



Assessment of Grassroot Innovations in the Healthcare Delivery System of Traditional Bone Setters in Southwestern Nigeria

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Abstract

The paper assessed the grass root innovations in the operations of traditional bone setters (TBS) with a view to proposing some policy measures that could enhance their performance in healthcare delivery in Nigeria. Three Southwestern States; Ogun, Ondo and Oyo were purposively chosen for the study. Using the multistage sampling technique and respondent driven sampling technique, primary data were collected from 69 TBS. The study showed that product (13.6%), marketing (19.1%), process (43.0%) and organizational (73.9%) innovations were reported. Also the use of X-Ray (52.9%), seminar attendance on the biology of bones (28.4%) and hiring of the services of orthodox health personnel (33.3%) were reported. The study concluded that the operation of the TBS could be greatly enhanced if there were policy intervention that fosters interaction between them and orthodox orthopaedic surgeons.

Introduction

The term innovation which was derived from a Latin word, is the introduction of a new thing to the existing realm and order of things (Shavinina, 2003 cited in Adegbite, 2009). The Oslo Manual (2005) defined innovation as the implementation of a new or significantly improved product or process, a new marketing method or a new organizational method in business practices, workplace, organization or external relations. It is a continuous process which involves the creation of a new initiative. The new initiative is then transformed into an implementable idea which ultimately leads to commercialization of the resulting new or significantly improved products/services (Oslo Manual, 2005).

Innovation brings about knowledge and also increases the knowledge base of the system under consideration. The purposeful application of such knowledge is referred to as technology. In spite of government investment in technical facilities towards the improvement in the treatment of orthopaedic cases, patients irrespective of age and education prefer the traditional form of treatment. Reasons include the belief that TBS are more skillful (Oyebola, 1980; Ikpeme, *et al.*, 2007; Idris *et al.*, 2010), low cost (Ogunlusi *et al.*, 2007; Dada *et al.*, 2009; Idris, *et al.*, 2010;), fear of plaster (or cast) or amputation (Ogunlusi *et al.*, 2007; Idris *et al.*, 2010), ignorance and third party advice (Ogunlusi *et al.*, 1980) and affordability, familiarity and custom (WHO, 1999, 2000). The practice of traditional bone

setting has been in Nigeria for centuries. Onuminya (2004) reported that traditional bone setting practices have been preserved as a family practice, training by apprenticeship and records kept by oral tradition. The author also found out that there was no prescribed fee and that patronage was high. A recent study has documented that 85% of patients with fractures made traditional bone setters their first place of treatment before going to hospitals (Omololu *et al.*, 2008).

This Traditional health sector has therefore become a force to be reckoned with in the management of bone injury. There is an increase in the rate at which the affected population patronizes the sector inspite of possible complications that may arise in the treatment process. However, there is a dearth of information on how TBS have improved their services over the years in terms of innovations. This necessitates the need to investigate and identify grassroot innovations in the operations of TBS. This is with a view to recommending policy interventions that may enhance the performance of this class of practitioners in the health sector.

Literature Review

Ilori (2006) argued that technology could be expressed in the form of a skill, a practice or culture. The effective operation of any technical system may depend on the diffusion of these technologies. The author also revealed that technology can be categorized into (1) a special resource, (2) an important strategy for the exploration of the natural resources sector and (3) an agent of social and economic change.

There are four major types of innovation according to Oslo Manual (2005). They are

- i) Product innovation: This is the introduction of a good or service that is new or significantly improved with

respect to its characteristics or intended uses.

- ii) Marketing innovation: This is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

- iii) Process innovation: This is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, technology equipment and or software.

- vi) Organizational innovation:

This is the implementation of a new organizational method in the firm's business practice, workplace, organization or external relations.

