C
Page(66)	2019	cervical	Kenya	505	Regional	Prospect	A,B
Low(43)	2019	Multisite[3]	Uganda	100	Hospital	Survey	A, B
Wambalaba(69)	2019	Multisite[4]	Kenya	1048	National	Retrospec	A, C
Grosse Frie(57)	2019	Breast	Mali	124	Regional	Survey	A, B, C
Yang(41)	2019	Breast	Tanzania	196	Hospital	Survey	B
Schleimer(27)	2019	Breast	Rwanda	151	Regional	Retrospec	A, B, C
Foerster(61)	2019	Breast	Uganda Nigeria Namibia	1335	Hospital	Prospect	A, B, C
Tapera(56)	2019	cervical	Zimbabwe	78	Regional	Survey	A, B, C
Agodirin(60)	2019	Breast	Nigeria	237	Regional	Survey	A, B, C
Rayne(33)	2019	Breast	S. Africa	252	Hospital	Survey	A, B
Subramanian(52)	2019	Breast	Kenya	800	Regional	Survey	A, B, C
Olarewaju(42)	2019	breast	Nigeria	275	Hospital	Survey	A, B, C
Ajah(30)	2019	Multisite[5]	Nigeria	95	Hospital	Survey	A
Martei(59)	2019	Multisite[6]	Botswana	286	Hospital	Retrospec	A
Herbst(24)	2018	Colorectal	S. Africa	162	Hospital	Retrospec	C
Anakwenze(50)	2018	Multisite[7]	Botswana	214	Hospital	Survey	A, B
Moodley(53)	2018	Breast	S. Africa	201	Hospital	Survey	A, B
Joffe	2018	Breast	S. Africa	499	Hospital	Survey	A, B, C
Awofeso(70)	2018	Breast, Cervical	Nigeria	105	Hospital	Survey	A, B, C
Bhatia(67)	2018	Multisite[8]	Botswana	214	Hospital	Survey	A,B
Oladeji(32)	2017	Multisite[9]	Nigeria	218	Hospital	Survey	A, B, C
Jedy-Agba(39)	2017	Breast	Nigeria	316	National	Case-control	A, B
Alatise(58)	2017	colorectal	Nigeria	127	Hospital	Survey	A, B, C
Cacala(51)	2017	Breast	S. Africa	172	Hospital	Prospect	A, B
Brinton(48)	2016	Breast	Ghana	1184	Regional	Survey	A, B
Mlange(64)	2016	Cervical	Tanzania	202	Hospital	Survey	A, B
Mwaka(73)	2015	Cervical	Uganda	149	Hospital	Survey	A, B
Long(47)	2015	Multisite[10]	Cameroon	220	Hospital	Survey	A, B, C
Pace(37)	2015	Breast	Rwanda	144	National	Survey	A, B, C
Tadesse(74)	2015	cervical	Ethiopia	198	Hospital	Survey	B, C

Dickens(75)	2014	Breast	S. Africa	1071	Hospital	Retrospec	B
De Boer(72)	2014	K. Sarcoma	Uganda	161	Hospital	Retrospec	A, B
Ntirenganya(71)	2014	Breast	Rwanda Sierra Leone	6820	National	Survey	A, B
Fasunla(49)	2013	Sinonasal	Nigeria	61	Hospital	Survey	A, B, C
Ibrahim(68)	2011	cervical	Sudan	197	Hospital	Retrospec	B
Anyanwu(23)	2011	breast	Nigeria	275	Hospital	Retrospec	B, C
Otieno(35)	2010	Breast	Kenya	166	Hospital	Survey	A, B, C
Ezeome(38)	2009	Breast	Nigeria	164	Hospital	Survey	A, B
Clegg-Lamptey(77)	2009	breast	Ghana	101	Hospital	Survey	A, B, C
Ukwenya(36)	2008	Breast	Nigeria	111	Hospital	Survey	A, B, C

1 – Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 – breast, cervical, head and neck, prostate; 3 – KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 – Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 – Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 – cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 – Cervical, breast, head and neck, vulvar, 8aposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 – Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 – Uterine cervix, breast, head and neck, prostate, GIT; 10 – skin, breast, colorectal, gynecologic, anal; 3 delays codes A – seeking care; B – reaching care; C – receiving quality care; S. Africa – South Africa; Retrospec – Retrospective; Prospect – Prospective; K. Sarcom – Kaposi Sarcoma; N – sample size

The reasons of the delays amalgamated from the studies and identified as contributing to each type of systems delay are outlined in Table 2. The comprehensive output with outcomes of the data extraction is included as Appendix 2 in the supplementary material.

Table 2. Reasons for three delays

Reasons for seeking care delay	Reasons for reaching care delay	Reasons for receiving quality care delay
• Anticipated expense of treatment • Anticipated long waiting time at clinic • Belief in witchcraft • Busy schedule • Denial • Distance • Economic impact of taking time off work • Embarrassment • Family and friends' disapproval • Fear of being asked to stop habits e.g. smoking • Fear of death • Fear of diagnosis • Fear of doctors • Fear of dying • Fear of job loss • Fear of losing part of body (e.g. breast) • Fear of missing family commitments because of treatment • Fear of telling people of illness • Fear of treatment • Fear treatment is painful • Financial incapability • Ignorance on available treatment • Ignorance on how to seek healthcare • Lack of awareness of symptoms • Lack of personal initiative • Lack of trust in health system	• Dependence on others for transport • Difficulty making appointment or reaching doctor • Distance • Earlier alternative treatment • Family responsibilities • High cost of prediagnostic costs • High cost of transport • Inability to afford clinic visits • Lack of knowledge of estimated distance to nearest service • Lack of money (for transport) • Lack of navigation in primary care • Lack of needed caregiver to accompany to facilities • Long investigation time at first contact • Misdiagnosis at lower levels • Obligations at home • Time restraints • Turned away from clinics for arriving late • Was told by health care worker there was no treatment for disease • Work commitments	• Absence of multidisciplinary team care • Burn out and disinterest of health care workers • Cancer not priority • Chemotherapy stock outs • Communication barriers • Declining treatment • Defaulting because of side effects of drugs • Diagnostic delay • Failure to come back for follow up diagnostic or treatment appointments • Failure to find accommodation as outpatients close to treatment centre • Family commitments • Fear of treatment (e.g. mastectomy) • Fear of wasting doctor's time • Few specialists • Financial incapability • High cost of medicines • High patient volume compared to resources • Lack of consent • Lack of continuity of care by same healthcare workers • Lack of palliative care and counselling services • Lack of pathology and screening services • Lack of smoking cessation clinics • Lack of specific appointments with specialists • Language barrier • Long appointments, waiting periods • Management of pregnancy

• Low education • No health insurance • No one to look after children • Obligations at home • Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture) • Preference for care abroad • Preference for food supplements/organic foods • Preference for prayers and spiritual intervention • Pregnancy/lactation/menopause • Prior bad experience at health centre of hospital • Prioritising day to day survival over seeking help • Putting others needs first • Secrecy • Stigma • Transport challenges (e.g. cost) • Travelled away from home (out of comfort zone)		• Misdiagnosis • No bed space • No relative to care for them during treatment • Not healthy enough to continue treatment • Patients changing mobile numbers so cannot be contacted for further management • Paying out of pocket expenses • Poor collaboration amongst health care workers • Poor nutrition • Poorly trained staff • Power outages • Pre-referral diagnosis not communicated • Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements) • Preference to observe • Surgeon/operating room unavailability • Unavailability of treatment modality • Unwelcoming, demotivated and uncommitted staff turn patients away

Seeking delay

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which manifested itself as fears, false perceptions and beliefs and embarrassment about cancer.(26,28,31,32,35,37,38,40,42,42,44,51,55,58,60,64,65,67,70,71,73,77,78) There was also a preference for seeking treatment from traditional or faith-based healers.(27,30,32,35–38,42,44,46,48,49,51,55,57,58,65,70,71,77,78) Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)(26,27,29,31,37,38,42,45,51,52,55,56,58,72,77,78); they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting.(26,31,36–38,42,44,47,51,53,67,73,78) Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment.(31,37,44,46) The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.(26,44)

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs.(23,27–29,32,33,37,40–42,47,50–52,55,56,60,62,71–73,77,78) Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier for referral of patients.(31,37,45,70,74,78) This was identified as a source of misdiagnosis and underlay the lack of

recognition for the urgency of transferring care to tertiary institutions. In one study, participants had reported that they had been misinformed at the primary level that their condition was incurable.(38)

Receiving quality care

The paucity of infrastructure, equipment, medication and human resources needed for cancer care underpinned the barriers to receiving quality cancer care.(28,62,69) We noted a lack of availability or poor quality diagnostic equipment and treatment facilities were also challenges identified.(58,62,70) Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer.(25,28,31,32,38,56,62) Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing to factors that drove patients to alternate medicine or even simply abandon treatment.(31,47,52) In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients.(23,29,31,32,36,42,47,49,52,55,56,61,62,76,77)

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Sub Saharan African countries are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources.(2,16) In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly.(17)

However, our systematic review of studies in Sub-Saharan Africa investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered to the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to manage these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.(80,81) Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.(82,83) This is exemplified by our findings which show research is concentrated on a pool of 4 or 5 better resourced countries and two main tumour types likely related to the availability of external funding.

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to account for important cofounding factors and system level processes to enable the effective problem solving. None the less they still provide a valuable baseline insights that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human or infrastructure). Across all delays cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport,

accommodation, diagnostic tests and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance.(84) A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).(85)

In seeking care, fear is compounded by the lack of awareness (knowledge) on the disease, availability of services or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinder free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could possibly discourage patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care the system with appropriate human resource and infrastructure (diagnostic and treatment). A lack of human resource encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment. Acceptance and adherence to treatment are also integral to a successful intervention as investigated by Anyanwu et al.(23)

The findings from our study suggests that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and inability to support diagnostic costs thereby relying on the patient to raise funds.

Limitations of the study

A major limitation in the interpretation and application of the findings of this research output is the quality of the included study. Recognition of this limitation and application of additional triangulation has assisted us to utilise what is available in this space.

Future directions based on our findings would be to conduct more research studies that will provide quality data for policy formation and effective implementation

Conclusion

To see a reduction in cancer mortality in Sub Saharan Africa health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind an effective population

approach can be achieved. Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions who have different realities. In carrying out this systematic review we intend to provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

Figure 1. Three Delays Framework
Figure 2. Flowchart of study selection as per Preferred Reporting
Figure 3. Quality assessment of studies , n= 14. *McGuinness, LA, Higgins, JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Syn Meth. 2020; 1- 7. https://doi.org/10.1002/jrsm.1411*

Contributorship DCL, MM and AA were involved in all aspects. SM, VB, MS, ASS, RM, JS and ADM participated in study design, data interpretation, preparation and revision of manuscript

Funding statement This work was supported by the London School of Hygiene and Tropical Medicine's Wellcome Institutional Strategic Support Fund (grant reference 204928/Z/16/Z)

Competing interests The authors have no financial disclosures or other conflicts of interest to report

Ethics approval Non-applicable. This study did not involve animal or human participants. Patient consent for publication was notrequired

Data availability statement No datasets were generated. The data extraction output is available as supplementary material.

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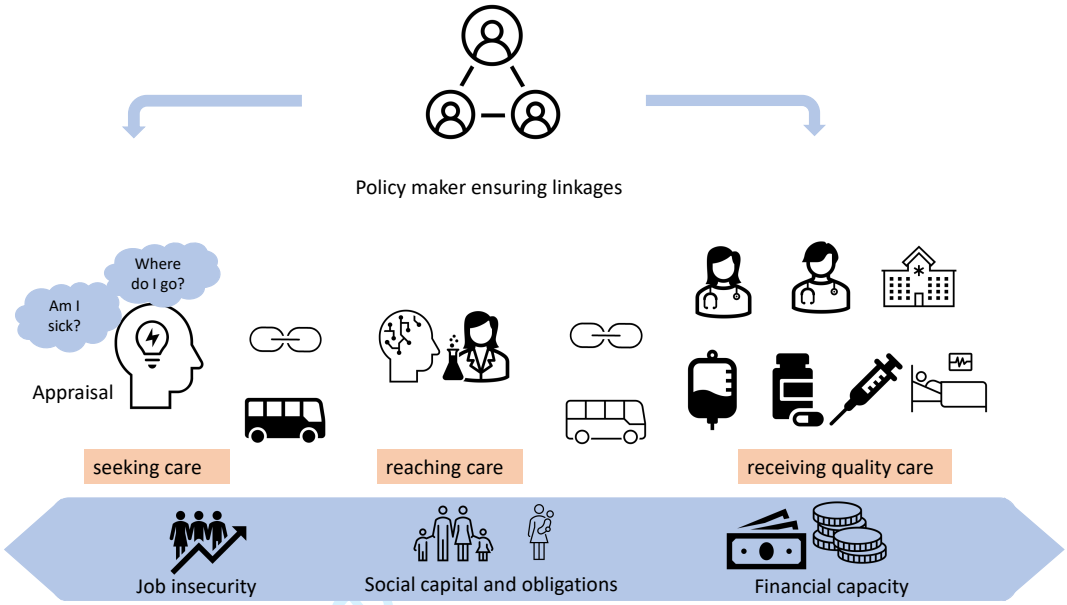

Figure 1: Three Delays Framework

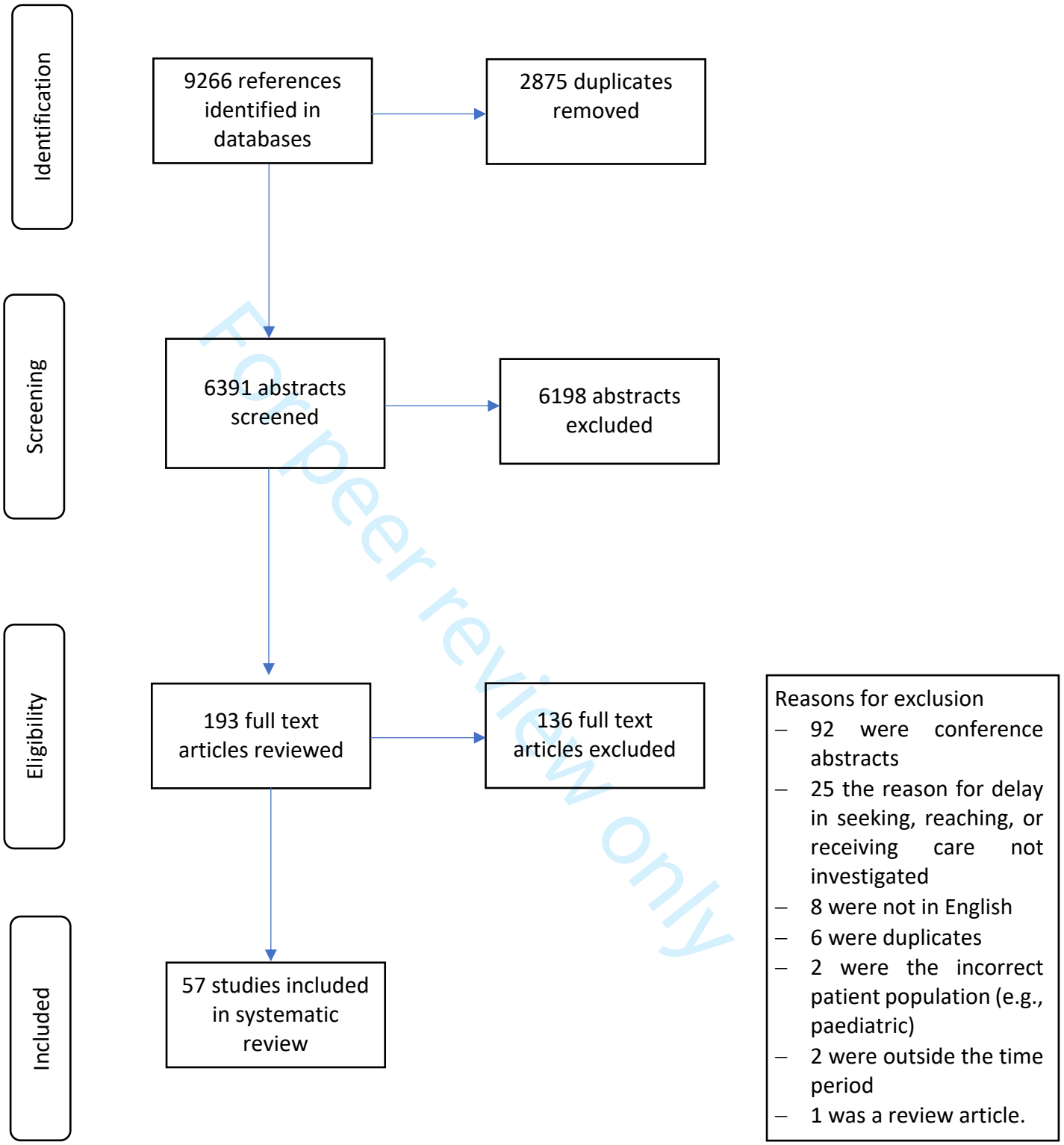

Figure 2. Flowchart of study selection as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance

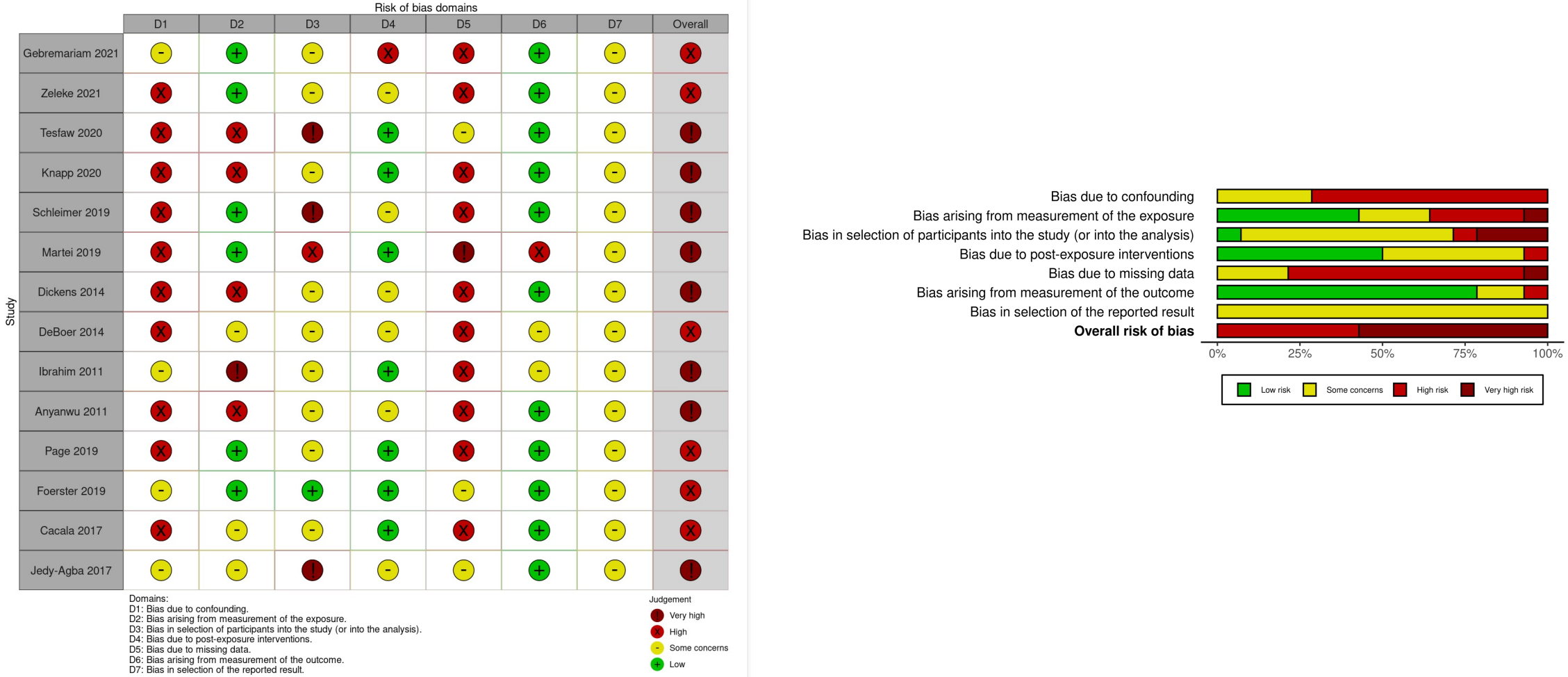

Figure 3. Quality assessment of studies , n= 14.

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Appendix 1. Search Strategy

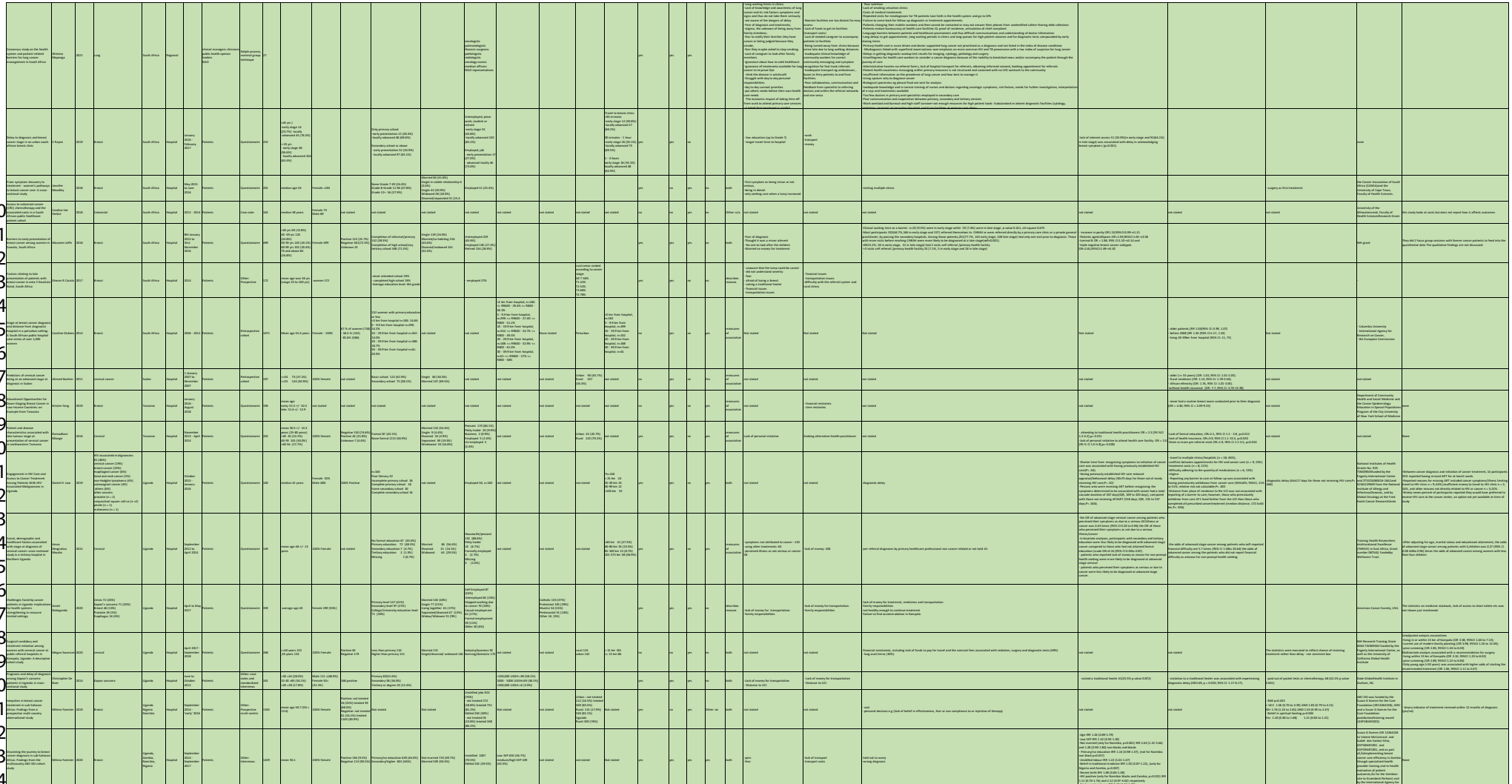
Systematic review	
Databases	PubMed
Search terms	Synonyms
1. Cancer ti,ab	cancer OR tumour OR tumor OR neopla* OR malignan* OR carcinoma
2. Delay ti, ab	barrier* OR delay* OR access OR late OR interval
3. Diagnosis and treatment ti, ab	diagnos* OR presentation OR intervention OR referral OR consult* OR treatment OR therap*
4. countries ti,ab	angola OR benin OR botswana OR burkina faso OR burundi OR cameroon OR cameron OR cape verde OR cabo verde OR central african republic OR ubangi shari OR chad OR comoros OR comoro islands OR iles comores OR congo brazzaville OR congo democratic republic OR democratic republic of congo OR congo OR zaire OR cote d ivoire OR cote divoire OR ivory coast OR djibouti OR french somaliland OR equatorial guinea OR eritrea OR ethiopia OR gabon OR Gabonese republic OR gambia OR ghana OR gold coast OR guinea OR guinea bissau OR kenya OR lesotho OR basutoland OR liberia OR madagascar OR malagasy OR malawi OR nyasaland OR mali OR mauritania OR mauritius OR mozambique OR namibia OR niger OR nigeria OR réunion OR rwanda OR Ruanda OR sao tome OR principe OR senegal OR seychelles OR sierra leone OR somalia OR south africa OR south sudan OR sudan OR swaziland OR tanzania OR tanganyika OR togo OR togolese republic OR uganda OR zambia OR zimbabwe OR africa OR african
5. Qualitative search terms	qualitative* OR narrative* OR interview* OR focus group* OR grounded theory*

