

ORIGINAL RESEARCH

Traditional bonesetting practices in the Northwest Region of Cameroon

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Abstract

Background

This study aimed to highlight the practice and dangers inherent in the practice of traditional bone setting in North- Western, Cameroon by traditional bone setters.

Methods

Interviews using questionnaires were administered to owners of traditional bone centers and their clients respectively. Five (5) of such centers were visited in Kumbo –Nso and their environs in the North-western region of Cameroon.

Results

All the traditional bonesetters had little or no formal education. All of them claimed ancestral/supernatural inheritance of the trade and do not want to disclose any secret. There was complete lack of knowledge of anatomy, physiology, complications, investigations and wound care. Advice of relatives and friends, as seen in 75 (30.6%) patients, was the most common reason for TBS patronage. Other reasons were cheaper cost (number [n]=60; 224.5%), sociocultural belief (n=35; 14.3%), easy accessibility (n=30; 12.4%), fear of amputation (n=25; 10.2%), and fear of operation (n=20; 8.2%). There was no correlation between these factors and age, marital status, occupation, and educational status (P=0.681). Ninety (36.7%) patients believed TBS were not useful, a nuisance (n=60; 24.6%), useful (n= 75; 30.7%), or indispensable (n=25; 10.3%). The opinion of patients about the outcome of TBS practice was: excellent (n= 72; 29.5%), good (n=113; 46.2%), acceptable (n=44; 17.8%) and poor (n=16; 6.5%).

Conclusions

The study established that traditional bonesetters enjoy a high patronage and confidence by the Cameroonians in general despite growing concerns by the biomedical practitioners. There is an urgent need for collaboration and integration of the traditional medicine and biomedical practices as advocated by the World Health Organization; so as to harness the gains by all and sundry. Functional health insurance for all citizens is mandatory. Patients who are misguided by false beliefs can be better educated by public enlightenment.

Keywords: bone fractures, traditional medicine, allopathic medicine, health-seeking behaviour, Cameroon

Introduction

In many developing countries, the traditional care of diseases and afflictions remain popular despite civilization and the existence of modern health care services[1,2]. Traditional healer can be defined as one who is recognized by his/her community as competent enough to provide health-care by using herbs, animal and mineral substances, or other methods. These methods are based on social, cultural and religious principles, including knowledge, attitudes and beliefs regarding the physical, mental and social well-being that are prevalent in their community. Some traditional healer have specialized in treating fractures and dislocations, and are

therefore called bonesetters [3-5]. Traditional bone setting is a known procedure among Africans, although it is associated with complications, such as pain, gangrene, mal-union, non-union, joint stiffness and infections, people prefer this method of treating fractures [6]. In Cameroon, the traditional bonesetters [TBS] perhaps more than any other group of traditional care-givers enjoy high patronage and confidence by the society [2,7]. Indeed, the patronage of this service cuts across every strata of the society including the educated and the rich [8]. This continued use of TBS by Africans is based on the belief that it is cheaper, more available and results in faster healing than

orthodox measures [2, 6, 8, 9]. Many reasons account for this patronage of TBS including the belief that diseases and accidents have spiritual components that need to be tackled along with treatment [10]. The age of their clients vary from the newborn with musculoskeletal deformity to the very elderly with fractures [6]. The commonest problems treated by them are fractures and dislocations [6, 11- 14]. The practice is wide-spread in Cameroon including areas well served with healthcare facilities such as Douala, Yaoundé and Bamenda [6, 7]. However, the outcome of their intervention in trauma care often leads to loss of limbs, lifelong deformities and sometimes death which therefore remain an issue of public health importance [15, 16].

Historically, in 1978, during the World Health Organization [WHO] conference on Primary Health Care in Alma Ata, it was recognized that besides biomedical healthcare, Traditional Medicine and complementary medicine existed, which was widely available and quite affordable. The Alma Ata report suggested that cooperation could contribute to improving access to healthcare. In furtherance of this goal, WHO has been active in creating strategies, guidelines and standards of botanical medicines [17-20]. In this respect, there is a growing concern by the WHO for integration of the Traditional Medicine (TM) and the Orthodox (Modern) Medicine when it announced “integrative” plus developments in India and China late in 2017. The global scenario illustrates vividly both promise and challenges presented by the TM. In Cameroon and other developing countries in Africa, this call for integration underscores the importance of TM based on availability, accessibility, affordability and acceptability proposed by the Four As Model as factors influencing health - seeking behavior [21].

The main objective of this study was to highlight experience with traditional bone setting in the Northwestern region of Cameroon. The specific objective was to explore patients' reasons for choosing between fracture treatment by either a hospital or a bonesetter in Northwestern Cameroon. We also tried to unravel the main factors that influenced their decision-making process. To get more in-depth information about fracture treatment by bonesetters, patients were asked to describe their treatment, experience and outcome.

Methods

Study Design

This study was a retrospective and qualitative review of the practice of TBSs in the Northwestern part of Cameroon. Using proforma, in-depth interviews and direct observation. All patients agreed to take part in the research.

Study Setting

The study was a community based study conducted in randomly selected five (5) traditional bone setting centers (TBC) in Kumbo- Nso and their environs within the Northwestern region of Cameroon. The selected traditional bonesetter facilities were located in 1. Kumbo, 2. Shishong, 3.

Ndu, 4. Oku, and 5. Ndop. The TBCs are located in a predominantly rural community with a teeming population of about 2million people, distance of about 30kilometer radius. There are few district hospitals and health centers which are supported by some mission hospitals. The coordination of this study was carried out at St Elizabeth Catholic General Hospital, located in Shisong, which is a 250 bedded hospital is one of the three surgical referral centers for the surrounding district hospitals, with emphasis on trauma care. Traditional medicine is commonly used, as is reflected by the large number of traditional healers in the district

Patients

The study was conducted in November 2017. Questionnaires were administered by a medical social worker and an orthopedic technician to both the TBS and clients. The medium of communication were English language, Pidgin English and local dialects through an interpreter. Parameters on the questionnaire included the biodata, years of experience, reason for patronage of TBS, methods of pain relief and assessment of outcome of treatment. The TBS among other things also answered, questions relating to their trade (*types of fractures treated, method of fracture treatment, types of complications and number of death recorded, class of people who come for treatment, mode of referrals to and from hospitals*), mode of acquisition of knowledge and assistance needed to improve their practice as well as ways to improve cooperation between TBS and orthodox practitioners.