A major innovation in both the modern and traditional health sector which could lead to improved health status of the population is the integration of traditional medicine practices into the mainstream of public health services. In the Declaration of Alma Ata on primary healthcare, WHO in 1978 appealed to the international community to support the inclusion of complementary medicine and traditional therapies of scientifically-proven effectiveness in national health systems. This innovation when carried out not only reduces the consumption of conventional pharmaceuticals and as a result reduces costs of public health systems but is also capable of reducing patients' adverse responses to conventional drugs as well as contributes to the development of the local economy through the production and use of traditional medicine (Pellizzoli and Dario, 2008). These authors also submitted that it will lead to the sustainability of health services. The African Network for Drug and Diagnostic Innovation has as its mission statement "To promote and sustain African-led Health

Product Innovation to address African public health needs through efficient use of local knowledge, assembly of research networks, and building of capacity to support economic development” (Rasoanaivo, 2010). Obeyesekere (1993) revealed that innovation within tradition consists in finalizing a treatment regimen by arriving at an optimum combination of internal and external methods from the vast and general repertoire. In India, Sujatha (2011) concluded that irrespective of the type of system (traditional or modern), innovation amounts to evolving new combinations based on existing methodological principles. The author revealed in a case study that such innovation in application made patients from outstation to go back home same day. This is because medicines were prepared in a way that could be administered by relatives at home.

A study of patients’ perception of traditional bone-setting in Calabar, Nigeria revealed that of the 76 fractures in 68 patients, 50 patients chose traditional bone-setting because traditional bone setters were believed to be more skillful than orthodox orthopaedic practitioners. (Ikpeme *et al.*, 2007). More than half of the study population (54%) in a prospective study in South India opted for *Puttur* (traditional bone setting practice) on the advice of old patients. The study also revealed that apart from the fact that more educated people (51%) are patronizing TBS, 23% of the patients took discharge voluntarily from modern hospital to visit TBS (Panda and Rout, 2011).

Traditional bonesetters have almost a common method in their approach in bone setting in the different communities. Differences in practice occur mainly due to available resources and innovations. Most times, innovations are as a result of available resources. In the Sudan, the common method of immobilization employed by traditional bonesetters is a native splint called *TABB* which consists of bamboo or palm leave axis

sticks, knitted together to form a raft-like splint. This is used as a wrap around the fracture site tightly and sometimes enforced by cloth bandages (Nag and Hag, 2010). In contrast, orthodox orthopaedic practice use a variety of methods for immobilization and stabilization, including external fixators which is used in stabilizing open (compound) fractures with extensive soft tissue injuries. Traditional bone setters identify fracture site of a closed fracture by palpation and clinical signs using their fingers. Upon identification of the fracture site, an attempt is made to reduce the fracture to its anatomical position. A herbal cream, *ufie*, is applied to the affected limb, which is then splinted to prevent limb movement. The splinting materials include cloths, cardboard and plywood (Nwachukwu *et al.*, 2011). In order to determine the duration of healing and when to remove the wrapped splints, a chicken leg, broken, reset and treated alongside the patient is put in place (Adesina, 2011).

In Nigeria, the approach involves the cleaning of wounds which resulted from fractures and setting the bones to make sure the ends of the bones meet and unite properly to prevent deformity. Plant extracts (such as basil or Cassava leaves) or the giant snail’s body fluid are employed to stop the bleeding arising from the wounds. Banana leaves are used as lint while wooden splints made from bamboo plants are used to immobilize the fractures. Either fresh or dry banana stem fiber served as bandage. Radiant heat treatment or hot pepper was applied to reduce inflammation and swelling. Some other traditional bone setters made traditional fracture splints from bamboo, rattan cane (*oncocalamus yrightiana*) and palm leaf axis (*Elaeisis guineansis*) (Ofiaeli, 1991; Oginni, 1992).

