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Cultural Convergence in Bone Tumour Care: Integrating Traditional Healing Practices with Contemporary Approaches

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ABSTRACT

Traditional medicine and culturally embedded health beliefs play a significant role in shaping cancer care pathways in low-resource settings, particularly in the management of bone tumours. This narrative review examines the interaction between traditional healing practices and biomedical orthopaedic oncology, focusing on identifying opportunities for safe and effective integration. A structured literature search was conducted across major databases from inception to March 2026, including studies on traditional medicine use, patient behaviours, and system-level interactions in bone cancer care in Africa and comparable contexts.

The findings indicate a high prevalence of traditional medicine use among cancer patients, often as a first-line intervention or alongside conventional treatment. Traditional bonesetters and herbal practitioners remain highly influential due to their cultural legitimacy, accessibility, and cost advantages. However, their involvement is associated with delayed presentation, advanced disease at diagnosis, and potential safety risks, including inappropriate interventions and unregulated therapies. Evidence for the clinical efficacy of traditional remedies remains largely preclinical, with limited robust data supporting their use in oncological care.

Three broad care models were identified: patient-driven pluralism, parallel systems with minimal coordination, and collaborative integration. Of these, structured collaborative models—incorporating defined referral pathways, training, and bidirectional communication—offer the greatest promise for improving timely diagnosis, treatment adherence, and patient outcomes. Key enablers include clear scope-of-practice boundaries, training in recognising red-flag features of malignancy, and regulatory frameworks that ensure quality and safety.

Despite policy recognition of traditional medicine in many settings, implementation remains inconsistent, and stakeholder mistrust persists. Addressing these gaps requires context-specific integration strategies, strengthened regulatory capacity, and a coordinated, multidisciplinary research agenda. Integrating traditional and biomedical systems offers a pragmatic approach to improving bone tumour care while respecting cultural contexts and safeguarding patient outcomes.

Introduction

Belief systems and cultural practices shape health behaviours globally. Across several settings, healthcare, including cancer care, is shaped by a complex interplay of traditional medicine, faith-based beliefs and practices, and biomedical approaches, with the former serving as a guiding compass that exerts a remarkable influence on health-seeking choices, particularly in Africa and similar sociocultural contexts[1]. These practices play a pervasive and clinically consequential role in bone cancer care, where they are frequently used as a first-line intervention before seeking conventional care[2,3].

Their use among cancer patients in low- and middle-income countries (LMICs) is remarkably high, ranging from 35% to 79% across studies[4]. Traditional and complementary medicine (TCM) encompasses a broad range of healing practices, including the use of indigenous medicinal plants and consultations with traditional or faith healers[5,6]. With regard to musculoskeletal illnesses, traditional bonesetters (TBSs) constitute a subset of TCM practitioners who provide care for a wide array of injuries and oncological pathologies[7].

LMICs bear a significant burden of the global cancer crisis, characterised by a high mortality-to-incidence ratio due to limited resources for detection and treatment, and patterns of delayed presentation with advanced disease[8]. Multiple reports have cited decisions or practices influenced by traditional medicine and religious beliefs as a potential cause of delay in seeking contemporary cancer care[9–11]. They profoundly influence perceptions of the causes of illness and decisions regarding cancer diagnosis and treatment. According to a recent scoping review of osteosarcoma, visits to traditional healers, taboos, cultural practices and religious beliefs contributed to late diagnosis and refusal of limb or life-saving procedures[9]. Evidently, patients and families frequently integrate TCM with conventional medical treatment, seeking support from both spheres and often prioritising their cultural traditions.

The outcome of cancer treatment is unforgivingly time-sensitive. The widespread use of traditional medicine and its centrality to health-seeking behaviour, coupled with the gross shortage of orthopaedic specialists, underscore the need for culturally sensitive, integrative cancer care models in Africa and similar sociocultural contexts that bridge these systems rather than polarise them. Collaborative approaches that engage traditional healers, spiritual leaders, and biomedical practitioners are increasingly recognised as essential to improving timely diagnosis, treatment adherence, and overall patient outcomes[6]. A recent WHO strategy and policy update explicitly encourages Member States to integrate TCM into people-centred health services while safeguarding quality, safety, and efficacy[12].

This article outlines opportunities to integrate TCM into bone cancer pathways in low-resource settings in Africa and similar sociocultural contexts, with a particular focus on the role of TBSs and allied practitioners in safely supporting musculoskeletal oncological care. It synthesises feasible, safe models of collaboration that promote equitable cancer care by reducing time-to-diagnosis and time-to-treatment, enhancing treatment adherence, improving the patient experience, and safeguarding safety, while respecting cultural contexts.

Methods

This narrative review synthesised the literature on how traditional medicine systems interact with bone cancer services delivered within biomedical frameworks, with a view to identifying domains of integration, coexistence, compromise, or conflict between traditional healers and biomedical practitioners.

