


Neglected cancer care needs among the nomadic pastoralist communities in sub-Saharan Africa: a call to action

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To cite: Abdihamid O, Rubagumya F, Vanderpuye V, *et al.* Neglected cancer care needs among the nomadic pastoralist communities in sub-Saharan Africa: a call to action. *BMJ Glob Health* 2024;**9**:e014207. doi:10.1136/bmjgh-2023-014207

Handling editor Seye Abimbola

Received 10 October 2023

Accepted 5 December 2023



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BACKGROUND

In sub-Saharan Africa (SSA), surging numbers of cancer incidences and mortalities need urgent attention. Without any intervention, data estimates show a major increase in cancer mortality from 520 348 in 2020 to about 1 million deaths per year by 2030.¹ While upscaling cancer care delivery in Africa has garnered significant attention in recent years,² specific populations within the continent are more severely disadvantaged in accessing currently available cancer diagnosis and treatment services. Among them are the nomadic populations.

Nomadism is defined as the periodic migration of people with their herds of animals searching for pasture and water, dispersed over time (seasons) and space.³ Nomads are generally classified as hunters, gatherers and pastoralists.⁴ Hunters and gatherers, such as the Kalahari Bushmen, predominantly live in the equatorial rainforests. Pastoralists are subdivided into transhumans, who regularly migrate between two grazing areas along well-defined routes, and those whose economy is based purely on migration and livestock keeping.^{5 6} Our paper focuses on pastoralist nomads in Africa, whose trajectories largely rely on grazing grounds for livestock.

There are an estimated 50 million nomadic pastoralists in SSA with little data on healthcare access and utilisation, especially on cancer care.⁷⁻⁹ The Intergovernmental Authority on Development in Eastern Africa block has attempted to map data on numbers and tribes identifying as pastoralists (table 1). They include Afar in Djibouti, Tigre in Eritrea, Bodi in Ethiopia, Borana and Gabra in Kenya, Somali in Somalia, Dinka in South Sudan, Ahmada in Sudan and Bahima in Uganda.¹⁰

The WHO¹¹ states that there are four key components to cancer control: cancer prevention, early detection, diagnosis and

SUMMARY BOX

- ⇒ African nomadic communities have neglected healthcare needs due to their statistical invisibility, inherent migratory lifestyle and their vulnerability to climate change and conflicts.
- ⇒ Cancer care is a significant unmet need among nomads, spanning the entire care continuum, with no existing guidelines, research, or data. This study is the first call to action in sub-Saharan Africa to highlight the challenges of meeting cancer care needs among nomads and to suggest practical solutions.
- ⇒ The recommendations provided in this study can be adapted by countries with nomadic populations to develop, fund, and implement guidelines and interventions for delivering cancer care services to nomads.

treatment, and palliative care. Most Low-and-middle-income countries (LMICs) face major challenges in each of these four areas. There is a paucity of data on cancer prevention, early detection, diagnosis and treatment, and palliative care among nomadic communities. Most data are based on specific, often small-scale studies, each providing a small part of the overall picture.^{3 6} Globally, cancer control and continuum of care protocols are well established, however, due to the migratory lifestyle of nomadic communities, such algorithms might not address the unique cancer care needs among nomadic populations. Population health data are a crucial social determinant of healthcare and is lacking in nomadic communities in SSA. We, therefore, attempted to summarise the fragmentary evidence from the literature on the state of cancer care, the scant cancer epidemiology data of the nomadic communities, and their unique challenges and needs for cancer care. We also attempt to provide real-world proffered solutions to the neglected modern