Oginni (1992) reported that the component materials for the splint used by traditional bone setters included rattan cane or palm leaf axis, cotton thread or strip of old cloth, old cloth or cotton bandage. These materials

were used in designing a mat which is used as a wrap round the fractured limbs. The splint is positioned in such a way that the fractured site is kept and placed against the bare skin and a tight bandage is applied. The splint is also positioned in such a way that the fractured site is kept midway the splint. The length of the splint is determined by the length of the limb that houses the fracture site. Traditional bone setting practices enjoy enormous patronage from all categories of people irrespective of age, gender, social, academic and economic status. The continuous patronage could be traced to the views that what the TBS practitioners do is more of service to humanity than profit making. The treatment outcome induces patronage and hence it can be concluded that the TBS practices has positive impact on the community (Uche-Okobi, 2013). In spite of government investment in technical facilities towards the improvement in the treatment of orthopaedic cases, patients irrespective of age and education prefer the traditional form of treatment. There is also the dearth of information on innovation to enable policy formulation and implementation on the possible training of TBS on the biology of bones and subsequent referrer system that would lead to adequate management of bone injury in Nigeria. This study, therefore assess the different innovations in the traditional bone setting practices.

Methods

The study area is Southwest, Nigeria. It is one of the six geopolitical zones (which reflect ethnic identity) in Nigeria and comprises of Ekiti, Lagos, Ogun, Ondo, Osun and Oyo states. The 1963 Population Census revealed that the population of the zone was 7, 220,074 (3,624,502 males and 3,595,572 females) while the 2006 National Population and Housing Census reported 27,722,432 (14,081,157 males and 13,641,275 females) as the population of the zone. This constitutes about 19.7% of the 2006 population figure of Nigeria (NPopC, 2006)

The zone with a total land mass of 78,505.17 Area/Sq. km, is bounded in the north by North Central zone, in the south by the Gulf of Guinea, in the east by South-South zone and in the west by the Republic of Benin. The zone houses a major ethnic group known as the Yorubas. Other major ethnic groups in Nigeria namely the Igbos and the Hausas can also be found resident in the zone. The zone experiences coastal lowlands with both rain and guinea Savannah vegetations. The people of the zone are majorly traders, artisans and farmers. Traditional health is a well known practice in the zone. The zone is blessed with different kinds of natural materials needed for the practice and as a result of this endowment there is little or no need for dependence on materials from outside the country. A multistage probability sampling procedure was employed for the study. The Southwest region consists of six states as stated earlier. Each of the states is made up three senatorial districts and each of the senatorial districts comprises of local government areas. Three states which constitute 50% of the number of states in the region were randomly selected using the ballot method. Two senatorial districts were randomly selected from each of the selected states by balloting. In each of the two senatorial districts selected, two local government areas (one urban and one rural) were purposively selected for the study.

The quantitative approach employed was by survey method which involved the use of structured questionnaire. The Respondent Driven Sampling (RDS) technique was employed in selecting the target population for the study. The sampling procedure involved the initial purposive selection of a person or group in the target population who served as seed(s). The seed(s) selected was given three coupons to recruit not more than three others (referred to as the first wave of respondents) in the target population. These in turn were given three coupons each to recruit three other members of the target

population (second wave). It was expected that by the second or third wave, the list of the target population would be near exhaustive and samples produced will be independent of the Seed(s) (Heckathorn, 1997; Salganik, 2006; Johnston and Sabin, 2010). A total of 69 TBS were sampled after getting their consent to partake in the study. Ethical clearance for the conduct of the survey was sought and obtained from Federal Medical Center, Ogun State.

The instrument for the study was validated through a pre-test carried out in a local government not selected for the study. The individual respondents were identified and the instrument administered on them to ensure that the questions were not ambiguous but easily understood. The pre tested instrument was examined to ensure that the variables of measurement were adequately captured, consistent and reliable in ensuring the realization of the objective of the study. The comfort and anonymity of the respondents were taken in to consideration during the design of the instrument used for data collection. The data collected for the study were subjected to both field and office editing. The SPSS was employed in the analysis of the data collected using both descriptive and inferential statistical techniques.

Results and Discussions

The results and discussions were based on the four major types of innovation namely product, market, process and organizational innovations as well as an examination of the factors that aid innovation.

Product innovation in the traditional bone setting practices

Table 1 presents the univariate analysis of the variables of measurement used to elicit information about product innovations introduced for the management of fractures. The Table revealed that majority (94.0%) sourced the materials for bone setting locally. Importation of materials from within or outside Africa is not common. This

depicts a near total reliance on locally sourced materials as 85.5% of them sourced more than 90.0% of the materials used locally.