Data collection and analysis

Thus, the purposive and snowball sampling techniques were used. First, bonesetter centers were identified by the researcher and snowballing technique was used to identify subsequent respondents/interviewees. Although patients were not evenly distributed in the centers identified, the available number of patients that a clinic can catered for within the period of the study was all selected. Patients in the clinics range between three and twenty-five. Both quantitative and qualitative methods were used to collect the necessary data. For the quantitative research method, Two hundred and fifty (250) copies of questionnaires were administered among patients in five traditional bonesetter's clinics that were identified and visited out of which Two hundred forty-seven (245) copies were retrieved for analysis, while the in-depth interview was conducted with traditional bonesetter practitioners in the five centers and fifteen patients that were visited. Quantitative data was presented using descriptive statistical tools like tables, percentages, frequency distributions and bar charts, while qualitative data was content analyzed.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethical Committee. Confidentiality was ensured by not writing the names of patients on proforma. Participant was given the right to decline from the study at any stage should he/she found it uncomfortable to continue. The study did not cause any harm to the participants in the process of admin-

Table 1. Demographic characteristics

GENDER	FREQUENCY	PERCENTAGE (%)
Male	196	80
Female	49	20
Total	245	100%
AGE(YEARS)	FREQUENCY	PERCENTAGE (%)
≤ 20	24.5	10
21-30	61.3	25
31-40	61.3	25
41-50	41.6	17
51-60	34.2	14
60 and above	22.1	9
Total	245.0	100%
EDUCATIONAL LEVEL	FREQUENCY	PERCENTAGE (%)
No formal schooling	25	10.0
Primary school	48	19.6
Secondary school	46	18.6
Higher secondary School	72	29.7
Tertiary School	54	22.1
Total	245	100%
OCCUPATION	FREQUENCY	PERCENTAGE
Motor cyclist	86	35
Civil servants	26	10.6
Students	17	7.0
Self employed	19	7.8
Farmers	22	9.0
Businessman	20	8.0
Housewife	17	7.0
Soldiers	14	6.0
Others	24	9.6
Total	245	100%
RELIGION	FREQUENCY	PERCENTAGE (%)
Christianity	110	45
Muslim	74	30
Traditional belief	49	20
Atheist	12	5
Total	245	100%

istering questionnaire and in-depth interviews. The participation of the respondents in the study was entirely voluntary.

Reporting

The STROBE guidelines were used in reporting this study [22].

Results

Two- hundred and forty-five respondents comprising essentially trauma patients from five (5) traditional bone centers (TBC) were involved in this study. Male/female ratio of the respondents was about 4:1 (196:49). Age ranged between 15 and 72 years (mean \pm SD was 35.44 \pm 3.71).

One hundred and forty-seven (60%) of the clients were youths aged between 21 and 40 years. Demographic and other characteristics of the clients are presented in Tables 1 and 2. The distribution of participants according to their educational status was varying. The findings showed that few of the respondents were not educated. Education level found to be of no role in the preference of treatment selection. 45% of the participants that were Christians still preferred to be treated by TBSs while 48% from rural descent preferred to be treated by TBSs.

Forms of pain relief used by the TBS included mixture of herbs (Figure 4 & 5) and pharmaceutical agents in 74 (30%) while 171 (70%) had no analgesics. The result of treatment was assessed as satisfactory by all (100%) the clients and practitioners. All the TBS and majority of their clients claimed that traditional bone setting is more effective. All of the 5 TBS cooperated well and responded to our questions. Four Head of TBCs claimed that traditional bone setting is mostly a family practice except one who acquired his skills strictly through apprenticeship. All of them used pulling/massage, herbal bandage and wooden splints during the process (Figure 3). Only 3 had knowledge of the existence/importance of orthodox fracture treatment. Two were willing to refer patients to hospitals but all claimed that investigations such as X-rays are not necessary. Four of the bone set-

Table 2. Factors driving patients to seek traditional bonesetters

FACTOR	FREQUENCY	PERCENT %
Advise of relatives	75	30.6
Sociocultural beliefs	35	14.3
Cheaper cost of treatment	60	24.5
Fear of operation	20	08.2
Fear of amputation	25	10.2
Easy accessibility	30	12.2
TOTAL	245	100

Table 3. Traditional bonesetter treatment outcomes

OUTCOME	FREQUENCY	PERCENTAGES
POOR	16	6.5
ACCEPTABLE	44	17.8
GOOD	113	46.2
EXCELLENT	72	29.5
TOTAL	245	100%

ters were males and one female, all aged >42 years; One had no formal education, 2 primary education and 2 secondary education. 38% of the participants from urban community preferred to be treated by TBSs while 48% from rural descent preferred to be treated by TBSs, $P=0.021$.

Advice of relatives and friends, as seen in 75 (30.6%) patients, was the most common reason for TBS patronage. Other reasons were cheaper cost (number [n] =60; 24.5%), sociocultural belief (n=35; 14.3%), easy accessibility (n=30; 12.4%), fear of amputation (n=25; 10.2%), and fear of operation (n=20; 8.2%) (Table 2). There was no correlation between these factors and age, marital status, occupation, and educational status ($P=0.681$).

Ninety (36.7%) patients believed TBS were not useful, a nuisance (n=60; 24.6%), useful (n= 75; 30.7%), or indispensable (n=25; 10.3%). Among those with a history of treatment by TBS, their TBS diagnosis was; dislocation (n=123; 50%), fracture (n=74; 30%), sprain (n=37; 15%) (Figure 2). The opinion of patients about the outcome of TBS practice was: excellent (n= 72; 29.5%), good (n=113; 46.2%), acceptable (n=44; 17.8%) and poor (n=16; 6.5%) (Table 3).