Systematic review	
Databases	EMBASE
Search terms	Synonyms
1. Cancer ti,ab	cancer:ti,ab OR tumour:ti,ab OR tumor:ti,ab OR neopla*:ti,ab OR malignan*:ti,ab OR carcinoma:ti,ab
2. Delay	barrier*:ti,ab OR delay*:ti,ab OR access:ti,ab OR late:ti,ab OR interval:ti,ab
3. Diagnosis and treatment ti, ab	diagnos*:ti,ab OR presentation:ti,ab OR intervention:ti,ab OR referral:ti,ab OR consult*:ti,ab OR treatment:ti,ab OR therap*:ti,ab
4. Sub-Saharan Africa ti, ab	angola:ti,ab OR benin:ti,ab OR botswana:ti,ab OR 'burkina faso':ti,ab OR burundi:ti,ab OR cameroon:ti,ab OR cameron:ti,ab OR 'cape verde':ti,ab OR 'cabo verde':ti,ab OR 'central african republic':ti,ab OR 'ubangi shari':ti,ab OR chad:ti,ab OR comoros:ti,ab OR 'comoro islands':ti,ab OR 'iles comores':ti,ab OR 'congo brazzaville':ti,ab OR 'congo democratic republic':ti,ab OR 'democratic republic congo':ti,ab OR congo:ti,ab OR zaire:ti,ab OR 'cote divoire':ti,ab OR 'cote d ivoire':ti,ab OR 'ivory coast':ti,ab OR djibouti:ti,ab OR 'french somaliland':ti,ab OR 'equatorial guinea':ti,ab OR eritrea:ti,ab OR ethiopia:ti,ab OR gabon:ti,ab OR 'gabonese republic':ti,ab OR gambia:ti,ab OR ghana:ti,ab OR 'gold coast':ti,ab OR guinea:ti,ab OR 'guinea bissau':ti,ab OR kenya:ti,ab OR lesotho:ti,ab OR basutoland:ti,ab OR liberia:ti,ab OR madagascar:ti,ab OR malagasy:ti,ab OR malawi:ti,ab OR nyasaland:ti,ab OR mali:ti,ab OR mauritania:ti,ab OR mauritius:ti,ab OR mozambique:ti,ab OR namibia:ti,ab OR niger:ti,ab OR nigeria:ti,ab OR réunion:ti,ab OR rwanda:ti,ab OR ruanda:ti,ab OR 'sao tome':ti,ab OR 'principe':ti,ab OR senegal:ti,ab OR seychelles:ti,ab OR 'sierra leone':ti,ab OR somalia:ti,ab OR 'south africa':ti,ab OR 'south sudan':ti,ab OR sudan:ti,ab OR swaziland:ti,ab OR tanzania:ti,ab OR tanganyika:ti,ab OR togo:ti,ab OR 'togolese republic':ti,ab OR uganda:ti,ab OR zambia:ti,ab OR zimbabwe:ti,ab OR africa:ti,ab OR african:ti,ab
5. Qualitative search terms	qualitative*:ti,ab OR narrative*:ti,ab OR interview*:ti,ab OR focus group*:ti,ab OR grounded theory*:ti,ab

Appendix 2. Data extraction sheet

Title	First author name	Year of publication	Cancer type	Country	Setting	Data collection timeframe	Participants	Design	Sample size	Patient factors: Age	Sex/gender	HIV status	Education	Marital status	Employment/ Occupation	Income	Religious affiliation	Place of residence	Distance from hospital	Type of delay: seeking care	reaching care	receiving quality care	Advanced stage used as a proxy	Framework	Reasons for type of delay: seeking care	Reasons for type of delay: reaching care	Reasons for type of delay: receiving quality care	Outcomes: seeking care	reaching care	receiving quality care	Sponsorship	Comments
Impact of Essential Medicine Stock Outs on Cancer Therapy Delivery in a Resource-Limited Setting.	Yehoda M. Martei,	2019	cervical breast prostate esophageal lung uterine ovarian colorectal head and neck cancers Kaposi sarcoma	Botswana	Hospital	1st January 2016 to 31st December 2016	Patients	Retrospective cohort	286	<65yrs =217 > 65yrs=61 Unknown =8	Male 77 Female 180 Unknown 29	Positive 80 Negative 80 Unknown 126								no	no	yes	no	both			-chemotherapy stock outs			-each week of stock out was strongly associated with a suboptimal therapy delivery event AL1(OR, 1.81; 95% CI, 1.62 to 2.02). -Every week of stock-out duration was associated with an almost two-fold increased risk of a suboptimal therapy delivery event (OR, 1.9; 95%CI, 1.7 t 2.13;P,.001). - patients receiving treatment regimens for colon (OR, 6.34;95% CI, 3.11 to 12.9;P,.001) or rectal cancer (OR, 7.07;95% CI, 1.83 to 27.3;P= .004) were at the highest risk of an event after adjusting for stock out, whereas those with prostate cancer were less likely than their counterparts to experience a suboptimal therapy delivery event (adjusted OR, 0.24; 95% CI, 0.08 to 0.79;P= .019	Pfizer (Inst), Genentech (Inst), Incyte (Inst),Millennium Pharmaceuticals (Inst), Bayer HealthCare Pharmaceuticals(Inst), Veridex (Inst), Calithera Biosciences (Inst), GlaxoSmithKline(Inst), Wyeth (Inst)	-The measured exposure was chemotherapy stock out, quantified as the duration of chemotherapy stock out within a cycle interval. -Stock-out duration was calculated by counting the days from the date the drug was out of stock to the date it was recorded as being back in stock. -The primary outcome, suboptimal therapy delivery, was defined as any of the following events: any dose reduction, at least 1-week delay in receipt of therapy, any missed dose, and any switch in intended therapy. - A majority of the patients with stage information had either stage III or IV disease. Of patients with known intent of treatment, 51%were receiving curative regimens and 49% were receiving noncurative regimens
Patient Factors Associated With Delays in Obtaining Cancer Care in Botswana.	Rhine K Bhatia	2018	All cancers Cervical 90 (42.3%) Breast 34 (16.0%) Head and neck 34 (16.0%) Vulvar 15 (7.04%) 9Kaposi's sarcoma 14 (6.7%) Endometrial 7 (3.3%) Penile 5 (2.4%) Anal 5 (2.4%) Oesophageal 5 (2.4%) Lymphoma 3 (1.4%) Prostate 1 (0.5%)	Botswana	Hospital	December 2015 - January 2017	Patients	Questionnaire	214	median age of 46 years (21-95 years)	Women 173 (81.3%) Men 41 (19.2%)	positive 128 (60.7%) negative 83 (39.3%)	None 28 (16.2%) Primary 59 (34.1%) Secondary 70 (40.5%) Tertiary or above 16 (9.3%)	Single 132 (62.9%) Married 47 (22.4%) serious or live-in 16 (7.7%) Separated/ widowed 15 (7.1%)	not stated	not stated	not stated	not stated	5-50 km 67 (32.7) 51-200 km 61 (29.8) 201-400 km 34 (16.6) > 400 km 43 (30.0)	yes	no	yes	no	both	Appraisal - sex, p=0.030: male 16 (39%); female 39 (22.5%) - severity of symptoms, p=0.006: not serious 22 (44.9%); a little serious 4 (10.3%); moderately serious 5 (21.7%); serious 5 (23.8%) very serious 19 (24.7%) - cancer site, p=0.011: Cervical 14 (15.6%); Vulvar 5 (33.3%); Anal 1 (20%); Head and neck 9 (26.5%); Penile 3 (60%); Breast 8 (23.5%); Lymphoma 2 (66.7%) Oesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - age, p=0.496 Fears - Scared of telling people that I am sick, p=0.006 4/213 (0.212%) - Scared of job loss, p=0.002 6/171 (90.22%) - Scared of surgery p=0.0415 8/206 (0.378%) - Scared of radiation therapy p=0.0253 8/211 (0.352%) - Scared of chemotherapy p=0.0339 12/213 (0.420%)		Beliefs: - declining treatment: getting cancer is part of God's plan p=0.0416 - 28/115 (2.74%)	Appraisal delay Female sex p=0.032 OR 0.45 Education level: primary schooling p=0.057 OR 0.367 Distance from PMH (201-400 km) p=0.056 OR 2.5 Cancer diagnosis site Kaposi sarcoma p< .001 OR 9.77; Penile cancer p=0.029 OR 8.14 Symptom severity A little serious p=0.001 OR 0.14; Very serious p=0.020 OR 0.402 Predominantly female cancer p=0.005 OR 0.4 Help-seeking delay No. of family members: 4-10 p=0.03 OR 0.314 Symptom severity: very serious p=0.012 OR 0.384 Cancer diagnosis site: Vulvar p=0.055 OR 2.97; Kaposi sarcoma p=0.011 OR 4.68	Predominantly female cancer p=0.015 OR 0.452 Relationship status: separated/widowed p=0.032 OR 0.3	English literacy: Can read in English, p=0.042 OR 2.32 Cancer diagnosis site: Breast p=0.017 OR 3.73 Head and neck p=0.017 OR 93.73	Not stated	- delay in appraisal defined as interval between detecting symptoms and perceiving a reason to discuss them with provider > 1 month - delay in help seeking defined as interval between discussing symptoms and first consultation with provider > 1 month - delay in diagnosis defined as interval between first consultation and receiving a diagnosis > 3 months - delay in treatment defined as interval between diagnosis and starting treatment > 3 months - The most common time interval for appraisal was < 1 week (n = 100, 46%). A quarter of patients (n = 55, 25.7%) experienced an appraisal delay as defined as > 1 month.
Factors related to advanced stage of cancer presentation in Botswana	Chidinma Anakwenze	2018	Response rate 99.53% n=220. cervical 90 breast 32 , head and neck 42 , vulvar 15, kaposi sarcoma 14, endometrial 7,penile 6, anal 5, esophageal 5,lymphoma 3 prostate 1	Botswana	Hospital	December 2015 to January 2017	Patients	Questionnaire	214	20-39 early 18 (8.9%) late 19 (9.4%) unknown 20 (9.9%) 40-59 early 28 (13.8%) late 43 (21.2%) unknown 39 (19.2%) >60 early 10 (4.9%) late 11 (5.4%) unknown 15 (7.4%)	Male early stage 2 (0.9%) late stage 8 (3.7%) unknown 31 (14.5%) Female early 54 (25.2%) late 65 (30.3%) unknown 50 (23.4%)	Positive early 38 (18.0%) late 45 (21.3%) unknown 45 (21.3%) Negative early 18 (8.5%) late 29 (13.7%) unknown 36 (17.1%)	No formal education early 6 (3.4%) late 11 (6.3%) unknown 11 (6.3%) Primary school only early 20 (11.4%) late 21 (12.0%) unknown 18 (10.3%) Secondary school early 19 (10.9%) late 29 (16.6%) unknown 22 (12.6%) Tertiary/post bachelor's degree early 4 (2.3%) late 6 (3.4%) unknown6 (3.4%) Other late stage =2 (1.1%)	Single early 41 (19.5%) late 40 (19.0%) unknown =51 (24.3%) Married/in a serious relationship early 9 (4.3%) late 24 (11.4%) unknown 22 (10.5%) Living with a partner early 3 (1.4%) late 4 (1.9%) stage 1 (0.5%) Divorced/separated/widowed early 3 (1.4%) late 6 (2.9%) stage 6 (2.9%)					5-50 km early 15 (7.3%) late 29 (14.1%) unknown =23 (11.2%) 51-200km early 20 (9.7%) late 19 (9.2%) unknown 22 (10.7%) 201-400km early 12 (5.8%) late stage 7 (3.4%) unknown15 (7.3%) > 400 early 9 (4.4%) late 19 (9.2%) unknown 15 (7.3%) Unable to locate village unknown 1 (0.5%)	yes	yes	no	yes	both		-Transportation problems; -Dependent on others for transportation		- not afraid of having cancer OR, 3.48; P < .05 - no family to care during treatment OR, 6.35; P = .05 -could not afford to develop cancer (OR, 2.73; P < .05) - belief use of contraceptive pills or injections causes cancer OR (0.72 P=0.02) - belief using hormone replacement pills after menopause can cause cancer OR (0.96 p=0.01)			Department of Radiation Oncology, University of Pennsylvania	
Factors associated with delays to surgical presentation in North-West Cameroon	Chao Long	2015	-skin -breast -colorectal -gynecologic -anal	Cameroon	Hospital	23rd June2014 - 5th August 2014	Patients	Other: cross sectional	220	15 to 20 yrs 4 21 to 29 yrs 7 30 to39 yrs 7 40to 49 yrs 8 50 to 59 yrs 14 60 to 69 yrs 13 70 to 79 yrs 5 80+ yrs 1	134 Males 86 females -cancer cohort had 19 males and 40 females		-less than primary school completed 37(16.8%) -completed primary school 115 (52.3%) -secondary school or higher education completed 68 (30.9%)							yes	yes	yes	no	describes reasons	-belief that they were not sick enough -belief that they could treat themselves	-transportation - inability to take time from work/commitments	-thought another health care provider could provide adequate or better care -Lack of knowledge about MBH hospital -cost of hospital fees -need for first aid/emergency care at the nearest facility -in ability to participate in care decisions due to mental state				Stanford Center for African Studies Summer Fellowship	-The delay measured was delay to presentation for definitive surgical treatment. Delay was defined for analysis as receiving treatment>7 days after symptoms appeared in the urgent cohort and>1 month for the cancer cohort.
Late-Stage Diagnosis and Associated Factors Among Breast Cancer Patients in South and Southwest Ethiopia: A Multicenter Study	Aragaw Tesfaw	2020	Breast	Ethiopia	Regional	January 2013 - December 2017	Patients	Retrospective cohort	426	mean 42.78 +/- 13.4	Male 28 (6.6%) Female 398 (93.4%)	Negative 362 (97.3%) Positive 10 (2.7%	not stated	not stated	not stated	not stated	not stated	Male 28 (6.6%) Female 398 (93.4%)	not stated	yes	no	yes	yes	measures of association	not stated	not stated	not stated	not stated	late-stage disease: -rural communities 224 patients (73%), urban areas 85(28%) -female patients (74.4%), male patients 46.4% -long patient delay 240 patients (77.2%) -long total delay vs short total delay (77.4% vs. 67.3%, respectively,P<.05)	- breast lump or mass as the chief complaint were 3 times more likely to be diagnosed with late-stage disease than those who did not (AOR= 3.01; 95% CI, 1.49-6.07)	Susan Komen Foundation Graduate Training in Disparities Research (grant GTDR16378013)in collaboration with Martin Luther University, Halle, Germany, and the School of Public Health of Addis Ababa University, AddisAbaba, Ethiopia	-The median patient delay was 120 day
Factors associated with delayed diagnosis of cervical cancer in tikur anbesa specialized hospital, Ethiopia, 2019: Cross-sectional study	Shegaw Zeleke	2021	Cervical	Ethiopia	Hospital	not stated	Patients	Other: case note review and interview	410	mean age 50 years (+/- 11.5)	100% Female	not stated	Cannot read and write 205 (50%)	Married 285 (69.5%) Single 11 (2.7%) Divorced 36 (8.8%) Widowed 78 (19.0%)	Farmer 182 (44.4 %) Governmental 27 (6.6%) Private 54 (13.2%) Unemployed 147 (35.9%)	not stated	Orthodox 275 (67.1%) Protestant 60 (14.6%) Catholic 2 (0.5%) Muslim 73 (17.8%)	Urban 223 (54.4%) Rural 187 (45.6%)	<100 km 106 25.9% >100 km 304 74.1%	yes	no	no	no	describes reasons	- Accept as cancer cannot heal - Go to traditional healers - Difficulty of decision - Can be healed by itself - Given priority for other diseases - Embarrassment - Unawareness of cervical cancer health service access	not stated	not stated	not stated	not stated	not stated	none	The true associations are missing. It states factors with p-value <= 0.2 were included in multivariable regression model but the statistical significant results not indicated (significance set at p<0.05)
Delayed initiation of adjuvant chemotherapy among women with breast cancer in Addis Ababa, Ethiopia	Alem Gebremariam	2021	Breast	Ethiopia	Regional	January 2017 - December 2019	Patients	Other: Retrospective review and interviews	223	<40 years 104 (46.6%); 40-49 years 51 (22.9%); >50 years 68 (30.5%)	100% female	not stated	Illiterate 37 (16.6%); Primary school 60 (26.9%); Secondary school 69 (30.9%); Diploma and above 57 (25.6%)	Not stated	Homemaker 102 (45.7%); Employed (governmental and private) 79 (35.4%); Daily laborer 29 (12.9%) Other (retired, no job)13 (5.7%)	<61.0 US dollar 58 (26%) 61.0-94.0 US dollar 107 (48.0%) >194.0 US dollar 58 (26%)	Not stated	not stated	not stated	no	no	yes	no	Other: measures of association	Not stated	Not stated	Not stated	Not stated	Not stated	- the risk of delay was significantly higher among women with lower monthly family income, p=0.002 - Women with a monthly income of US$<61.0 had a three times higher risk of delay (RR=3.98; 95% CI 1.67-9.46) compared to those women with a family monthly income of US$>194	Intramural Research Department of the American Cancer Society	Definitions: - TTC: time to initiation of chemotherapy > 90days considered delay - receipt of 85% of planned therapy considered complete -Delay to initiation of adjuvant chemotherapy ,<30 days 42 (18.8%); 31-60 days 65 (29.2%); 61-90 days 48 (21.5%) >90 days 68 (30.5%)
Adherence to Newly Implemented Tamoxifen Therapy for Breast Cancer Patients in Rural Western Ethiopia	Christian Felix Rebold	2020	Breast	Ethiopia	Hospital	January 2010 - December 2015	Patients	Other: questionnaire and interviews	51	mean 45 years (35-51)	100% female	not stated	Literate (n = 38), No 31 (77%) Yes 9 (23%)	Married 38 (93%) Not married 3 (7%)	Housewife 28 (57%) Farmer 17 (35%) Student 1 (2%) Other 3 (6%)	not stated	Christian 38 (79%) Muslim 9 (19%) Other 1 (2%)	rural	not stated	no	no	yes	no	describes reasons	not stated	not stated	- lack of consent - problems on the health care provider side (12; 48%) where patients had not been given an appointment (n = 9), the physician was absent (n = 2), and other (n = 1). - Reasons on the patient side (13; 52%) included lack of money (n = 2), too weak to travel (n = 1), fear of treatment (n = 1), and private reasons (n = 1). - No information was available for 8 patients.	not stated	not stated	not stated	Else Krv∂ner-Fresenius-Stif-tung grant 2014_HA72, through a private donation project by the Department of Gynecology, Martin Luther University, Halle (Saa-le), Germany, and by members of the German Gynecologic Oncol-ogy Working Group (AGO), Breast Committee	-Is tamoxifen necessary? (n = 19) No 0 (0) Yes 19 (100%) -Would you pay for tamoxifen? (n = 14%) No11 (79%) Yes 3 (21%) - Why do you take tamoxifen? (n = 17%), No idea 6 (35%) Prevents cancer 9 (53%) Is helpful 1(6%) Hinders the power of cancer (6%) - Why did you stop taking tamoxifen? (n = 9)Terminal illness 2 (22%) Difficult circumstances 2 (22%) Lack of money 2 (22%) Side effects of therapy 2 (22%) Unknown 1 (11%) -Describe discomforts with the taking of tamoxifen (n = 21; more than one answer possible, No problems, Difficult to swallow, Interrupts daily work, Reminds of the disease 14 (59%)7 (29%)2 (8%)1 (4%)
Factors associated with advanced stage at diagnosis of cervical cancer in Addis Ababa, Ethiopia: A population-based study	Nebiyu Dereje	2020	Cervical	Ethiopia	Regional	1st January 2017 to 30th June 2018	Patients	Other: Questionnaire, case notes	212	<40 yrs=42 (19.8%) 40-59 yrs=103 (48.6%) >60 yrs =67 (31.6%)	Female =212	Positive 46 (21.7%) Negative 166 (78.3%)	-No formal education 86 (40.6%) -Yes formal education 126 (59.4%)			<3200 ETB =142 (67.5%) monthly >3200 ETB =69(32.5%)				yes	yes	no	Yes	both	-medical expenses -not going to facility immediately after symptom recognition	-visiting more than three different health care facilities before diagnostic confirmation	not stated	-Religous practices/Did nothing APR=1.25, 95% CI: 1.05 to 1.53 , p=0.02 -visited >3 different healthcare facilities prior to diagnostic confirmation APR=1.24, 95% CI: 1.08 to 1.91 p=0.01 - Out of pocket medical expenses APR 1.44 (1.08-1.91), p=0.003			the American Cancer Society	
Extent and predictors of delays in diagnosis of cervical cancer in Addis Ababa, Ethiopia: A population-based prospective study	Nebiyu Dereje	2020	Cervical	Ethiopia	Regional	1st January 2017 to 30th June 2018	Patients	Questionnaire	231	<50 =111 (48.1%) >50 =120 (51.9%)	Female -231		-Unable to read or write 89 (38.5%) -Primary level 85 (36.8%) -Secondary level 43 (18.2%) ->Diploma 15 (6.5%)	-Married 96 (41.6%) -Single 11 (4.8%) -Divorced 36 (15.6%) -Widowed 52688 (38.1%)	-Housewife =114 (62.3%) -Government employed =29 (12.6%) -Privately employed =23(10%) -Merchant =10 (4.3%) -Daily laborer =13 (5.6%) -Pensioner =8 (3.5%) -Other 4 (1.7%)	Family income per month <600 ETB =35 (15.2%) 601 -1 650 =56 (24.2%) 1651 -3 200 =66 (28.6%) 3 201- 5 250 =49 (21.2%) 5 251 -7 800=19 (8.2%) >7 801 =6 (2.6%)	Christian =212 (91.8%) Muslim =19 (8.2%)			yes	yes	no	no	both	- Not bothered about first symptom 16 (29.6%) -Thought it would go away by itself 21 (38.9%) -Misinterpretation (not aware) of symptoms 14 (25.9%) -Ashamed to tell anyone about symptoms10 (18.5%) -Not knowing which health facility to visit 8 (14.8%) -Thought treatment would be expensive 3 (5.5%) -Thought religious activities would cure problem 5 (9.3%)			-The odds of delay in health seeking: - never heard of cervical cancer before diagnosis (adjusted OR [AOR], 2.3; 95% CI, 1.11 to 4.70) - waited until they saw additional symptoms (AOR, 2.3;95% CI, 1.096 to 4.90) - practiced a religious ritual as a solution for their cancer (AOR,3.3; 95% CI, 1.46 to 7.48)	The odds of diagnostic delays: - contacted primary-level health facilities (health centers and private clinics as compared to contacted secondary- or tertiary-level health facilities (AOR, 2.6; 95% CI, 1.33 to 5.27). -patients who visited, >= 4different health facilities for their cancer diagnosis as compared to those who visited, < 4 different health facilities (AOR, 2.7; 95% CI, 1.07 to6.71). -patients who made 5 visits to health facilities before receipt of histologic diagnostic confirmation compared to those patients who made 5 visits (AOR, 2.2;95% CI, 1.05 to 4.43)		Supported by the American Cancer Society	-
Socio-economic and cultural vulnerabilities to cervical cancer and challenges faced by patients attending care at Tikur Anbessa Hospital: A cross sectional and qualitative study	Sara Kebede Tadesse	2015	cervical	Ethiopia	Hospital	15 April - 15 May 2013	Patients	Other: questionnaire and interview	198	Avg 50 years (26-75 years)	100% Female	not stated	Illiterate 103 (52.0%) Read and write only 29 (14.6%) Grade 1-4 21 (10.6%) Grade 5-8 27 (13.6%) Grade 9-12 12 (6. 1%) College, University graduated 6 (3.0%)	Single 1 (0.5%) Married 101 (51.0%) Widowed 69 (34.8%) Separated 19 (9.6%) Divorced 8 (4.0%)	Housewife 78 (39.4%) Farmer 73 (36.9%) Government 13 (6.6%) Merchant 12 (6.1%) private for profit sector 9 (4.5%) Pensioner 8 (4.0%) Daily laborer 2 (1.0%) NGO 1 (0.5%) Unemployed 1 (0.5%)	<500 43 (23.9%) 500 - 999.99 77 (42.8%) 1,000 - 1,499.99 29 (16.1%) 1,500 - 1,999.99 19 (10.6%) 2,000 or more 12 (6.7%)	Christian Orthodox 123 (62.1%) Christian Protestant 29 (14.6%) Muslim 46 (23.2%)	not stated	not stated	no	yes	yes	no	describes reasons	not clear	misdiagnosis	long waiting time	not stated	not stated	not stated	Addis Ababa University and Center for GenderStudies	
Patient delay and contributing factors among breast cancer patients at two cancer referral centres in Ethiopia: A cross-sectional study	Aragaw Tesfaw	2020	Breast	Ethopia	Regional	September 2019 to April 30 2020	Patients	Questionnaire	371	median 40 (30-70), Mean 48.1 <40 83 (22.4%) >40 288 (77.6%)	100% female	not stated	Illiterate136 (36.7%) Primary education 153 (41.2%) Secondary education and above 82 (22.1%)	Married 298 (80.3%) Single 73 (19.7%)	Housewife 215 (58.0%) Farmer 94 (25.3%) Government employee 52 (14.0%) Other 10 (2.7%)	not stated	Orthodox 172 (46.4%) Muslim 96 (25.9%) Protestant 97 (26.1%) Catholic 6 (1.6%)	Rural 249 (67.1%) Urban 122 (32.9%)	<5 km 163 (43.9%) > 5 km 208 (56.1%)	yes	yes	no	yes	both	- Lack of awareness about early symptoms 345 (92.9%) - Relating symptoms with other medical problems 132 (35.6%) - Belief that breast cancer has not any medical treatment 88 (23.7%) - Use of traditional and spiritual treatment options 286 (77.1%)	not stated	not stated	- rural residence (AOR=3.72; 95% CI=1.82-7.AF2561). - Illiterate women (AOR=3.8; 95% CI=1.71-8.64) - painless wound (AOR=3.32; 95% CI=1.93-5.72) - no lump/swelling in their armpit (AOR=6.16; 95% CI=2.80-13.54). - no previous breast problem (AOR=2.46; 95% CI=1.43-4.22)	- more than 5 km travel distance (AOR=1.66; 95% CI=1.09-3.00)	not stated	not stated	none
Why do breast cancer patients report late or abscond during treatment in Ghana? A pilot study.	J. Clegg-Lamptey	2009	breast	Ghana	Hospital	September 2007 - July 2008	Patients	Questionnaire	101	-new patients: mean 44.8, median 43 yrs -defaulters mean: age 44.5, median 44 yrs	101 women		-Nil New patients 11 (16%, defaulters 5 (14.3%) - Primary new patients 15 (22.7%) , defaulters 5 (14.3%) -Secondary new patients 18 (27.3%) , defaulters 20 (57.1%) - Tertiary new patients 22 (33.3%) 5 (14.3%) defaulters	-Single new patients 13 (19%), defaulters 2 (5.7%) -Married patients 38 (57.7%) , defaulters 32 (88.6%) -Divorced/separated new patients 3 (4.2%), defaulters 2 (5.8%) -Widowed new patients 22 (18.2%)						yes	yes	yes	no	describes reasons	New patients -ignorance 19 (28.8%), -fear of mastectomy 16 (24.2%), - herbal treatment 13(19.7%), -prayers and prayer camps 13(19.7%), -financial incapability 12 (18.2%), -fear of diagnosis 7 (10.6%), -other spiritual 6(9.1%) food supplements 6 (9.1%) -busy schedule 2 (3.0%), - homeopathy 1(1.5%), -Chinese/acupuncture1 (1.5%), -organic food 1 (1.5) - travelled 1 (1.5%)	-previous medical consultation 26 (29.4%) -Financial incapability	Defaulters - fear of mastectomy 20 (57.1%), -Herbal treatment 13 (37.1%), -Financial incapability 11 (31.4%), -Prayers and Prayer camps 10 (28.6%), -Chinese medication 5 (14.3%) -observing 3 (8.6%) -Ulcer healed. Thought disease was healed 2 (5.7%), -Had complete clinical response 2 (5.7%), food supplement2 (5.7%), exercising faith 2 (5.7%) -Side effects of drugs 1 (2.9%) - Pressure from in-laws to refuse mastectomy 1(2.9) - Father refused treatment 1 (2.9%), -family commitments(2.9%), -acupuncture treatment at 1 (2.9%).				-	
Factors contributing to delays in diagnosis of breast cancers in Ghana, West Africa	Louise Brinton	2016	Breast cancer	Ghana	Regional	-	Patients	Questionnaire	1184	<40 246 (20.8%) 40-44 158 (13.3%) 45-49 188 (15.9%) 50-54 167 (14.1%) 55-59 150 (12.7%) 60-64 113 (9.5%) 65-69 63 (5.3%) >70 = 95 (8.0%) Unknown = 4 (0.3%)	1184 women									yes	yes	no	no	both	-Consulting a traditional healer and using traditional medication			-low education having an OR of 2.11 (95% CI1.47-3.04) -divorced/separated OR 1.65 (1.15-2.37) or widowed women OR 2.16 (1.42-3.28)	Other predictors of large tumours are seeking assistance from someone other than a doctor or nurse for breast symptoms (2.65, 1.31,Äì5.40).		-	
Financial barriers related to breast cancer screening and treatment: A cross-sectional survey of women in Kenya	Sujha Subramanian	2019	Breast	Kenya	Regional	November 2017 to April 2018	Patients	Questionnaire	800	<45 yrs -women with breast 187 (46.8%) -without without 307 (76.8%) >45 yrs -women with breast cancer 209 (52.3%) -without 92 (23.0%)	Female		- None:With BC 10; Without 6 - Primary: With BC 136 Without 101 -Secondary/Vocational: With BC 149 Without 154 -College05: With BC 70 Without 109 -University:With BC 32 Without 26 -Missing: With BC 2 Without 4	-Never married: With BC 41 without 79 -Married/ living together: With BC 244 without 226 -Divorced/ separated: With BC 68 without 63 -Widowed: With BC 46 without 30 -Missing: With BC 41 without 2	with BC 132 without BC 258					yes	yes	yes	no	describes reasons	-Transportation barriers 23.3% -Busy schedule 9.0% -Disapproval of family and friends 3.8% -Embarrassment 6.5% -Fear of what the doctor might find 19.3% -General fear of the doctors visit 19.3%	-Transportation barriers 23.3%	-Cost of going to the doctor 46.3% -Inability to discuss symptoms confidently 10.0% -Difficulties setting up appointment 9.8% -Communication barriers 6.5% -Fear of wasting the doctor's time 3.3%				RTI International	- The qualitative component doesn't say what method they used to collect data
Patient factors affecting successful linkage to treatment in a cervical cancer prevention program in Kenya: A prospective cohort study	Charlotte M Page	2019	cervical cancer	Kenya	Regional	February - October 2018	Community	Other: prospective cohort	505	median 33 (27-42)	100% female	not stated	Primaryschool or less 428 (85%) At least some secondary 77 (15%)	Not partnered 132(27%) Partnered 366 (73%)	No 214(42%) Yes 291(58%	not stated	not stated	Rural	8 km (5-12)	yes	yes	no	no	measures of association	not stated	not stated	not stated	not stated	- primary school education or less - women who did not miss work to come to CHC	not stated	National Cancer Institute	none
Prevalence and Capacity of Cancer Diagnostics and Treatment: A Demand and Supply Survey of Health-Care Facilities in Kenya	Francis W Wambalaba	2019	Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver	Kenya	National	November 2013 - February 2014	Other: Patients and adminstrators	Other: -patient data from records -interviews with volunteer patients -survey data from hospital medical officers	1048	Female 52 years Men 62 years	Female 57% Male 43%	not stated	not stated	not stated	not stated	not stated	not stated	not stated	not stated	no	no	yes	yes	describes reasons	not stated	not stated	- preventive services limited	not stated	not stated	not stated	Rockefeller Foundation through the Africa Cancer Foundation	none
Delayed presentation of breast cancer patients.	E.S. Otieno	2010	Breast	Kenya	Hospital	1 October 2003 to 31st March 2006	Patients	Questionnaire	166	mean age 47, age range 17 to 88	98.8% female									yes	yes	yes	no	describes reasons	-Painless symptomatology 39 (23.5%, cumulative% 47.6) -Not aware of the disease 13 (7.8%, cumulative % 84.9) -Worried they would be diagnosed with cancer 33 (19.9%, cumulative % 67.5) -Attending to traditional healers and taking herbal preparations 16 (9.6% cumulative % 77.1)		-Reassured that their condition was benign by the first medical personnel they visited 40 (24.1% cumulative %24.1)				-	
Health system organisation and patient pathways: breast care patients' trajectories and medical doctors' practice in Mali	Kirsten Grosse Frie	2019	Breast	Mali	Regional	1 January 2016 - April 2016	Patients and clinicians	Questionnaire	124	16-24 42 (33.9%); 35-49 47 (37.9%); 50-80 35 (28.2%)	100% female	Not stated	not stated	Married 83 (66.9%) Single 14 (11.3%) Divorced 7 (5.6%) Widowed 20 (16.1%)	Housewife 55 (44.4%); Public service 19 (15.3%); Business 9 (7.3%); Student 9 (7.3%); Other 32 (25.8%)	not stated	not stated	not stated	not stated	yes	yes	yes	Other: No	both	-no health insurance - traditional healer	n/a	- knowledge about breast	-Having someone in the family with breast cancer was also associated with a delay of >6 months in acknowledging breast symptoms (p=0.028).	n/a	- community healthcare centres and private clinics first contact	DAAD P.R.I.M.E from the German Federal Ministry of Education and Research and the People Programme (Marie CurieActions) of the European Union,Äôs Seventh Framework Programme (FP7/2007/2013) under REA grant agreement n¬∞ 605728. T	Definitions: -Health Seeking Interval(HSI): time from date of first symptom recognition to date of first healthcare visit) -Diagnostic Interval(DI): time from first healthcare visit to date of receiving results at the Pathology Department