Majority (92.8%) of the respondents used cloths/bandages in the management of bone injuries. This is a new addition to TBS practice and it serves as a replacement of the palm frond used in making tight the rattan mat placed around the fractured site to enhance immobility. Herbs and animal parts are also materials used by majority (91.5% and 63.8% respectively) of the respondents. Furthermore, 82.4% of the respondents employed incantation. Of this proportion 94.4% recite the incantation in their local language. These results are not different from the findings of Ofiaeli (1991), Oginni (1992), Nag and Hag (2010), Nwachukwu *et al.*, (2011), Panda and Rout (2011) and Sofowora (1982) (cited in Owumi *et al.*, 2013).

The respondents also reported the use of the following materials: Bamboo Stick, “*ori*” (Shea butter), Palm Oil, Black soap, “*Iyere*”, “*olorin*”, Palm branch, Palm kernel oil, “*Atarun-Iroko*” (Thunder stone) and Prayers. This was also reported by Mc Canley (1984) (cited in Ogunbodede (2000)) and UNESCO (2013). About a tenth had formulated bone injury products while 13.6% of the respondents reported having added new materials in the preparation of treatment regimen. Interviews further revealed that this new addition was discovered about four years before this survey. New materials added include sewing pins, safety pins, scissors, gloves, traction kit, injection, “figure 8”, robb, olive oil, airplane oil and spirit/alcohol. Of the 13.6% who reported adding new materials in the preparation of the treatment regimen, 77.8% of them revealed that the addition was made to strengthen the regimen. More than two-thirds indicated that the addition was made to aid recovery. About 67.0% of the respondents claimed to have acquired knowledge of bone setting through divine

means, while 33.3% acquired it through trial and error. More than two-thirds of the respondents reported training their apprentices about the new addition. It can be concluded that there were very few product innovation among traditional bone setters.

Interviews revealed that there is no interaction with Scientists (in University and non-university research institution). Therefore, formal research seems to be non-existent

Table 1 Product innovation in the traditional bone setting practices

Variables	N	Frequency	Percentage*
Materials used (multiple response)	69		
Cloths/Bandage		64	92.8
Hard cardboard		14	20.3
Plywood		29	42.0
Herbs		63	91.3
Animal parts		44	63.8
Voicing/Incantation		56	82.4
Source of materials used (multiple response)	69		
Local (within environment)		63	94.0
Local (outside environment)		47	68.1
Imported (from within Africa)		6	9.0
Imported (from outside Africa)		2	2.9
Proportion of local material (%)	62		
<80		2	3.2
80-90		7	11.3
>90		53	85.5
Language of incantation	56		
Local language		51	94.4
Other Nigerian language		2	3.6
Foreign language		-	-
Ever formulated bone injury products	65		
Yes		8	12.3
No		57	87.7
Ever added new material in the preparation of treatment regimen	66		
Yes		9	13.6
No		57	86.4
Reasons for new addition (multiple response)	9		
Strengthen treatment regimen		7	77.8
Due to other accompanying ailment		4	44.4
For faster recovery		6	66.7
Increase effective days of the regimen		4	44.4
Source of knowledge of new addition (multiple response)	9		
Divine means		6	66.7
Colleagues		-	-
Trial/Error		3	33.3
Relatives		2	22.2
Train trainees on new addition	9		
Yes		7	77.8
No		2	22.2

* valid percentages were presented

The following plates (Plates 1-7) show some of the materials used in bone setting. Plate 1 is a patient on admission at the TBS clinic as at the time of the survey. It shows fractures at the two legs around the ankle area as a result of being run over by a truck. The patient was first taken to an orthopaedic clinic of a hospital, where orthopaedic doctors recommended that the two legs be amputated. The patient's family took the decision to take him to a TBS who assured them that the bones will set if the tendons "*isan*" were still in place. The family's decision to take the patient to a TBS was as a result of an experience they had over the amputation of another family member's leg which resulted in the death of the person. A nurse was employed to come to the TBS clinic for the dressing of the wounds. Family members decided to administer palm (red) oil to prevent swelling of the affected parts.