Sex and Age Range of Respondents

At the five Bone-setting centers (TBCs), fifteen patients were interviewed. Eight patients were female while seven patients were male. Furthermore, ten patients were within 30-59 years, while the other five patients were above 60 years. Table 1 is the distribution of respondents' socio-demographic characteristics.

Level of Education of Respondents

According to the Cameroon report of 2015, in the Northwestern Region, illiteracy levels are generally high (75%). The situation appears to have trickled down to the TBCs as five patients have never been to school while two patients and one patient had basic and tertiary levels of education respectively while Table 1 shows the level of education of respondents at the TBC.

Occupations of Respondents

Patients at the TBCs are engaged in diverse economics activities. However, farming was predominant, as four patients were farmers while others were artisans work and petty traders as seen in Table 1. Majority of the patients were predominantly engaged in low income activities.

Hierarchy of Bonesetters and Succession Plan

According to the Head of Bonesetters at the Oku Center, the overall head of the TBC is the Head of the Ndifon family, who does not have any skills in bone setting and hence is not a practitioner of bone setting. However, at the Shisong TBC, a 55-year old School Certificate holder is the Head of Bonesetters at the Centre, while there are eight others at the Centre. Among the eight other bonesetters, three are full practitioners, while five are assisting and also undergoing training. In event of incapacitation of the Head of Bone setters, the family would nominate one of the three Bonesetters to take over the headship.

Recruitment of New Traditional Bonesetters

On recruitment of new bonesetters to join the Team of Bonesetters, the Head of Bonesetters informed that from time to time younger members of the Ndifon Family are selected to join the team of bonesetters. These young ones learn the art of bone setting by initially observing the way the bonesetters treat patients at the Center and later assisting to set bones until they become well equipped to set bones themselves. "That is how we all learnt how to set bones" (Male, 49 years old, Head of Bonesetters). However like the other centers, to qualify to learn the art, you must be a member of the Ndifon family. This finding supports reports that traditional bone setting is mostly a family practice [6, 22-24]. Consequently, one cannot acquire the skill by apprenticeship at the Centre as opined by [6, 23-25].

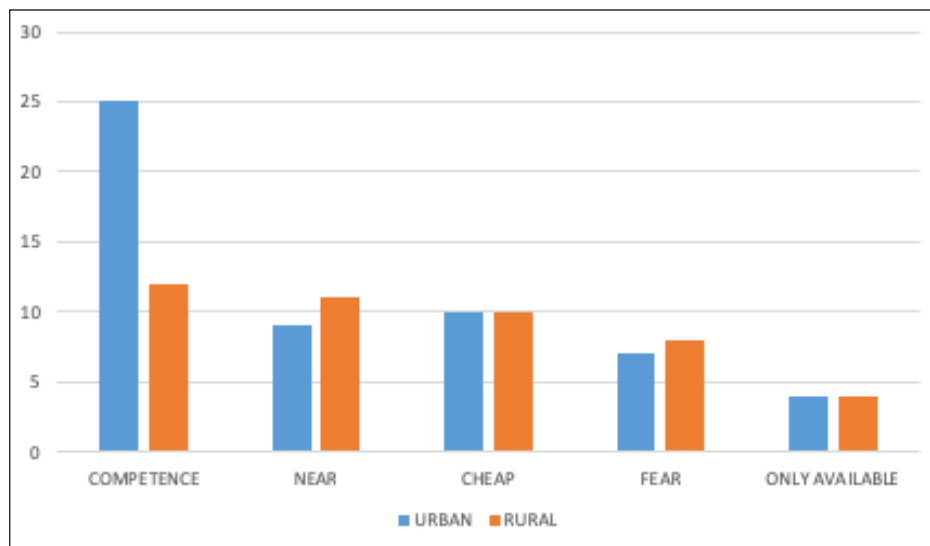


Figure 1. Reasons for preference of traditional bonesetters among the general population

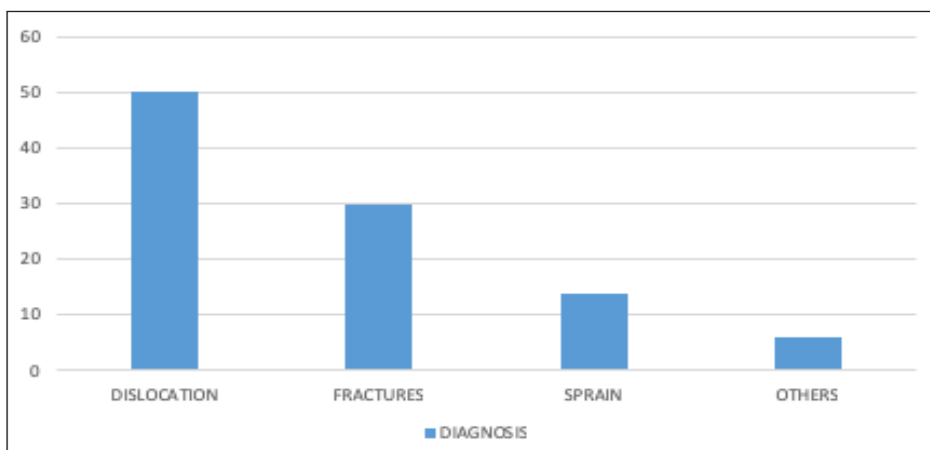


Figure 2. Injuries treated as reported by previous traditional bonesetter clients

Traditional Bone Setting Knowledge Base, Attitudes and Practices and Strategies

The Head of Bonesetters at the Ndop Bone -setting Centre informed that the knowledge, skills and ideas regarding bone setting are acquired through experiential learning. According to him, he started learning how to set bones when he was young, alongside attending school. But along the line he travelled to Douala for greener pasture. In 1999 he travelled home to visit his father, who was the Head of Bonesetters and realized that his father was old. As a result he decided to stay back home. When he stayed back, he claimed that: “so I always come out to sit [here] and watch what they are doing, asking questions; why not do it this way or that way? Until I became used to it [bone setting] and decided to go into it”. Thus by observing his father and uncles treat fractured and dislocated limbs the Bonesetter acquired the knowledge as well as skills, attitudes and strategies; the repertoire of bone setting.