Geospatial barriers to healthcare access for breast cancer diagnosis in sub-Saharan African settings: The African Breast Cancer,ÄîDisparities in Outcomes Cohort Study	Kayo Togawa	2020	Breast	Namibia Nigeria Uganda Zambia	Hospital	September 2014 - September 2017	Patients	Other: Interview	1518	mean 50 years (+/- 13 19-97)	100% women	not stated	Primary school or less 681 (45%) Secondary/high school 509 (34%) Technical/university 328 (22%)	not stated	not stated	not stated	not stated	Urban 814 (54%) Rural 704 (46%)	not clear	no	yes	yes	yes	describes reasons	-Other obligations/no permission from family member -Embarrassment -Pain or discomfort -Fear of dying/treatment -No trust in medicine/prefer traditional healer	-Transport -Hospital too far -Difficulty with making an appointment or reaching doctor	-Cost of diagnostic tests/treatment	not stated	- rural residence OR:1.40, 95% CI: 1.06-1.84 - distance (OR per 50 km increment OR = 1.04, 95% CI: 1.00-1.09, P 0.048	not stated	Centre International de Recherche sur le Cancer;Susan G. Komen, Grant/Award Numbers:GSP18IARC001, GSP19IARC001, IIR 13264158	none
Prevalence and Pattern of Late-Stage Presentation in Women with Breast and Cervical Cancers in Lagos University Teaching Hospital, Nigeria.	Opeyemi Awofeso	2018	Breast 85 Cervical 20	Nigeria	Hospital	April to June 2016	Patients	Questionnaire	105	All - mean age 51. 14 (+/- 11.70) Breast - 51.09 (+/- 11.76); 29 - 73 years Cervix - 51.35 (+/- 11.71); 40 - 71 years	Females: 105 (100%)	Cervix only: Positive 0 (0.0) Negative 7 (35.0%) Unknown 13 (65.0%)	None 7 (6.7%) Primary 26 (31.4%) Secondary 33 (31.4%) Post secondary 39 (37.1%)	Single 4 (3.8%) Married 86 (81.9%) Divorced/separated 3 (2.9%) Widowed 12 (11.4%)	Not stated	<N9000 57 (54.3%) N9001-N18,00 24 (22.9%) N18,001-N50,000 15 (14.3%) N50,001-N90,000 7 (6.7%) N90,001-N150,000 1 (1.0%) N90,001-N150,000 1 (1.0%) N150,000 1 (1.0%)	not described	Rural 19 (18.1) Urban 86 (81.9)	<30 min 3 (2.9%) 30 min-1h 23 (21.9%) 1-2 h 26 (24.8%) >2 h 53 (50.5%)	yes	yes	yes	yes	Other: describes reasons and measures of associations	-ignorance and lack of personal initiative -preference for alternative medicine -fear -myths and misconceptions	-investigation time at first contact -misdiagnosis at lower levels	-unavailability of appropriate treatment modality	-Ignorance and lack of personal initiative χ2 5.07 p= 0.0243	-Patient delayχ2 8.5p=0.0363 -Misdiagnosis at lower levels of health care χ2 7.11 p=0.0077 -Delayed investigation time χ2 14.88 p=0.0001	-Systemic delay χ2 8.1 p=0.0174	None	- Patient delay defined as time difference > 3 months between the first notice of the first AHS by the patient and the first visit to any health-care provider - System delay defined as the time difference > 3 months between the first presentation and the onset of the treatment Treatment received: Breast: Chemotherapy - 37 (43.5%); Radiotherapy - 12 (14.1%); Surgery - 32 (37.7%); Target therapy - 0 (0%); Yet to be treated - 3 (3.5%)
Effect of Sociodemographic Variables on Patient and Diagnostic Delay of Breast Cancer at the Foremost Health Care Institution in Nigeria.	Sunday O Olarewaju	2019	breast	Nigeria	Hospital	August - October 2018	Patients	Questionnaire	275	mean 49 +/- 11.9	100% female	not stated	Primary 46 (16.7%) Secondary 87 (31.6%) Tertiary 142 (51.6%)	Single 12 (4.4%) Married 193 (70.2%) Divorced/separated 19 (6.9%) Widowed 51 (18.5%)	Unemployed 124 (45.1%) Employed 151 (54.9%)	<18,000 99 (36%) >18,000 176 (64%)	Christian 211 (76.7%) Islamic 64 (23.3%)	not stated	not stated	yes	yes	yes	no	both	Obligations at home 75 (77.3%) High cost of transportation 74 (76.3%) Stigma of disease 71 (73.2%) Denial or anxiety 71 (73.2%) Fear of seeking medical advice 69 (71.1%) Earlier alternative treatment 52 (53.6%) Non-awareness of the disease 38 (39.2%) Fear of diagnosis 67 (79.8%)	Obligations at home 77 (91.7%) High cost of prediagnostic test 69 (82.1%) Earlier alternative treatment 66 (78.6%) High cost of transportation 13 (15.5%)	High cost of medicine 71 (73.2%)	-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009	marital status p=0.00	not stated	not stated	PD could range from less than 1 month, 1to 3 months, or greater than 3 months, prolonged delays defined as intervals greater than 12 weeks
Acceptance and adherence to treatment among breast cancer patients in Eastern Nigeria.	Stanley N.C. Anyanwu	2011	breast	Nigeria	Hospital	2004 to 2008	Patients	Case note	275	<30yrs 19 (6.9%) 30-39 yrs 74 (26.9%) 40-49 yrs 77 (28.0%) 50-59 yrs 50 (18.2%) 60-69 yrs 39 (14.2%) >70 yrs 16 (5.8%)	females 273 male 2		primary 215 (80%) high school/tertiary 168 (60%)							no	yes	yes	no	describes reasons	Distance	-distance	- Declined any form of treatment 65 (37.6%) -Accepted single treatment modality 57 (32.9%) -Cost of drugs, laboratory expenses and transportation to the hospital. - No bed space -No relatives to care for them during treatment				authors did not receive any funding	
Presentation intervals and the impact of delay on breast cancer progression in a black African population	Olayide Agodirin	2020	Breast	Nigeria	Regional	June 2017-May 2018	Patients	Questionnaire	420	21-30 = 16 (3.8%) 31-40 =92 (22) 41-50 =119 (28.2%) 51-60 =(92 22%) 61-70 =50 (12%) 71-80 =32 (7.6%) >80 =7 (1.6%) Unspecified =12 (2.8%) mean: 50.6 ¬± 1 median: 49 (IQR 40-60 years)	420 females (100%)	not stated	tertiary 144 (34.3 %) secondary 124 (29.5 %) primary 66 (15.7 %) none 79 (18.8 %) unspecified 7 (1.7 %)	married 285 (68 %) widow 48 (11.5 %) single 23 (5.5 %) separat/divorced 7 (1.7389 %) unspecified 57 (13.3 %)	Not stated	Not stated	Christian 296 (70.5 %) Muslim 113 (27 %) Unspecified 11 (2.5 %)	not stated	Not stated	yes	yes	yes	no	both	- ignorance 6 (3.5%) - pregnancy/ lactation/ menopause 8 (4.6%) - thought benign/thought will disappear 50 (29%) - small size 2 (1.2%) - lump only 2 (1.2%) - no pain 19 (11%) - thought boil/using antibiotics 15 (8.7%) - thought ringworm/skin change only 1.0 (0.6%) - busy schedule 3.0 (1.7%) - financial constraint 18 (10.5%) - family issues 2.0 (1.2%) - distance 3.0 (1.7%) - secrecy 1.0 (0.6%) - spiritual 10 (5.8%) - herbal care 10 (5.8%) - reassured by first home person or first health care provider 7.0 (4.0%) - fear of diagnosis/panic 5.0 (2.9%) - fear of mastectomy 6.0 (3.5%)	- Navigation in primary care 1.0 (0.6%) -Misdiagnosis/ investigations 46 (27.5%) - financial constraint 33 (19.7%) - family issues 2.0 (1.2%) - reassured by first home person or first health care provider 7.0 (4.2%) - distance 3.0 (1.7%) - financial constraint 18 (10.5%)	- misdiagnosis - strike 4.0 (2.4%)	no associations given	-The PCI (median 106, 13-337) was significantly longer than the HSI (median 42, 7-150), Wilcoxon-Signed Rank test p= 0.0001.(paired t-test mean difference 140 ¬±442 days (95% CI 95-186). -Most respondents disclosed early within 30 days (330 (81, 95% CI 77-85) and consulted FHP within 60 days (230 (60, 95% CI 53-63). -Most respondents had long PCI of > 30 days. 1-7 days in 91(25% (95% CI 20-29), 1-30 days in 134 (36 95% CI31-41) and > 30 days in 237 out of 377(64 95% CI 59-68). -The SCI was > 90 days in 293 of 401 (73% (95% CI68-77), 91-180 days in 70 of 401 (17% (95% CI 14-22)and > 180 days in 226 of 401 (56% (95% CI 51-61) -More respondents with big (> 5 cm) tumors received correct advice compared to those with small tumors(Risk difference 5.5% (95% CI 4.0-15).		The African Research Group for Oncology	Shorter self appraisal associated with: -Patronising orthodox care AOR 3.1(1.3-6.7), p=0.02 -Being married AOR 2.1 (1.1-4.2), p=0.03 -Being younger AOR 2.0(0.9-4.4), p=0.02 Shorter help seeking interval associated with: - receiving correct advice AOR 1.7, p=0.02 -patronising hospital for other illnesses AOR 2.5, p=0.01 Association with short primary care interval: - big tumor AOR 0.7, p=0.12 - Health professional 1 advice p=0.02 correct advice AOR 2.0(1.1 -3.5), p=0.02
Infrastructural challenges lead to delay of curative radiotherapy in Nigeria	Jim Leng	2020	- breast (37.5%), - cervical (16.3%), - head and neck (11.9%) - prostate (10.9%)	Nigeria	Hospital	June 2017 to August 2017	Patients	Questionnaire	186	Median age was 50 (range from 17 to 79)	Male 58 Female 127		None 20 (10.9%) Primary 46 (25.0%) Secondary 52 (28.3%) Vocational/technical 18 (9.8%) Polytechnic/OND/some college 15 (8.2%) Bachelor degree/HND 24 (13.0%) Postgraduate degree 9 (4.9%)	Married 162 (87.1%), Widowed 12 (6.5%) Divorced 1(0.5%) Separated 1 (0.5%) Never married 10 (5.4%)	None 37 (19.9%) Trader 68 (36.6%) Farmer 9 (4.8%) Artisan 23 (12.4%) Professional 38 (20.4%) Other 11 (5.9%)	The median monthly income 15,000 naira (5,000 - 40,000N)which converts to approximately 50 dollars per month.	Christian =127 (68.3) Muslim =59 (31.7)			yes	yes	yes	no	describes reasons		-The clinic was too far away - too expensive to travel to clinic	-treatment might be too expensive - Infrastructural barriers increased the odds of radiotherapy delay - Health care worker strikes - Machine breakdowns - power outages - paying out of pocket for their treatment expenses - inability to pay	-Sociocultural factors include; -Lack of knowledge of appropriate medical facility , time to clinic visit OR 4.96 (2.41 to 10.21),P=<.001* time to radiotherapy treatment OR=1.92 (0.89 to 4.15) P= .099 -Not wanting others to know of sickness time to clinic visit OR 3.63 (1.35 to 9.72) P=.011* Time to radiotherapy treatment OR=1.75 (0.67 to 4.58) P=.253 -Tried another treatment first , time to clinic visit OR 2.45 (1.26 to 4.76) P=.008* Time to radiotherapy treatment OR= 1.50 (0.75 to 2.97) P=.248 -Fear of treatment , time to clinic visit OR 0.90 (0.5 to 1.63) P= .732 time to radiotherapy treatment OR 0.42 (0.22 to 0.81) P= .009* -Concern over cost of travel for treatment Time to clinic visit OR= 1.19 (0.7 to 2.04) P= .523 time to radiotherapy treatment OR= (0.3 to 0.95) P=.033* -Previous bad experience at hospital ,time to clinic visit 0R=7.05 (2.15 to 23.12) P= .001* time to radiotherapy treatment OR= 2.19 (0.67 to 7.09) P=.192		-Inability to pay time to clinic visit OR=1.99 (1.05 to 3.77) P= .034* Time to radiotherapy treatment OR= 1.85 (0.95 to 3.57) Time to radiotherapy treatment p=.069 -Infrastructural factors include; -Machine breakdown time to clinic visit OR=1.39 (0.78 to 2.48) P= .264 Time to radiotherapy treatment OR=2.92 (1.54 to 5.53) P=.001* -Worker strike time to visit clinic OR= 0.65 (0.38 to 1.13) P= .127 Time to radio therapy treatment OR=2.64 (1.46 to 4.79)P= .001 -Power outage time to visit clinic OR=1.88 (0.8 to 4.42) P=.147 Time to radiotherapy treatment OR=2.81 (1.16 to 6.79) P= .022*	The University of Chicago Pritzker School of Medicine Summer Research Program; National Institutes of Health	-The focus was on radiotherapy treatments of patients rather than a specific cancer. -The most common cancers treated were breast (37.5%),cervical (16.3%), head and neck (11.9%), and prostate(10.9%) -The primary measures were delays in presentation, defined as length of time from diagnosis to clinic visit, and delays in initiation of radiotherapy, defined as length of time from clinic visit to treatment initiation.
Geospatial access predicts cancer stage at presentation and outcomes for patients with breast cancer in southwest Nigeria: A population-based study	Gregory C Knapp	2020	Breast	Nigeria	Hospital	May 2009 - January 2019	Patients	Retrospective cohort	609	median 49 (40-58)	Female 598 (98.2%) Male 11 (1.8%)	not stated	None 56 (9.3%) Primary 196 (32.4%) Secondary 141 (23.3%) Tertiary 212 (35.0%)	not stated	not stated	Socioeconomic status Low 417 (68.5%) Middle185 (30.4%) High 7 (1.2%)	not stated	not stated	not stated	yes	yes	no	yes	measures of association	not stated	not stated	not stated	not stated	- primary education only (21.9%; P= .002) - longer travel times 2.8-fold increased (95% CI, 1.30-6.11; P= .006)	not stated	Global Cancer Disparities Initiative is funded by Memorial Sloan Kettering Cancer Cente	none
Complementary and alternative medicine. Use and challenges among gynaecological cancer patients in Nigeria: Experiences in a tertiary health institution - Preliminary results	T.O. Nwankwo	2019	Cervical 42, ovarian 31, endometrial 8, vulva 5, choriocarcinoma 4, leiomyosarcoma 4	Nigeria	Hospital	June 2014 to June 2020	Patients	Questionnaire	95	21-30 2 (2.1%) 31-40 17 (17.9%) 41-50 27(28.4%) >50 49(51.6%)			Primary/non formal 44 (46.3%) Secondary 28 (29.5%) Tertiary23 (24.2%)	Single 13(13.7%) Married 77(81.1%) Divorced /separated 5 (5.3%)	Trader 37 (38.9%) Artisan/farmer 23 (24.2%) Professional/Civil servant 18(19.0%) Unemployed17 (17.9%)	Income < monthly expenses 59 (62.0%) Income =/>monthly Expenses 36(38.0%)	Christianity 93 (97.8%) Moslem 2 (2.2%)	Urban 63 (66.3%) Rural 32 (33.3%)		yes	no	no	no	describes reasons	-Complementary and alternative medicine use - Herbs - spiritual sacrifice diet modification - Chinese medicine - prayers combined with other methods .			-recommendation from friends and relatives (pvalue = 0.017 - income was less than monthly expenditure - duration of illness was equal or greater than six months pvalue = 0.02, OR = 0.36 CI 0.15-0.86			-	The use of CAM made 75.4% (46)of participants delay for conventional medical treatment. The duration of illness was equal or greater than six months in 69.6% (32/46) of those affected-
Effect of sociodemographic variables on patient and diagnostic delay of breast cancer at the foremost health care institution in Nigeria	Sunday Olarewaju	2019	Breast	Nigeria	Hospital	August - October 2018	Patients	Questionnaire	275	Mean 49 +/-11.9	100% women	not stated	Primary 46 (16.7%) Secondary 87 (31.6%) Tertiary 142 (51.6%)	Single 12 (4.4%) Married 193 (70.2%) Divorced/separated 19 (6.9%) Widowed 51 (18.5%)	Unemployed 124 (45.1%) Employed 151 (54.9%)	<18,000 99 (36%) >18,000 176 (64%).	Christian 211 (76.7%) Islamic 64 (23.3%)	not stated	not stated	yes	yes	no	no	both	n = 97 -Obligations at home -High cost of transportation -Stigma of disease -Denial or anxiety -High cost of medicine -Fear of seeking medical advice -Earlier alternative treatment -Nonawareness of the disease	Obligations at home High cost of transportation	High cost of prediagnostic test	-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009	-marital status, p=00 (single at higher risk of late stage diagnosis)	not stated	not stated	- 35.3% attribute patient delay -30.5% attribute diagnostic delay
Impact of Primary Care Delay on Progression of Breast Cancer in a Black African Population: A Multicentered Survey	Olayide Agodirin	2019	Breast cancer	Nigeria	Regional	May 2017 - July 2018	Patients	Questionnaire	237	<= 30 18(7.6%) 31-40 51(21%) 41-50 74(31.2%) 51-60 46(19.4%) 61-70 24(10.1%) >=7124(10.1%)			tertiary 91(38.3%) secondary 78(33%) primary 30(12.7%) none 38(16%)	married 167(70.5%) single 11(4.6%) divorced or separated 4(1.7%) widow 22(9.3%) unspecified 33(13.9%)						yes	yes	yes	no	describes reasons	-Fear of treatment most probably mastectomy -Age -Distance to specialist clinic -Need for social acceptability	-Distance to specialist clinic	-Misdiagnosis -Misinformation by FHP				The African Research Group for Oncology	
Health-seeking behavior and barriers to care in patients with rectal bleeding in Nigeria	Olusegun I. Alatise	2017	colorectal cancer	Nigeria	Hospital	2013 to 2014	Other: patients, physicians	Questionnaire	127	<45 =41(50.6%) >46 =40 (49.4%)	Male = 64 (78.1%) Female = 18 (22.0%)		-No formal or primary education 23 (28.1%) -Secondary education 27 (32.9%) -Tertiary education 32 (39.0%)	Married 69= (84.2%) Single 12= (14.6%) Widow 1= (1.2%)		<$100 =49 (59.8%) >$101= 33 (40.2%)	Christianity =54 (66.7%) Islam =27 (33.3%)			yes	no	yes	no	describes reasons	- Not serious -symptom cleared -Embarrassing -Knew the cause -Fear of unknown -No money -Religious beliefs -belief in herbal medicine		-Hospital bottlenecks - misdiagnosis -Unknown availability or cost of colonoscopy				Supported in part by the National Cancer Institute Cancer Center support grant No. P30 CA008748, the Thompson Family Foundation, and the Memorial Sloan Kettering Cancer Center Global Cancer Disparity Initiative	The paper was leaning more on bleeding per rectum than colorectal cancer.
Determinants of stage at diagnosis of breast cancer in Nigerian women: sociodemographic, breast cancer awareness, health care access and clinical factors	Elima Jedy-Agba	2017	Breast	Nigeria	National	January 2014 - July 2016	Patients	Other: Case-control	316	mean age 45.4 (SD11.4)	100% women	not stated	None: early 5 (12.2%) late 36 (87.8%) Primary/Secondary: early 33 (29.2%) late 80 (70.8%) Tertiary/Post graduate (PG): early59 (41.3%) late 84 (58.7%) Not reported early0 (0) late 3 (100%)	Married: early 71 (33.6%) Late 140 (66.4%)	not stated	Personal income yes early 23 (25.6%) late 67 (74.4%) Personal income no early 74 (35.2%) 136 (64.8%)	Christianity: early 80 (30.7%) late 181 (69.3%) Islam early 17(47.2%) late 19 (52.8%)	North central (Abuja) early 85 (37.6%) late 141 (62.4%) South-Eastern (Enugu) 12 (16.2%) late 62 (83.8%)	< 1 hour: early 66 (36.1%) late 117 (63.9%) 1 - < 2 hours: early 15 (33.3%) late 30 (66.7%) >=2 hours: early 5 (22.7%) late 17 (77.3%) Not reported: early 11 (22.0%) late 39 (78.0%)	yes	yes	no	yes	measures of association	not stated	not stated	not stated	- never having heard of BC OR=2.24; 95% CI 1.25, 4.03; p=0.01 - Women who did not believe in a BC cure (OR=2.23; 95% CI 1.40, 3.56; p=0.001) - did not practice BSE (OR=1.89; 95% CI 1.20, 2.99; p=0.01)	-In age-adjusted analysis, the odds of later stage were positively associated with the amount of travel time taken by the woman to reach the first healthcare provider she visited (pt=0.04)	- lower educational level (p=0.002); - no formal education 2.75 (95% CI 1.37, 5.52, p=0.004)	Training Program in Nigeria for Non-communicable Diseases Research (TRAPING NCD) grant number FIC/NIH D43TW009106 from the Fogarty International Centre.	- Muslim women were less likely to be diagnosed at later stages than Christian women (age-adjusted OR=0.46; 95% CI 0.24, 0.90; p=0.02), with this association strengthening slightly after further adjustment for educational level (OR=0.38; 95% CI 0.19, 0.75; p=0.005).
Delay in presentation of cancer patients for diagnosis and management: An institutional report	A Oladeji	2017	Uterine cervix, breast, head and neck, prostate, GIT, others	Nigeria	Hospital	June 2014 to May 2015	Patients	Questionnaire	218	21 to 83										yes	yes	yes	no	describes reasons	-Lack of awareness of cancer symptoms -Using food supplements -Treatment received by cancer patients at point of first presentation include spiritual care (prayers), herbal medicine -Seeking alternative therapy -Fear of diagnosis of cancer	-Challenges of distance to treatment center -Lack of family support	-Fear of treatment side effects -Financial constraints - inadequate facilities					-The patients were classified into those without significant delays (less than 3 months delay) and those with significant delays (more than 3 months delay). Those with significant delay were further classified as significant delay 12-26weeks and prolonged delay (more than 26 weeks).
Factors contributing to poor management outcome of sinonasal malignancies in South-west Nigeria.	A.J.Fasunla	2013	Sinonasal Malignancies	Nigeria	Hospital	March 2006 - February 2011	Patients	Questionnaire	61	mean age 37 years +/- 19.4 (range 4 years - 72 years)	females 33 (54.1%) males 28 (45.9%)	not stated	No post secondary education 40 (65.6%) With post secondary education 21 (34.4%)	Married 39 (63.9%) Not married 22 (36.1%)	none stated	Low socioeconomic class 80.3% High socioeconomic class 4.9%	Christians 53% Muslims 47% Other 1%	Rural 34 (55.7%) Urban 27 (54.3%)	Not stated	yes	yes	yes	no	Other: none stated	- attitude of hospital staff - lack of confidence in orthodox therapy - proximity to health facility -traditional and religious belief	- patients, wrong advice	-high cost of medical treatment	None	None	none	None stated	
Delays in presentation and treatment of breast cancer in Enugu, Nigeria	ER Ezeome	2009	Breast	Nigeria	Hospital	June 1999 to May 2005	Patients	Questionnaire	164	age range 21 -77 yrs mean age of 45.7 yrs, median age of 45	162 female 2 male		Non 24 (15.2%) Primary 38 (24.2%) Secondary 45 (28.7%) Tertiary 47 (29.9%) Higher Degree 3 (1.8%)	Married 116 (71.2%) Not married 19 (11.7%) Widowed 24 (14.7%) Divorce/separated 4 (2.5%)			Catholics 81 (49.7%) Orthodox protestants 39 (23.9%) Pentecostals 31 (19%) Unspecified Christians 7 (4.3%) Muslims 3 (1.8%) Traditional religion 2 (1.2%)			yes	no	yes	Other:	describes reasons	-did not consider the symptoms serious or thought it will disappear -did not know the implication of the abnormality -lacked finance to go for treatment - alternative practitioners and prayer houses - did not experience pain and therefore did not present earlier		-wrong advice and false reassurances from the initial doctor or health professional -delays in getting biopsy or histology reports -physician's failure to get biopsy or histology at the initial evaluation -industrial actions in the hospitals				-	
Delayed treatment of symptomatic breast cancer: The experience from Kaduna, Nigeria	A. Y. Ukwenya	2008	Breast	Nigeria	Hospital	1st July 2003 to 30 June 2005	Patients	Questionnaire	111	Median age among those admitted for treatment within a month 50 after a month 43			Illiterate/primary 59 Secondary/tertiary 52	Currently married 97 Currently unmarried 14						yes	yes	yes	no	describes reasons	- Patient not aware of seriousness of a lump in the breast 47(47.5%) - Went for alternative (traditional/spiritual) treatment 38(38.4%)		Provider delay -Failure to refer patient at first consultation 40 (40.4%) -Attempted treatment by lumpectomy with recurrence 15(15.1%) -Lump not sent for histopathological examination 14(14.1%) -Patient not counselled about seriousness of breast lump 13(13.1%) -Breast lump mistakenly incised as an abscess 10 (10.1%) -Breast lump not felt at initial examination 7(7%) -Biopsy result not immediately communicated to patient 4 (4%) -Initial biopsy diagnosis of benign disease 3(3%) Patient reasons for delay are -Family refused hospital treatment 25 (25.3%) -Did not want mastectomy as treatment 21 (21.2%) - Could not initially afford hospital treatment 13(13.1%)					
Cancer Control at the District Hospital Level in Sub-Saharan Africa: An Educational and Resource Needs Assessment of General Practitioners.	Allison N. Martin	2019	cancer type not specified (provider study)	Rwanda	National	early 2017	Clinicians	Questionnaire	73	20-24 2 (2.7%) 25-29 64 (87.7%) 30-34 5 (6.9%) >35 2 (2.7%)	Female 15 (21.1%) Male 56 (78.9%)	not stated	first year general practitioners (doctors)	not stated	doctors	not stated	n/a	not stated	n/a	no	no	yes	no	describes reasons	- lack of awareness of symptoms 65 (89%)	- inability to afford clinic visits 48 (66%)	-referrals with lack of specific appointments to specialists - lack of pathology or screening services 47 (49%)	n/a	n/a	n/a	National Cancer Institute Grant ; National Institutes of Health Ministry of Health Rwanda Centers for Disease Control Global Fund	None
Barriers to timely surgery for breast cancer in Rwanda	Lauren E. Schleimer	2019	Breast	Rwanda	Regional	1st January 2014 to 31 December 2015	Patients	Case note	151	Median age 54 (27-84)	Female 144 Male 7									yes	yes	yes	no	describes reasons	-Financial/social issues -Seeking traditional medicine -Seeking care abroad	-Financial/social issues	-Surgeon/operating room availability -Management of pregnancy -Inoperable, referred for second opinion -Chemotherapy toxicity -Patient refused breast surgery 4 -Patient refused referral for off-site operative treatment				Harvard medical scholars research grant	-Disruptions in care were defined as events causing delays of>7 days for scheduled neoadjuvant chemotherapy operation,>30 days for receipt of neo-adjuvant endocrine therapy, any missed visit for surgical evaluation, or any change in clinical status other than progression requiring modification of treatment plan.
Delays in breast cancer presentation and diagnosis at two rural cancer referral centers in Rwanda	Lydia E. Pace	2015	Breast	Rwanda	National	November 2012 - February 2014	Patients	Questionnaire	144	median age 49 years <40 32 (22%) 40,Äì49 43 (30%) 50,Äì59 43 (30%) >60 26 (18%)	100% female	HIV-positive 6 (4%)	None or primary school 108 (75%) Secondary school or university 36 (25%)	Single, widowed or divorced 73 (51%) Married 71 (49%)	not stated	not stated	not stated	rural	<2 hr 117 (81%) >=2 hr 57 (19%) CHW who visits regularly 51 (35%)	yes	yes	yes	yes	both	- not bothered by the problem at first - did not know I needed to see a doctor and thought it would go away - visited a traditional healer first - thought treatment might be too expensive - too busy at home or at my job - afraid it might be cancer afraid of treatments, including potentially losing breast - afraid of possibly dying if breast removed - too expensive to travel to the health center or hospital - did not know where an appropriate medical facility was - did not want anyone knowing had a breast problem - afraid of being examined by a doctor or other healthcare provider - had or knew someone who had a bad experience at a health center or hospital - The health center or hospital was too far - did not know that this cancer center existed	- visited another health center or hospital first and was not referred to this hospital immediately - needed a transfer form from another facility before coming here - too expensive to travel from home to -was told by healthcare worker there was no treatment for thdisease - The hospital was too far to travel to	none	delay of >=6 months: -low education (odds ratio [OR], 4.88; 95% CI 1.72-13.88; p=0.003; -seeing a traditional healer before a nurse or doctor (OR, 4.26; 95% CI, 1.56-11.60; p=0.005);	- patients who visited other healthcare facilities >=5 times before diagnosis were more likely to experience system delays of >6 months (OR, 2.69; 95% CI, 1.24-5.84;p5.01). -Patients residing in Butaro or Rwinkwavudistrict were less likely to experience long system delays (OR, 0.05; 95%CI, 0.004-0.55; p=0.02)	not stated	Global Women,Äôs Health Fellowship, Brigham and Women,Äôs Hospital and K24CA181510 from the National Cancer Institute.	none
Prevalence of breast masses and barriers to care: Results from a population-based survey in Rwanda and Sierra Leone	Faustin Ntirenganya	2014	***Breast masses not specified if cancer or not	Rwanda Sierra Leone	National	October 2011 - January 2012	Community	Questionnaire	Sierra Leone 3645 Rwanda 3175	*women with breast masses Sierra Leone: median 31 years, n=57 Rwanda: median 43 years, n=79	Sierra Leone: Men 46% women 54% Rwanda: Men 43% women 57%	not stated	*women with breast masses Sierra Leone, n=57: None 38 (66.7%) Primary 3 (5.3%) Secondary 14 (24.6%) Tertiary 2 (3.5%) Rwanda, n=79: None 33(41.8%) Primary 44 (55.7%) Secondary 2 (2.5%) Tertiary 0	not stated	*women with breast masses Sierra Leone, n=57: None 10 Home maker 7 Domestic help 2 Farmer 26 Self employed/small business 12 Rwanda, n=-79: None 9 Home maker 0 Domestic help 0 Farmer 70 Self employed/small business 0	not stated	not stated	not stated	not stated	yes	yes	no	no	describes reasons	- absence of disability associated with breast mass -lack of trust in the health care system -long distance required to reach the provider -stigma associated with having a breast problem -consulted traditional healers instead of going to health centers	-lack of money (Sierra Leone 35.1% Rwanda 11.4%)	not stated	n/a	n/a	n/a	not stated	none