Plate 2 shows the age long rattan mat made from bamboo stem (said to be medicinal) and hewed together with "*iko*" to form a mat. It is the major material placed round the fractured site to immobilize the affected part and aid the union of the broken parts. Plate 3 is a material known as *Íyere*". This is

administered on the site of the fracture alongside palm oil to reduce inflammation and swelling of the affected area. Plate 4 shows a TBS patient being managed at his residence. The fracture took place at the upper left of the arm. Plate 5 shows a place for storage and regimen preparation. The bench placed outside the compound of the TBS clinic has upon it a bottle of alcoholic drink known as "Seaman's Schnapps" "*oti agba*" or "*ogogoro*". Needles are placed inside the drink and administered on the patient around the fractured area.

Plate 6 shows a white linen cloth cut into long pieces. The cloth is tied around the fracture site to further hold the rattan mat in place for further immobilization of the affected part and to aid union of the broken bone. The texture of the cloth is such that when treatment oil is administered to the fractured area, it penetrates into the skin around the fractured site. Plate 7 shows a TBS holding a rattan mat in a folded position and another bone setting material known as "*Epo Kinniun*" (Lion Oil) placed in a container and placed inside nylon. This is administered on the patient in order to aid union of the affected bones.



Plate 1 Fracture on both legs



Plate 2: Rattan mat
Source: Prepared by High Chief Ajigbede,
TBS, Irele Town, Ondo State



Plate 3: “Iyere”

Source: Prepared by High Chief Ajigbede,
TBS, Irele Town, Ondo State



Plate 4: Fracture site at upper left arm



Plate 5: Different materials and place of
preparation of treatment regimen
Source: High Chief Ajigbede,
TBS Clinic, Irele Town, Ondo State



Plate 6: Linen cloth



Plate 7. Rattan mat (in folded position) and Lion Oil

Interview further revealed that patients are advised to do away with Cigarette, Indian hemp and alcoholic drink as they destroy the potency of the herbs been prepared and administered on them. Patients are encouraged to eat “*Ogede Dudu*” (Unripe Plantain), Apple, Garden Egg, Banana to serve as source of iron for the body. Patients are to do away with “*obeeyo*” (draw soup) as it is believed that it causes delay in recovery. However, draw soup is applied to the affected part only when there is a hook at the joint. Patients are also encouraged to take pain reliefs such as Novalgin, Ibucap or Tiramadol. A TBS interviewed uses calcium (colour white type sold for ₦150.00) to dry the wound and prevent the affected area from swelling. These are practices of the

orthodox medicine that have been integrated into the traditional bone setting.

Market innovation in the traditional bone setting practices

Table 2 showed the responses of the respondents on what and type of market innovation they have introduced. The Table revealed that only 19.1% of the respondents had ever done any print media coverage of their practices. With regards to radio and television adverts and exhibition of products and activities, only 2.9% and 5.9% had ever utilized those mediums respectively. Majority of the respondents (95.6%) had never ventured into repackaging of products for sale.

Table 2 Market innovations in the traditional bone setting practices

Variables	N	Frequency	Percentage
Ever done News/Print media coverage	68		
Yes		13	19.1
No		55	80.9
Ever done television/radio advert	68		
Yes		2	2.9
No		66	97.1
Product/Activities exhibition	68		
Yes		4	5.9
No		64	94.1
Repackaging of bone injury product	68		
Yes		3	4.4
No		65	95.6
Have Bill/Sign boards of establishment	68		
Yes		34	50.0
No		34	50.0
Handbills/Posters/Banners for advert of establishment	67		
Yes		14	20.9
No		53	79.1
Establishment on social network	68		
Yes		8	11.8
No		60	88.2
Social Network (multiple response)	8		
Facebook		7	87.5
Twitter		-	-
2go		-	-
Whatsapp		-	-

Half of the respondents (50.0%) had bill/sign boards erected to advertise their services. More than two-thirds (79.1%) did not subscribe to printing and placing of handbills, posters or banners to advertise or market their establishments. However, 11.8% of the respondents reported having their activities on social network and of which 87.5% make use of “Facebook”. Interviews revealed however that relatives and friends of patients serve as advertising agents. This confirms the findings of Ogunlusi *et al.*, (2007) and Onuminya *et al.*, (2004) that identified old patients, middle men, families, friends and relatives as agents of links with TBS.