A structured search was conducted across major bibliographic databases, including PubMed, Embase, Web of Science, CINAHL, and Google Scholar. We considered all relevant literature from inception to March 2026, with a focus on publications highlighting contemporary developments in bone tumour oncological services and integrative health discourse.

Search strings combined controlled vocabulary and free-text keywords related to: “bone cancer,” “oncology,” “neoplasms,” “musculoskeletal oncology,” “traditional medicine,” “traditional healers,” “traditional bonesetters,” “faith-based healing,” “complementary and alternative medicine,” “cultural practices,” “indigenous knowledge,” and “Africa” (including regional and country-specific terms). We also explored integrated cancer care models in comparable sociocultural contexts in Asia and Latin America. The reference lists of included studies and relevant reviews were manually screened, and the grey literature was searched to identify additional eligible publications.

Studies were eligible if they focused on bone cancer care or on mixed-cancer populations that included musculoskeletal pathologies; examined traditional healing practices or complementary therapies rooted in indigenous systems or culturally embedded health beliefs; or addressed interactions with, perceptions of, or integration into biomedical oncology services, including cancer care models in Africa and similar low-resource sociocultural contexts in Asia and Latin America. All article types were considered, except editorials, commentaries, and conference abstracts.

Titles and abstracts were screened for relevance to the predefined objectives. Full texts of potentially eligible articles were then reviewed to confirm inclusion. Data extraction captured study characteristics; the type of traditional practice described and its drivers of use; the stage and type of cancer care addressed; and reported interactions between traditional and biomedical systems. Extracted data also included patient and clinician perspectives, reported outcomes, and policy or systems-level considerations. Findings were synthesised thematically.

Prevalence of Traditional Medicine Use

The general use of traditional medicine among African cancer patients varies considerably, ranging from 14.1% to 84% across studies (Figure 1). The highest prevalence was reported in Malawi at 84%[13], followed by Ethiopia

at 79%[14], and Uganda at 77%[15]. Other notable rates include Ghana at 73.5%[16], Nigeria at 71.5%[17] and 66.3%[18], Tunisia at 71%[19], and Tanzania at 70.5%[20]. Aggregated estimates from one systematic review of 12 African countries reported a prevalence ranging from 36% to 80%[21], while a scoping review calculated a median prevalence of 60.0% and an average prevalence of 66.7% across sub-Saharan Africa[22].

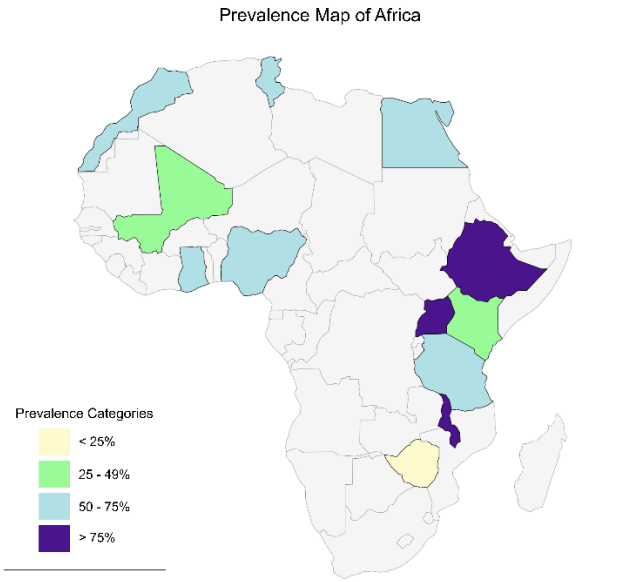

Figure 1. Geographic variation in the use of traditional medicine among cancer patients.

However, the quantitative prevalence data on traditional medicine specific to bone cancer patients were reported in only a small subset of the included studies. The most precise estimate comes from a Ugandan cohort, where approximately one-quarter of paediatric osteosarcoma patients had received manipulative therapy before referral[10]. The Nigerian case series reported an extremely high rate of traditional bonesetter intervention among patients whose tumours had ulcerated (83.3%), though the denominator was small[23]. In Kenya, bone cancer constituted 12.5% of all cancer patients surveyed at traditional health practitioner outlets, though this figure reflects the case mix at those outlets rather than the proportion of bone cancer patients using traditional medicine[24]. The remaining studies identified the use of traditional medicine as a contributing factor to late presentation and poor outcomes, but did not provide specific prevalence figures[9,25].