Preparation of Materials for Treatment and Treatment Sessions

At the Centre, both open and close wounds are treated. With regards to materials used for treatment, a head of bonesetters at the Centre disclosed that only one herb is used for treatment. The herb is gotten from a local tree known as ‘sheyshey’, which is located at a particular place, and a black substance prepared from a local tree known as ‘mbdzenfeng’. The bark is harvested, boiled and then used to massage the affected area while sheyshey is cultivated near the Centre as seen in Figure 4-7. Commenting on the use of substances in traditional bone setting, a medical director contended that: “TBS practice also leads to infections because they put black substances into wounds.” In relation to treatment procedures, the Head of the Centre informed that: first of all the affected area is massaged with the boiled herbs and if there are particles of bones in the flesh, they have to be removed because



Figure 3. Splinting and bandaging of a fracture by a traditional bonesetter



Figure 4. Herbal concoction blended into a cream

the flesh would not heal if there are any broken bones inside it. And if there is an open wound, you apply a paste made of procaine mixed with shea butter into the sore before applying a splint and then tie it up.

Commenting on modifications made to treatment at the Centre since he assumed headship, the Bonesetter claimed that: *“when I was a school boy, no matter how dangerous it [wound] was, they [Bonesetters] used shea butter. But now that the world is advanced, we try to adopt orthodox medicine... things like Procaine, pain killers and other things. We just have to mash our shea butter, open this procaine, pour it into the shea butter, and mix it. So that after massaging the sore, you just apply the paste on cotton wool and cover the sore before you put your substances to tie it.”* From discussions in this section, the fact that the head of bonesetters in this Centre is educated seems to have tremendous effect on practices at the Centre as well as information given about the practice of bone setting at the center.

Hygiene Level of Materials

According to the Head of Bonesetters, the Bonesetters at the Centre are aware of vulnerability of open wounds to infections, including human immunodeficiency syndrome (HIV)/acquired immune deficiency syndrome (AIDS) as a result of two different sessions of training they have attended in the past. These training sessions were organized by the National Directorate of Health Service and Regional delegation of health. Consequently, the herbs, paste and other materials used for treatment at the Centre are prepared under hygienic conditions. Antiseptics are used to disinfect instruments used to treat one person before they are used to treat another person. Gloves are worn before attending to patients with open wounds. Interestingly however, *interactions with patients revealed otherwise; five patients were of the view that materials used for treatment at the Centre are not hygienic, while three patients opined that materials used for treatment are hygienic.*

Supporting his assertion that materials used for treatment are hygienic, a 58-year old farmer who has not been to school stated that: *“the water is clean; and that is what they use to cook the herbs, prepare other substances and massage us”.* Yet a view that was eminent was the use of the same facilities for treatment and other domestic purposes, including culinary activities.

Explaining what he meant by unhygienic practices, a 30-year old tertiary school leaver and an accountant asserted that: *“they [bonesetters] are lacking some facilities; for example, hand gloves; they use one towel for all the patients; the very buckets used for treatment and washing the bandages are used to wash cooking utensils...items are not sterilized. If health workers could come and educate the Bonesetters on hygiene, it would help.”*



Figure 5. Herbal alcohol analgesic cocktail used by traditional bones setters

Factors Influencing Patients' Decision to Seek Treatment by Traditional Bone Setting

As regards factors considered before opting for treatment by traditional bone setting as shown in figure 1, all (eight) respondents claimed that they considered efficacy of TBS at the Center. Consequently factors such as cost, distance and socio-cultural factors as proposed by the Health Belief Model (HBM), [21, 26] and availability, accessibility, affordability and acceptability proposed by the Four As Model as factors influencing health-seeking behavior [21] do not apply in this case. However, it is instructive to note that five respondents had their injuries within the Northwestern region of Cameroon; two respondents had their injuries in other parts of the Southwestern and only one respondent had the injury elsewhere in the Northern Region of Cameroon. As a result, factors such as availability and accessibility as proposed by the Four As Model and the Health Care Utilization Model cannot be ruled out entirely. In all four patients visited a modern health care facility prior to coming to the Bone-setting Center while the other four came to the Center right after the injury.

In attempt to find out why patients did not go to or left allopathic health care facility, diverse responses were obtained. A 29-year old female farmer who did not go to hospital before coming to the Center argued that: "I knew that this place [TBC] was better than the hospital". On his part, a 58-year old male farmer who came straight to the TBC after obtaining the injury claimed that: "prior to my accident I sent my son who had a broken arm to the hospital and they put Plaster of Paris (POP) on it. When he got healed, it was stiff . . . I did not want my leg to suffer the same thing that is why I came here."

Explaining the reason for his choice, a 36-year old leaver (of hospital) claimed that: "I went to the Bamenda Regional General Hospital but after several weeks my condition was deteriorating so I decided to ask for release and then I came here . . . My condition is improving only after three weeks."

Inherent in the views expressed above is the perception that bonesetters are better than the orthodox practitioners. This view supports the contention that: "The successes achieved in the area of orthopedics by traditional healers have been so amazing that even the western orthodox medical practitioners have had to acknowledge the fact that traditional bone setters are better." A similar account was reported by some authors [27, 28].

In relation to how the Kumbo TBC was chosen, three respondents informed that they chose the Centre based on advice from friends and relations while two respondents informed that their selection of the Center was based on previous experience. The finding here corroborates the idea of cues to action as proposed by the HBM. According to the HBM, action in health seeking is guided, among other things by cues to action, which includes previous experience and advice from friends and relations as quoted in the report by Hausmann-Muela in 2003 [21].

