Ethiopian Medical Journal 2024, 62(supplement 1)
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ISSN 0014-1755 eISSN 2415-2420 Mekonnen et al.

Original Article

Traditional Bone Setting Practice in Addis Ababa, Ethiopia: Perspectives of Traditional Bone Setters and Orthopedic Surgeons

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Abstract

Introduction: *Traditional bone setting (TBS) is extensively used throughout the world irrespective of the accessibility of modern medicine. It is a source for primary fracture care among Ethiopians although it has not been studied as much as it deserves especially from the perspective of the practitioners. The aim of this study was therefore to explore the perception of traditional bone setters and orthopedic surgeons towards TBS practice in Addis Ababa, Ethiopia.*

Method: *A qualitative descriptive study design was employed to conduct interviews. Audio recorded interview and field notes data was transcribed and then analyzed using thematic analysis.*

Result: *A total of 21 TBS practitioners and orthopedic surgeons participated in this study. The findings revealed four main themes that dealt with orthopedic surgeons' perception towards TBS practice; reasons for community preference to use TBS services; materials used, client payments, home-based services, and sources of knowledge for TBS practice and views on possible collaboration between allopathic and traditional bone setting practice.*

Conclusion: *The TBS practice is commonly used and accepted by the Ethiopian community for different reasons despite the safety concerns raised. This calls for more collaboration among the TBS practitioners and the orthopedic surgeons as well as a policy intervention to ensure that society accesses safe and effective orthopedic primary healthcare services*

Keywords*: Traditional bone setting, orthopedics, practitioners' perception, Ethiopia*

Citation : *Mekonnen, E.K., Habte, B.M., Wamisho, B.L. & Yeshak, M.Y. (2024).Traditional Bone Setting Practice in Addis Ababa, Ethiopia: Perspectives of Traditional Bone Setters and Orthopedic Surgeons. Ethiop Med J, 62 (Supplement 1), pp.55-62.*

Submission date : 7 *November 2023 Accepted: 2 February 2024 Published: April ,2024*

Introduction

Literature findings depict that up to 80% of the Ethiopian population uses traditional medicine, including the services of traditional bone setters called 'Wogesha' in Amharic, for their primary healthcare needs. This has been ascribed to the cultural acceptability, the relatively low cost, and better geographical accessibility of traditional medicine (1). The traditional bone setting (TBS) practitioners have variously been defined by different authors. Ezeanya-Esiobu has defined a traditional bonesetter as "a lay practitioner of bone manipulation, well-versed—at least, according to the view of patrons and his community at large—in the medical art of restoring broken bones to full functionality" (2). Another study defines a traditional bonesetter as "a lay practitioner of joint manipulation. He or she is the 'unqualified practitioner' who takes up the practice of healing without having had any formal training in accepted medical procedures" (3). The TBS practice, which is the traditional care of musculoskeletal injury, is one of the most widely recognized forms of traditional medical practice, with an estimated 10–40% of people using it worldwide (5). It involves the use of splints and bamboo sticks or rattan cane or palm leaf axis with cotton thread or old cloth and herbs used in the form of concoctions and incantations (4). TBS existed long before formal orthopedic care emerged; it is also a well-known procedure throughout Africa, including Ethiopia, where it provides significant primary fracture care (4).

Because traditional bonesetters are positioned strategically throughout the community, anyone in need of fracture management may be able to get assistance from them (6). Moreover, the number of

trauma patients in Ethiopia is sharply increasing due to the increase in accidents such as those related to road traffic and occupational hazards (4, 7).

In a country where there is a severe shortage of orthopedic surgeons, TBS practitioners can potentially play a critical role in expanding access to musculoskeletal care and improving health outcomes for morbidity as a result of these incidents (5). This view seems to be shared by the majority of orthopedic surgeons in one study while acknowledging problems associated with the TBS practice, including those related to the use of excessively tight splints (8). Several studies reported on the different problems associated with TBS practitioners, such as a high proportion of amputations due to gangrene and other complications as a result of tightly wrapped bamboo splints (4, 5). With the interest of enhancing access to safer and improved fracture therapy by TBS practitioners, especially in developing countries, a narrowed gap between traditional and allopathic practitioners is mandatory. In this case, better-prepared traditional bone setters can bridge the gap that is left by the shortage of orthopedic surgeons in developing countries especially in Africa (8).