Types of Traditional Medicine Used

The types of traditional medicine and the practitioners involved varied across studies, reflecting the diversity of traditional healing systems across different regions. Two broad categories of traditional practice emerge. The first encompasses manipulative or physical interventions, such as therapeutic cuttings, incisions, massage, and attempted drainage, primarily performed by TBSs as documented in the Ugandan and Nigerian studies[10,23]. These practices appear to be common when the presenting symptom is swelling or pain in an extremity, which traditional practitioners may interpret as a fracture, infection, or abscess rather than a neoplasm. In a report, P. Doe et al. documented osteosarcoma treatment using "Sakiya" (scarification), a traditional practice involving incisions made with a heated instrument, among the predominantly Hausa-Fulani population in Northwest Nigeria[26]. This practice may also involve arranging straws around the limb and securing them with hand-woven bandages to form a splint.

TBSs are indigenous practitioners who treat musculoskeletal injuries and non-traumatic disorders using informal, culturally rooted techniques passed down through generations. Their practice dates back centuries in Asia and Africa[27,28], and they remain the primary source of care for musculoskeletal disorders in many LMICs, handling up to 85% of fractures in Nigeria and a majority in India[27,28]. TBSs have no formal medical training, lack access to radiographic imaging or sterile equipment, and acquire their skills through family transmission or apprenticeship, spiritual belief or divine gift, and observation or experience[29,30]. Notwithstanding, they treat a broad range of musculoskeletal conditions, including fractures, dislocations, sprains, and non-traumatic pathologies such as tumours. Treatment modalities include massage and manipulation; splinting/immobilisation with rigid materials (wood, bamboo) or soft materials (cloth, leaves); topical applications of organic materials and inorganic substances; and invasive procedures, including cutting the skin with unsterile tools, attempted incision and drainage, and re-breaking healed fractures.

The second category of traditional practice involves herbal medicine, the most frequently cited form of traditional medicine in Kenya[24], and it was extensively catalogued in the Nigerian ethnomedicinal survey, which identified 126 plant species used across 20 cancer types[31]. Across a mixed population of cancer patients, herbal medicines derived from indigenous medicinal plants and prepared as decoctions, infusions, powders, or ointments were commonly utilised[32–35]. Specific usage

rates included 72.1% in Ethiopia[14], 69.7% in Tunisia[19], 65% in Nigeria[17], 59.2% in Ghana[16], and 56% in Malawi[13]. In Kenya, 80% used raw plants[24]; massage therapy was reported by 66.3% in Ghana and 12.5% in Kenya[16,24]. The most used plant parts are leaves, roots, and bark[35,36]. In addition to herbal medicine, biological products (including animal-derived substances and minerals) and dietary medicinal fruits are also utilised[37,38].

Associated Factors

Cultural factors were the most consistently cited driver across studies, although the specific cultural mechanisms varied by context. In Uganda and South Africa, the emphasis was on community beliefs, with traditional healers widely regarded as possessing not only culturally embedded knowledge but also supernatural healing wisdom and powers to treat musculoskeletal conditions[10,25]. Cultural resistance to uptake of conventional medicine management recommendations and misguidance by traditional healers were frequently cited[39–41]. In a case report, deeply held parental beliefs against surgery required mediation by spiritual leaders before conventional treatment could proceed despite unsuccessful treatment by traditional healers[42], highlighting the impact of cultural beliefs and the importance of culturally-sensitive care coordination. In south-western Nigeria, herbal knowledge is transmitted intergenerationally as part of Yoruba cultural heritage[31], with herbal medicine considered by many to be the first line of treatment for most illnesses. Despite well-documented limitations in both the skill set and clinical outcomes of orthopaedic care provided by TBSs, these practitioners continue to command substantial patronage and trust within their communities[43,44].

Healthcare access barriers were the second most prominent drivers. Multiple sources documented workforce shortages, infrastructure deficits, and geographic inaccessibility of cancer treatment centres as factors that push patients toward locally available traditional practitioners[9,10,25]. The impact of the workforce shortage was highlighted by reports that TBS provided primary orthopaedic care to an estimated 70–90% of some rural communities[45,46]. This sustained reliance reflects a complex interplay of accessibility, cultural acceptability, cost considerations, and gaps in formal healthcare provision, underscoring their entrenched role within the local health system despite ongoing concerns regarding quality and safety.

The Kenyan study added an important nuance: traditional medicine was not solely a substitute for unavailable conventional care but was also sought when conventional treatment failed to produce a desirable response, with 42.2% of respondents citing unresponsive conditions as the primary motivation[24]. The same study found that some traditional medicine users were well-educated and relatively affluent, challenging the assumption that use of traditional medicine is driven purely by poverty or ignorance[18,47]. A systematic review reported more frequent usage among women, rural residents, and patients in advanced cancer stages[21].

Usage Patterns and Disclosure

The sequencing of care varies across studies. In the Ugandan and Nigerian studies, traditional medicine was typically sought for bone cancers before any conventional consultation[10,23], whereas in Kenya, most cancer patients visited traditional health practitioners after initial conventional treatment, often driven by unresponsive conditions or inaccessible biomedical services[24]. A case report described the concurrent use of traditional and conventional care in the management of paediatric osteosarcoma, highlighting the impact of cultural beliefs and systemic healthcare gaps on the management of bone tumours[42].