Table 1 Available data on Pastoralism in IGAD region³⁹

Country	Ethnicities affiliated with pastoralism†	Pastoral lands	Estimates of pastoralist population*
Djibouti	Afar, Somali	Pasture: 73% Other: 26% Combined: 99%	Data not available
Eritrea	Tigre, Saho, Kunama, Rashaida, Bilen, Afar, Beni Amer, Hidareb, Nera	Pasture: 68% Other: 9% Combined: 77%	Data not available
Ethiopia	Afar, Bodi, Borana, Dasanech, Hamar, Murle, Mursi, Nyangatom, Nuer, Oromo, Somali, Suri	Pasture: 20% Other: 51% Combined: 71%	12%–15% of the National Population (~10–12 million people) (Desta 2006)
Kenya	Borana, Dasanech, Gabra, Maasai, Pokot, Rendille, Sakuye, Samburu, Somali, Turkana	Pasture: 37% Other: 45% Combined: 82%	~10% of the National Population (~4 million people) (~800 000 households) (Krätli and Swift 2014; Wanyama 2020)
Somalia	Somali	Pasture: 68% Other: 19% Combined: 87%	~60% of the National Population (~9–10 million people) (2013 National Adaptation Programme of Action)
South Sudan	Dinka, Jie, Mandari, Murle, Nyangatom, Nuer, Toposa	Pasture: 40% Other: 43% Combined: 83%	Data not available 54% report owning livestock (WFP 2018)
Sudan	Ahamda, Baggara, Bega, Kababish, Lahaween, Missiriya, Rufaa, Shukria	Pasture: 84% Other: 0% Combined: 84%	~20% of the National Population (~8.5 million) (Casciarri and Ahmed 2009)
Uganda	Bahima, Banyarwanda, Baruli, Basongoro, Dodos, Itesot, Jie, Karimojong, Langi	Pasture: 25% Other: 14% Combined: 39%	~12% of the National Population (~5 million people) Estimates vary widely, 1–10 mil. (1.1 million households) (Krätli and Swift 2014; Wanyama 2020)

IGAD, Intergovernmental Authority on Development.

cancer care needs among nomadic communities in SSA (table 2).

CANCER PREVENTION AMONG NOMADIC POPULATIONS

While there is a paucity of data on cancer prevention strategies among nomadic populations, their ambulatory lifestyle, less exposure to urbanisation, and Western diet and industrial carcinogens might decrease their risk for certain cancers. However, their mobility means undetected exposures to infection-related cancers such as cervical and liver cancers, and poor uptakes of vaccines, leading to late presentation, and resultant poor outcomes.

The integrated human and animal vaccination campaign has effectively reached the unvaccinated children from nomadic and pastoralist communities of Somalia.¹² A similar approach can be used in Human Papillomavirus (HPV) and hepatitis vaccines, a key strategy in cancer prevention strategy against cancers among nomads in SSA. However, gender roles should be considered. For example, girls in nomadic communities are often not sent to schools or taken early out of school; therefore, school-based HPV vaccination is often not feasible for these communities, hence, the provision of mobile health is key.¹³

Therefore, a systematic global approach to cancer care delivery among nomadic populations is urgently needed to ensure equity in care delivery. Such interventions may include conducting global studies to investigate and understand epidemiological cancer patterns among nomads to ensure equity in care delivery and deploying mobile cancer screening services along the migration routes of nomads. Culturally appropriate education on cancer-preventative measures can also be explored among nomadic communities.

CANCER EARLY DETECTION AMONG NOMADIC POPULATIONS

Nomadic-specific cancer screening, early detection and treatment strategies, including an amalgamation of ‘mobile’ services informed by the migratory tendencies of nomads, culturally acceptable services, community-directed interventions (CDIs) and One Health design, have shown promise.¹⁴ One Health is an approach calling for ‘the collaborative efforts of multiple disciplines working locally, nationally and globally, to attain optimal health for people, animals and our environment’, as defined by the One Health Initiative Task Force.^{9 15}

Deploying mobile cancer screening/early detection to designated water and pasture points could be explored. Women’s presence at such waterpoints is variable but

Table 2 Challenges and proffered solutions to the neglected cancer care needs among the nomadic communities