Patients' Perception of the Bone-setting Center Prior to Visit

Discussions revealed that before coming to the TBC, all respondents, with wide range of educational background perceived of the Bonesetters as effective in treating fractures and dislocations. Notable among reasons given is that the Bone-setting Centers have already attained wide popularity not only in the Northwestern Region but nationwide and beyond Cameroon. In his own words, a 30-year old contractor who had his accident in the Central Region claimed that: "even in Central Region of Cameroon Bone-setting practice is very popular; many people advised me to bring my injury here"

Experiences of Patients at the Bone-setting Center

All respondents claimed that they had pleasant encounters at the Center. For instance, three respondents described their experiences as excellent while five respondents described their experience at the Center as very good. Substantiating his assertion of excellent encounters at the Center, a 32-year old male tertiary school leaver and an accountant claimed that: "Bonesetters handle people here is really good; emotional stress is taken off before you are treated. When I came here I couldn't even stand up...now with the aid of crutches I can walk and even stretch my knee". A 30-year old contractor who described his experience at the Center as very good asserted that: "the Bonesetters are very cooperative and they care for us all; I am always happy". In this regard, the Bonesetters provide socially acceptable services to their clients.

Skills Level of Traditional Bonesetters

With regards to the level of skills of the Bonesetters, three patients opined that the Bonesetters are very competent, while



Figure 6. Traditional small gourds and amulets used as charms to ward off witches and wizards

five patients thought they are competent. Thus on a whole, all respondents were of the view that the Bonesetters are competent. Consequently, the level of education of respondents does not appear to influence assessment of the level of competence of TBSs at the Center. Justifying her view, a 35-year old female farmer contended that: *“they have the requisite skills”*. Other views expressed include remarkable improvement in injury situation since first visit to the Centre. A 60-year old visually impaired female farmer claimed that: *“they are very competent because I have experienced great improvement since I was brought here”*. The situation here totally agrees with the assertion by Onuminya in 2004 [6] that traditional bonesetters are considered the views of Hag et al [25] and Agarwal et al [20] who describe TBSs as quack, with no skills and ‘unqualified practitioner’ respectively. Hag and Hag et al [25] contend that *“TBSs develop their skills and experience by practice (trials and errors)”*. And indeed similar views were expressed by two directors of health. A medical director contended that: *“they use psychology to treat; they actually do try and error”*. Similarly, a director of health services argued that: *“they do try and error. After all, in first aid if you put splint on somebody and you tie and you leave the person over a period, the person recovers . . . having practiced for some time they would definitely have some skills.”*

Commenting on the skills level of TBSs, a medical director on his part asserted that: *“they inherit the practice without skills but since practice makes perfect, with time they get used to doing it...their practice sometimes lead to limb gangrene and amputations...they don’t know the difference between simple fracture which they can treat and complex ones which are beyond them.”*

What is interesting to note in the views expressed by Hag and Hag (2010), the Medical Director and the Director of Health Service interviewed is the fact that all of them do acknowledge that since TBSs practice for some time they do acquire some skills. This intimates that TBSs do have some

skills. Yet it points to the lack of regard by allopathic health care providers for traditional medicine. However, on his part, the 56 - year old Head of Bonesetters at the Centre contended that:

We [bonesetters] are the best; if people are discouraging [patronage of] traditional bone setting they are wrong because **one**: *“hospital says amputate but we say no”*; **two**: *“traditional bone setting heals faster than hospital... I will say we are better than hospital... TBSs have qualities. If we say traditional medicine is not good we are lying to ourselves. There are some bonesetters who are corrupt; assuming we were charging people...but we always want the truth. If you come with an old case and we see that we cannot treat it, we would tell you.”*

The view of the Bonesetter that their treatment heals faster supports the assertion that there is a belief among the general populace that traditional bone setting heals faster [29, 30]. In relation to concerns raised about unequal length in healed limbs; mal-union; nonunion; fixed knee flexion deformity and limb amputations raised by some authors [11, 24, 31-33]. Bonesetter further elaborated: *“We will never treat a person for the person to be deformed; deformation means that the bones were not well set. That is the main reason why every day we open it [wound] to observe so that if it is not correct we will correct it.”*

On death of patients at the Center, the Bonesetter informed that for some time now the Center has not recorded any. He explained further that: *“the rule here is that if we treat someone [for] three to four weeks and there is no improvement we refer the person to the hospital”*. Appraising the general performance of bonesetters at the Center, four patients said that general performance was excellent while the other four thought they were very good.



Figure 7. Traditional bonesetter on duty preparing an herbal concoction

Level of Satisfaction of Patients

On a whole, all (eight) respondents with diverse educational background described their level of satisfaction as satisfactory; four patients disclosed that they were very satisfied while four maintained that they were satisfied. Therefore the level of education of patients does not appear to have a linkage with the level of satisfaction of patients at the Center. At the time of the study, no patient at the Center was dissatisfied with the treatment and general conduct of the Bonesetters albeit concerns about the hygiene level of practices at the Centre as presented earlier on. The finding here corroborates the finding of Udosen et al [28,34] in a study of eight TBCs in Calabar in Nigeria where 100% of patients assessed their level of satisfaction as satisfactory.

Improving Quality of Services

In relation to quality of services rendered at the Center, three patients argued that there was the need to improve upon it. On the contrary, five patients maintained that quality of services offered at the Center was just enough and thus there was no need to improve upon it. All respondents who opined that there was the need to improve on quality of services were concerned with hygiene and not the method of treatment and the materials used for treatment. A 30-year old male Contractor explained that: *“especially the hygiene aspect needs improvement”*. On the part of the respondents who maintained that the quality of service was enough, it was not uncommon to hear: *“I think it is just sufficient because I am getting better”*. A 62-year old male farmer expatiated: *“because I am getting well I think there is nothing to improve upon here”*. The level of education of patients seems to have an effect on the opinion about quality of service rendered. For instance, three out of five respondents who had never had formal education maintained that there was no need to improve upon the quality of service rendered at the Center, while the only patient with tertiary level of education opined that there was the need to improve on the quality of services offered at the Center.