Among a broader cohort of cancer patients, a substantial proportion of patients used traditional medicine concurrently with conventional cancer treatment: 60% in Malawi, 61.11% in Tunisia, and approximately 42% in Morocco[13,47,48]. In a Tanzanian study, 67.1% switched to conventional medicine after stopping herbal medicine, while 24.9% continued both herbal and conventional medicine[20]. Notably, 74% of patients in a Tanzanian study consulted a traditional healer before seeing a conventional healthcare provider[49]. Disclosure rates to healthcare providers were consistently low across studies: 13% in Morocco, 12.6% in Nigeria, 16.7% in Ghana, 18.1% in Uganda, 22.5% in Tanzania, and 20.8% in Ethiopia[14,16,18,20,22,47]. This heterogeneity in sequencing suggests that the use of traditional medicine operates at different points along the care pathway, depending on context.

Aside from seeking traditional medicine because it is deeply embedded in local culture, more affordable than biomedical treatments, and more accessible, some patients wanted to "try everything that could help" reflecting a pragmatic approach to therapeutic options[3,4,37,50]. Other reported reasons for using traditional medicine include boosting immunity, managing side effects of conventional treatments, improving psychological well-being, and believing the disease was spiritual[16,22,47,51,52].

Effectiveness and Safety

Ethnopharmacological studies have identified several African medicinal plants with in vitro and in vivo anticancer activity[5,53–55]. However, most findings are preclinical, and robust clinical trial data demonstrating efficacy in humans are lacking. Only a minority have undergone scientific validation in uncontrolled clinical settings, and safety data remain limited[5,21,56]. Specific cytotoxic activity against Ewing sarcoma cells has been demonstrated in Alstonia boonei leaves, commonly used as a cancer remedy in Ghana, with bioassay-guided fractionation revealing 15-hydroxyangustilobine A as the active component, which induces G2/M-phase cell-cycle arrest and apoptosis[57]. Other cytotoxic plants from Central, Eastern, and Western Africa, known to exert cytotoxic effects through caspase activation, alteration of mitochondrial membrane potential, induction of reactive oxygen species, or anti-angiogenic effects, include: *Beilschmiedia acuta*, *Echinops giganteus*, *Erythrina sigmoidea*, *Imperata cylindrica*, *Nauclea pobeguinii*, *Piper*

capense, *Polyscias fulva*, *Uapaca togoensis*, *Vepris soyauxii*, and *Xylopia aethiopica*[58].

While some plant extracts show low cytotoxicity to normal cells in laboratory studies, there are documented fears among users regarding overdose, toxicity, and lack of hygiene in preparation[55,59]. The absence of standardised dosing, quality control, and regulatory oversight further complicates safety assessment. Additionally, concurrent use with conventional treatments may increase the risk of adverse interactions, as demonstrated by a Ghanaian study, which reported overlapping toxicity with conventional treatments[16]. The use of herbal medicine alongside chemotherapy without disclosure to the healthcare provider, thus, raises concerns about potential interactions and unmonitored adverse effects[20].

A retrospective cohort study from Uganda examined outcomes in 74 paediatric osteosarcoma patients, comparing 19 who received initial treatment by traditional healers with 55 who did not[10]. Patients treated by traditional healers experienced significantly delayed referral (median 45 vs 28 days, $p = 0.012$), higher rates of metastasis (77.8% vs 60.4%), and elevated serum lactate dehydrogenase levels ($p = 0.046$). Median survival was also lower, and, while not statistically significant, delayed referral for formal oncological care represents a key pathway by which unregulated traditional treatment may compromise outcomes. A companion study from the same institution found that over a quarter of osteosarcoma patients had undergone invasive procedures that could compromise tumour integrity prior to appropriate referral[11]. A similar narrative was reported in a Pakistani study, in which 68% of patients with neglected tumours had consulted TBSs prior to hospital presentation[60].

The body of evidence from Asian studies suggests that traditional medicine adjunctive therapies improve pain control, quality of life, and treatment-related toxicity in metastatic primary bone cancer, though survival benefit remains equivocal, while traditional bonesetter-type massage manipulation applied to primary bone tumours accelerates disease progression and worsens outcomes. Traditional Chinese medicine formulations - including compound kushen injection, external herbal applications, and oral preparations - used as adjuncts to standard oncological care were consistently associated with improved pain relief (pooled RR 1.25 to 1.49)[61,62], but there was limited survival data. TBS-like massage manipulation applied to osteosarcoma was associated with a three-fold acceleration of metastasis (median 4 vs. 12 months, $p < 0.0001$)[63], consistent with mechanical disruption facilitating haematogenous dissemination, with correspondingly elevated tumour markers supporting this mechanistic explanation[63].