Understanding why members of society prefer TBS, understanding the practice of TBS practitioners, and assessing potential ways for collaboration between TBS practitioners and orthopedic surgeons are thus key issues to work towards the integration of TBS practices into primary healthcare (4, 5). The aim of this study was, therefore, to explore the perception of traditional bone setters and orthopedic surgeons towards the TBS practice in Addis Ababa, Ethiopia.

Participants and Methods

A qualitative descriptive design was employed to explore the perception of traditional bone setters and orthopedic surgeons towards TBS practice in Addis Ababa, Ethiopia (1). Qualitative approaches in this study were useful in providing rich descriptions of complex perceptions and belief systems regarding traditional bone-setting practices. (1)

Study setting and study period

The data were collected from Addis Ababa which is the political and commercial capital of Ethiopia. Addis Ababa is administratively divided into eleven subcities It is also home to 12 public and more than 40 private hospitals. There are a few public and private hospitals that give orthopedic treatment in Addis Ababa including the Orthopedics Center in Tikur Anbessa Specialized Hospital. The study was conducted from April to September 2023 G.C. at different hospitals that provide orthopedic services and different parts of the city.

Study participants

A total of 21 practitioners participated in this qualitative study, including 10 traditional bone setters and 11 physicians practicing in the orthopedic surgery field. The physicians were practicing as orthopedic surgeons in the different private and public hospitals in Addis Ababa and traditional bone setters practicing in different parts of Addis Ababa. These participants were purposively selected. Snowball sampling technique was used to recruit the Traditional Bone Setters.

Data collection methods

Qualitative interviews using a semi-structured interview guide were conducted by the first author. The interviews which lasted from 25 to 90 minutes were conducted in Amharic, the official language of Ethiopia and widely used in Addis Ababa. A half-day validation workshop was conducted which included practitioners from both TBS and Orthopedic surgeons, an expert from the national medicine regulatory body, and researchers. The data collection tool has components assessing the socio-demographics, orthopedic surgeons' perceptions towards traditional bone setting practice, reasons for community preference to use TBS services, Traditional bone setters' practice, and collaboration ideas between allopathic and traditional bone setting practice.

Data analysis

Collected data from the qualitative interviews were transcribed verbatim. The textual data were then thematically analyzed (2).

Trustworthiness

The trustworthiness of the findings was enhanced by different forms of triangulation including sources, investigators, and methods. Orthopedic doctors and traditional bone setters participated as sources of data; investigators from different disciplines such as orthopedic surgery and pharmacy collaborated in this research and thus different perspectives at different stages of the research were entertained; different methods including interviews and observations were used which added to the trustworthiness. The first author who also collected the data underwent a process of reflexivity during the different research phases to enhance trustworthiness. The presentation of verbatim transcription of the study participants we believe also contributes to the trustworthiness of the findings. Finally, the preliminary findings were presented among different stakeholders including some of the study participants who were able to validate it and further provide enrichments.

Ethical considerations

Ethical approval were obtained from the Institutional Review Boards of the School of Pharmacy (Ref. No. ERB/SOP/461/14/2022) and the Department of Orthopedics, School of Medicine (MF/ORTH/324/2023), College of Health Sciences, Addis Ababa University. All study participants provided informed oral consent before the data collection, and they were assured that

confidentiality would be maintained and about the voluntary nature of their participation.