Process innovation in the traditional bone setting practices

The different types of fractures managed by TBS are revealed on Table 3. All the respondents claimed they could manage multiple fractures while 63.8% of the respondents could handle open, closed and simple fractures. This shows that not all the respondents have the capability of handling open, closed and simple fractures. The Table reveals that 54.4% of the respondents depend on the patients to determine the point of fracture.

Table 3 Process innovation in the traditional bone setting practices

Variables	N	Frequency	Percentage
Type of fracture being managed (multiple response)	69		
Open		44	63.8
Closed		44	63.8
Simple		44	63.8
Multiple		69	100.0
Determination of points of fracture			
As directed by patients	68		
Yes		37	54.4
No		31	45.6
Use of X-Ray	68		
Yes		36	52.9
No		32	47.1
Use of fingers	69		
Yes		65	94.2
No		4	5.8
Divine means	68		
Yes		59	86.8
No		9	13.2
Ever attended seminar/training on biology of bones	67		
Yes		19	28.4
No		48	71.6
Employ the services of an orthopaedic nurse/doctor	69		
Yes		23	33.3
No		46	66.7
Contact fellow TBS on difficult cases	69		
Yes		27	39.1
No		42	60.9

The use of X-Ray (brought from the hospitals by the patients), in determining the point of fracture was also dominant among the respondents as 52.9% of them subscribe to the use of this technology. This is indeed a new innovation in the process of managing fractures in the study area. The adoption of this technology according to Hinojosa (2004) reveals that TBS are adopting X-Rays as part of their self-validation and also to appear to their clients as being conversant with the technology. The use of fingers and divine means to determine the point of fracture is predominantly high among the respondents. These are traditional ways of determining the points of fracture. Majority (94.2% and 86.8%) of the respondents still employ the method of using fingers and divine means respectively. This result is in line with Panda and Rout (2011), who reported the use of fingers in determining the point of dislocated joint or fracture. Other method includes the use of eye contact to determine the area of fracture.

Table 4 presents the rate of use of the methods identified. The Table showed that reliance on patients (Patient Directed) and

X-Ray were seldom used as a method of detecting the point of fracture (0.768 and 1.029 respectively). This is also in agreement with the findings of Panda and Rout (2011) that X-Rays are given less importance even though Patients bring their X-Rays. Fingers were very often used (2.67) as a method of detecting the point of fracture. This is in line with Hinojosa (2004) who reported that TBS everywhere place great importance on their hands when it comes to diagnosing and treating. Divine means was often used (2.32). The mean rating of Fingers as a method of detecting points of fracture was significantly different ($p < 0.05$) from all other identified methods. A similar conclusion could also be drawn with divine means as a method of detecting points of fractures ($p < 0.05$). The mean rating of Patient Directed and X-Ray method of detecting points of fracture were not significantly different ($p > 0.05$). Other authors such as Paul (1976), Ofiaeli (1991) and Oginni (1995) have reported the identification of closed fracture site using palpation and clinical signs with the aid of fingers.

Table 4 Methods of identifying points of fracture

Methods	Rate				Means	Standard Deviation
	3	2	1	0		
Patient Directed	2 (2.9)	12 (17.4)	23 (33.3)	32 (46.4)	0.7681 ^c	0.8427
X-Ray	7 (10.1)	20 (29.0)	10 (14.5)	32 (46.4)	1.0290 ^c	1.08426
Fingers	58 (84.1)	3 (4.3)	4 (5.8)	4 (5.8)	2.6667 ^a	0.83431
Divine Means	42 (60.9)	16 (23.2)	2 (2.9)	9 (13.0)	2.3188 ^b	1.03601