The Role of Spirituality in Traditional Bone Setting

Spirituality was adjudged to play very influential roles in collecting and preparing materials for treatment as well as the treatment and healing process of patients undergoing treatment at the Center as well demonstrated in Figure 4-7. On collecting one of the herbs, - ‘sheyshey’ a 55-year old head of Bonesetters at the Center asserted that: “it has a particular day, not that anytime at all you like you just go and cut and you start burning. Thus the idea of “auspicious timing” (COMPAS, 2007:83) applies here [35]. In bid to find out what would happen if they go for the herbs before the slated day, the Bonesetter said that: *“well, that one I cannot explain because this is what I saw... but we have tried it in another way: when we have a stock and see that it is about to finish, and yet it is not time to harvest, we normally harvest some, burn it and add it to the old one. That is the only way we can do it but if it is completely finished we have to wait for the date ...”*

In relation to preparations prior to going for the herbs, the Head of Bonesetters at the Centre informed that: *“when we are going for the herbs, we do not chant, sing or perform any rituals because there are no sacrifices under [in] this Bone-setting Centre. Even the fowl we collect, we don’t kill it; we don’t sacrifice it; we leave it”*.

The situation depicted here was equally supported the assertion by Dime (1995: 66), quoted in Peter (2003:3) [27] that: “. . . in many cases, when he goes to collect leaves or barks or roots of trees for his medicinal preparation, he performs some rituals he usually involves the spirit in the tree or herb, the breaks kolanuts and, at times cowries or money are offered to the spirits; he pours libation and at other times offers sacrifice. Yet the situation is contrary to the assertion of a 36 -year old female TBS that *“rituals are not needed to be performed because bonesetters are no fetish priests”* cited in (Aries et al, 2007:570) [19].

However, prior to commencement of treatment, the fowl that is offered as part of items required for treatment is given to the patient or his or her caretaker to make a wish on the fowl. Afterwards, an elder of the Centre would catch the fowl, get closer to the patient and spit on the ground and then the patient would also spit on the ground too. This is done three times for a male patient and four times for a female patient, and then the fowl is left to move about. And according to the Head of Bonesetters: Commenting on visions and trances as pertain elsewhere, the Bonesetter claimed that: “. . . and before I start the treatment what I say is: in the name of the Almighty Allah we see visions; we see visions in the sense that if you come with a broken limb and we tie it, in two, three days’ time, if there is a problem, there would be a sign, which is showing that there is a problem. We would force you to give us all your views and we will look through [analyze] all your views and solve the problem before your limb can be healed. Maybe you have disobeyed your husband . . . if you come and we do [treat] it, it would never work [heal].

Taboos Observed at the Centre

According to the Head of Bonesetters at the Center, there are no taboos for the medicine; apart from the fact that *sheyshey* is harvested at a specified time. However, on their part, while undergoing treatment at the Center patients, together with their caretakers have to strictly adhere to the taboo of no sexual intercourse. In attempt to find out why patients and their caretakers should not indulge in sexual relationship while at the Center, the 55-year old Bonesetter explained that: *“no sex because the Center came about as a result of rivalry between co-wives and the rivalry was over a man.”* In case of default, he asserted that: *if someone does that [sex] even in secret he or she would have to confess if not he or she would never get healed. And there are some rituals you would perform: you would buy a white ram, a white fowl and some money. But because we don't have juju to sacrifice, the elder just say in the name of Allah, read the Holy Quran and sacrifice it.*

Thus sacrifices are performed to appease god under certain circumstances. The views expressed here point to the fact that socio-cultural and religious background of the team of Bonesetters at the Center play instrumental role in their work at the Center.

Integrating Traditional Bone Setting into Primary Health Care System

This study discovered that there is some form of collaboration between the TBC and the Health Center at Ndu and the District Hospital in Oku. In relation to integrating the Center into modern health care system, views were varied. Five respondents opined that the Center should not be integrated with modern health care system. On the other hand, three respondents were of the view that the Centre should be integrated into modern health care system. Underscoring a case for no integration, a 30-year old Contractor maintained that: *“two masters cannot be in one ship; the modern health practitioners would want to control the traditional bonesetters.”* Another point for no integration was expressed by a 60-year old farmer as: *“if traditional bone setting is integrated into modern health care system, it would become expensive and thus out of reach of poor people like me.”* On the contrary, a 37-year old female farmer argued that: *“integration would help the patients in the sense that the modern health care providers would thrive at open wounds, complex cases and other diseases.”* Also, another patient opined that: *“the TBSs and modern health care providers have a common objective; treating sick people”.* Yet on his part the Head of Bonesetters at the Center vehemently opposed integration but hastily added that they want to continue to work with formal health care providers. He asserted: *“that one I will say no because our father didn't accept it . . . the District Assembly gave us a quarters at the Hospital . . . but his fears were that the practice is a family thing, if we carry it out of the family maybe it would not work. But we have been appealing for a nurse from the Hospital.”* He further elaborated on the relationship between the Center and the Health Center as: *“the Hospital [Health Center] does refer people to this place. If an accident happens and they rush the victim to the Hospital, if they see that there is a broken limb, they themselves do bring the patient here.”* The

Bonesetter also informed that whenever a patient is brought to the Center, without going to a formal health facility before, he normally asks the caretaker of the patient to take him or her to the Health Center for tetanus injection before commencement of treatment.

Successes Achieved by Traditional Bonesetters

The Head of Bonesetters alleged that the Center has achieved a lot of successes. He elaborated that: *“we have had so many dangerous ones that would have been amputated if [they were] taken to the Hospital... we have been able to treat all successfully and discharge them. Secondly we had an award and so many things.”*

On the issue of referral of cases that are beyond their ability the Bonesetter claimed that: *“they are things that have kept long [old cases]. We are even doing better than our forefathers; during their time, if it [the wound] was older than three weeks and you brought it, they would reject it. But we try if it is not more than two years and sometimes we succeed but I have never seen a fresh patient who has been brought here that has not been successfully treated.”*

Traditional Bone Setting: A Business or a Calling?