Lack of data and research on nomadic health	Global studies to investigate epidemiological cancer patterns among nomads to ensure equity in care delivery. Innovative approaches to population-based registries can be adapted to capture some cancer epidemiological profiles and service utilisation among the nomadic population.
Cancer early detection among nomads	Recruiting and training community health workers (CHWs) can be attempted in introducing cancer screening and patient education among nomadic communities in designated villages or waterpoints
Cancer prevention strategies	Redefining the word ‘cancer’ with cultural synonyms; cancer information must be delivered in a culturally acceptable form and through a shared decision model. Community outreach programmes on cancer education; local oncologists and other healthcare providers need to address patients in a language they understand best or through a translator
Cancer diagnosis	Deploying mobile cancer screening services such as clinical breast exams, cervical cancer screening and digital rectal exams are real-world screening modalities that can be explored along the migration routes of nomads. One Health model—promoting healthcare services such as cancer diagnosis that are tailored to the nomadic pastoralist that integrates human and veterinary health services
Cancer treatment	Adopting continuity of care model that will not clash with nomadic lifestyle patterns of patients with cancer. On-site treatment and follow-up at converging water and grazing points and subsequent referral pathways to urban tertiary care.
Hospice and palliative care services	Provision of mobile drug caravans such as opioids and interventions towards alleviating pain and suffering. Culturally based end-of-life care approaches are key to improving compliance and acceptance.
Cancer survivorship	Recruiting and training CHWs on patient education and cancer survivorship by tracking nomads across their common migratory routes and designated villages or waterpoints well known to CHWs.
Effect of mobility on nomadic health	Timely resettlement and integration into urban healthcare facilities are vital in addressing the care gap for this unique population. Dynamic mobile cancer care services are urgently needed to bridge the gap of cancer care inequities.
Effects of droughts and wars on the cancer care of nomads	Addressing environmental injustice should translate into the funding of research and mobilisation of efforts of the international community to address the increasing health inequities these populations face due to climate change and conflicts.
Lack of nomadic community healthcare workers	Recruiting and training CHWs can be attempted in introducing cancer screening, patient education and palliative care services among the nomadic communities.
Lack of Nomadic Health Guidelines in National Cancer Control Programmes	Developing cancer care guidelines that are resource stratified but tailored to the inherent cancer care needs of the nomadic communities is urgently needed

offering risk-stratified HPV vaccination for girls, on-site clinical breast exams, cervical cancer screening and digital rectal exams for elderly men with urinary symptoms are some of the prevention, screening and early detection modalities that can be explored.

CDIs can reach underserved populations and have been successful in treating diseases such as malaria case management through local community efforts.¹⁶ A study from Ethiopia reported the success of a mobile health team that provided nutrition services, vaccinations against measles and acute malnutrition among pastoralist children.¹⁷

Similar efforts led by trained community health workers (CHWs) can be attempted in introducing cancer screening, early detection and patient education, among the nomadic communities in designated villages or waterpoints well known to CHWs. Designing such programmes requires political will and leadership to provide sustained and practical support to these marginalised communities

CANCER DIAGNOSIS AMONG THE NOMADIC POPULATION

Nomadic patients often ignore illnesses that do not cause immediate functional loss and resort to the use of predominantly traditional and alternative medicines due to the low trust in or limited access to modern allopathic medicines.¹⁸ Timely cancer diagnosis among nomads can be challenging due to their inherent migratory lifestyles.¹⁹ Therefore, effective cancer management among nomads should include a continuity of care model that will not clash with nomadic lifestyle patterns. These interventions may include on-site clinical history taking and physical exams at converging water and grazing points, a form of mobile health. Another feasible approach is adopting the tuberculosis treatment model for nomads, in which Tayler-Smith *et al* and Keus *et al*^{20 21} reported the ‘TB village’ and humanitarian model, respectively. In both studies, the TB village approach to patients (and the main reason for the very low defaulter rate) was the provision of incentives such as free temporary social amenities

such as food and housing. Similar interventions could be adopted by implementing a ‘cancer village’ that will bring mobile cancer services closer to hard-to-reach nomadic communities, especially cancer screening, clinical diagnosis, palliative care services and subsequent referrals. Furthermore, it is important to link the cancer diagnosis among these communities to a clear care pathway from diagnosis to treatment, be it curative or palliative by possibly following up these patients in their watering points and other approaches.