While bone-cancer specific patient satisfaction data were scarce, data across the general oncology population showed that patient satisfaction with traditional medicine varied considerably. In Kenya, 76% of respondents reported an improved quality of life, and 78.2% reported an improved ability to perform daily activities[24]. However, in Nigeria, 69.6% of users reported no actual benefit from use[17], and 64.2% of users in another Nigerian study reported adverse effects[18]. In Kenya, only 45% were satisfied, while 55% were disappointed[64]. A Ugandan study comparing patients using combined herbal medicine and conventional therapies versus conventional therapies alone found better mean scores for quality of life and symptom severity in the combination group, but only role functioning showed a statistically significant difference ($p=0.046$)[65].

System integration

The literature reveals a consistent pattern: integrating traditional healing practices with conventional cancer care in Africa and settings with similar sociocultural paradigms is widely recognised as necessary yet remains structurally underdeveloped. Developing this interface is essential for creating strong pathways for bone tumour care that aim to improve outcomes by reducing diagnosis and treatment times, increasing treatment adherence, enhancing the patient experience, and ensuring safety.

COLLABORATIVE MODEL

This is characterised by structured interactions between traditional and biomedical providers (Figure 2). With TBSs serving as a community entry point for initial musculoskeletal care, including bone tumours, it is vital to evolve referral pathways to conventional facilities for suspicious cases. The proposed training approaches differ notably: Adamtey et al. and Onyemaechi et al. describe top-down models where orthopaedic specialists train TBSs[66,67], whereas Binnerts et al. piloted a novel collaborative bilateral knowledge exchange model, primarily for trauma care, in which both orthopaedic specialists and TBSs learn from each other, explicitly designed to avoid paternalistic dynamics that risk alienating TBSs[68]. For many patients, particularly those in rural areas, TBSs provide quicker access due to geographical proximity, deep community trust and cultural legitimacy; therefore, with suitable training, their integration could decrease the time to initial assessment by serving as accessible first-contact providers with potential malignancies referred through an appropriate referral pathway.

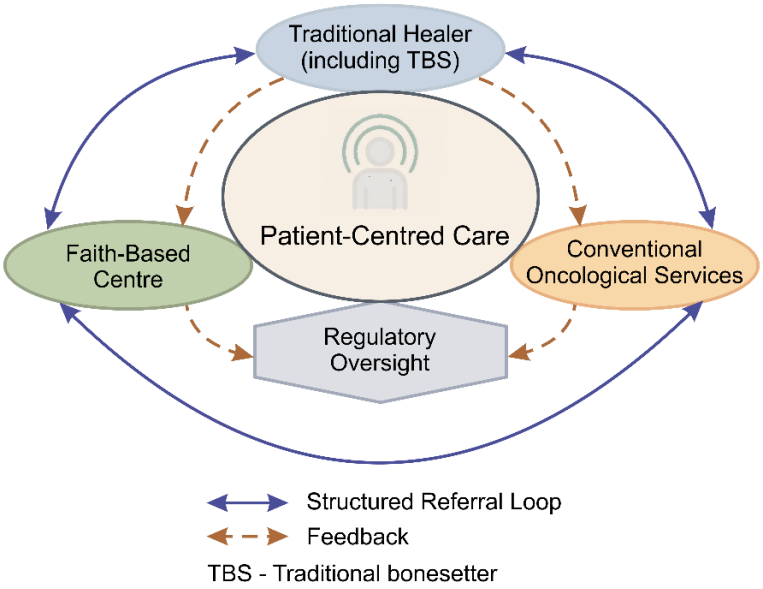

Figure 2. Illustrates the structured referral loop and feedback in the collaborative model.

The Guatemala case study represents the most fully elaborated collaborative pathway between TCM and conventional medicine, featuring joint workshops, comparative diagnoses, patient referrals, and formal Memoranda of Understanding delineating roles, with the National Cancer Institute responsible for biomedical procedures, Councils of Elders coordinating with healers and patients, and ETH Zurich facilitating and mediating[69].

Training, regulation of practice, and the establishment of clear boundaries are vital to the success of this framework, as TBSs generally acquire their knowledge experientially, without formal medical training, and commonly believe that healing power resides in their hands[30]. Their diagnostic methods make it impossible to differentiate fractures from bone tumours, further emphasising the need for training[29,30]. A systematic review found that 62% of stakeholders - including TBSs, hospital staff, and patients - supported this form of intersectoral collaboration between TBSs and conventional healthcare[70]. Implementing this structured integration is crucial not only to facilitate improved access but also to reduce the reported prevalent adverse outcomes associated with TBS-managed conditions[44,67,71].

A valuable Nigerian qualitative study and a Ghanaian proof-of-concept model provide important evidence that TBS can be successfully trained as technicians, with measurable safety improvements when proper training protocols are implemented, aligning with the broader integration model[72,73]. Primarily focused on fracture management services, these studies demonstrated achievable improvements in knowledge among TBSs, established referral systems, enhanced practice, and supported the registration and licensing of trained TBSs to work as orthopaedic technicians in rural primary health care centres[72,73].