Results

Socio-demographic characteristics of the participants

A total of 21 practitioners participated in this qualitative study, including 10 traditional bone setters and 11 physicians practicing in the orthopedic surgery field. As can be seen in Table 1, an equal number of women and men traditional bone setters were interviewed with most being older than 50 years of age, married, and having a high school level education. With regards to their practice, most were full-time TBS practitioners with practice durations of more than 10 years, average income levels from 1000-5000 ETB, and annual client visits of 100-500 (Table 2). With regards to the physicians, most were male, less than 30 years of age, and had 4 to 7 years of experience as depicted in Table 3.

Table 1: Socio-demographic characteristics of study participants practicing TBS, Addis Ababa, Ethiopia, 2023 (N=10)

Socio-demographic Characteristics		Number
Sex	Male	5
	Female	5
Age	<30 years	0
	31–49 years	3
	>50 years and above	6
Marital status	Single	0
	Married	7
	Divorced	2
Religion	Orthodox	6
	Muslim	1
	Protestant	2
Education	Illiterate	2
	High school level	4
	Post-secondary education	3

Table 2: Traditional bone setting practice related information among practitioners, Addis Ababa, Ethiopia, 2023 (N=10)

TBS practice-related information		Number
Average monthly income (ETB)	1000-5000	7
	5000-10,000	1
	10,000-15,000	2
	>15,000	0
Duration of TBS practice (years)	8-10	2
	>10	8
Number of average annual client visits	50-100	2
	100-500	6
	>1000	2

Table 3: Socio-demographic characteristics of physicians practicing orthopedic surgery, Addis Ababa, Ethiopia, 2023. (N=11)

Socio-demographic Characteristics		Number
Sex	Male	9
	Female	2
Age	<30 years	7
	31–49 years	4
Marital status	Single	8
	Married	3
Religion	Orthodox	8
	Muslim	1
	Protestant	2
Education	Resident	7
	Senior orthopedic surgeon	4
Year of experience	1-3 years	2
	4-7 years	6
	8-10 years	1
	>10 years	2

The findings from this study revealed four main themes that described the perceptions of TBS practitioners and orthopedic surgeons on TBS practice. The main themes that were identified included the following: orthopedic surgeons' perception towards the TBS practice; reasons for community preference to use TBS services; traditional bone setters' practice including the materials used, client payments, provision of home-based services and source of knowledge of TBS practitioners; and views on possible collaboration between modern and TBS practice as presented below.

Orthopedic surgeons' perceptions towards traditional bone setting practice

The orthopedic surgeon participants explained that most of the experience and knowledge regarding TBS practice came while they were on duty in different parts of the country, through actual encounters with patients and interaction with the community. Nevertheless, they also came to know about the TBS practice through personal experience and through family members who visited traditional bone setters, called *Wogesha* in Amharic. The quotes below are indicative of the common use of traditional bone setting practice among these study participants' circles including about possible mishaps clients may encounter.

> *"Oh, I have relatives who are living very far away…I go on vacation with them … and I observed that they use the traditional bone setting for their health care*

needs" (Physician #4)

"Yes, there are many of them. I think there is a daughter of a family that I know closely. She is now 10 or 12 years old, and when she was a child, her arm was broken, and the traditional treatment she received was Wogesha. She was lucky and her arm was not amputated…but now her arm is bent." (Physician #5)

Some orthopedic surgeon participants reported patient complications that they encountered after being treated by the TBS practitioners, especially for certain procedures in pediatrics as depicted by the following quote.

"If the provided treatment for conditions such as fracture is not appropriate, it will cause chronic pain and swelling at the site." (Physician #5)

Some of the participants have also cited concerns about the role of the mass media; which is considered a credible source of information by society, in broadcasting 'misleading' advertisements by the traditional bone setters regarding their practice. Another concern relates to the views of influential personalities that were supportive of the TBS practice that was however not evidence-based. These two ideas are depicted by the following quotes.

"On different occasions in the last 6/7 months, a Wogesha came and advertised on television explaining it is very healing." (Physician #5)
"…Because of lack of knowledge, attitudes from responsible bodies are also becoming a barrier in policy-making, implementation as well as monitoring of traditional medicine especially bone setting practice… (Workshop participant #1)

Workshop participants have recommended that higher educational institution curricula in health programs be revised to be accommodative of concepts related to Ethiopian traditional medicine including TBS practice.