Health information from online or in leaflet form can be inaccessible due to low literacy levels, particularly among older adults in nomadic communities; therefore, where possible, local healthcare professionals need to address such patients in a language they understand best or through a translator.

CANCER TREATMENT AMONG THE NOMADIC COMMUNITY

Several factors that impede access to cancer treatment among nomadic populations are outside their community’s control. These include geographical isolation, logistical difficulties, lack of available resources in rural areas and their marginalised status.^{22–23} Health systems are often designed to serve static populations, with services that cater to nomadic lifestyles rarely being prioritised.²⁴ For example, the Bedouin women in Lebanon perceive the health system as being underpinned by institutional discrimination against their ethnic group.²⁵

There is often a lack of representation of nomadic cultures in national governments, therefore, nomadic populations are left out of health policy agendas including those that aim to increase access to modern cancer care services. Another way in which nomads are vulnerable to political factors is through regional political conflict and climate change.²⁶

Decentralisation of access to care remains a challenge due to unpredictable migratory patterns of nomads. A study from Timbuktu, Mali,²⁷ a country with a nomadic community, showed the average distance to the local health centre was 40.94 km. Key barriers to access were transportation options (79.4%), the quality of healthcare services provided (39.2%) and the high-cost health services (35.7%). Additionally, the study reported more than a quarter of the study subjects would not consent to be examined by a healthcare worker of the opposite gender. This unique cultural need for consenting to treatment highlights unspoken barriers to other healthcare needs like cancer treatments which require cultural sensitivity. A study from Somalia, a country with (59%) of its population practising a nomadic lifestyle, found that 90% of nomads were out of the reach of the national health services due to constant mobility coupled with seasonal barriers such as rivers, floods and terrains, making treatment access even more challenging.²⁸

One Health provides healthcare services that are tailored to the nomadic pastoralists that integrate the human and veterinary health services that improve both

human and animal health^{9 15 29} a potentially effective strategy for cancer care delivery and prevention strategies among nomads.

While there is no existing evidence, we suggest an adjusted approach to providing access to cancer treatment for nomads including providing oral anticancer agents that can be taken while patients are on the move, even though this is not a one-size-fits-all recommendation against all cancers.

Innovative mobile health delivery methods will be needed to manage toxicities and ensure treatment adherence. Another approach is the consideration of de-escalation treatment protocols using shorter courses of chemotherapy or radiotherapy in addition to facilitating temporary housing for patients who present to cancer treatment facilities. De-escalation therapy can be applied to both palliative and curative modalities.

PALLIATIVE CARE AMONG NOMADIC COMMUNITY

Public health programmes on hospice and PC services may fail to reach nomadic populations. Nomadic patients with cancer need PC services that are designed specifically for them, although the per capita cost is bound to be high because of the scattered population and the need for mobile clinics.³⁰

The most effective and feasible intervention for pain control among nomadic patients with cancer is medication. Tablets-based inexpensive analgesic medicines such as non-opioids and weak opioids can be provided through mobile health access programmes. Therefore, health planners in developing countries with scarce resources and large nomadic populations should consider such adopted approaches.³¹

Other effective approaches for specific cancer pain indications include palliative radiotherapy and surgery. Again, through mobile health such patients can be transferred to nearby facilities with palliative radiotherapy and surgical services to alleviate pain and suffering. This will call for a well-established ambulatory referral pathway for hard-to-reach nomadic patients with cancer.³¹ Exploiting emerging telemedicine, digital palliative care services through mobile applications can be explored to establish and support community-based PC for nomadic communities, particularly pain management.³²

CANCER SURVIVORSHIP CARE AMONG NOMADS

Given their migratory lifestyle, livelihood, geographical inaccessibility, communication barriers, illiteracy and poverty, it is challenging for pastoralists to access lengthy inpatient clinical care and long-term periodic follow-up at the survivorship clinics.³³ Therefore, decentralisation of cancer survivorship services through mobile health services and conducting an onsite qualitative survey for cancer treatment-related symptoms, cumulative disease-related burden and pain, clinical evaluation of disease stage or recurrence and then upscaling through mobile referral pathways is essential.