Nevertheless, establishing a clearly defined scope of practice is essential, with explicit boundaries to specify the limits of TBS involvement and prevent improper management of bone tumours. Within this framework, targeted training could be expanded to include recognition of red-flag features suggesting musculoskeletal malignancy, enabling early suspicion and prompt triage. Emphasis should be placed on facilitating immediate referral to specialised services, ensuring that potential malignant conditions are not subjected to prolonged or unsuitable treatment within the traditional care pathway. This approach ensures safe, accessible primary orthopaedic care in rural areas where modern orthopaedic services are limited.

In Eastern Nigeria, community-based training for traditional healers and faith-based outreach initiatives are proposed as collaborative mechanisms[74], while a Cameroonian study highlighted the value of educating traditional healers about early warning signs of paediatric cancers and of including them in surveillance and referral algorithms[75]. A Ghanaian perspective proposed multiple integration models, including patient co-referrals; creating a unit for traditional medicine within outpatient departments, allowing patients to choose either biomedicine or traditional medicine; incorporating aspects of traditional healing into the training of biomedical practitioners; and creating spaces for knowledge sharing[76].

PARALLEL AND PATIENT-DRIVEN PATHWAYS

Parallel care models, in which patients simultaneously use traditional medicine and conventional cancer treatment, are common in Africa and similar contexts, with a study reporting 94-100% of patients using both concurrently rather than sequentially[37]. The impact of concurrent uncoordinated use of traditional and conventional care in the management of paediatric osteosarcoma was also reported by Malima[42]. This model predominates in the South African literature. Three closely related studies from KwaZulu-Natal describe a model in which traditional health practitioners and radiation oncologists work independently but share certain patient information, with the patient functioning as the central coordinator of their own care[77–79].

While there may be some information exchange often initiated by the patient, there are no formalised referral

algorithms, shared care plans, or jointly agreed treatment boundaries. The patient, therefore, occupies the functional centre of the system, translating advice, reconciling competing therapeutic narratives, and sequencing care (Figure 3). This configuration introduces an appearance of cooperation without institutional integration.

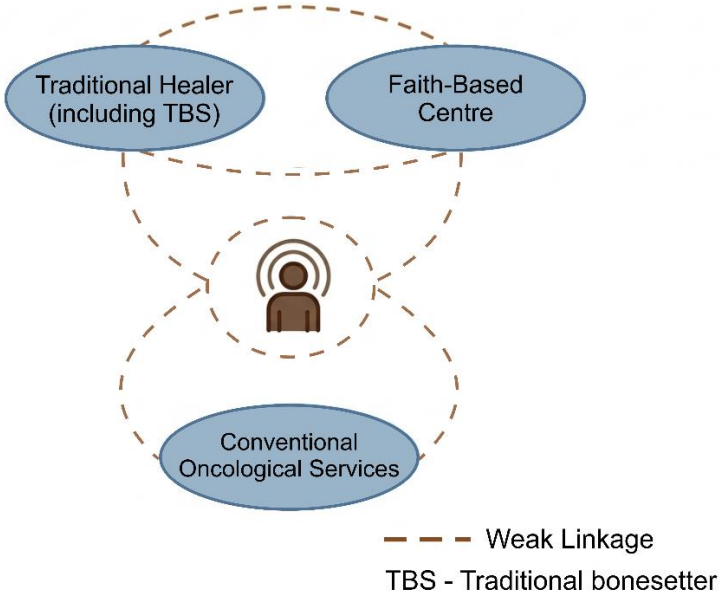

Figure 3. Parallel model showing weak linkages between systems.

This model occupies an intermediate position between informal pluralism and collaborative integration. Transitioning from parallelism to true integration would require adding defined referral triggers, agreed-upon scope-of-practice frameworks, bidirectional communication, and a shift from coexistence to coordinated co-management.

The patient-driven pathway is a framework depicted in many studies, where no deliberate integration has been established. Patients navigate between traditional and biomedical systems, with treatment outcomes, dissatisfaction with prior treatment, financial exhaustion, or advice from family members influencing whether to continue with the initial modality or switch to an alternative[54]. In the Ugandan and Nigerian studies, traditional medicine was typically sought for bone cancers as the first line of treatment[10,23], whereas in Kenya, most cancer patients visited traditional healers after initial conventional oncological treatment, often driven by persistence of symptoms, dissatisfaction with prior treatment, financial exhaustion, or advice from family members[24].

As illustrated in Figure 4, the absence of a defined referral interface meant that each transition effectively reset the diagnostic process, thereby contributing to cumulative delays and migration between diagnostic stages. This informal model represents an unregulated medical pluralism in which integration occurs at the patient level rather than at the health system level. Transforming this into a collaborative model would require shifting the responsibility for coordination from individual patients to institutional frameworks, introducing referral triggers, safety guardrails, and bidirectional communication pathways without eroding cultural legitimacy.