"…Since we have learned in the conventional education system our perception towards traditional medicine is negatively biased. If the education system could address the relevant traditional medicine aspects, it can serve as a cornerstone for future learners…" (Workshop participant # 4)

Reasons for community preference to use TBS services

The majority of the orthopedic surgeon participants indicated that the community preferred to use TBS services rather than the allopathic orthopedic treatment based on the nature of the condition to be treated, previous experience, family influence, and availability of services among others as illustrated by the following quotes.

"…What I have now become convinced of is that everyone, especially those who have had a very shocking accident and have not had to make a decision, or who have been treated by their family or themselves in the past, has the confidence to believe in traditional medicine." (Physician #1)

"The community member believes that he should go to the Wogesha, where his whole family has been treated, and that's the traditional treatment, so it's easier for an older person to go to a place that someone is used to…The current generation, instead of visiting a doctor…it's easier to believe what his best friend, a villager, and his family say." (Physician, #6)

This view regarding community acceptance is supported by the TBS practitioners who explained that the community had a positive understanding and attitude towards TBS practice which led to using their services from near and afar as depicted by the following quote.

"The people from the countryside and the city respect me and traditional bone setting practice, they come, heal, and leave." (TBS practitioner #1)

Traditional bone setters' practice
Materials used by the TBS practitioners

The TBS practitioners explained the different items and facilities used while serving their patients to keep the injured bone from further damage or to facilitate their work in the healing process such as cardboard, bamboo, abujedi, bandage, and vaseline as depicted by the quote below.

"I use tape, cardboard, Abujade (type of cloth), bandage and the most important one is bamboo. There are many different types of bandages." (TBS practitioner, #6)

The TBS practitioners further explained how they provide further recommendations and precautions to their clients as part of the treatment and appoint them for further follow-up as depicted in the following quotes.

"Nutrition has a big role in traditional bone setting healing process" (TBS practitioner #5)
"… It takes from six to12 months to recover, depending on the degree of damage and the

location of the damage." (TBS practitioner #6)

Some of the physicians also reported how the TBS practitioners utilized modern technology as depicted in the following quote.

> *"They do x-rays, physiotherapy, they have a massage room, they have beds, they have three, four rooms, they have double access." (Physician #1)*

Views on the payments for TBS services

The traditional bone setters and the physicians had different points of view on the payments paid by clients. The traditional bone setter participants believed that the payment for their services depended on the condition treated but was considered affordable to the community and that they would accept whatever their clients considered was adequate for their services. The physician participants on the other hand related as to how they believed the payments asked by these TBS practitioners were high and unaffordable. These differing points are depicted by the following quotes.

> *"I accept whatever they have given me" (TBS practitioner #3)*
> *"We are told that these people will come after paying a lot" (Physician #7)*

Provision of home-based services

One of the peculiar natures of the TBS practice is its flexibility to provide home-based services to those patients who have limited mobility as depicted below.

> *'...Many people are home patients with many injuries, for example, they cannot stand up and walk, and even if they try to get in and out of the car, they will cry even if they try to move. Therefore, we treat it at home so that it doesn't get worse." (TBS practitioner #6)*

Source of knowledge for traditional bone setting practice

The source of knowledge and skill for the TBS practitioners was mostly from a parent to a child but also others to which one is close through apprenticeship as described by the following quote.

> *"There was a woman, an older woman, I used to live with her, and I took the experience from her." (TBS practitioner #5)*

The connection of traditional medicine to spiritual processes was also raised by some participants as described below although most TBS practitioners stated that TBS practice was just a practice acquired from elders and not related to any spirituality.

> *"I pray, and I think that God will help me" (TBS practitioner #2)*

Collaboration ideas between allopathic and traditional bone-setting practice

The idea of collaboration between TBS and modern healthcare to provide better care for the community was looked upon positively by some of the participants. From the TBS practitioners' side, participants cited collaboration in getting access to training to modernize their practice, offer complementary services, and refer complicated cases as depicted by the following quotes.