The bonesetters at the Kumbo Bone-setting Center earn their living from peasant farming. The Head of Bonesetters informed that bone setting for them was a calling, adding that monetizing the practice had the risk of killing its potency. Consequently, patients who visit the Center for treatment are not charged, beyond one fowl and CFA 500 before commencement of treatment and CFA 1,000 after the wound is healed. They however accept gifts offered as sign of appreciation of their good work. This was corroborated by patients at the Center.

At the Oku TBC however, the situation was different. Though the bonesetters claimed that they only take a token from patients ranging between CFA 5,000 and GH¢ 40,000 depending on the degree of injury, discussions with patients revealed that patients paid amounts over and above the range given. Patients paid rates ranging from CFA 10,000 to 25,000 before commencement of treatment and whatever amount one pays before treatment; upon healing the person pays the same amount. For instance, a 21-year old second cycle student informed that he paid CFA 15,000 before he was admitted to the Center in 2009. Bonesetters also informed that their daily needs were met from the proceeds of their work at the Center. Consequently, though the bonesetters claimed that bone setting was a calling, bone setting is a lucrative business for them at the Center.

The situation in Ndop was slightly different as the bonesetter claimed that charging their clients would render the practice ineffective. All the bonesetters at the Center earn their living from peasant farming. In most cases they attend to the patients very early in the morning and then leave for their farms. Prior to commencement of treatment, a new arrival is expected to provide certain items, including a fowl, a pot and two calabashes. Since people report at the Center

in pain, the Bonesetters have converted the items into CFA 15,000 so that after payment patients do not incur any other cost prior to treatment. However, after healing, the patient is expected to offer a bowl of millet, some tobacco leaves and 1500 cowries. But the 1500 cowries have been converted into about CFA 25,000 due to scarcity of cowries. These were the items offered as gift to their great grandfathers some 200 years ago when they successfully treated their first patient.

Informant credibility

In all three centers inconsistencies were discovered. While all bonesetters did not hesitate to assure the researcher of their frankness, the study discovered that at each center there was at least one untruth. For instance, in Shisong the head of Bonesetters claimed that by the grace of god they had never failed in treating any patient at the Center. Thus they have never referred any client to any other bonesetter, adding that other bonesetters refer patients to them instead. However, discussions with patients at the Center revealed that on numerous occasions the Bonesetters had referred patients to Oku and Ndop TBCs.

Findings at Oku and Ndop Bone-setting Centers confirmed this. Especially in Oku where records and case histories, including previous facilities visited by patients were available. Similarly at the Kumbo TBC, claims by the Bonesetters about their ability to treat all cases that report to the Center were refuted by patients, informing that some patients have been referred to Oku Bone -setting Center and other spiritual centers. Secondly, claims by the Bonesetters that they charge only a token ranging from CFA 500 to CFA 1,000 was also refuted as some patients pay as much as CFA 50,000 in all at the Center. That is, CFA 10,000 at the beginning of treatment and CFA 40,000 at the end of the entire process. Finally, a more sensitive issue revolves around loss of lives at the Center. According to the team of Bonesetters, for the past five years there had not been any death at the Center. However, findings revealed that in mid-2016 a male patient undergoing treatment at the Center met his untimely death at the Center.

The Shisong TBC had its own share of untruths. The literate head of Bonesetters was seemingly very cooperative and forthcoming with information in comparative terms. He also had a vivid understanding of the vulnerability of, especially open wounds to infection and thus claimed that bonesetters at the Center use one towel per patient per session. Again, findings pointed to the contrary; one towel is used for all patients and equipment used at the Center are not sterilized before and after they are used.

The position of Pritchard (1940) cited in Bleek et al 1987 [36] that respondents become increasingly apathetic and reluctant to cooperate as the subject for discussion gets more intimate and embarrassing seems to apply in this study. This may result in lying. And according to Bleek [35] “... *there must be an awareness that people are lying*”. Due to the mixed methods research approach adopted in this study, these contradictions came to light. This also agrees with the assertion that complementarity does not mean that findings have to be

identical, they can also be contradictory according to Mee-too & Temple in 2003 [7].

Even though all patients undergoing treatment at the three bone-setting centers had pleasant impressions about the competences and general conduct of the bonesetters, in attempt to present themselves as perfect bonesetters who are dexterous, all bonesetters interviewed told one lie or the other. Far from rendering the study invalid, these inconsistencies as well as their discovery enriched the study. The situation here also reinforces the fact that social science research is complex because it deals with research participants who are subject to change.

Discussion

Traditional bone setting is a well-recognized and age long practice in African tradition [38]. The treatment of bone injuries is associated with much mythology and superstition [8, 38]. It is a known fact that the repeated manipulation and massage of fractured bones cause severe pain and result in complications such as nonunion, malunion, joint stiffness and infections [8, 39].

Hundred twenty-five (125) of the TBS's clients (51%) went to TBS from the start of their injury, this result agrees with Owumi et al study, where 74.9% of patients were seen initially by TBS [40]. This could be dangerous especially in those that could have sustained concomitant life threatening injuries. In the main, it is interesting that 40.5% of the patients initially were taken to hospitals before being withdrawn and attended treatment by TBS. This result is comparable to studies by OlaOlorun and Solagberu, where the incidences were 50% and 43% respectively [41, 42]. This high percentage requires an audit of our orthodox system in order to correct over inadequacies.

In this study, it was found that despite the painful experience by all “patients” and the high rate of complications, 100% of them still preferred native bone setting to orthodox treatment. The TBCs enjoy wide popularity not only in the northwestern region, nationwide and beyond Cameroon. The findings here corroborates the idea of cues to action as proposed by the HBM. According to the HBM, action in health seeking is guided, among other things by cues to action, which includes previous experience and advice from friends and relations [21, 23]. Advice of relatives and friends, as seen in 75 (30.6%) patients, was the most common reason for TBS patronage. Other reasons were cheaper cost (number [n]=60; 224.5%), sociocultural belief (n=35; 14.3%), easy accessibility (n=30; 12.4%), fear of amputation (n=25; 10.2%), and fear of operation (n=20; 8.2%) (Table 2). There was no correlation between these factors and age, marital status, occupation, and educational status (P=0.681) and similar findings were reported by other authors [43-46]. There is an erroneous belief in traditional Africa that the only available option for treatment of fractures in hospitals is amputation [6, 43]. It is also believed that the application of plaster of Paris (POP) usually results in atrophy and gangrene of affected limbs [6, 43]. Patient are warned mainly by relatives or friends not to seek orthodox care when they have fractures/

dislocations. These behaviors have placed a great burden on the orthodox traumatologists who spent their expertise in correcting complications rather than practice modern Orthopedics [6, 43]. These wrong beliefs can only be eradicated through education, public enlightenment [6, 39]. It has also been advocated that to ultimately reduce the financial burden of such indigent patients especially in the rural communities of Cameroon, a functional health insurance for all citizens should be mandatory [6, 39].