EFFECT OF CLIMATE CHANGE, CONFLICTS AND WARS ON THE CANCER CARE OF NOMADS

Inherent in the dynamism of nomadism response to harsh climatic conditions and political instability is the mobility of nomads to safe havens and favourable climatic conditions as a coping mechanism that can be a reference model for other populations in the context of climate change and civil unrest. Large-scale droughts have historically threatened nomads' livelihoods, causing the loss of their livestock and livelihood and environmental injustice and inequity. Drought, conflicts and displacement have interfered with these communities' centuries-built resilience and cohesiveness. The Sahelian countries (Niger, Mali) experienced a drought-induced famine in (1968–1973), while Somalia, Ethiopia and Sudan underwent a prolonged drought in 1971–1972, 1982–1984 and 1990–1992, respectively, associated with political wars and civil unrest.^{34 35}

Such perennial droughts, seasonal migration, cattle rustling and political instability affect the implementation of cancer care services in these communities, forcing nomads to settle in shanty towns in urban areas. The disruption of their lifestyle hampers integration into urbanisation, further exacerbating inequities they face within the urban poor population. Such refugee camps are common in northern Kenya under the human resettlement programmes by the United Nations for previously nomadic communities that were affected by climate change and civil unrest. There is currently no established programme on non-communicable diseases (NCDs) such as cancer in these camps, and cancer care needs remain neglected in these areas. Therefore, timely resettlement and tailored mobile cancer services are vital in addressing the care gap for this special population.

Addressing environmental injustice should translate into the funding of research and mobilisation of efforts of the international community to address the increasing health inequities these populations face. While these populations caused a tiny fraction of the current global environmental crisis as compared with high-income countries, they continue to bear the brunt of the effect of climate change.

DISCUSSION

Nomads are among the most underserved and hard-to-reach populations facing increasing challenges.³⁶ Mobile African pastoralists have been described as populations with 'multiple statistical invisibility' over the last half-century, thus, demographic and population census data are challenging to capture.³⁷

One dimension of inequity is that global cancer literature often fails to list African nomadic populations among vulnerable populations and is not geographically representative of regions known for nomadic pastoralism, such as Somalia and Mali, especially in cancer and other NCDs.¹² These countries remain outside the usual research partnership and international research

funding ecosystem. In addition to funding and investing in research and cancer control among nomadic populations in Africa, equitable global partnerships directed towards regions and countries of need should be encouraged to truly address the needs of these increasingly vulnerable populations.

Similarly, data on cancer prevention and early detection among nomadic communities are limited, therefore, studies on cancer as a disease, perceptions and beliefs, and practices that impact healthcare utilisation among nomadic populations can provide further insight into cancer screening, diagnosis and treatment services is needed.^{3 6 13} The use of CDIs such as trained CHWs can be attempted in introducing cancer screening, patient education and palliative care among the nomadic communities in designated villages or waterpoints well known to CHWs.¹⁶ Moreover, given the existing patriarchy among many nomads in SSA, engaging male community leaders has the potential to increase service utilisation as they have decision-making powers³⁸; however, women should equally be engaged as they represent a huge population of female-related cancers. It is important to note that pastoralist societies are not homogeneous; women and women's networks within these communities can exert tremendous influence and autonomy over health, wealth and other aspects of social capital in general. In addition, given changing dynamics due to environmental and geopolitical stressors, these communities often experience shifting gender norms that may worsen women's positions or paradoxically enhance their positions in these societies. Nonetheless, engaging men and boys is a sound approach to improve health outcomes for all.

While there are no data on established cancer prevention strategies among nomadic populations, their ambulatory lifestyle, less exposure to urbanisation, western diet and industrial carcinogens may reduce some of their risks. However, they are unlikely to access preventative services such as vaccinations leading to late presentation of infection-related cancers and resultant poor outcomes. Owing to the success of integrated human and animal vaccination campaigns among nomadic and pastoralist communities of Somalia,¹² a similar approach can be used in HPV and hepatitis vaccines, a key strategy in cancer prevention strategy against cancers.