> *"... I believe that a complete treatment cannot be found, because traditional medicine has its expertise and wisdom, and scientific medicine has its way." (TBS practitioner #6)*
> *"...There are many injuries that are beyond my control; we are sending to the hospital" (TBS practitioner #4)*

The physician participants were mostly skeptical about the possibility of collaborations citing mostly the TBS practitioners' lack of expertise and lack of accountability as depicted below.

> *"I don't think it will help at all with the orthopedics...because they (TBS practitioners) can't know the insides of the whole human anatomy the same way we do...so I don't think it's going to help in any way." (Physician #1)*
> *"...so, unless there is some accountability, some training unless they can become a legal body, it is not good to work." (Physician #7)*

The perspectives of the policymakers concerning the issue of collaboration were expressed during the workshop about the strategic plan of the regulatory authority as follows.

> *"...As a regulatory we have developed a strategic plan for integration of the TBS and allopathic medicine to be implemented in the coming 3 years, especially in rural areas of Ethiopia..." (Workshop participant #1)*

Discussion

Findings from the present study indicated the community acceptance of the TBS practice but also concerns about its safety. In addition, the findings have revealed the common materials used in the TBS and common source of knowledge which was mainly through apprenticeship with close relatives or others. With regards to the possibility of collaboration, positive outlooks were expressed although issues were raised on the need for training and to ensure accountability on the part of the TBS practitioners.

The findings from the present study indicated the acceptance of TBS practitioners among the community as described by both the TBS and orthopedic practi-

tioners. This view is supported by local studies conducted in different parts of Ethiopia among both community members and admitted patients, whereby high levels of preference were reported (3). The findings of other studies from Sudan and Nigeria support this view of community acceptance of TBS services (4-10). A review paper has reported the acknowledgment of the value of TBS practitioners by orthopedic practitioners in rural developing nations for their capacity to provide a low-cost and culturally acceptable alternative to treat common orthopedic and trauma conditions (11).

Different reasons such as family influence, cultural acceptance, affordability, availability, and flexibility to provide home-based services seem to have contributed to the community's inclination toward TBS rather than allopathic orthopedic clinics (12). The findings from a local study reported similar reasons for preferring TBS services such as lower cost, quick services, availability, and family influence (13). Findings of studies from Sudan and Nigeria similarly reported cultural beliefs, low cost, easy accessibility, quick services, attitude of health workers, delay in hospitals, fear of plaster, operation or amputation, and family and friends' influence, among reasons to patronize TBS practitioners (9, 10, 14).

The source of knowledge in TBS practice in the present study seems to be from parents to children and through apprenticeship. This finding is similar to that reported from Tanzania where the source of knowledge for TBS practice was through passage from parents to children and apprenticeship with male neighbors (8, 12). This mode of acquisition of knowledge could limit transfer or even lead to loss of this indigenous knowledge to the next generation which calls for policy intervention to preserve the beneficial aspects of TBS practice.

Findings from this study revealed the use of mostly traditional materials such as bamboo and prescribed nutrition but also make use of modern ones such as Vaseline, bandages, and even X-rays among some TBS practitioners. Studies reporting in the context of developing countries have reported the use of splints and bamboo sticks, cloth, herbal medicines, animal hide, analgesics for pain, and supplies such as disposable gloves, topical antiseptic and sterile cotton, and gauze for wound care in TBS practices (3, 8, 10, 15). The reviewed studies also revealed the use of massage as a common procedure during TBS practices (10, 15) with similar practices implied in the present study.