Appendix 3. Exposures and Outcome for cohort studies

Table 1. Exposure-Outcome relationship for cohort studies		
Author	Exposure	Outcome
Cacala 2017	Breast Cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Late presentation of Breast Cancer (T-stage)
De Boer 2014	Kaposi's Sarcoma pathway to diagnosis	Delay in diagnosis of Kaposi's Sarcoma (Poor outcomes)
Dickens 2014	Distance from diagnostic hospital to treatment center	Stage of breast cancer at diagnosis
Foerster 2019	Breast Cancer Pathway to treatment	Receipt of treatment
Gebremariam 2021	Breast Cancer Care pathway to chemotherapy	Time to initiation of chemotherapy
Ibrahim 2011	Cervical cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Advanced stage disease
Jedy-Agba 2017	Breats Cancer Pathway to diagnosis	Stage at diagnosis
Knapp 2020	Geospatial access	Cancer stage at diagnosis
Martei 2019	Chemotherapy stock out	Suboptimal therapy delivery
Page 2019	Positive HPV test	Acceptance and adherence to diagnostic procedure and treatment
Schleimer 2019	Pathway from diagnosis to surgery	Delay to appropriate operative treatment
Tesfaw 2020	Breast Cancer diagnostic pathway; patient delay>3 months	Advanced stage of cancer at diagnosis
Zeleke 2021	Cervical Cancer Diagnostic pathway	Stage IIIA-IVB presentation

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5,6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Appendix 2
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Appendix 2
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	6,7,8 Figure 3
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Appendix 2
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	n/a
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n/a
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n/a
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	n/a
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	6,7,8 Figure 3
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	n/a

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 2
Study characteristics	17	Cite each included study and present its characteristics.	7, Appendix 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Figure 3
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Appendix 2
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	n/a
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	n/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	n/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Figure 3
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	n/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	16,17,18
	23b	Discuss any limitations of the evidence included in the review.	18
	23c	Discuss any limitations of the review processes used.	n/a
	23d	Discuss implications of the results for practice, policy, and future research.	18
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	n/a
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Notprepared
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	19
Competing interests	26	Declare any competing interests of review authors.	19
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	19

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

BMJ Open

Delays in seeking, reaching and access to quality cancer care in sub-Saharan Africa: a systematic review

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2022-067715.R2
Article Type:	Original research
Date Submitted by the Author:	08-Mar-2023
Complete List of Authors:	Lombe, Dorothy; Te Whatu Ora Health NZ MidCentral, Radiation Oncology Mwamba, Monde; ZAMBART Msadabwe, Susan; Cancer Diseases Hospital Bond, Virginia ; London School of Hygiene & Tropical Medicine and ZAMBART, Social Science Simwinga, Musonda; Zambart Ssemata, Andrew Sentoogo; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Muhumuza, Richard; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Seeley, Janet; London School of Hygiene and Tropical Medicine, Department of Global Health &Development Mwaka, Amos; Makerere University CHS, Department of Medicine Aggarwal, Ajay; King's College London
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Global health
Keywords:	Adult oncology < ONCOLOGY, Urological tumours < ONCOLOGY, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Delays in seeking, reaching and access to quality cancer care in sub-Saharan Africa: a systematic review

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Keywords: sub-Saharan Africa, cancer, delays, seeking care, diagnosis, treatment

Word count: 3180

Abstract

Objectives: Late presentation and delays in diagnosis and treatment consistently translate into poor outcomes in sub-Saharan Africa (SSA). The aim of this study was to collate and appraise the factors influencing diagnostic and treatment delays of adult solid tumours in SSA.

Design: Systematic review with assessment of bias using Risk of Bias in Non- randomized Studies of Exposures (ROBINS-E) tool.

Data sources: PubMed and Embase, for publications from January 1995 to March 2021.

Eligibility criteria: Inclusion criteria: quantitative or mixed method research, publications in English, on solid cancers in SSA countries. Exclusion criteria: paediatric populations, haematologic malignancies, and assessments of public perceptions and awareness of cancer (since the focus was on patients with a cancer diagnosis and treatment pathways).

Data extraction and synthesis: Two reviewers extracted and validated the studies. Data included year of publication; country; demographic characteristics; country level setting; disease subsite; study design; type of delay, reasons for delay and primary outcomes.

Results: 57 out of 193 full text review were included. 40% were from Nigeria or Ethiopia. 70% focused on breast or cervical cancer. 43 studies had a high risk of bias at preliminary stages of quality assessment. 14 studies met the criteria for full assessment and all totaled to either high or very high risk of bias across 7 domains. Reasons for delays included high costs of diagnostic and treatment services; lack of coordination between primary, secondary and tertiary health care sectors; inadequate staffing; and continued reliance on traditional healers and complimentary medicines.

Conclusions: Robust research to inform policy on the barriers to quality cancer care in SSA is absent. The focus of most research is on breast and cervical cancers. Research outputs are from few countries. It is imperative that we investigate the complex interaction of these factors to build resilient and effective cancer control programs.

Strengths and limitations of this study

- The study interrogated two layers of factors (context and delays) by considering the 'Three Delays' framework.
- We used the Risk of Bias in non- randomized Studies – of Exposures (ROBINS-E) tool to evaluate the quality of studies.
- We reduced heterogeneity by focusing on solid tumours, excluding awareness studies and restricting the timeframe to allow for applicability of findings to the evolving health care systems with time.
- The quality of the studies included was largely poor; however, rigorous assessment of risk of bias across seven domains allowed deduction of key study findings that are a useful steppingstone for further investigation.

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition.(1,2) In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 people respectively, cancer is becoming a leading public health problem.(3) There is growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.(4,5) The system level challenges are heterogenous across SSA but factors germane to all countries includes limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.(5–8)

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment and post treatment care makes cancer hard to manage in developing nations and ultimately result in high levels of premature mortality.(9) Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized(10); 2) across prevention, treatment, palliation(11); 3) across primary, secondary and tertiary health care sectors(12). Additionally, building strong system linkages to coordinate cancer care across primary, secondary and tertiary sectors within country are generally overlooked and this results in critical delays.(9)

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their own specific agendas perpetuating silos of development.(13,14) This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.(15,16) These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including accessibility to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay.(17) However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain under-researched. In addition, robust study designs need to be employed to help compare results between studies and provide further insights as part of the system evaluation.

In this review we used the 'Three Delays' framework to support the synthesis and classification of research studies focusing on barriers to diagnosis and treatment. The three delays framework has been used in other health conditions e.g. child and maternal health, emergency medicine however, to date it has not been applied to cancer care delivery.(18,19) The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care(20) Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

The aim of this investigation was to identify common factors influencing diagnostic delays of adult solid tumours and highlight areas that require further study whether that be specific countries, tumour types or settings, in order to help target resources and inform interventions that reduce cancer survivorship disparities globally.

METHODS

Study design

We undertook a systematic review and the findings are reported according to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The study selection flowchart diagram is presented in Figure 2

Search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021. We restricted the timeframe to allow for relevance and applicability of findings to the evolving health care systems with time. The full search strategy is in the supplementary material as Appendix 1

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer. We excluded studies that included paediatric populations, haematologic malignancies, as well assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis and treatment pathways. Haematological malignancies have been excluded because the pathways of referral, detection, management and prognosis are very different compared to solid organ malignancies and would require a separate evaluation.

Study selection

Two reviewers (DL and MM) screened the abstracts and full text articles with a third reviewer (AA) to resolve any conflicts. We utilized the systematic review tool Covidence to screen, extract and validate data.(21)

Data abstraction and synthesis

The two primary reviewers extracted and validated the entries together before merging the outputs. Data extracted included year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated, reasons for delay and primary outcomes.