There has always been an attempt by the bonesetters to introduce some forms of pain relief into their practice [47, 48]. This may be as a result of alliance with quack Medicine dealers and some hospital staff [6, 42]. This has been noted by some researchers that some hospital workers do offer some services or collaborate with them for some gains [2, 48]. It should be noted that the application of analgesics without proper reduction and immobilization of fractures is a futile exercise [47, 49].

Ignorance was a major disadvantage among the TBS because the highest educational level attained by the TBS was secondary education in 33% of them. The study shows that it is predominantly a male trade. Only one out of the 5 practitioners was a female. In all the five centers visited, there was an overwhelming cooperation from the TBSs and willingness to provide relevant and credible information towards this study which was highly commendable. Majority of them claimed that the trade is hereditary and they look forward to seeking support and collaboration with or make referrals to orthodox practitioners in the nearest future. This was contrary to previous findings in the literature where the TBSs opposed the ideal of collaboration essentially for spiritual reasons and in general saw orthodox practitioners/researchers as intruders into their business [39, 40, 45].

Furthermore, majority (50%) of those patronizing them were motor cyclists and artisans who were predominantly illiterates and this is concordance with the findings of other literature [6, 41, 45]. All the TBS use the same method of herbal cream / paste application, native bamboo splinting, frequent pulling and massage. Complications such as tetanus, gangrene and nonunion are usually attributed to charms and witchcrafts. They lack basic knowledge of anatomy and physiology.

This study shows that it may be difficult to stop traditional bone setting in our society but with concerted effort may be easy to stop the complications associated with this procedure. A study in North-West Nigeria on the complications of fracture treatment by bonesetters concluded that traditional healers can be integrated, but they need to be taught on alarming symptoms like skin ischaemia, reduced skin temperature and sudden absence of pain [50]. In a similar study in 1979, the Primary Health Training for Indigenous Healers Project (PRHETIH) was started in the Techiman area to train traditional healers to widen their skills [51].

For now, some authors perceived that the activities of the TBS is a great hindrance to the practice of modern Orthopedics in Cameroon and Africa in general [42, 52]. It is advocated in some quarters that TBSs and Traditional healers

should be trained and integrated into our community health system as is done for traditional birth attendants especially using China as case study [47, 53]. This approach had been experimented in the neighboring Nigeria and found to offer the desired solution [24, 33]. China also has a rich tradition in the healing art. Recently the Chinese have made significant efforts to integrate traditional with modern methods in the treatment of fractures [54, 55].

The national and International organizations including the Cameroon Orthopedic Association, Primary health/Community health providers should take urgent steps to help prevent the complications arising from traditional bone setting [2, 6, 13, 41, 55]. This can be achieved through eradication of poverty and ignorance as well as making appropriate legislation to restrict this menace [30]. Secondly, initiation of community projects that would create awareness among the TBSs and patients could discourage these harmful practices [7, 43, 47-49, 52, 55].

One way of achieving this is to train rural orthopedic assistants whose primary duty would be to disseminate information, provide emergency trauma care and refer of difficult cases [39]. In turn, the trained TBS should be recognized as a primary orthopedic practitioner for fracture treatment before sending patients to secondary or tertiary institutions. Similarly, other types of healthcare practitioners can be integrated within the primary healthcare system of a country [56]. For example, a similar initiative also for incorporating the services of "local dais" and "traditional birth attendants" into primary healthcare delivery in rural India, after training in the basics of safe delivery methods, has resulted in significant reduction in maternal morbidity and mortality [57]. The World Health Organization has taken a similar approach related to traditional healers in Africa, rural South America and underdeveloped regions of Asia [58, 59]. This needs to be supplemented by legislation and regulations imposed upon these traditional practices to ensure that the practices are carried out in a safe manner [44]. For now the road to collaboration and integration of TBS services with biomedical practices appears like 'a long dark tunnel with light towards the end.'

Limitations

The researchers were unable to get the opportunity to observe the management of fresh fractures at the bonesetters' clinics, to have a first-hand account of initial treatment, reviewing X-rays and repositioning fractures despite several visits.

The researchers relied strictly on the interpreters for the interviews, as only a minority of the patients spoke adequate English. We realize that interpretation has the potential of reducing the true picture therefore can impact negatively on the patients' overall original views.

The cultural and professional background of the interviewers possibly could have evoked desirable answers.

In view of the fact that the researchers were not directly involved in the diagnostic course and treatment proposal, therefore were only compel to objectivity with respect to the details of patients care.

Conclusions

Traditional bone setting is an ancient trade practiced in Cameroon and most developing African countries without government regulations and they lack guidance. The complications that accompany these practices are highly unacceptable. It may be difficult to stop traditional bone setting in Cameroon but may be easy to stop the complications by drawing the TBS together for the purpose of basic education and restriction. This government legislation should include an adoption of a standard training curriculum for TBS and the establishment of a sound referral system. It is obvious that the society stands to benefit significantly after their training. They can then be properly licensed, supervised and fully incorporated to function at the primary level especially in the rural areas. Finally, there is an urgent call for collaboration and integration of the TBS and biomedical practices as advocated by the WHO; so as to harness the gains by all and sundry. Functional health insurance for all citizens is mandatory. Patients who are misguided by false beliefs can be better educated by public enlightenment.

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