3 = Very Often

2 = Often

1 = Seldom

0 = Not at all

a,b,c – Duncan Range Test for homogenous subsets of ratings

Note: Figures in brackets are percentages

Another innovation in the management process is the fact that 28.4% of the respondents reported attending a seminar or training on the biology of bones. So also is

the hiring of the services of orthodox health personnel such as orthopaedic nurses and doctors as revealed by 33.3% of the respondents. This group of respondents

introduced this to manage injuries or wounds when they must have set the fractured bone(s). A new process innovation is revealed in their linkage with other TBS should there be a difficult case to handle. The Table revealed that 39.1% of the respondents reported this type of linkage.

Organizational innovation in the traditional bone setting practices

From Table 5, organizational flow chart was not a common system put in place among the respondents, however, a few of the respondents (10.3%) reported having a flow chart which describe the movement process from the patient to the bone setter.

Figure 1 represents the path process of the flow from the patient to the bone setter. A reverse flow from the TBS to the nurse takes place when there is a wound to be taken care of.

Majority (73.9%) of the respondents keep patient records. This allows them to keep track of the nature of the fracture being managed as well as an opportunity for them to know the patients' healing progress. This could be said to be a new organizational innovation which involves monitoring and evaluation.

Table 5Organizational innovation in the traditional bone setting practices

Variables	N	Frequency	Percentage
Have organizational flow chart	68		
Yes		7	10.3
No		61	89.7
Have Patient Record	69		
Yes		51	73.9
No		18	26.1
Type of clinic run	69		
Outpatient		3	4.3
Inpatient		1	1.4
Both		65	94.3

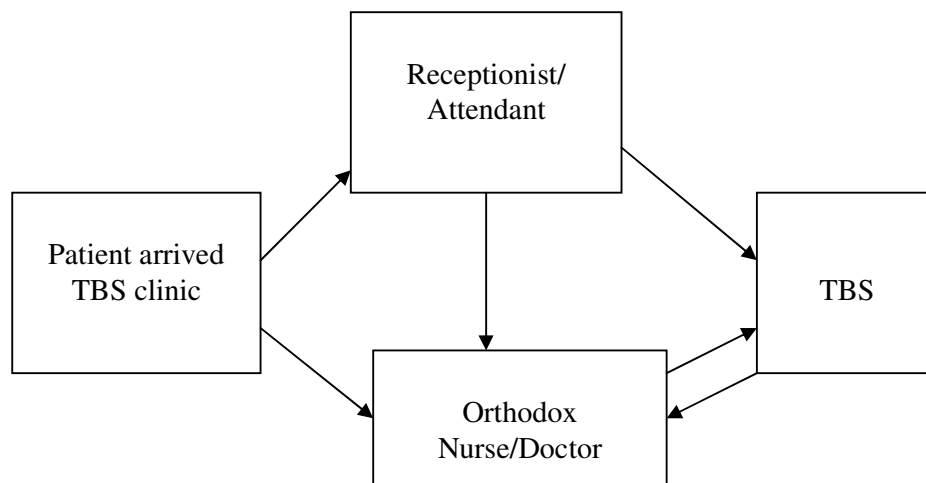


Figure 1.TBS Organizational flow chart

The Table further revealed that bone setters run majorly both out-patient and in-patient type of clinic. Interviews revealed that when patients are brought to their clinic, the patients are placed on admission until initial treatment and are then discharged. The bone setters then visit the patients in their respective homes for further management of the fracture(s) which include massage, a form of physiotherapy. This is the only organizational innovation identified in the practices of bone setters in the study area. Interviews further revealed that this is put in place for possible monitoring and evaluation of rate of recovery of their patients and also

to assist their patients through physiotherapy.

Conclusion

The study concludes that product, marketing, process and organizational innovations were identified in the operations of TBS in the study area. Of note is their interaction with orthodox health personnel as well as the use of modern equipment such as X-ray in determining the point of fracture. Therefore the operations of TBS could be greatly enhanced if there were policy intervention that fosters interaction between them and orthodox orthopaedic surgeons

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