Quality assessment was interrogated with ROBINS-E tool by DL and AA.(22)

Patient and public involvement

None.

RESULTS

Study characteristics

An initial search identified 6391 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.(23–78) The full data extraction output is included in the supplementary material in Appendix 2.

Country and setting profile

The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%) and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at national level. Of the remaining studies, two thirds were conducted at the hospital level (n=38) and a quarter (n=14) being conducted at regional level.

Research design

Two thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types

Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2) and patients and health facility administrators (n=1)

Assessment of study quality

Fourteen cohort studies met the eligibility for a full assessment. The scores across the domains are illustrated in Figure 3. The exposure and outcome characteristics are included in the supplemental material as Appendix 3. Two cohort studies did not require full interrogation as preliminary assessment of bias by asking the following three questions placed them in the very high-risk category i) Did the authors make any attempt to control for confounding? ii) Was the method of measuring exposure inappropriate? iii) Was the method of measuring the outcome inappropriate? The remaining 40 were surveys. However, all the studies provided valuable insights that we used in the narrative synthesis. A similar finding on data quality from this region has been highlighted before in a contemporary systematic on the routes to diagnosis of symptomatic cancer in SSA.(79) Figure 3 illustrates the different domains and proportions of bias across the studies. For the studies that were assessed comprehensively all of them had an overall judgement of high or very high risk of bias. In most studies the patient related confounders (age, marital status and socioeconomic status such as income and education level were collected as variables but not controlled for appropriately. Health systems factors were poorly accounted for in statistical analysis plans.

Three delays framework

We synthesized the empirical studies into the three delay areas: seeking, reaching and receiving quality cancer care. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the how the various studies addressed the components of the three delays framework.

Table 1. Three delays framework distribution of studies

First author name	Year	Cancer type	Country	N	Setting	Design	3 delays
Gebremariam(34)	2021	Breast	Ethiopia	223	Regional	Retrospec	C
Zeleke(46)	2021	Cervical	Ethiopia	410	Hospital	Retrospec	A
Mapanga(31)	2021	Lung	S. Africa	27	Regional	Delphi	A, B, C
Nakaganda(29)	2020	Multisite[1]	Uganda	359	Hospital	Survey	A, B, C
Tesfaw(63)	2020	Breast	Ethiopia	426	Regional	Retrospec	A, C
Tesfaw(65)	2020	Breast	Ethiopia	371	Regional	Survey	A, C
Reibold(25)	2020	Breast	Ethiopia	51	Hospital	Survey	C
Knapp(54)	2020	Breast	Nigeria	609	Hospital	Retrospec	A, B
Leng(62)	2020	Multisite[2]	Nigeria	186	Hospital	Survey	A, B, C

Togawa(55)	2020	Breast	Namibia Nigeria Uganda Zambia	1518	Hospital	Survey	A,C
Swanson(76)	2020	cervical	Uganda	268	Hospital	Survey	C
Foerster(40)	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Hospital	Survey	A, B, C
Dereje(45)	2020	Cervical	Ethiopia	212	Regional	Survey	A, C
Dereje(44)	2020	Cervical	Ethiopia	231	Regional	Survey	A, B
Agodirin(78)	2020	Breast	Nigeria	420	Regional	Survey	A, B, C
Martin(28)	2019	cancer type not specified	Rwanda	73	National	Survey	C
Page(66)	2019	cervical	Kenya	505	Regional	Prospect	A,B
Low(43)	2019	Multisite[3]	Uganda	100	Hospital	Survey	A, B
Wambalaba(69)	2019	Multisite[4]	Kenya	1048	National	Retrospec	A, C
Grosse Frie(57)	2019	Breast	Mali	124	Regional	Survey	A, B, C
Yang(41)	2019	Breast	Tanzania	196	Hospital	Survey	B
Schleimer(27)	2019	Breast	Rwanda	151	Regional	Retrospec	A, B, C
Foerster(61)	2019	Breast	Uganda Nigeria Namibia	1335	Hospital	Prospect	A, B, C
Tapera(56)	2019	cervical	Zimbabwe	78	Regional	Survey	A, B, C
Agodirin(60)	2019	Breast	Nigeria	237	Regional	Survey	A, B, C
Rayne(33)	2019	Breast	S. Africa	252	Hospital	Survey	A, B
Subramanian(52)	2019	Breast	Kenya	800	Regional	Survey	A, B, C
Olarewaju(42)	2019	breast	Nigeria	275	Hospital	Survey	A, B, C
Ajah(30)	2019	Multisite[5]	Nigeria	95	Hospital	Survey	A
Martei(59)	2019	Multisite[6]	Botswana	286	Hospital	Retrospec	A
Herbst(24)	2018	Colorectal	S. Africa	162	Hospital	Retrospec	C
Anakwenze(50)	2018	Multisite[7]	Botswana	214	Hospital	Survey	A, B
Moodley(53)	2018	Breast	S. Africa	201	Hospital	Survey	A, B
Joffe (26)	2018	Breast	S. Africa	499	Hospital	Survey	A, B, C
Awofeso(70)	2018	Breast, Cervical	Nigeria	105	Hospital	Survey	A, B, C
Bhatia(67)	2018	Multisite[8]	Botswana	214	Hospital	Survey	A,B
Oladeji(32)	2017	Multisite[9]	Nigeria	218	Hospital	Survey	A, B, C
Jedy-Agba(39)	2017	Breast	Nigeria	316	National	Case-control	A, B
Alatise(58)	2017	colorectal	Nigeria	127	Hospital	Survey	A, B, C
Cacala(51)	2017	Breast	S. Africa	172	Hospital	Prospect	A, B
Brinton(48)	2016	Breast	Ghana	1184	Regional	Survey	A, B

Mlange(64)	2016	Cervical	Tanzania	202	Hospital	Survey	A, B
Mwaka(73)	2015	Cervical	Uganda	149	Hospital	Survey	A, B
Long(47)	2015	Multisite[10]	Cameroon	220	Hospital	Survey	A, B, C
Pace(37)	2015	Breast	Rwanda	144	National	Survey	A, B, C
Tadesse(74)	2015	cervical	Ethiopia	198	Hospital	Survey	B, C
Dickens(75)	2014	Breast	S. Africa	1071	Hospital	Retrospec	B
De Boer(72)	2014	K. Sarcoma	Uganda	161	Hospital	Retrospec	A, B
Ntirenganya(71)	2014	Breast	Rwanda Sierra Leone	6820	National	Survey	A, B
Fasunla(49)	2013	Sinonasal	Nigeria	61	Hospital	Survey	A, B, C
Ibrahim(68)	2011	cervical	Sudan	197	Hospital	Retrospec	B
Anyanwu(23)	2011	breast	Nigeria	275	Hospital	Retrospec	B, C
Otieno(35)	2010	Breast	Kenya	166	Hospital	Survey	A, B, C
Ezeome(38)	2009	Breast	Nigeria	164	Hospital	Survey	A, B
Clegg-Lamptey(77)	2009	breast	Ghana	101	Hospital	Survey	A, B, C
Ukwenya(36)	2008	Breast	Nigeria	111	Hospital	Survey	A, B, C

1 – Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 – breast, cervical, head and neck, prostate; 3 – KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 – Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 – Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 – cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 – Cervical, breast, head and neck, vulvar, 8aposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 – Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 – Uterine cervix, breast, head and neck, prostate, GIT; 10 – skin, breast, colorectal, gynecologic, anal; 3 delays codes A – seeking care; B – reaching care; C – receiving quality care; S. Africa – South Africa; Retrospec – Retrospective; Prospect – Prospective; K. Sarcom – Kaposi Sarcoma; N – sample size.

The reasons of the delays amalgamated from the studies and identified as contributing to each type of systems delay are outlined in Table 2. They are further synthesized into economic, psychological, sociocultural, health services and geography subthemes and referenced appropriately in the text. The comprehensive output with outcomes of the data extraction is included as Appendix 2 in the supplementary material.

Table 2. Reasons for three delays

Reasons for seeking care delay	Reasons for reaching care delay	Reasons for receiving quality care delay
Psychological		
Belief in witchcraft	Preference for alternative treatment	Defaulting because of side effects of drugs
Denial		Declining treatment
Embarrassment		Fear of wasting doctor's time
Fear of being asked to stop habits e.g. smoking		Fear of treatment (e.g. mastectomy)
Stigma		Lack of consent
Secrecy		Preference to observe
Putting others needs first		Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements)
Prior bad experience at health centre of hospital		
Preference for care abroad		
Lack of trust in health system		
Fear of doctors, diagnosis, dying, job loss, losing part of body, missing family commitments because of treatment, telling people of illness, treatment		
Sociocultural		
Family and friends' disapproval	Family responsibilities	Communication barriers
Busy schedule	Lack of a caregiver to accompany to facilities	Family commitments
Anticipated long waiting time at clinic	Obligations at home	Language barrier
Preference for prayers and spiritual intervention		No relative to care for them during treatment
Preference for food supplements/organic foods		Patients changing mobile numbers so cannot be contacted for further management
Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture)		Ignorance on available treatment
No one to look after children		
Low education		
Lack of personal initiative		
Ignorance on how to seek healthcare		
Lack of awareness of symptoms		
Economic		

Impact of taking time off work	Dependence on others for transport	Cancer not priority
Anticipated expense of treatment	Difficulty making appointment or reaching doctor	Failure to come back for follow up diagnostic or treatment appointments
Transport challenges (e.g. cost)	High cost of prediagnostic costs	Failure to find accommodation as outpatients close to treatment centre
Prioritising day to day survival over seeking help	High cost of transport	Financial incapability
Obligations at home	Inability to afford clinic visits	High cost of medicines
No health insurance	Lack of money (for transport)	Paying out of pocket expenses
Financial incapability	Work commitments	Poor nutrition
Geography		
Distance	Distance	
Travelled away from home (out of comfort zone)	Lack of knowledge of estimated distance to nearest service	
Health service		
Lack of cancer awareness programs and screening	Lack of navigation in primary care	Absence of multidisciplinary team care
	Long investigation time at first contact	Burn out and disinterest of health care workers
	Misdiagnosis at lower levels	Diagnostic delay
	Was told by health care worker there was no treatment for disease	Chemotherapy stock outs
	Turned away from clinics for arriving late	Few specialists
		High patient volume compared to resources
		Lack of continuity of care by same healthcare workers
		Lack of palliative care and counselling services
		Lack of pathology and screening services
		Lack of smoking cessation clinics
		Lack of specific appointments with specialists
		Unwelcoming, demotivated and uncommitted staff turn patients away
		Long appointments, waiting periods
		Misdiagnosis
		No bed space
		Not healthy enough to continue treatment
		Patients changing mobile numbers so cannot be contacted for further management
		Poorly trained staff
		Power outages
		Unavailability of treatment modality
		Surgeon/operating room unavailability
		Pre-referral diagnosis not communicated
		Poor collaboration amongst health care workers

Seeking care

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which manifested itself as fears, false perceptions and beliefs and embarrassment about cancer.(26,28,31,32,35,37,38,40,42,42,44,51,55,58,60,64,65,67,70,71,73,77,78) There was also a preference for seeking treatment from traditional or faith-based healers.(27,30,32,35–38,42,44,46,48,49,51,55,57,58,65,70,71,77,78) Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)(26,27,29,31,37,38,42,45,51,52,55,56,58,72,77,78); they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting.(26,31,36–38,42,44,47,51,53,67,73,78) Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment.(31,37,44,46) The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.(26,44)

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs.(23,27–29,32,33,37,40–42,47,50–52,55,56,60,62,71–73,77,78) Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier for referral of patients.(31,37,45,70,74,78) This was identified as a source of misdiagnosis and underlay the lack of recognition for the urgency of transferring care to tertiary institutions. In one study, participants had reported that they had been misinformed at the primary level that their condition was incurable.(38)

Receiving quality care

The paucity of infrastructure, equipment, medication and human resources needed for cancer care underpinned the barriers to receiving quality cancer care.(28,62,69) We noted a lack of availability or poor quality diagnostic equipment and treatment facilities were also challenges identified.(58,62,70) Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer.(25,28,31,32,38,56,62) Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing to factors that drove patients to alternate medicine or even simply abandon treatment.(31,47,52) In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients.(23,29,31,32,36,42,47,49,52,55,56,61,62,76,77)

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Countries in SSA are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources.(2,16) In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly.(17)

However, our systematic review of studies in SSA investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered to the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and

esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to manage these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.(80,81) Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.(82,83) This is exemplified by our findings which show research is concentrated on a pool of 4 or 5 better resourced countries and two main tumour types likely related to the availability of external funding.

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to account for important cofounding factors and system level processes to enable the effective problem solving. None the less they still provide a valuable baseline insight that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human or infrastructure). Across all delays cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport, accommodation, diagnostic tests and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance.(84) A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).(85)

In seeking care, fear is compounded by the lack of awareness (knowledge) on the disease, availability of services or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinder free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could possibly discourage patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care the system with appropriate human resource and infrastructure (diagnostic and treatment). A lack of human resource encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment. Acceptance and adherence to treatment are also integral to a successful intervention as investigated by Anyanwu et al.(23)

The findings from our study suggests that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and inability to support diagnostic costs thereby relying on the patient to raise funds.

Limitations

A major limitation in the interpretation and application of the findings of this research output is the quality of the included studies. Recognition of this limitation and application of additional triangulation has assisted us to utilize what is available in this space. Future directions based on our findings would be to conduct more research studies that will provide quality data for policy formation and effective implementation.

Conclusion

To see a reduction in cancer mortality in SSA health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind an effective population approach can be achieved. Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions who have different realities. In carrying out this systematic review we intend to provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

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Contributors DCL, MM and AA were involved in all aspects. SM, VB, MS, ASS, RM, JS and ADM participated in study design, data interpretation, preparation and revision of manuscript.

Funding This work was supported by the London School of Hygiene and Tropical Medicine's Wellcome Institutional Strategic Support Fund (grant reference 204928/Z/16/Z)

Competing interests The authors have no financial disclosures or other conflicts of interest to report.

Ethics approval Non-applicable. This study was a systematic review so did not directly involve animal or human participants. Patient consent for publication was not required.

Data availability statement No datasets were generated. The data extraction output is available as supplementary material.

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Figure 1. Three delays framework
Figure 2. Flowchart of study selection
Figure 3. Quality assessment of studies (n= 14)

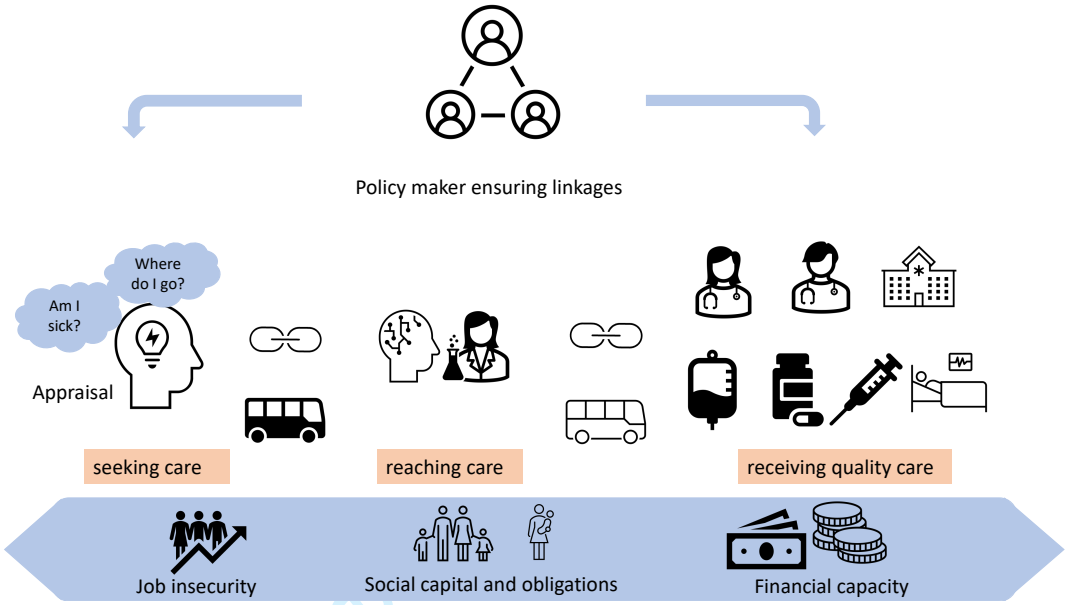


Figure 1: Three Delays Framework

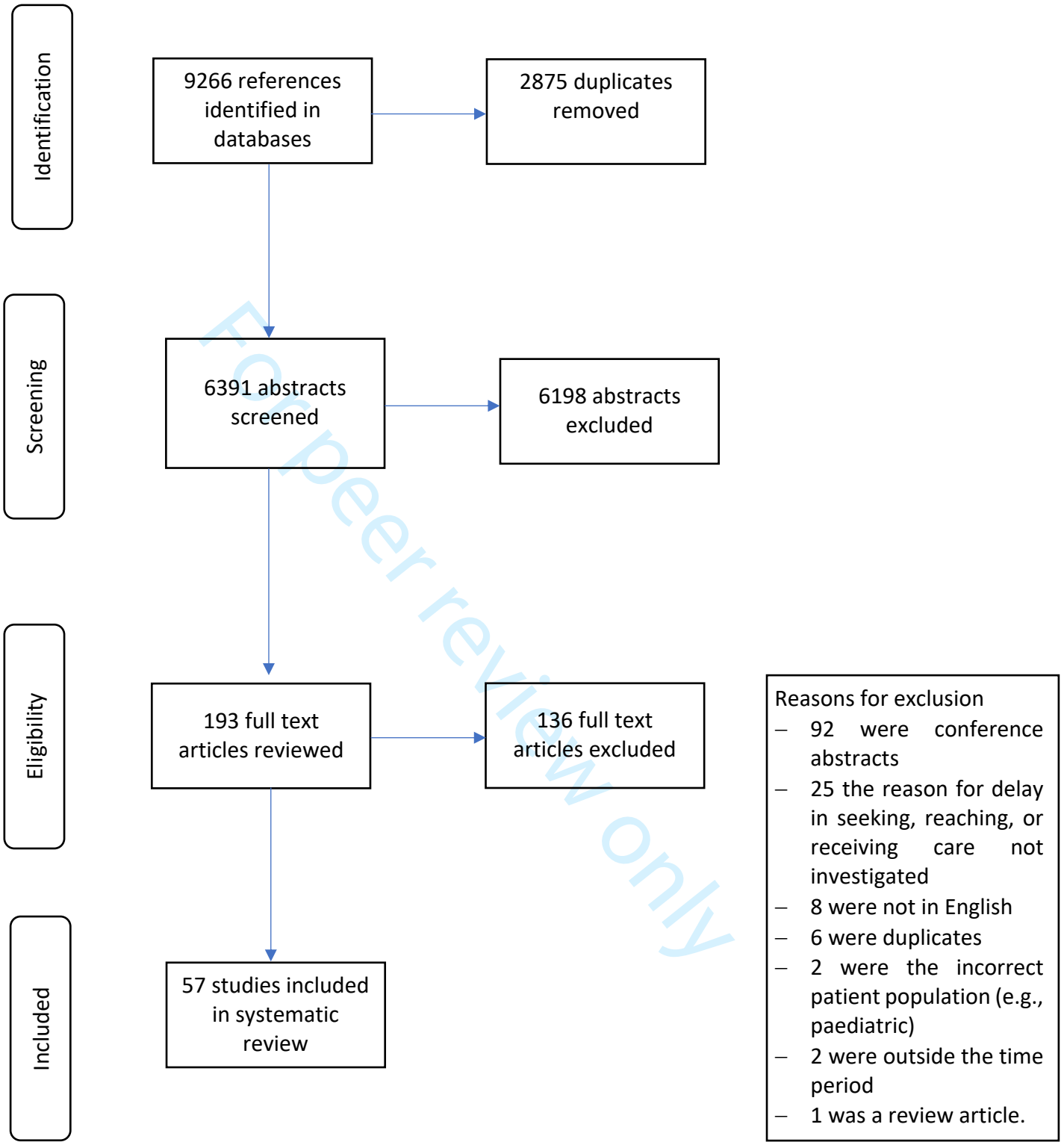
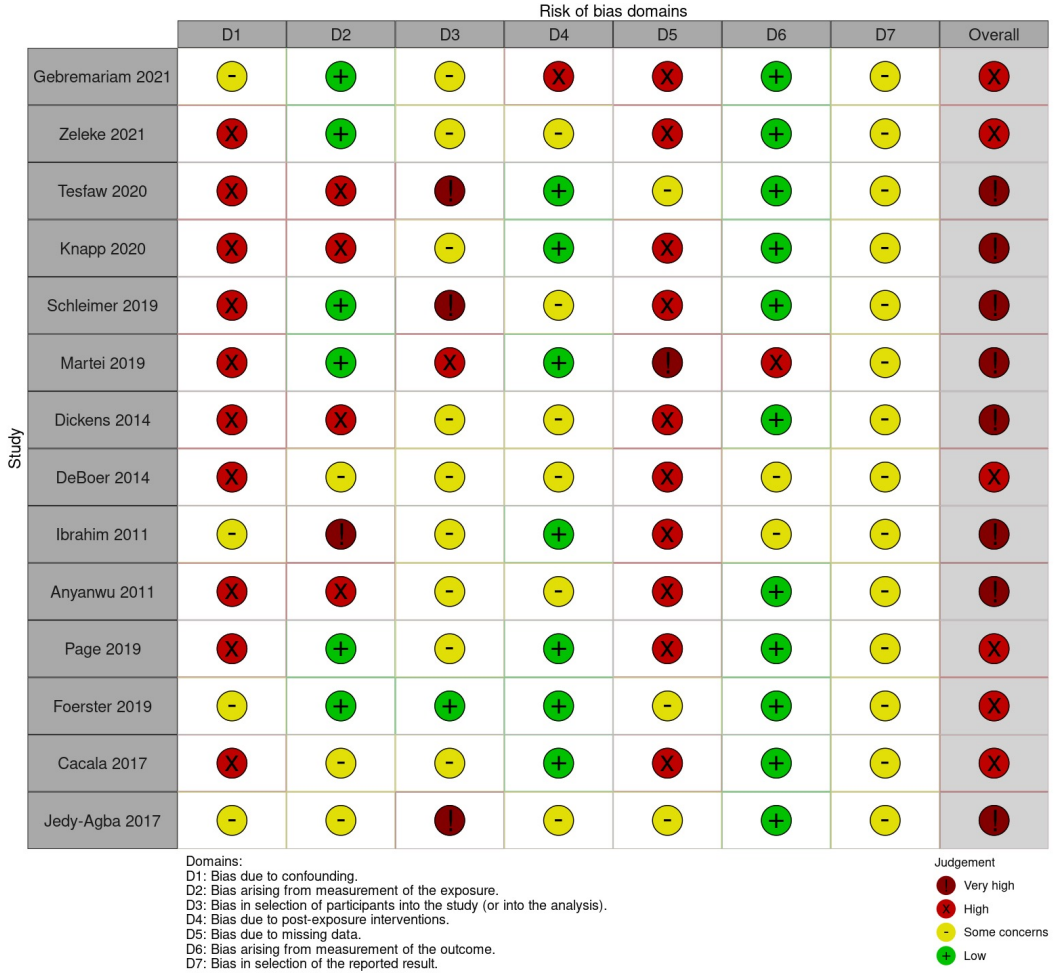


Figure 2. Flowchart of study selection as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance



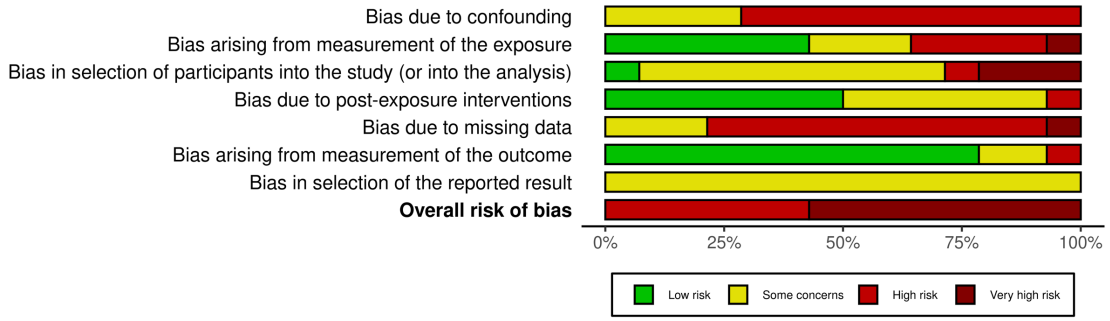


Figure 3. Quality assessment of studies , n= 14.