Despite the community acceptance and advantages related to TBS practice, safety concerns were raised by the allopathic professional participants including serious complications in pediatric patients. Studies have similarly reported different complications such as malunion and nonunion from lack of radiographic imaging or proper reduction, compartment syndrome and gangrene from constrictive immobilization, and infection and tetanus from lack of sterility, lack of prophylaxis, and scarification (4, 16-18). Some of these complications arising from TBS practice were apparently due to the practitioner's lack of knowledge of the risks associated with procedures and their reclusive nature (19). Another study reported how most of these complications associated with TBS practice were preventable conditions if diagnosed early (20). These issues seem to be modifiable if the traditional and allopathic practitioners collaborate in the interest of enhancing community access to orthopedic care while minimizing harm.

Collaboration was viewed positively from the TBS practitioners' side with the interest to access training, offer complementary services, and referral of complicated cases but skeptically by orthopedic surgeons' citing the former's lack of expertise and accountability. A local study has described how training in collaboration with local leaders has led to a significant decrease in both the number of gangrenous limbs requiring amputations and the total number of amputations in a two-year prospective trial period (19). Findings from other developing countries context including Africa similarly recommend training to these TBS practitioners in the basics of orthopedic care, sterile techniques, and others that would enable access to safe primary orthopedic care to the majority of the population (11, 15, 21).

The concerns of the orthopedic surgeon participants go beyond the lack of expertise and raise the issue of accountability for the TBS practice which cannot be addressed by training alone. Literature from the developing world reveals interests and strategies to integrate these practitioners into primary healthcare similar to that attempted with traditional birth attendants in obstetrics care in light of the huge patronage to the TBS practitioners on the one hand and the scarcity of orthopedic surgeons. Accordingly, a system to identify, train, certify, and regulate the TBS practice was one approach suggested to integrate these practitioners into the health system to improve their practice and ensure patient health outcomes (11, 15, 21). This approach has been indicated as a strategic direction of the Ethiopian government explicitly citing registration, licensing, and integration of traditional medical practices into the healthcare system although details have not been provided (27).

These and other recommendations for integration of traditional medicine including TBS practice into the formal healthcare system require the need for a collaborative spirit and prioritize the health needs of society. They also require active interventions to bridge the mistrust that seems apparent between the TBS practitioners and the orthopedic surgeons (15, 21). Some of these interventions such as creating forums and meet-

ings can be organized by willing practitioners while a more sustainable approach would require a policy -level intervention similar to the one indicated by the workshop participant from the regulatory body. Additional research into the practice and of the different stakeholders including the TBS clients is however required to further understand the different perspectives.

Conclusion

It was apparent from the present study that the TBS practice enjoyed community acceptance, although serious safety concerns were expressed by the orthopedic surgeons. The collaborations that were hinted at by the TBS practitioners such as access to training, provision of complementary services, and referrals to the allopathic healthcare system could address some of the concerns. This in turn requires the interventions of both groups of practitioners but also of the policy makers to build trust and collaboration to better serve society. In addition, further research to explore the perspectives of the different stakeholders is recommended.

Abbreviation: TBS: Traditional bone setting

Consent for publication: Written informed consent for each key informant was taken while collecting data, identification number was not included. No videos or images specific to participants were included in the collected data.

Availability of data and materials: The raw data used for this research can be accessed upon reasonable request from the corresponding author.

Competing interests: All the authors declared no competing interests.

Funding: Women Research Fund, Addis Ababa University.

Authors' contributions: EKM, BMH, BLW, and MYY were involved in the conceptualization and design of the study. EKM carried out the interviews, the transcription, and coding. EKM and BMH were involved in the analysis of the interviews with BLW and MYY commenting on the analysis. EKM drafted the manuscript, and all the others revised it. All authors read and approved the final manuscript.

Acknowledgments: The authors would like to thank the Orthopedic Clinic and the School of Pharmacy, CHS, AAU for facilitating this study, the traditional bone setters and physician orthopedic practitioners, as well as the workshop participants who willingly participated in this research.