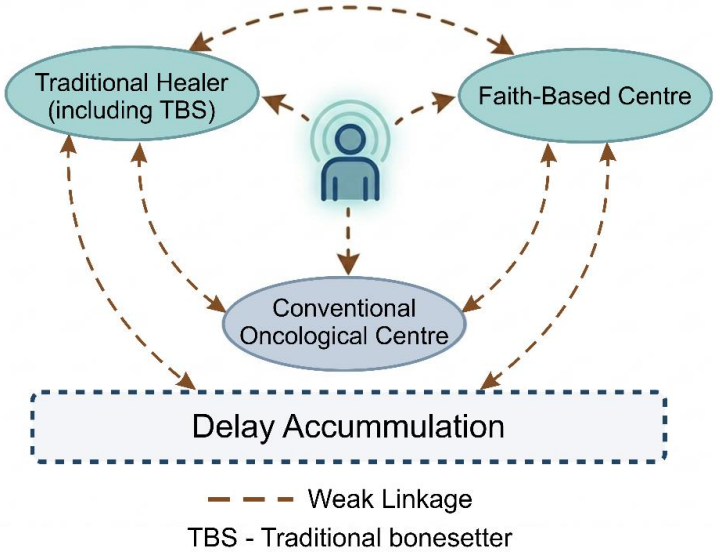

Figure 4. Patient-driven model demonstrating care integration at the patient level rather than the health system level.

PATHWAY STRUCTURE

The apparent pattern across studies is that patients combine traditional and biomedical care, whether on their own initiative or within a system framework. While patient-driven pluralism seems predominant, it introduces treatment interruptions, diagnostic delays, and safety risks. Hence, the challenge is developing context-appropriate collaboration to reduce harm and improve outcomes. The collaborative mechanism exemplified in African studies, particularly regarding TBSs, has proven to improve trust, reduce negative stereotypical attitudes, and foster collaboration between biomedical practitioners and traditional healers. This is an antithesis to the lack of relationships, teamwork, respect, trust, and communication observed in settings without a formal integration mechanism, reinforcing the importance of shared protocols, mediated communication, defined roles, and formal safety monitoring through institutional review board oversight, all of which are required for integration to function safely.

Regulatory and policy considerations

The WHO strategy emphasises integrating TCM into primary healthcare as the most viable entry point[12,80], with TBSs serving as the primary entry point for musculoskeletal oncology. However, the challenges are substantial: many practices, service delivery models, and education systems exist for traditional medicine, and countries have adopted varying strategies with no standardised model[80]. A dominant finding across the literature is that many African countries have enacted legislation or policies recognising traditional medicine, yet the depth and enforceability of these frameworks vary significantly. A survey of 47 countries in the WHO African Region found that 40 had national policies on traditional medicine and 38 had legal frameworks governing practice[81]. Despite this, substantive regulatory implementation remains uneven.

Currently, there is no validated cancer-specific training module for traditional bonesetters, but evidence from existing TBS training programmes, community health worker models, and clinical guidelines provides a foundation for developing such protocols[28,68,72,73]. Training should concentrate on differentiating trauma from non-traumatic pathology, recognising red flags and referral criteria, harm reduction protocols, and implementing referral pathways. Given the documented unsafe TBS practices and cancer-related risks[10,11,29,30,71], the scope-of-practice restrictions should prevent manipulation of masses without a clear traumatic cause, incisions over swellings (to reduce tumour seeding risk), treatment of pathological fractures, management of patients with constitutional symptoms, and mandate referral for any patient not improving within 2-4 weeks[29,68].

Drawing from existing regulatory frameworks and aligning with Onyemaechi et al's recommendations on the establishment of a certification board for licensing and regulation of TBS practice[67,72], there is a need for prompt implementation and local recognition of mechanisms that incorporate scope-of-practice restrictions, define prohibited practices, and regulatory approaches that extend to the certification of TBSs and other traditional medicine practitioners.

Additionally, there is a need to strengthen the systems, build mutual trust, and bridge the implementation gaps. The most effective regulatory pathway for any given country depends on its existing institutional infrastructure, the degree of formalisation of traditional medicine, and the availability of resources for regulatory enforcement. For countries with strong institutional capacity, the primary challenge is translating existing legislation into enforceable standards with adequate monitoring, while consolidating awareness focused on musculoskeletal disorders. For countries with weaker institutional infrastructure, the priority must be building basic regulatory capacity - training personnel, establishing laboratories, and creating sustainable funding mechanisms - before more sophisticated regulatory mechanisms can function.