McGuinness, LA, Higgins, JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Syn Meth. 2020; 1- 7. https://doi.org/10.1002/jrsm.1411

Systematic review	
Databases	PubMed
Search terms	Synonyms
1. Cancer ti,ab	cancer OR tumour OR tumor OR neopla* OR malignan* OR carcinoma
2. Delay ti, ab	barrier* OR delay* OR access OR late OR interval
3. Diagnosis and treatment ti, ab	diagnos* OR presentation OR intervention OR referral OR consult* OR treatment OR therap*
4. countries ti,ab	angola OR benin OR botswana OR burkina faso OR burundi OR cameroon OR cameron OR cape verde OR cabo verde OR central african republic OR ubangi shari OR chad OR comoros OR comoro islands OR iles comores OR congo brazzaville OR congo democratic republic OR democratic republic of congo OR congo OR zaire OR cote d ivoire OR cote divoire OR ivory coast OR djibouti OR french somaliland OR equatorial guinea OR eritrea OR ethiopia OR gabon OR Gabonese republic OR gambia OR ghana OR gold coast OR guinea OR guinea bissau OR kenya OR lesotho OR basutoland OR liberia OR madagascar OR malagasy OR malawi OR nyasaland OR mali OR mauritania OR mauritius OR mozambique OR namibia OR niger OR nigeria OR réunion OR rwanda OR Ruanda OR sao tome OR principe OR senegal OR seychelles OR sierra leone OR somalia OR south africa OR south sudan OR sudan OR swaziland OR tanzania OR tanganyika OR togo OR togolese republic OR uganda OR zambia OR zimbabwe OR africa OR african
5. Qualitative search terms	qualitative* OR narrative* OR interview* OR focus group* OR grounded theory*

Systematic review	
Databases	EMBASE
Search terms	Synonyms
1. Cancer ti,ab	cancer:ti,ab OR tumour:ti,ab OR tumor:ti,ab OR neopla*:ti,ab OR malignan*:ti,ab OR carcinoma:ti,ab
2. Delay	barrier*:ti,ab OR delay*:ti,ab OR access:ti,ab OR late:ti,ab OR interval:ti,ab
3. Diagnosis and treatment ti, ab	diagnos*:ti,ab OR presentation:ti,ab OR intervention:ti,ab OR referral:ti,ab OR consult*:ti,ab OR treatment:ti,ab OR therap*:ti,ab
4. Sub-Saharan Africa ti, ab	angola:ti,ab OR benin:ti,ab OR botswana:ti,ab OR 'burkina faso':ti,ab OR burundi:ti,ab OR cameroon:ti,ab OR cameron:ti,ab OR 'cape verde':ti,ab OR 'cabo verde':ti,ab OR 'central african republic':ti,ab OR 'ubangi shari':ti,ab OR chad:ti,ab OR comoros:ti,ab OR 'comoro islands':ti,ab OR 'iles comores':ti,ab OR 'congo brazzaville':ti,ab OR 'congo democratic republic':ti,ab OR 'democratic republic congo':ti,ab OR congo:ti,ab OR zaire:ti,ab OR 'cote divoire':ti,ab OR 'cote d ivoire':ti,ab OR 'ivory coast':ti,ab OR djibouti:ti,ab OR 'french somaliland':ti,ab OR 'equatorial guinea':ti,ab OR eritrea:ti,ab OR ethiopia:ti,ab OR gabon:ti,ab OR 'gabonese republic':ti,ab OR gambia:ti,ab OR ghana:ti,ab OR 'gold coast':ti,ab OR guinea:ti,ab OR 'guinea bissau':ti,ab OR kenya:ti,ab OR lesotho:ti,ab OR basutoland:ti,ab OR liberia:ti,ab OR madagascar:ti,ab OR malagasy:ti,ab OR malawi:ti,ab OR nyasaland:ti,ab OR mali:ti,ab OR mauritania:ti,ab OR mauritius:ti,ab OR mozambique:ti,ab OR namibia:ti,ab OR niger:ti,ab OR nigeria:ti,ab OR réunion:ti,ab OR rwanda:ti,ab OR ruanda:ti,ab OR 'sao tome':ti,ab OR 'principe':ti,ab OR senegal:ti,ab OR seychelles:ti,ab OR 'sierra leone':ti,ab OR somalia:ti,ab OR 'south africa':ti,ab OR 'south sudan':ti,ab OR sudan:ti,ab OR swaziland:ti,ab OR tanzania:ti,ab OR tanganyika:ti,ab OR togo:ti,ab OR 'togolese republic':ti,ab OR uganda:ti,ab OR zambia:ti,ab OR zimbabwe:ti,ab OR africa:ti,ab OR african:ti,ab
5. Qualitative search terms	qualitative*:ti,ab OR narrative*:ti,ab OR interview*:ti,ab OR focus group*:ti,ab OR grounded theory*:ti,ab

Appendix 2. Data extraction

Title,Author,Year of publication	Cancer type	Setting Country	Data collection timeframe	Participants	Sample size and design	Patient factors	Distance from hospital	Reasons for delay and outcomes
Impact of Essential Medicine Stock Outs on Cancer Therapy Delivery in a Resource-Limited Setting. Yehoda M. Martei, 2019	cervical breast prostate esophageal lung uterine ovarian colorectal head and neck cancers Kaposi sarcoma	Hospital Botswana	1st January 2016 to 31st December 2016	Patients	286 Retrospective cohort	Male 77 Female 180 Unknown 29<65yrs =217 > 65yrs=61 Unknown =8		-each week of stock out was strongly associated with a suboptimal therapy delivery event AL1(OR, 1.81; 95% CI, 1.62 to 2.02). -Every week of stock-out duration was associated with an almost two-fold increased risk of a suboptimal therapy delivery event (OR, 1.9; 95%CI, 1.7 t 2.13;P,.001). - patients receiving treatment regimens for colon (OR, 6.34;95% CI, 3.11 to 12.9;P,.001) or rectal cancer (OR, 7.07;95% CI, 1.83 to 27.3;P=.004) were at the highest risk of an event after adjusting for stock out, whereas those with prostate cancer were less likely than their counterparts to experience a suboptimal therapy delivery event (adjusted OR, 0.24; 95% CI, 0.08 to 0.79;P= .019 1:1048576 -The measured exposure was chemotherapy stock out, quantified as the duration of chemotherapy stock out within a cycle interval. -Stock-out duration was calculated by counting the days from the date the drug was out of stock to the date it was recorded as being back in stock. -The primary outcome, suboptimal therapy delivery, was defined as any of the following events: any dose reduction, at least 1-week delay in receipt of therapy, any missed dose, and any switch in intended therapy. - A majority of the patients with stage information had either stage III or IV disease. Of patients with known intent of treatment, 51%were receiving curative regimens and 49% were receiving noncurative regimens-chemotherapy stock outs
Patient Factors Associated With Delays in Obtaining Cancer Care in Botswana. Rhine K Bhatia 2018	All cancers Cervical 90 (42.3%) Breast 34 (16.0%) Head and neck 34 (16.0%) Vulvar 15 (7.04%) 9Kaposi's sarcoma 14 (6.7%) Endometrial 7 (3.3%) Penile 5 (2.4%) Anal 5 (2.4%) Oesophageal 5 (2.4%) Lymphoma 3 (1.4%) Prostate 1 (0.5%)	Hospital Botswana	December 2015 - January 2017	Patients	214 Questionnaire	not stated not statedSingle 132 (62.9%) Married 47 (22.4%) serious or live-in 16 (7.7%) Separated/ widowed 15 (7.1%)None 28 (16.2%) Primary 59 (34.1%) Secondary 70 (40.5%) Tertiary or above 16 (9.3%)Women 173 (81.3%) Men 41 (19.2%)median age of 46 years (21-95 years)	5-50 km 67 (32.7) 51-200 km 61 (29.8) 201-400 km 34 (16.6) > 400 km 43 (30.0)	English literacy: Can read in English, p=0.042 OR 2.32; Cancer diagnosis site: Breast p=0.017 OR 3.73; Head and neck p=0.017 OR 93.73Predominantly female cancer p=0.015 OR 0.452; Relationship status: separated/widowed p=0.032 OR 0.3Appraisal delay; Female sex p=0.032 OR 0.45; Education level: primary schooling p=0.057 OR 0.367; Distance from PMH (201-400 km) p=0.056 OR 2.5; Cancer diagnosis site Kaposi sarcoma p< .001 OR 9.77; Penile cancer p=0.029 OR 8.14; Symptom severity A little serious p=0.001 OR 0.14; Very serious p=0.020 OR 0.402;Predominantly female cancer p=0.005 OR 0.4 ; Help-seeking delay No. of family members: 4-10 p=0.03 OR 0.314; Symptom severity: very serious p=0.012 OR 0.384; Cancer diagnosis site: Vulvar p=0.055 OR 2.97; Kaposi sarcoma p=0.011 OR 4.68Beliefs: - declining treatment: getting cancer is part of God's plan p=0.0416 - 28/115 (2.74%)Appraisal - sex, p=0.030: male 16 (39%); female 39 (22.5%) - severity of symptoms, p=0.006: not serious 22 (44.9%); a little serious 4 (10.3%); moderately serious 5 (21.7%); serious 5 (23.8%) very serious 19 (24.7%) - cancer site, p=0.011:Cervical 14 (15.6%); Vulvar 5 (33.3%); Anal 1 (20%); Head and neck 9 (26.5%); Penile 3 (60%); Breast 8 (23.5%); Lymphoma 2 (66.7%) Oesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - age, p=0.496 Fears - Scared of telling people that I am sick, p=0.006 4/213 (0.212%) - Scared of job loss, p=0.002 6/171 (90.22%) - Scared of surgery p=0.0415 8/206 (0.378%) - Scared of radiation therapy p=0.0253 8/211 (0.352%) - Scared of chemotherapy p=0.0339 12/213 (0.420%) - Scared of missing family commitments as a result of treatment p=0.0061 4/210 (0.212%) - Scared of death p=0.0169 13/213 (0.392%) Beliefs - death is near p=0.0406 9/210 (0.393%)
Factors related to advanced stage of cancer presentation in Botswana Chidinma Anakwenze 2018	Response rate 99.53% n=220. cervical 90 breast 32 , head and neck 42 , vulvar 15, kaposi sarcoma 14, endometrial 7,penile 6, anal 5, esophageal 5,lymphoma 3 prostate 1	Hospital Botswana	December 2015 to January 2017	Patients	214 Questionnaire	Single early 41 (19.5%) late 40 (19.0%) unknown =51 (24.3%) Married/in a serious relationship early 9 (4.3%) late 24 (11.4%) unknown 22 (10.5%) Living with a partner early 3 (1.4%) late 4 (1.9%) stage 1 (0.5%) Divorced/separated/widowed early 3 (1.4%) late 6 (2.9%) stage 6 (2.9%)No formal education early 6 (3.4%) late 11 (6.3%) unknown 11 (6.3%)	5-50 km early 15 (7.3%) late 29 (14.1%) unknown =23 (11.2%) 51-200km early 20 (9.7%) late 19 (9.2%) unknown 22 (10.7%) 201-400km early 12 (5.8%) late stage 7 (3.4%) unknown15 (7.3%) > 400 early 9 (4.4%) late 19 (9.2%) unknown 15 (7.3%) Unable to locate village unknown 1 (0.5%)	- not afraid of having cancer OR, 3.48; P < .05 - no family to care during treatment OR, 6.35; P = .05 -could not afford to develop cancer (OR, 2.73; P < .05) - belief use of contraceptive pills or injections causes cancer OR (0.72 P=0.02) - belief using hormone replacement pills after menopause can cause cancer OR (0.96 p=0.01)-Transportation problems; -Dependent on others for transportation
Factors associated with delays to surgical presentation in North-West Cameroon Chao Long 2015	-skin -breast -colorectal -gynecologic -anal	Hospital Cameroon	23rd June2014 - 5th August 2014	Patients	220 Other: cross sectional	-less than primary school completed 37(16.8%) -completed primary school 115 (52.3%) -secondary school or higher education completed 68 (30.9%)134 Males 86 females -cancer cohort had 19 males and 40 females15 to 20 yrs 4 21 to 29 yrs 7 30 to39 yrs 7 40to 49 yrs 8 50 to 59 yrs 14 60 to 69 yrs 13 70 to 79 yrs 5 80+ yrs 1		-thought another health care provider could provide adequate or better care -Lack of knowledge about MBH hospital -cost of hospital fees -need for first aid/emergency care at the nearest facility -in ability to participate in care decisions due to mental state -transportation - inability to take time from work/commitments -belief that they were not sick enough -belief that they could treat themselves
Late-Stage Diagnosis and Associated Factors Among Breast Cancer Patients in South and Southwest Ethiopia: A Multicenter Study Aragaw Tesfaw 2020	Breast	Regional Ethiopia	January 2013 - December 2017	Patients	426 Retrospective cohort	not stated not statednot statednot statedMale 28 (6.6%) Female 398 (93.4%)mean 42.78 +/- 13.4	not stated	- breast lump or mass as the chief complaint were 3 times more likely to be diagnosed with late-stage disease than those who did not (AOR= 3.01; 95% CI, 1.49-6.07)late-stage disease: -rural communities 224 patients (73%), urban areas 85(28%) -female patients (74.4%), male patients 46.4% -long patient delay 240 patients (77.2%) -long total delay vs short total delay (77.4% vs. 67.3%, respectively,P<.05)not statednot statednot statednot stated
Factors associated with delayed diagnosis of cervical cancer in tikur anbesa specialized hospital, Ethiopia, 2019: Cross-sectional study Shegaw Zeleke 2021	Cervical	Hospital Ethiopia	not stated	Patients	410 Other: case note review and interview	Farmer 182 (44.4 %) Governmental 27 (6.6%) Private 54 (13.2%) Unemployed 147 (35.9%) not statedMarried 285 (69.5%) Single 11 (2.7%) Divorced 36 (8.8%) Widowed 78 (19.0%)Cannot read and write 205 (50%)100% Femalemean age 50 years (+/- 11.5)	<100 km 106 25.9% >100 km 304 74.1%	not statednot statednot statednot statednot stated- Accept as cancer cannot heal - Go to traditional healers - Difficulty of decision - Can be healed by itself - Given priority for other diseases - Embarrassment - Unawareness of cervical cancer health service access

Delayed initiation of adjuvant chemotherapy among women with breast cancer in Addis Ababa, Ethiopia Alem Gebremariam 2021	Breast	Regional Ethiopia	January 2017 - December 2019	Patients	223 Other: Retrospective review and interviews	Homemaker 102 (45.7%); Employed (governmental and private) 79 (35.4%); Daily laborer 29 (12.9%) Other (retired, no job)13 (5.7%) <61.0 US dollar 58 (26%) 61.0-94.0 US dollar 107 (48.0%) >194.0 US dollar 58 (26%)Not statedIlliterate 37 (16.6%); Primary school 60 (26.9%); Secondary school 69 (30.9%); Diploma and above 57 (25.6%)100% female<40 years 104 (46.6%); 40-49 years 51	not stated	- the risk of delay was significantly higher among women with lower monthly family income, p=0.002 - Women with a monthly income of US$<61.0 had a three times higher risk of delay (RR=3.98; 95% CI 1.67-9.46) compared to those women with a family monthly income of US$>194Not statedNot statedNot statedNot statedNot statedNot stated
Adherence to Newly implemented Tamoxifen Therapy for Breast Cancer Patients in Rural Western Ethiopia Christian Felix Rebold 2020	Breast	Hospital Ethiopia	January 2010 - December 2015	Patients	51 Other: questionnaire and interviews	Housewife 28 (57%) Farmer 17 (35%) Student 1 (2%) Other 3 (6%) not statedMarried 38 (93%) Not married 3 (7%)Literate (n = 38), No 31 (77%) Yes 9 (23%)100% femalemean 45 years (35-51)	not stated	not statednot statednot stated- lack of consent - problems on the health care provider side (12; 48%) where patients had not been given an appointment (n = 9), the physician was absent (n = 2), and other (n = 1). - Reasons on the patient side (13; 52%) included lack of money (n = 2), too weak to travel (n = 1), fear of treatment (n = 1), and private reasons (n = 1). - No information was available for 8 patients. not statednot stated
Factors associated with advanced stage at diagnosis of cervical cancer in Addis Ababa, Ethiopia: A population-based study Nebiyu Dereje 2020	Cervical	Regional Ethiopia	1st January 2017 to 30th June 2018	Patients	212 Other: Questionnaire, case notes	<3200 ETB =142 (67.5%) monthly >3200 ETB =69(32.5%)-No formal education 86 (40.6%) -Yes formal education 126 (59.4%) Female =212<40 yrs=42 (19.8%) 40-59 yrs=103 (48.6%) >60 yrs =67 (31.6%)		-Religous practices/Did nothing APR=1.25, 95% CI: 1.05 to 1.53 , p=0.02 -visited >3 different healthcare facilities prior to diagnostic confirmation APR=1.24, 95% CI: 1.08 to 1.91 p=0.01 - Out of pocket medical expenses APR 1.44 (1.08-1.91), p=0.003not stated -visiting more than three different health care facilities before diagnostic confirmation-medical expenses -not going to facility immediately after symptom recognition
Extent and predictors of delays in diagnosis of cervical cancer in Addis Ababa, Ethiopia: A population-based prospective study Nebiyu Dereje 2020	Cervical	Regional Ethiopia	1st January 2017 to 30th June 2018	Patients	231 Questionnaire	-Housewife =114 (62.3%) -Government employed =29 (12.6%) -Privately employed =23(10%) -Merchant =10 (4.3%) -Daily laborer =13 (5.6%) -Pensioner =8 (3.5%) -Other 4 (1.7%) Family income per month <600 ETB =35 (15.2%) 601 -1 650 =56 (24.2%) 1651 -3 200 =66 (28.6%) 3 201- 5 250 =49 (21.2%) 5 251 -7 800=19 (8.2%) >7 801 =6 (2.6%)-Married 96 (41.6%) -Single 11 (4.8%) -Divorced 36 (15.6%)		The odds of diagnostic delays: - contacted primary-level health facilities (health centers and private clinics as compared to contacted secondary- or tertiary-level health facilities (AOR, 2.6; 95% CI, 1.33 to 5.27). -patients who visited, >= 4different health facilities for their cancer diagnosis as compared to those who visited, < 4 different health facilities (AOR, 2.7; 95% CI, 1.07 to6.71). -patients who made 5 visits to health facilities before receipt of histologic diagnostic confirmation compared to those patients who made 5 visits (AOR, 2.2;95% CI, 1.05 to 4.43) -The odds of delay in health seeking: - never heard of cervical cancer before diagnosis (adjusted OR [AOR], 2.3; 95% CI, 1.11 to 4.70) - waited until they saw additional symptoms (AOR, 2.3;95% CI, 1.096 to 4.90) - practiced a religious ritual as a solution for their cancer (AOR,3.3; 95% CI, 1.46 to 7.48) - Not bothered about first symptom 16 (29.6%) -Thought it would go away by itself 21 (38.9%) -Misinterpretation (not aware) of symptoms 14 (25.9%) -Ashamed to tell anyone about symptoms10 (18.5%) -Not knowing which health facility to visit 8 (14.8%) -Thought treatment would be expensive 3 (5.5%) -Thought religious activities would cure problem 5 (9.3%)
Socio-economic and cultural vulnerabilities to cervical cancer and challenges faced by patients attending care at Tikur Anbessa Hospital: A cross sectional and qualitative study Sara Kebede Tadesse 2015	cervical	Hospital Ethiopia	15 April - 15 May 2013	Patients	198 Other: questionnaire and interview	Housewife 78 (39.4%) Farmer 73 (36.9%) Government 13 (6.6%) Merchant 12 (6.1%) private for profit sector 9 (4.5%) Pensioner 8 (4.0%) Daily laborer 2 (1.0%) NGO 1 (0.5%) Unemployed 1 (0.5%) Temp worker 1 (0.5%) <500 43 (23.9%) 500 - 999.99 77 (42.8%) 1,000 - 1,499.99 29 (16.1%) 1,500 - 1,999.99 19 (10.6%) 2,000 or more 12 (6.7%)Single 1 (0.5%) Married 101 (51.0%) Widowed 69 (34.8%) Separated 19 (9.6%) Divorced 8	not stated	not statednot statednot statedlong waiting timemisdiagnosisnot clear
Patient delay and contributing factors among breast cancer patients at two cancer referral centres in Ethiopia: A cross-sectional study Aragaw Tesfaw 2020	Breast	Regional Ethopia	September 2019 to April 30 2020	Patients	371 Questionnaire	Housewife 215 (58.0%) Farmer 94 (25.3%) Government employee 52 (14.0%) Other 10 (2.7%) not statedMarried 298 (80.3%) Single 73 (19.7%)Illiterate136 (36.7%) Primary education 153 (41.2%) Secondary education and above 82 (22.1%)100% femalemedian 40 (30-70), Mean 48.1 <40 83 (22.4%) >40 288 (77.6%)	<5 km 163 (43.9%) > 5 km 208 (56.1%)	not stated- more than 5 km travel distance (AOR=1.66; 95% CI=1.09-3.00)- rural residence (AOR=3.72; 95% CI=1.82-7.AF2561). - Illiterate women (AOR=3.8; 95% CI=1.71-8.64) - painless wound (AOR=3.32; 95% CI=1.93-5.72) - no lump/swelling in their armpit (AOR=6.16; 95% CI=2.80-13.54). - no previous breast problem (AOR=2.46; 95% CI=1.43-4.22)not statednot stated- Lack of awareness about early symptoms 345 (92.9%) - Relating symptoms with other medical problems 132 (35.6%) - Belief that breast cancer has not any medical treatment 88 (23.7%) - Use of traditional and spiritual treatment options 286 (77.1%)