Nomadic-specific cancer screening, and early detection, including One Health design, have shown initial promise on which future work should build on.¹⁴ One Health provides healthcare services that are tailored to the nomadic pastoralist that integrate human and veterinary health services.^{9 15} Adopting such strategies can bridge the gap among hard-to-reach nomadic communities and improve cancer care equity.

Timely cancer diagnosis among nomads is low due to inherent migratory lifestyles, low trust in modern allopathic medicines and the less acute nature of cancer symptoms.¹⁸ Therefore, a continuity of care model that will not clash with nomadic lifestyle patterns including on-site clinical history taking and physical exams at

converging water and grazing points is urgently needed. Establishing ‘cancer villages’ as a form of mobile cancer care is a feasible project that can be adopted by reaching remote rural nomadic villages and offering cancer diagnostic and screening services. Similar strategies were successful in screening and treating tuberculosis among nomads.^{20 21}

Because existing health services are designed to serve static populations,^{22–24} nomadic patients are rarely prioritised in cancer treatment access programmes. Therefore, a tailored One Health approach and policies to address these challenges are urgently needed to achieve universal health coverage. While there are no existing data to support its success, such tailored services include oral chemotherapy in lieu of infusion-based treatment in some cancers due to their mobility and de-escalation treatment protocols using shorter courses of chemotherapy or radiotherapy. However, dynamic mobile health delivery methods will be needed to manage toxicities and ensure treatment adherence.

While there are no existing hospice and palliative care services among nomadic communities in SSA,³⁰ a feasible strategy for pain control among nomadic patients with cancer is the provision of inexpensive analgesic medicines such as non-opioids and weak opioids through mobile health access programmes, and timely referral for palliative radiotherapy and surgery to nearby facilities.

Nomadic cancer survivors do not have access to survivorship clinics due to their migratory lifestyle,³³ therefore, keeping a patient database for follow-up and appointment reminders can be considered. Another strategy is providing an on-site visit, a form of mobile health, to evaluate cumulative disease-related or prior treatment-related toxicities, physical and emotional well-being, disease stage, or recurrence. On-site patient education on the above symptoms is also key.

In summary, this paper calls to action to stakeholders to understand the challenges better and develop a concerted approach to improve the provision of cancer care services to nomadic populations. It provides information to adapt proven approaches to target the specific needs of nomadic populations including a ‘One Health’ approach, mobile cancer screening and diagnosis, referral pathways, palliative care and survivorship to nomadic people and understanding strategies that work with them. One of the pillars of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals is the pledge to ‘leave no one behind.’ We hope nomads are not left behind in the continuum of cancer care.

CONCLUSIONS

Inequalities in health exist between nomadic and settled populations and directly stem from an absence of tailored healthcare services for nomadic populations. Therefore, implementing cancer prevention, screening, diagnosis, treatment, palliative care and survivorship for

nomads should be equally prioritised. A dynamic and adapted cancer approach that does not clash with the culture and lifestyle of nomads in SSA is urgently needed to improve cancer care compliance and outcomes of nomadic patients with cancer. Mobile health and One Health among nomadic patients with cancer are non-existent in Africa and speak to the enormous cancer care inequity, social, environmental, climate and healthcare injustice towards nomadic communities in SSA. Therefore, governmental policies and cancer control plans should explicitly address these gaps in countries with sizeable nomadic populations. The global oncology community should recognise the healthcare needs of African nomads and invest in cancer research and advocacy to improve equitable access to cancer care. Reaching the millions of nomads in SSA presents an opportunity for improving global health outcomes and moving towards sustainable development goals.

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Contributors OA, FR and NH led the drafting of the paper. All authors contributed to drafting and have read and approved the final version of the manuscript. All authors had final responsibility for the decision to submit for publication.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement The commentary does not present new data. Sources for data cited are available in the references provided.

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