Beyond the difficulties posed by resource constraints, technical and capacity limitations, and weak implementation mechanisms, stakeholder resistance has been identified as a major obstacle, with biomedical practitioners described as rejecting the traditional system[82]. Likewise, traditional healers are reluctant to engage with scientific communities because of concerns about knowledge appropriation[83]. This dynamic has been perpetuated by the biomedical profession's disproportionate political dominance, creating structural barriers to equitable integration[84]. Addressing these challenges requires deliberate efforts to foster collaboration and mutual trust between these sectors, underpinned by transparent engagement, respect for complementary roles, and safeguards that ensure equitable knowledge exchange.

Research gaps and future directions

Despite TCM's potential in musculoskeletal oncology care, significant research gaps remain. These gaps limit the potential of the available evidence to influence policy, clinical integration, and scalability.

CLINICAL EVALUATION OF TRADITIONAL CANCER REMEDIES

Most existing ethnopharmacological reports are preclinical or observational, providing valuable mechanistic insights and generating hypotheses about potential antineoplastic, immunomodulatory, or cytotoxic properties[34,85]. However, they do not establish clinical efficacy, optimal dosing parameters, pharmacokinetics, or safety profiles in human populations. This underscores the need for robust clinical trials to evaluate these parameters and support approval for use in standard care. Trial design should be culturally sensitive through community engagement, partnerships with traditional practitioners, and the incorporation of culturally meaningful outcome measures, thereby enhancing recruitment, retention, and acceptability while adhering to international standards.

IMPLEMENTATION RESEARCH ON INTEGRATIVE CARE MODELS

There is a paucity of implementation research on understanding how integrative cancer care models can be operationalised within African health systems. Existing studies often focus on belief systems, utilisation patterns, and associations, while comparatively little attention has been paid to the design, piloting, and evaluation of structured integration interventions. Future research should focus not only on problem description but also on designing and real-world testing of interventions. There are various implementation science frameworks that can help assess the fidelity, acceptability, feasibility, and sustainability of models across African settings[86].

Variations in regulatory environments, health system organisation, and sociocultural norms across countries necessitate locally grounded implementation strategies rather than uniform models for determining which integration mechanisms are scalable, safe, and sustainable. Such frameworks can guide the staged introduction of collaborative mechanisms such as formal referral pathways between traditional healers and biomedical providers, shared documentation systems, liaison roles, and infrastructure that facilitates collaboration.

LONGITUDINAL OUTCOMES OF INTEGRATIVE CANCER CARE

Although cross-sectional studies and reports have highlighted the potential benefits of integrative cancer care, more longitudinal studies are needed to establish a link between these models and improved clinical outcomes. Prospective cohort studies should be conducted to evaluate clinical outcomes, such as symptom control, treatment adherence, survival, and quality of life, over time. These studies will also help to understand the consequences of integration. Insights from these studies will support the development of better frameworks that ensure patient safety and balance culture with scientific evidence.

PARTICIPATORY AND COORDINATED RESEARCH AGENDA

Future research should reposition patients and traditional healers not as passive subjects of study but as active partners in knowledge generation and intervention design. Participatory action research offers a structured mechanism for co-creating contextually grounded models of care that are culturally legitimate and more likely to achieve sustained uptake. Such approaches are particularly important when addressing cancer-related stigma, taboos, and culturally embedded explanatory models of disease, which conventional biomedical strategies alone may not adequately navigate.

These priorities underscore the need for a coordinated, multidisciplinary research agenda. Advancing integrative cancer care will require collaboration across oncology, pharmacology, surgery, implementation science, and health policy and systems research. Inter-disciplinary engagement can facilitate data harmonisation, strengthen methodological rigour, support regulatory development, and enhance capacity building within local institutions. A coordinated research strategy is essential to move beyond fragmented evidence toward a coherent, scalable framework for safe and context-sensitive integration.

Conclusion

The evidence base indicates that integrating traditional and biomedical cancer care systems is the most pragmatic approach for system frameworks to reduce time-to-diagnosis and time-to-treatment, enhance treatment adherence, improve the patient experience, and safeguard healthcare across Africa and similar contexts, where health and wellness have a strong cultural and faith-based dimension. While the different models have their strengths and weaknesses, the context determines which integration model is feasible. In settings with extreme resource scarcity and geographic barriers, the referral-based model may be the most pragmatic first step. In settings with some institutional infrastructure, parallel models with formalised communication channels may be achievable. Fully collaborative models require sustained external facilitation, research infrastructure, and political will. In all settings, the patient remains the de facto coordinator of their own care across systems, and pathways must be designed around this reality rather than assuming centralised control.

Regardless of the adopted model, the key components include training traditional healers to recognise cancer and refer patients to the biomedical system, establishing an open bidirectional communication and channel between traditional and biomedical providers, providing patient navigation support, enacting and implementing policy frameworks that recognise and regulate traditional medicine, and embedding cultural sensitivity throughout the pathway.

Conflicts of interest

The authors have no conflicts of interest to declare.

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