Why do breast cancer patients report late or abscond during treatment in Ghana? A pilot study. J. Clegg-Lamptey 2009	breast	Hospital Ghana	September 2007 - July 2008	Patients	101 Questionnaire	-Single new patients 13 (19%), defaulters 2 (5.7%) -Married patients 38 (57.7%) , defaulters 32 (88.6%) -Divorced/separated new patients 3 (4.2%), defaulters 2 (5.8%) -Widowed new patients 22 (18.2%) - Nil New patients 11 (16%, defaulters 5 (14.3%) - Primary new patients 15 (22.7%) , defaulters 5 (14.3%) -Secondary new patients 18 (27.3%) , defaulters 20 (57.1%) - Tertiary new patients 22 (33.3%) 5 (14.3%) defaulters101 women-new patients: mean 44.8, median 43 yrs		Defaulters - fear of mastectomy 20 (57.1%), -Herbal treatment 13 (37.1%), -Financial incapability 11 (31.4%), -Prayers and Prayer camps 10 (28.6%), -Chinese medication 5 (14.3%) -observing 3 (8.6%) -Ulcer healed. Thought disease was healed 2 (5.7%), -Had complete clinical response 2 (5.7%), food supplement2 (5.7%), exercising faith 2 (5.7%) -Side effects of drugs 1 (2.9%) - Pressure from in-laws to refuse mastectomy 1(2.9) - Father refused treatment 1 (2.9%), -family commitments(2.9%), -acupuncture treatment at 1 (2.9%).-previous medical consultation 26 (29.4%) -Financial incapability New patients -ignorance 19 (28.8%), -fear of mastectomy 16 (24.2%), - herbal treatment 13(19.7%), -prayers and prayer camps 13(19.7%), -financial incapability 12 (18.2%), -fear of diagnosis 7 (10.6%), -other spiritual 6(9.1%)
Factors contributing to delays in diagnosis of breast cancers in Ghana, West Africa Louise Brinton 2016	Breast cancer	Regional Ghana	-	Patients	1184 Questionnaire	1184 women<40 246 (20.8%) 40-44 158 (13.3%) 45-49 188 (15.9%) 50-54 167 (14.1%) 55-59 150 (12.7%) 60-64 113 (9.5%) 65-69 63 (5.3%) >70 = 95 (8.0%) Unknown = 4 (0.3%)		Other predictors of large tumours are seeking assistance from someone other than a doctor or nurse for breast symptoms (2.65, 1.31,Ä¡5.40). -low education having an OR of 2.11 (95% CI1.47-3.04) -divorced/separated OR 1.65 (1.15-2.37) or widowed women OR 2.16 (1.42-3.28) -Consulting a traditional healer and using traditional medication
Financial barriers related to breast cancer screening and treatment: A cross-sectional survey of women in Kenya Sujha Subramanian 2019	Breast	Regional Kenya	November 2017 to April 2018	Patients	800 Questionnaire	with BC 132 without BC 258 - Never married: With BC 41 without 79 -Married/ living together: With BC 244 without 226 -Divorced/ separated: With BC 68 without 63 -Widowed: With BC 46 without 30 -Missing: With BC 41 without 2 - None:With BC 10; Without 6 - Primary: With BC 136 Without 101 - Secondary/Vocational: With BC 149 Without 154 -College05: With BC 70 Without 109 -University:With BC 32 Without 26		-Cost of going to the doctor 46.3% -Inability to discuss symptoms confidently 10.0% -Difficulties setting up appointment 9.8% -Communication barriers 6.5% -Fear of wasting the doctor's time 3.3% -Transportation barriers 23.3% -Transportation barriers 23.3% -Busy schedule 9.0% -Disapproval of family and friends 3.8% -Embarrassment 6.5% -Fear of what the doctor might find 19.3% -General fear of the doctors visit 19.3%
Patient factors affecting successful linkage to treatment in a cervical cancer prevention program in Kenya: A prospective cohort study Charlotte M Page 2019	cervical cancer	Regional Kenya	February - October 2018	Community	505 Other: prospective cohort	No 214(42%) Yes 291(58% not statedNot partnered 132(27%) Partnered 366 (73%)Primaryschool or less 428 (85%) At least some secondary 77 (15%)100% femalemedian 33 (27-42)	8 km (5-12)	not stated- primary school education or less - women who did not miss work to come to CHC not statednot statednot statednot stated
Prevalence and Capacity of Cancer Diagnostics and Treatment: A Demand and Supply Survey of Health-Care Facilities in Kenya Francis W Wambalaba 2019	Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver	National Kenya	November 2013 - February 2014	Other: Patients and adminstrators	1048 Other: - patient data from records - interviews with volunteer patients -survey data from hospital medical officers	not stated not statednot statednot statedFemale 57% Male 43%Female 52 years Men 62 years	not stated	not statednot statednot stated- preventive services limited not statednot stated
Delayed presentation of breast cancer patients. E.S. Otieno 2010	Breast	Hospital Kenya	1 October 2003 to 31st March 2006	Patients	166 Questionnaire	98.8% femalemean age 47, age range 17 to 88		-Reassured that their condition was benign by the first medical personnel they visited 40 (24.1% cumulative %24.1)-Painless symptomatology 39 (23.5%, cumulative% 47.6) -Not aware of the disease 13 (7.8%, cumulative % 84.9) -Worried they would be diagnosed with cancer 33 (19.9%, cumulative % 67.5) -Attending to traditional healers and taking herbal preparations 16 (9.6% cumulative % 77.1)
Health system organisation and patient pathways: breast care patients' trajectories and medical doctors' practice in Mali Kirsten Grosse Frie 2019	Breast	Regional Mali	1 January 2016 - April 2016	Patients and clinicians	124 Questionnaire	Housewife 55 (44.4%); Public service 19 (15.3%); Business 9 (7.3%); Student 9 (7.3%); Other 32 (25.8%) not statedMarried 83 (66.9%) Single 14 (11.3%) Divorced 7 (5.6%) Widowed 20 (16.1%)not stated100% female16-24 42 (33.9%); 35-49 47 (37.9%); 50-80 35 (28.2%)	not stated	- community healthcare centres and private clinics first contact n/a-Having someone in the family with breast cancer was also associated with a delay of >6 months in acknowledging breast symptoms (p=0.028).- knowledge about breast n/a-no health insurance - traditional healer

Geospatial barriers to healthcare access for breast cancer diagnosis in sub-Saharan African settings: The African Breast Cancer,ÂïDisparities in Outcomes Cohort Study Kayo Togawa 2020	Breast	Hospital Namibia Nigeria Uganda Zambia	September 2014 - September 2017	Patients	1518 Other: Interview	not stated not statednot statedPrimary school or less 681 (45%) Secondary/high school 509 (34%) Technical/university 328 (22%)100% womenmean 50 years (+/- 13 19-97)	not clear	not stated - rural residence OR:1.40, 95% CI: 1.06-1.84 - distance (OR per 50 km increment OR = 1.04, 95% CI: 1.00-1.09, P 0.048not stated-Cost of diagnostic tests/treatment -Transport -Hospital too far -Difficulty with making an appointment or reaching doctor -Other obligations/no permission from family member -Embarrassment -Pain or discomfort -Fear of dying/treatment -No trust in medicine/prefer traditional healer
Prevalence and Pattern of Late-Stage Presentation in Women with Breast and Cervical Cancers in Lagos University Teaching Hospital, Nigeria. Opeyemi Awofeso 2018	Breast 85 Cervical 20	Hospital Nigeria	April to June 2016	Patients	105 Questionnaire	Not stated <N9000 57 (54.3%) N9001-N18,00 24 (22.9%) N18,001-N50,000 15 (14.3%) N50,001-N90,000 7 (6.7%) N90,001-N150,000 1 (1.0%) N90,001-N150,000 1 (1.0%) N150,000 1 (1.0%)Single 4 (3.8%) Married 86 (81.9%) Divorced/separated 3 (2.9%) Widowed 12 (11.4%)None 7 (6.7%) Primary 26 (31.4%) Secondary 33 (31.4%) Post secondary 39 (37.1%)Females: 105 (100%)All - mean age	<30 min 3 (2.9%) 30 min-1h 23 (21.9%) 1-2 h 26 (24.8%) >2 h 53 (50.5%)	-Systemic delay χ2 8.1 p=0.0174-Patient delayχ2 8.5p=0.0363 -Misdiagnosis at lower levels of health care χ2 7.11 p=0.0077 -Delayed investigation time χ2 14.88 p=0.0001 -Ignorance and lack of personal initiative χ2 5.07 p= 0.0243 -unavailability of appropriate treatment modality-investigation time at first contact -misdiagnosis at lower levels-ignorance and lack of personal initiative -preference for alternative medicine -fear -myths and misconceptions
Effect of Sociodemographic Variables on Patient and Diagnostic Delay of Breast Cancer at the Foremost Health Care Institution in Nigeria. Sunday O Olarewaju 2019	breast	Hospital Nigeria	August - October 2018	Patients	275 Questionnaire	Unemployed 124 (45.1%) Employed 151 (54.9%) <18,000 99 (36%) >18,000 176 (64%)Single 12 (4.4%) Married 193 (70.2%) Divorced/separated 19 (6.9%) Widowed 51 (18.5%)Primary 46 (16.7%) Secondary 87 (31.6%) Tertiary 142 (51.6%)100% femalemean 49 +/- 11.9	not stated	not stated marital status p=0.00-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009High cost of medicine 71 (73.2%)Obligations at home 77 (91.7%) High cost of prediagnostic test 69 (82.1%) Earlier alternative treatment 66 (78.6%) High cost of transportation 13 (15.5%)Obligations at home 75 (77.3%) High cost of transportation 74 (76.3%) Stigma of disease 71 (73.2%) Denial or anxiety 71 (73.2%) Fear of seeking medical advice 69 (71.1%) Earlier alternative treatment 52 (53.6%) Non-awareness of the disease 38 (39.2%) Fear of diagnosis 67 (79.8%)
Acceptance and adherence to treatment among breast cancer patients in Eastern Nigeria. Stanley N.C. Anyanwu 2011	breast	Hospital Nigeria	2004 to 2008	Patients	275 Case note	primary 215 (80%) high school/tertiary 168 (60%) females 273 male 2<30yrs 19 (6.9%) 30-39 yrs 74 (26.9%) 40-49 yrs 77 (28.0%) 50-59 yrs 50 (18.2%) 60-69 yrs 39 (14.2%) >70 yrs 16 (5.8%)		- Declined any form of treatment 65 (37.6%) -Accepted single treatment modality 57 (32.9%) -Cost of drugs, laboratory expenses and transportation to the hospital. - No bed space -No relatives to care for them during treatment -distance Distance
Presentation intervals and the impact of delay on breast cancer progression in a black African population Olayide Agodirin 2020	Breast	Regional Nigeria	June 2017-May 2018	Patients	420 Questionnaire	Not stated Not stated married 285 (68 %) widow 48 (11.5 %) single 23 (5.5 %) separat/divorced 7 (1.7389 %) unspecified 57 (13.3 %)tertiary 144 (34.3 %) secondary 124 (29.5 %) primary 66 (15.7 %) none 79 (18.8 %) unspecified 7 (1.7 %) 420 females (100%)21-30 = 16 (3.8%) 31-40 =92 (22) 41-50 =119 (28.2%) 51-60 =(92 22%)	Not stated	-The PCI (median 106, 13-337) was significantly longer than the HSI (median 42, 7-150), Wilcoxon-Signed Rank test p= 0.0001.(paired t-test mean difference 140 ¬±442 days (95% CI 95-186). -Most respondents disclosed early within 30 days (330 (81, 95% CI 77-85) and consulted FHP within 60 days (230 (60, 95% CI 53-63). -Most respondents had long PCI of > 30 days. 1-7 days in 91(25% (95% CI 20-29), 1-30 days in 134 (36 95% CI31-41) and > 30 days in 237 out of 377(64 95% CI 59-68). -The SCI was > 90 days in 293 of 401 (73% (95% CI68-77), 91-180 days in 70 of 401 (17% (95% CI 14-22)and > 180 days in 226 of 401 (56% (95% CI 51-61) -More respondents with big (> 5 cm) tumors received correct advice compared to those with small tumors(Risk difference 5.5% (95% CI 4.0-15). no associations given- misdiagnosis - strike 4.0 (2.4%) - Navigation in primary care 1.0 (0.6%) -Misdiagnosis/ investigations 46 (27.5%) - financial constraint 33 (19.7%) - family issues 2.0 (1.2%) - reassured by first home person or first health care provider 7.0 (4.2%) - distance 3.0 (1.7%) - financial constraint 18 (10.5%)- ignorance 6 (3.5%) - pregnancy/ lactation/ menopause 8 (4.6%) - thought benign/thought will disappear 50 (29%) - small size 2 (1.2%) - lump only 2 (1.2%)
Infrastructural challenges lead to delay of curative radiotherapy in Nigeria Jim Leng 2020	- breast (37.5%), - cervical (16.3%), - head and neck (11.9%) - prostate (10.9%)	Hospital Nigeria	June 2017 to August 2017	Patients	186 Questionnaire	None 37 (19.9%) Trader 68 (36.6%) Farmer 9 (4.8%) Artisan 23 (12.4%) Professional 38 (20.4%) Other 11 (5.9%) The median monthly income 15,000 naira (5,000 - 40,000N)which converts to approximately 50 dollars per month. Married 162 (87.1%), Widowed 12 (6.5%) Divorced 1(0.5%) Separated 1 (0.5%) Never married 10 (5.4%)None 20 (10.9%) Primary 46 (25.0%) Secondary 52 (28.3%) Vocational/technical 18 (9.8%) Polytechnic/OND/com		-Inability to pay time to clinic visit OR=1.99 (1.05 to 3.77) P= .034* Time to radiotherapy treatment OR= 1.85 (0.95 to 3.57) Time to radiotherapy treatment p=.069 -Infrastructural factors include; -Machine breakdown time to clinic visit OR=1.39 (0.78 to 2.48) P= .264 Time to radiotherapy treatment OR=2.92 (1.54 to 5.53) P=.001* -Worker strike time to visit clinic OR= 0.65 (0.38 to 1.13) P= .127 Time to radio therapy treatment OR=2.64 (1.46 to 4.79)P= .001 -Power outage time to visit clinic OR=1.88 (0.8 to 4.42) P=.147 Time to radiotherapy treatment OR=2.81 (1.16 to 6.79) P= .022*-Sociocultural factors include; -Lack of knowledge of appropriate medical facility , time to clinic visit OR 4.96 (2.41 to 10.21),P=<.001* time to radiotherapy treatment OR=1.92 (0.89 to 4.15) P= .099 -Not wanting others to know of sickness time to clinic visit OR 3.63 (1.35 to 9.72) P=.011* Time to radiotherapy treatment OR=1.75 (0.67 to 4.58) P=.253 -Tried another treatment first , time to clinic visit OR 2.45 (1.26 to 4.76) P=.008* Time to radiotherapy treatment OR= 1.50 (0.75 to 2.97) P=.248 -Fear of treatment , time to clinic visit OR 0.90 (0.5 to 1.63) P= .732 time to radiotherapy treatment OR 0.42 (0.22 to 0.81) P= .009* -Concern over cost of travel for treatment Time to clinic visit OR= 1.19 (0.7 to 2.04) P= .523 time to radiotherapy treatment OR= (0.3 to 0.95) P=.033* -Previous bad experience at hospital ,time to clinic visit OR=7.05 (2.15 to 23.12) P= .001* time to radiotherapy treatment OR= 2.19 (0.67 to 7.09) P=.192 -treatment might be too expensive - Infrastructural barriers increased the odds of radiotherapy delay - Health care worker strikes - Machine breakdowns - power outages - paying out of pocket for their treatment expenses

Geospatial access predicts cancer stage at presentation and outcomes for patients with breast cancer in southwest Nigeria: A population-based study Gregory C Knapp 2020	Breast	Hospital Nigeria	May 2009 - January 2019	Patients	609 Retrospective cohort	not stated Socioeconomic status Low 417 (68.5%) Middle185 (30.4%) High 7 (1.2%)not statedNone 56 (9.3%) Primary 196 (32.4%) Secondary 141 (23.3%) Tertiary 212 (35.0%)Female 598 (98.2%) Male 11 (1.8%)median 49 (40-58)	not stated	not stated- primary education only (21.9%; P= .002) - longer travel times 2.8-fold increased (95% CI, 1.30-6.11; P= .006) not statednot statednot statednot stated
Complementary and alternative medicine. Use and challenges among gynaecological cancer patients in Nigeria: Experiences in a tertiary health institution - Preliminary results T.O. Nwankwo 2019	Cervical 42, ovarian 31, endometrial 8, vulva 5, choriocarcinoma 4, leiomyosarcoma 4	Hospital Nigeria	June 2014 to June 2020	Patients	95 Questionnaire	Trader 37 (38.9%) Artisan/farmer 23 (24.2%) Professional/Civil servant 18(19.0%) Unemployed17 (17.9%) Income < monthly expenses 59 (62.0%) Income =/>monthly Expenses 36(38.0%)Single 13(13.7%) Married 77(81.1%) Divorced /separated 5 (5.3%)Primary/non formal 44 (46.3%) Secondary 28 (29.5%) Tertiary23 (24.2%)21-30 2 (2.1%) 31-40 17 (17.9%) 41-50 27(28.4%) >50 49(51.6%)		-recommendation from friends and relatives (pvalue = 0.017 - income was less than monthly expenditure - duration of illness was equal or greater than six months pvalue = 0.02, OR = 0.36 CI 0.15-0.86-Complementary and alternative medicine use - Herbs - spiritual sacrifice diet modification - Chinese medicine - prayers combined with other methods .
Effect of sociodemographic variables on patient and diagnostic delay of breast cancer at the foremost health care institution in Nigeria Sunday Olarewaju 2019	Breast	Hospital Nigeria	August - October 2018	Patients	275 Questionnaire	Unemployed 124 (45.1%) Employed 151 (54.9%) <18,000 99 (36%) >18,000 176 (64%). Single 12 (4.4%) Married 193 (70.2%) Divorced/separated 19 (6.9%) Widowed 51 (18.5%)Primary 46 (16.7%) Secondary 87 (31.6%) Tertiary 142 (51.6%)100% womenMean 49 +/- 11.9	not stated	not stated-marital status, p=00 (single at higher risk of late stage diagnosis)-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009High cost of prediagnostic testObligations at home High cost of transportation n = 97 -Obligations at home -High cost of transportation -Stigma of disease -Denial or anxiety -High cost of medicine -Fear of seeking medical advice -Earlier alternative treatment -Nonawareness of the disease
Impact of Primary Care Delay on Progression of Breast Cancer in a Black African Population: A Multicentered Survey Olayide Agodirin 2019	Breast cancer	Regional Nigeria	May 2017 -July 2018	Patients	237 Questionnaire	married 167(70.5%) single 11(4.6%) divorced or separated 4(1.7%) widow 22(9.3%) unspecified 33(13.9%)tertiary 91(38.3%) secondary 78(33%) primary 30(12.7%) none 38(16%)<= 30 18(7.6%) 31-40 51(21%) 41-50 74(31.2%) 51-60 46(19.4%) 61-70 24(10.1%) >=7124(10.1%)		-Misdiagnosis -Misinformation by FHP-Distance to specialist clinic-Fear of treatment most probably mastectomy -Age -Distance to specialist clinic -Need for social acceptability
Health-seeking behavior and barriers to care in patients with rectal bleeding in Nigeria Olusegun I. Alatise 2017	colorectal cancer	Hospital Nigeria	2013 to 2014	Other: patients, physicians	127 Questionnaire	<$100 =49 (59.8%) >$101= 33 (40.2%)Married 69= (84.2%) Single 12= (14.6%) Widow 1= (1.2%)-No formal or primary education 23 (28.1%) -Secondary education 27 (32.9%) -Tertiary education 32 (39.0%)Male = 64 (78.1%) Female = 18 (22.0%)<45 =41(50.6%) >46 =40 (49.4%)		-Hospital bottlenecks - misdiagnosis -Unknown availability or cost of colonoscopy - Not serious -symptom cleared -Embarrassing -Knew the cause -Fear of unknown -No money -Religious beliefs -belief in herbal medicine
Determinants of stage at diagnosis of breast cancer in Nigerian women: sociodemographic, breast cancer awareness, health care access and clinical factors Elima Jedy-Agba 2017	Breast	National Nigeria	January 2014 - July 2016	Patients	316 Other: Case-control	not stated Personal income yes early 23 (25.6%) late 67 (74.4%) Personal income no early 74 (35.2%) 136 (64.8%)Married: early 71 (33.6%) Late 140 (66.4%)None: early 5 (12.2%) late 36 (87.8%) Primary/Secondary: early 33 (29.2%) late 80 (70.8%) Tertiary/Post graduate (PG): early59 (41.3%) late 84 (58.7%) Not reported early0 (0) late 3 (100%)100% womenmean age 45.4 (SD11.4)	< 1 hour: early 66 (36.1%) late 117 (63.9%) 1 - < 2 hours: early 15 (33.3%) late 30 (66.7%) >=2 hours: early 5 (22.7%) late 17 (77.3%) Not reported: early 11 (22.0%) late 39 (78.0%)	- lower educational level (p=0.002); - no formal education 2.75 (95% CI 1.37, 5.52, p=0.004) -In age-adjusted analysis, the odds of later stage were positively associated with the amount of travel time taken by the woman to reach the first healthcare provider she visited (pt=0.04) - never having heard of BC OR=2.24; 95% CI 1.25, 4.03; p=0.01 - Women who did not believe in a BC cure (OR=2.23; 95% CI 1.40, 3.56; p=0.001) - did not practice BSE (OR=1.89; 95% CI 1.20, 2.99; p=0.01) not statednot statednot stated

Delay in presentation of cancer patients for diagnosis and management: An institutional report A Oladeji 2017	Uterine cervix, breast, head and neck, prostate, GIT, others	Hospital Nigeria	June 2014 to May 2015	Patients	218 Questionnaire	21 to 83		-Fear of treatment side effects -Financial constraints - inadequate facilities -Challenges of distance to treatment center -Lack of family support -Lack of awareness of cancer symptoms -Using food supplements -Treatment received by cancer patients at point of first presentation include spiritual care (prayers), herbal medicine -Seeking alternative therapy -Fear of diagnosis of cancer
Factors contributing to poor management outcome of sinonasal malignancies in South-west Nigeria. A.J.Fasunla 2013	Sinonasal Malignancies	Hospital Nigeria	March 2006 - February 2011	Patients	61 Questionnaire	none stated Low socioeconomic class 80.3% High socioeconomic class 4.9%Married 39 (63.9%) Not married 22 (36.1%)No post secondary education 40 (65.6%) With post secondary education 21 (34.4%)females 33 (54.1%) males 28 (45.9%)mean age 37 years +/- 19.4 (range 4 years - 72 years)	Not stated	noneNoneNone-high cost of medical treatment - patients, wrong advice - attitude of hospital staff - lack of confidence in orthodox therapy - proximity to health facility -traditional and religious belief
Delays in presentation and treatment of breast cancer in Enugu, Nigeria ER Ezeome 2009	Breast	Hospital Nigeria	June 1999 to May 2005	Patients	164 Questionnaire	Married 116 (71.2%) Not married 19 (11.7%) Widowed 24 (14.7%) Divorce/separated 4 (2.5%)Non 24 (15.2%) Primary 38 (24.2%) Secondary 45 (28.7%) Tertiary 47 (29.9%) Higher Degree 3 (1.8%)162 female 2 maleage range 21 - 77 yrs mean age of 45.7 yrs, median age of 45		-wrong advice and false reassurances from the initial doctor or health professional -delays in getting biopsy or histology reports -physician's failure to get biopsy or histology at the initial evaluation -industrial actions in the hospitals -did not consider the symptoms serious or thought it will disappear -did not know the implication of the abnormality -lacked finance to go for treatment - alternative practitioners and prayer houses - did not experience pain and therefore did not present earlier
Delayed treatment of symptomatic breast cancer: The experience from Kaduna, Nigeria A. Y. Ukwenya 2008	Breast	Hospital Nigeria	1st July 2003 to 30 June 2005	Patients	111 Questionnaire	Currently married 97 Currently unmarried 14Illiterate/primary 59 Secondary/tertiary 52 Median age among those admitted for treatment within a month 50 after a month 43		Provider delay -Failure to refer patient at first consultation 40 (40.4%) -Attempted treatment by lumpectomy with recurrence 15(15.1%) -Lump not sent for histopathological examination 14(14.1%) -Patient not counselled about seriousness of breast lump 13(13.1%) -Breast lump mistakenly incised as an abscess 10 (10.1%) -Breast lump not felt at initial examination 7(7%) -Biopsy result not immediately communicated to patient 4 (4%) -Initial biopsy diagnosis of benign disease 3(3%) Patient reasons for delay are -Family refused hospital treatment 25 (25.3%) -Did not want mastectomy as treatment 21 (21.2%) - Could not initially afford hospital treatment 13(13.1%)- Patient not aware of seriousness of a lump in the breast 47(47.5%) - Went for alternative (traditional/spiritual) treatment 38(38.4%)
Cancer Control at the District Hospital Level in Sub-Saharan Africa: An Educational and Resource Needs Assessment of General Practitioners. Allison N. Martin 2019	cancer type not specified (provider study)	National Rwanda	early 2017	Clinicians	73 Questionnaire	doctors not statednot statedfirst year general practitioners (doctors)Female 15 (21.1%) Male 56 (78.9%)20-24 2 (2.7%) 25-29 64 (87.7%) 30-34 5 (6.9%) >35 2 (2.7%)	n/a	n/an/an/a-referrals with lack of specific appointments to specialists - lack of pathology or screening services 47 (49%) - inability to afford clinic visits 48 (66%)- lack of awareness of symptoms 65 (89%)
Barriers to timely surgery for breast cancer in Rwanda Lauren E. Schleimer 2019	Breast	Regional Rwanda	1st January 2014 to 31 December 2015	Patients	151 Case note	Female 144 Male 7Median age 54 (27-84)		-Surgeon/operating room availability -Management of pregnancy -Inoperable, referred for second opinion -Chemotherapy toxicity -Patient refused breast surgery 4 -Patient refused referral for off-site operative treatment -Financial/social issues -Financial/social issues -Seeking traditional medicine -Seeking care abroad
Delays in breast cancer presentation and diagnosis at two rural cancer referral centers in Rwanda Lydia E. Pace 2015	Breast	National Rwanda	November 2012 - February 2014	Patients	144 Questionnaire	not stated not statedSingle, widowed or divorced 73 (51%) Married 71 (49%)None or primary school 108 (75%) Secondary school or university 36 (25%)100% femalemedian age 49 years <40 32 (22%) 40,Äi49 43 (30%) 50,Äi59 43 (30%) >60 26 (18%)	<2 hr 117 (81%) >=2 hr 57 (19%) CHW who visits regularly 51 (35%)	not stated - patients who visited other healthcare facilities >=5 times before diagnosis were more likely to experience system delays of >6 months (OR, 2.69; 95% CI, 1.24-5.84;p5.01). -Patients residing in Butaro or Rwinkwavudistrict were less likely to experience long system delays (OR, 0.05; 95%CI, 0.004-0.55; p=0.02)delay of >=6 months: -low education (odds ratio [OR], 4.88; 95% CI 1.72-13.88; p=0.003; -seeing a traditional healer before a nurse or doctor (OR, 4.26; 95% CI, 1.56-11.60; p=0.005);none- visited another health center or hospital first and was not referred to this hospital immediately - needed a transfer form from another facility before coming here - too expensive to travel from home to -was told by healthcare worker there was no treatment for thdisease - The hospital was too far to travel to - not bothered by the problem at first - did not know I needed to see a doctor and thought it would go away - visited a traditional healer first - thought treatment might be too expensive - too busy at home or at my job - afraid it might be cancer afraid of treatments, including potentially losing breast - afraid of possibly dying if breast removed - too expensive to travel to the health center or hospital - did not know where an appropriate medical facility was - did not want anyone knowing had a breast problem - afraid of being examined by a doctor or other healthcare provider - had or knew someone who had a bad experience at a health center or hospital - The health center or hospital was too far - did not know that this cancer center existed