Reference

1. Colorafi KJ, Evans B. Qualitative descriptive methods in health science research. HERD: Health Environments Research & Design Journal. 2016;9(4):16-25.
2. Braun V, Clarke V. Reflecting on reflexive thematic analysis. Qualitative research in sport, exercise and health. 2019;11(4):589-97.
3. Endeshaw BA, Belay W, Gete A, Bogale KA, Wubeshet B, Azene AG, et al. Traditional bone setting service users and associated factors among people with trauma in Mecha district, Ethiopia. BMC Complementary Medicine and Therapies. 2023;23(1):1-9.
4. A EL Hag MI, M EL Hag OB. Complications in fractures treated by traditional bonesetters in Khartoum, Sudan. Khartoum Medical Journal. 2012;3(1).
5. Abia OH, Eyoma O. Review of traditional bone setting in Calabar Metropolis, Cross River State, Nigeria. Int J So. 2017;11(1):126-34.
6. Bassey R, Aquaisua A, Edagha I, Peters I, Bassey E. The practice of traditional bone setting in the south-south region of Nigeria. Internet J Altern Med. 2009;8(2):2-7.
7. Dada A, Yinusa W, Giwa S. Review of the practice of traditional bone setting in Nigeria. African health sciences. 2011;11(2).
8. Odatuwa-Omagbemi DO, Enemudo RE, Enamine SE, Esezobor EE. Traditional bone setting in the Niger Delta region of Nigeria. Nigerian Journal of Medicine. 2014;23(2):157-61.
9. Idris SA, Mohammed OB, Basheer ES. Why do people prefer traditional bonesetters in Sudan? Sudan Journal of Medical Sciences. 2010;5(3):199-206.
10. Owumi B, Taiwo PA, Olorunnisola A. Utilization of traditional bone-setters in the treatment of bone fracture in Ibadan North Local Government. International Journal of Humanities and Social Science Invention. 2013;2(5):47-57.
11. Agarwal A, Agarwal R. The practice and tradition of bonesetting. Education for Health. 2010;23(1):225.
12. Card EB, Obayemi JE, Shirima O, Lazaro M, Massawe H, Stanifer JW, et al. Practices and Perspectives of Traditional Bone Setters in Northern Tanzania. Annals of Global Health. 2020.

13. Worku N, Tewelde T, Abdissa B, Merga H. Preference of Traditional Bone Setting and associated factors among trauma patients with fracture at Black Lion Hospital in Addis Ababa, Ethiopia: institution based cross sectional study. BMC Research Notes. 2019;12:1-6.
14. Aderibigbe S, Agaja S, Bamidele J. Determinants of utilization of traditional bone setters in Ilorin, north central Nigeria. Journal of preventive medicine and hygiene. 2013;54(1):35.
15. Card EB, Obayemi JE, Shirima O, Lazaro M, Massawe H, Stanifer JW, et al. Practices and perspectives of traditional bone setters in northern Tanzania. Annals of Global Health. 2020;86(1).
16. Kumma WP, Kabalo BY, Woticha EW. Complications of fracture treatment by traditional bone setters in Wolaita Sodo, southern Ethiopia. J Biol. 2013;3(12):1.
17. Kuubiere B, Abass A, Mustapha I. Fracture complications after treatment by traditional bone setters in Northern Ghana. Adv Appl Sci Res. 2013;4(6):207-11.
18. OlaOlorun D, Oladiran I, Adeniran A. Complications of fracture treatment by traditional bonesetters in southwest Nigeria. Family practice. 2001;18(6):635-7.
19. Eshete M. The prevention of traditional bone setter's gangrene. The Journal of Bone & Joint Surgery British Volume. 2005;87(1):102-3.
20. Yasin SM, Ayana B, Bezabih B, Wamisho BL. Causes of pediatric limb amputations at Tikur Anbessa Specialized Hospital and the role of traditional bone setters ("Wogeshas"). Infection. 2018;2:2.0.
21. Onyemaechi NO, Itanyi IU, Ossai PO, Ezeanolue EE. Can traditional bonesetters become trained technicians? Feasibility study among a cohort of Nigerian traditional bonesetters. Human Resources for Health. 2020;18 (1):1-8.