Prevalence of breast masses and barriers to care: Results from a population-based survey in Rwanda and Sierra Leone Faustin Ntirenganya 2014	***Breast masses not specified if cancer or not	National Rwanda Sierra Leone	October 2011 - January 2012	Community	Sierra Leone 3645 Rwanda 3175 Questionnaire	*women with breast masses Sierra Leone, n=57: None 10 Home maker 7 Domestic help 2 Farmer 26 Self employed/small business 12 Rwanda, n=-79: None 9 Home maker 0 Domestic help 0 Farmer 70 Self employed/small business 0 not statednot stated*women with breast masses Sierra Leone, n=57: None 38 (66.7%) Primary 3 (5.3%) Secondary 14 (24.6%) Tertiary 2 (3.5%) Rwanda, n=79: None 33(41.8%) Primary 44 (55.7%) Secondary 2	not stated	n/an/an/anot stated-lack of money (Sierra Leone 35.1% Rwanda 11.4%)- absence of disability associated with breast mass -lack of trust in the health care system -long distance required to reach the provider -stigma associated with having a breast problem -consulted traditional healers instead of going to health centers
Consensus study on the health system and patient-related barriers for lung cancer management in South Africa Witness Mapanga 2021	Lung	Regional South Africa		clinical managers clinicians public health opinion leaders NGO	27 Delphi process, nominal group technique	oncologists pulmonologists thoracic surgeons pathologists radiologists oncology nurses medical officers NGO representatives		- Poor nutrition -Lack of smoking cessation clinics -Costs of medical treatments -Repeated visits for misdiagnoses for TB-patients lose faith in the health system and go to GPs -Failure to come back for follow up diagnostic or treatment appointments -Patients changing their mobile numbers and then cannot be contacted or may not answer their phones from unidentified callers-fearing debt collection. -Patients endure bureaucracy at health care facilities ID, proof of residence, articulation of chief complaint -Language barriers between patients and healthcare practioneers and thus difficult communications and understanding of doctor information -Long delays to get appointments ,long waiting periods in clinics and long queues for high patient volumes and for diagnostic tests compounded by early closing times -Primary health care is nurse driven and doctor supported-lung cancer not prioritized as a diagnosis-and not listed in the index of disease conditions - Misdiagnosis linked with superficial examinations-over emphasis on more common HIV and TB pneumonia with a low index of suspicion for lung cancer -Delays in getting diagnostic workup test results for imaging, cytology, pathology and surgery -Unwillingness for health care workers to consider a cancer diagnosis because of the inability to break bad news and/or accompany the patient through the journey of care -Administration hassles-no referral forms, lack of hospital transport for referrals, obtaining informed consent, booking appointment for referrals -Patient health awareness messaging within primary resources is not structured and sustained with no CHC outreach to the community -Insufficient information on the prevalence of lung cancer and how best to manage it -Using sputum only to diagnose cancer -Biological specimens eg pleural fluid not sent for analysis
Delay to diagnosis and breast cancer stage in an urban south african breast clinic S Rayne 2019	Breast	Hospital South Africa	January 2016 - February 2017	Patients	252 Questionnaire	Unemployed, piece work, student or retired -early stage 55 (34.8%) -locally advanced 103 (65.2%) Employed, job - early presentation 17 (27.0%) - advanced locally 46 (73.0%) Only primary school -early presentation 21 (30.4%) -locally advanced 48 (69.6%) Secondary school or above - early presentation 52 (34.9%) - locally advanced 97 (65.1%) <45 yrs)	Travel to breast clinic: <30 minutes -early stage 12 (30.8%) -locally advanced 27 (69.2%) 30 minutes - 1 hour -early stage 26 (35.1%) -locally advanced 73 (69.5%) 1 - 4 hours early stage 26 (35.1%) locally advanced 48 (64.9%)	lack of internet access 51 (35.9%)in early stage and 91(64.1%) in late stage) was associated with delay in acknowledging breast symptoms (p=0.051). -work -transport -money - low education (up to Grade 7) - longer travel time to hospital
From symptom discovery to treatment - women's pathways to breast cancer care: A cross-sectional study Jennifer Moodley 2018	Breast	Hospital South Africa	May 2015 to June 2016	Patients	201 Questionnaire	Employed 51 (25.4%) Married 84 (41.8%) Single in stable relationship 6 (3.0%) Single 42 (20.9%) Widowed 38 (18.9%) Divorced/separated 31 (15.4None-Grade 7 49 (24.4%) Grade 8-Grade 11 96 (47.8%) Grade 12+ 56 (27.9%)Female =201median age 54		- surgery as first treatemnt-visiting multiple clinics-first symptom as being minor or not serious, -being in denial. -only seeking care when a lump increased
Access to colorectal cancer (CRC) chemotherapy and the associated costs in a South African public healthcare patient cohort Candice-lee	Colorectal	Hospital South Africa	2012 - 2014	Patients	162 Case note	not stated not statednot statednot statedFemale 73 Male 89median 58 years	not stated	not statednot statednot statednot statednot statednot stated
Barriers to early presentation of breast cancer among women in Soweto, South Africa Maureen Joffe 2018	Breast	Hospital South Africa	8th January 2015 to 31st December 2016	Patients	499 Questionnaire	Unemployed 229 (45.9%) Employed 136 (27.2%) Retired 134 (26.9%) Single 119 (24.0%) Married/co-habiting 216 (43.6%) Divorced/widowed 161 (32.4%)Completion of informal/primary 142 (28.5%) Completion of high school/any tertiary school 348 (71.5%)Female 499<40 yrs 69 (13.8%) 40 -49 yrs 124 (24.8%) 50-59 yrs 120 (24.1%) 60-69 yrs 102 (20.4%) 70 and above 84 (16.8%)		- increase in parity OR1.10,95%CI:0.99–±1.21 -Patients aged<40years OR=1.93,95%CI:1.05–±3.58 -luminal B OR = 1.86, 95% CI:1.10–±3.14 and -triple negative breast cancer subtypes OR=2.61,95%CI:1.69–±5.30 -Clinical waiting time as a barrier n=23 (9.5%) were in early stage while 19 (7.4%) were in late stage. p-value 0.411, chi square 0.675 -Most participants 323(64.7%,166 in early stage and 157) referred themselves to CHBAH or were referred directly by a primary care clinic or a private general practitioner, by passing the secondary hospitals. Among those patients,251(77.7%, 143 early stage, 108 late stage) had only one visit prior to diagnosis. Those with more visits before reaching CHBAH were more likely to be diagnosed at a late stage(œÂ<0.001). -49(15.2%, 18 in early stage, 31 in late stage) had 2 visits self referral /primary health facility ->3 visits self referral /primary health facility 23 (7.1%, 5 in early stage and 18 in late stage) - -Fear of diagnosis -Thought it was a minor ailment - No one to look after the children -Worried no money for treatment

Factors relating to late presentation of patients with breast cancer in area 2 KwaZulu-Natal, South Africa Sharon R Cacala 2017	Breast	Hospital South Africa	2014	Patients	172 Other: Prospective	- employed 27% -never attended school 19% - completed high school 19% -Average education level: 6th grade women 172mean age was 56 yrs (range 23 to 100 yrs)		- financial issues -transportation issues -difficulty with the referral system and rural clinics - unaware that the lump could be cancer - did not understand severity - fear - afraid of losing a breast - seeing a traditional healer - financial issues -transportation issues
Stage at breast cancer diagnosis and distance from diagnostic hospital in a periurban setting: A South African public hospital case series of over 1,000 women Caroline Dickens 2014	Breast	Hospital South Africa	2006 - 2012	Patients	1071 Retrospective cohort	not stated <5 km from hospital, n=183: <= R9600 - 29.4% <= R800 - 50.3% 5 - 9.9 km from hospital, n=299: <= R9600 - 27.4% <= R800 - 51.2% 10 - 19.9 km from hospital, n=242: <= R9600 - 24.7% <= R800 - 49.3% 20 - 29.9 km from hospital, n=188: <= R9600 - 32.9% <= R800 - 61.0% 30 - 39.9 km from hospital, n=61: <= R9600 - 27% <= R800 - 58% not stated152 women with primary education or less <5 km from hospital n=183: 14.6%	<5 km from hospital, n=183 5 - 9.9 km from hospital, n=299 10 - 19.9 km from hospital, n=242 20 - 29.9 km from hospital, n=188 30 - 39.9 km from hospital, n=61	Not stated - older patients [RR 1.03(95% CI: 0.99, 1.07) - before 2008 [RR 1.34 (95% CI:1.17, 1.53) - living 30-39km from hospital (95% CI: 11, 75) Not statedNot statedNot statedNot stated
Predictors of cervical cancer being at an advanced stage at diagnosis in Sudan Ahmed Ibrahim 2011	cervical cancer	Hospital Sudan	1 January 2007 to December 2007	Patients	197 Retrospective cohort	not stated not stated Single 60 (30.5%) Married 137 (69.5%)Basic school 122 (61.9%) Secondary school 75 (38.1%)100% female<=54 73 (37.1%) >=55 124 (62.9%)	not stated	not stated - older (>= 55 years) (OR: 1.03, 95% CI: 1.01-1.05). - Rural residence (OR: 1.13, 95% CI: 1.78-5.50). - African ethnicity (OR: 1.76, 95% CI: 1.01-3.05). -without health insurance (OR: 7.7, 95% CI: 3.76-15.38)not statednot statednot statednot stated
Educational Opportunities for Down-Staging Breast Cancer in Low-Income Countries: an Example from Tanzania Kristen Yang 2019	Breast	Hospital Tanzania	January 2016 - August 2018	Patients	196 Questionnaire	not stated not statednot statednot statednot statedmean age early: 51.5 +/- 10.3 late: 51.6 +/- 12.9	not stated	not stated - never had a routine breast exam conducted prior to their diagnosis (OR = 4.40; 95% CI = 2.09-9.25) not statednot stated- financial restraints - time restraints not stated
Patient and disease characteristics associated with late tumour stage at presentation of cervical cancer in northwestern Tanzania Ramadhani Mlange 2016	Cervical	Hospital Tanzania	November 2013 - April 2014	Patients	202 Questionnaire	Peasant 170 (84.1%) Petty trader 20 (9.9%) Business 2 (0.9%) Employed 5 (2.4%) Un-employed 5 (2.4%) not statedMarried 110 (54.4%) Single 9 (4.4%) Divorced 10 (4.9%) Separated 39 (19.3%) Windowed 34 (16.8%)Formal 87 (43.1%) None formal (115 (56.9%)100% femalemean 50.5 +/- 13.3 years (25-80 years) <40 45 (22.2%) 40-59 101 (50.0%) >60 56 (27.7%)	not stated	not stated -Lack of formal education, OR=2.1, 95% CI 1.2 - 3.8, p=0.012 -lack of health insurance, OR=3.9, 95% CI 1.1-13.3, p=0.033 -three or more pre-referral visits OR=1.9, 95% CI 1.1-3.5, p=0.034 - attending to traditional health practitioners OR = 2.3 [95 %CI 1.2-4.2],p= 0.011 -lack of personal initiative to attend health care facility OR = 2.0 [95 % CI 1.0-3.8],p= 0.028) not statedSeeking alternative-health practitionerLack of personal initiative
Engagement in HIV Care and Access to Cancer Treatment Among Patients With HIV-Associated Malignancies in Uganda. Daniel H. Low 2019	HIV associated malignancies: KS (46%) cervical cancer (19%) breast cancer (10%) esophageal cancer (6%) head and neck cancer (5%) non-Hodgkin lymphoma (4%) vulvovaginal cancer (4%) others (6%)	Hospital Uganda	October 2015 - January 2016	Patients	100 Questionnaire	Employed 34, n=100 not statednot statedn=100 Poor literacy 32 Incomplete primary school 36 Complete primary school 18 Some secondary school 30 Complete secondary school 16 Female 52% Male 48% median 41 years	?n=104 < 25 km 24 25-49 km 23 50-99 km 12 >100 km 55	-diagnostic delay (44v117 days for those not receiving HIV care;P= .048)- travel to multiple clinics/hospitals (n = 18; 46%), -conflicts between appointments for HIV and cancer care (n = 9; 23%) -treatment costs (n = 8; 21%) -difficulty adhering to the quantity of medications (n = 6; 15%) -stigma - Reporting any barrier to care at follow-up was associated with having prematurely withdrawn from cancer care (36%v0%; 95%CI, 21% to 51%; relative risk not calculable;P= .003 -Distance from place of residence to the UCI was not associated with reporting of a barrier to care; however, those who prematurely withdrew from care AF1 lived farther from the UCI than those who completed all prescribed cancertreatment (median distance, 172.5v40 km;P= .056)-Shorter time from recognizing symptoms to initiation of cancer care was associated with having previously established HIV care(P= .04). -Having previously established HIV care reduced appraisal/behavioral delay (30v75 days for those not al-ready receiving HIV care;P= .02) -Persons who were receiving ART before recognizing the symptoms determined to be associated with cancer had a total cascade duration of 207 days(IQR, 109 to 320 days), compared with those not receiving AF3ART (318 days; IQR, 155 to 537 days;P= .004). diagnostic delaynot statednot stated
Social, demographic and healthcare factors associated with stage at diagnosis of cervical cancer: cross-sectional study in a tertiary hospital in Northern Uganda. Amos Deogratius Mwaka 2015	Cervical	Hospital Uganda	September 2012 to April 2014	Patients	149 Questionnaire	Housewife/peasant 132 (88.6%) Petty trader 10 (6.7%) Formally employed 4 (2.7%) Missing 3 (2.0%) not statedMarried 84 (56.4%) Divorced 21 (14.1%) Widowed 44 (29.5%)No formal education 67 (45.0%) Primary education 72 (48.3%) Secondary education 7 (4.7%) Tertiary education 2 (1.3%) Missing 1 (0.7%)100% Femalemean age 48 +/- 13 years	<40 km 41 (27.5%) 40-80 km 35 (23.5%) 81-100 km 13 (8.7%) 101-375 km 58 (38.9%)	-the odds of advanced stage cancer among patients who self-reported financial difficulty are 5.7 times (95% CI 1.58to 20.64) the odds of advanced cancer among the patients who did not report financial difficulty as areason for non-prompt health seeking-the OR of advanced stage cervical cancer among patients who perceived their symptoms as due to a serious AE1illness or cancer was 0.43 times (95% CI 0.20 to 0.96) the OR of those who perceived their symptoms as not due to a serious illness/cancer -In bivariate analyses, participants with secondary and tertiary education were less likely to be diagnosed with advanced stage cancer compared to those who had not attained formal education (crude OR=0.16 (95% CI 0.03to 0.87). - patients who reported lack of money as reason for non-prompt health seeking were more likely to be diagnosed at advanced stage cervical - patients who perceived their symptoms as serious or due to cancer were less likely to be diagnosed at advanced stage cancer. -pre-referral diagnoses by primary healthcare professional non-cancer related or not told: 61-lack of money: 108-symptoms not attributed to cancer : 130 -using other treatments: 60 -perceived illness as not serious or cancer: 58

Challenges faced by cancer patients in Uganda: Implications for health systems strengthening in resource limited settings Annet Nakaganda 2020	Cervix 72 (20%) Kaposi's sarcoma 71 (20%) Breast 46 (13%) Prostate 19 (5%) Esophagus 16 (4%)	Hospital Uganda	April to May 2017	Patients	359 Questionnaire	Self Employed 87 (24%) Unemployed 82 (23%) Stopped working due to cancer 70 (20%) Casual employment 61 (17%) Formal employment 39 (11%) Other 20 (6%) - Married 143 (43%) Single 77 (21%) Living together 61 (17%) Separated/divorced 47 (13%) Widow/Widower 31 (9%)Primary level 147 (41%) Secondary level 97 (27%) College/University education level 71 (20%)female 199 (55%) average age 43		-lack of money for treatment, medicines and transportation. -family responsibilities -not healthy enough to continue treatment -failure to find accommodation in Kampala.-lack of money for transportation. -family responsibilities -lack of money for transportation. -family responsibilities
Surgical candidacy and treatment initiation among women with cervical cancer at public referral hospitals in Kampala, Uganda: A descriptive cohort study Megan Swanson 2020	cervical	Hospital Uganda	April 2017 - September 2018	Patients	268 Questionnaire	Industry/business 92 farming/domestic 175 not statedMarried 121 Single/divorced/ widowed 146Less than primary 110 Higher than primary 151100% Female>=50 years 123 ,50 years 133	> 15 km 181 <= 15 km 86	The statistics were executed to reflect chance of receiving treatment rather than delay - see comment boxnot statednot stated-financial constraints, including lack of funds to pay for travel and the nominal fees associated with radiation, surgery and diagnostic tests (69%) - long wait times (30%)not statednot stated
Prognosis and delay of diagnosis among Kaposi's sarcoma patients in Uganda: A cross-sectional study Christopher De Boer 2014	Kaposi sarcoma	Hospital Uganda	June to October 2012	Patients	161 Other: case notes and standardized interviews	<100,000 UGSH =90 (58.1%) 100K - 500K UGSH=59 (38.1%) >500,000 UGSH =6 (3.9%)Primary 83(51.6%) Secondary 58 (36.0%) Tertiary or degree 20 (12.4%)Male 111 =(68.9%) Female 50= (31.1%)<30 =44 (28.0%) 31-40 =85 (54.1%) >40 =28 (17.8%)		- paid out of pocket tests or chemotherapy, 68 (42.2% p value 0.001) - visitation to a traditional healer was associated with experiencing diagnostic delay (OR2.69, p = 0.020, 95% CI: 1.17-6.17). -visited a traditional healer 41(25.5% p value 0.872) -Lack of money for transportation - Distance to UCI -Lack of money for transportation - Distance to UCI
Inequities in breast cancer treatment in sub-Saharan Africa: Findings from a prospective multi-country observational study Milena Foerster 2019	Breast	Hospital Uganda Nigeria Namibia	September 2014 - 'early' 2016	Patients	1335 Other: Prospective multi-centric	Unskilled jobs 923 (70%) - not treated 172 (18.8%) treated 751 (81.2%) Skilled 503 (30%) - not treated 55 (13.8%) treated 348 (86.2%) Not statedNot statedNot stated100% femalemean age 50.7 (SD = 13.6)	Not stated	- BMI p=0.023 < 18.5 1.58 (0.70 to 3.59) AND 1.83 (0.79 to 4.21) 30+ 1.76 (1.10 to 2.81) AND 1.53 (0.95 to 2.47) - Belief in spiritual healing p=0.004 Yes 1.18 (0.83 to 1.68) 1.21 (0.84 to 1.21)not statednot stated- cost - personal decision e.g (lack of belief in effectiveness, fear or non compliance to or rejection of therapy)not statednot stated
Dissecting the journey to breast cancer diagnosis in sub-Saharan Africa: Findings from the multicountry ABC-DO cohort study Milena Foerster 2020	Breast	Hospital Uganda, Zambia, Namibia, Nigeria	September 2014 - September 2017	Patients	1429 Other: Interviews	Unskilled 1007 (70.5%) Skilled 242 (29.5%) Low SEP 810 (56.7%) medium/high SEP 439 (43.3%)Not married 710 (49.7%) Married 539 (50.3%)Primary/no education 628 (44.0%) Secondary/higher 801 (56%)100% femalemean 50.1	Not stated	-Age IRR 1.26 (0.89-1.79) -Low SEP IRR 1.10 (0.93-1.30) -Not married (only for Namibia, p<0.001) IRR 2.63 (1.22-5.64) and 1.28 (0.90-1.80) non blacks and blacks - Primary/no education IRR 1.16 (0.98-1.37), (not for Namibia non black p=0.037) -Unskilled labour IRR 1.22 (1.01-1.47) -Belief in traditional medicine IRR 1.03 (0.87-1.22), (only for Nigeria and Zambia, p=0.007) -Recent birth IRR 1.08 (0.84-1.38) -HIV positive (only for Namibia-blacks and Zambia, p=0.022) IRR 1.11 (0.70-1.76) and 2.12 (0.97-4.62) respectvely -First symptom lump IRR 1.42 (1.14-1.76)-told not to worry -wrong diagnosis-lack of transport -transport costs-pain -fear
Health system constraints affecting treatment and care among women with cervical cancer in Harare, Zimbabwe O. Tapera 2019	cervical	Regional Zimbabwe	January to April 2018	Patients and clinicians	212: -patients 134 - health workers 78 Other: questionnaire, IDI, FGD	female patients 134 male hcw 15 female hcw 63 patients mean age 50.2 untreated cervical cancer and 52.9 for those with treated cancer health workers mean age 37.3 yrs	Distance from nearest cervical cancer screening health facility <10 km untreated 5 (12%) treated 30 (33%) 11-50km untreated 4 (10%) treated 18 (19%) > 50km untreated 1 (2%) treated =7 (8%) Don't know untreated 32 (76%) treated 37 (40%)	Women: -inability to see specialist - less access to regular general practitioners - paying out of pocket for health services Health care workers -inadequate training of HCW for cervical cancer treatment and care. - not knowing or having read both the National Cancer Prevention and Control Strategy (2013-2017) and the Cervical Cancer Prevention and Control Strategy for Zimbabwe (2016-2020) -not enough health professionals to meet the demand of services in health facilities -weak surveillance system for cervical cancer -unavailability of back-up for major equipment- didn't know estimated distances from their residence to the nearest cervical cancer screening -lack of finances. - Financial challenges - transport challenges

Table 1. Exposure-Outcome relationship for cohort studies		
Author	Exposure	Outcome
Cacala 2017	Breast Cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Late presentation of Breast Cancer (T-stage)
De Boer 2014	Kaposi's Sarcoma pathway to diagnosis	Delay in diagnosis of Kaposi's Sarcoma (Poor outcomes)
Dickens 2014	Distance from diagnostic hospital to treatment center	Stage of breast cancer at diagnosis
Foerster 2019	Breast Cancer Pathway to treatment	Receipt of treatment
Gebremariam 2021	Breast Cancer Care pathway to chemotherapy	Time to initiation of chemotherapy
Ibrahim 2011	Cervical cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Advanced stage disease
Jedy-Agba 2017	Breats Cancer Pathway to diagnosis	Stage at diagnosis
Knapp 2020	Geospatial access	Cancer stage at diagnosis
Martei 2019	Chemotherapy stock out	Suboptimal therapy delivery
Page 2019	Positive HPV test	Acceptance and adherence to diagnostic procedure and treatment
Schleimer 2019	Pathway from diagnosis to surgery	Delay to appropriate operative treatment
Tesfaw 2020	Breast Cancer diagnostic pathway; patient delay>3 months	Advanced stage of cancer at diagnosis
Zeleke 2021	Cervical Cancer Diagnostic pathway	Stage IIIA-IVB presentation

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5,6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Appendix 2
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Appendix 2
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	6,7,8 Figure 3
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Appendix 2
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	n/a
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n/a
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n/a
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	n/a
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	6,7,8 Figure 3
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	n/a

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 2
Study characteristics	17	Cite each included study and present its characteristics.	7, Appendix 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Figure 3
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Appendix 2
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	n/a
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	n/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	n/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Figure 3
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	n/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	16,17,18
	23b	Discuss any limitations of the evidence included in the review.	18
	23c	Discuss any limitations of the review processes used.	n/a
	23d	Discuss implications of the results for practice, policy, and future research.	18
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	n/a
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Notprepared
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	19
Competing interests	26	Declare any competing interests of review authors.	19
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	19

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71