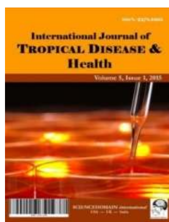

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Family Structure and Bonesetter's Gangrene in Children: A Case Series

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Authors' contributions

This work was carried out in collaboration between all authors. Authors SAA, IOA and DAOO designed the study. Authors SAA, IOA and SUE wrote the first draft of the manuscript. Authors SAA and IOA managed the literature searches. Authors OTA, SUE, AA and DAOO did a critical revision of the manuscript. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Aims: The aim of this case series is to draw attention to the influence of family structure on the patronage of traditional bonesetters and the frequent occurrence of bonesetter's gangrene in children being raised in the absence of their biological fathers.

Presentation of Case: We present four cases of limb gangrene complicating musculoskeletal injury treatment by traditional bonesetters of children being raised by mothers in families where their biological fathers were lacking owing to marital conflicts.

Discussion: Sub-Saharan Africa is experiencing steady growth in out-of-wedlock motherhood and marital instability which has resulted in a large number of single mother families in the region. Bonesetter's gangrene is common in many sub-Sahara African countries including Nigeria,

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because of the widespread patronage of traditional bonesetters (TBS) for the treatment of musculoskeletal injuries. Children are often victims because being dependants, they are influenced by the health care-seeking decisions of their parents which is in turn affected by the number of parents that they live with, and whether their parents are married.

Conclusion: Interventions to protect children from bonesetter's gangrene should include the provision of avenues for peaceful marital conflict resolution that preserves marital unions, and mothers and fathers should be health-educated so that they can make informed decisions on behalf of their children.

Keywords: Bonesetter's gangrene; musculoskeletal injuries; children; biological fathers; Sub-Saharan Africa.

1. INTRODUCTION

Sub-Saharan Africa is experiencing steady growth in out-of-wedlock motherhood and marital instability which has resulted in a large number of single mother families in the region [1]. Children stand the best chance of receiving good nurturing when both parents are available to discharge their parental responsibilities [2]. Children who do not live with their fathers run a greater risk of getting into troubles but the presence of another adult in the home, not a step parent but a grandparent or other blood relation as found in an extended family system, lowers the risk almost to the level found in a two parent families, especially for boys [3].

In Nigeria, high rates of divorce, separation, birth to unmarried couples, desertion, economic instability, and social movement are disrupting the traditional family systems and contributing to the increase in single parenthood, such that many children are now growing up without their fathers [3]. For instance, close to one million women were either divorced or separated in Nigeria in 2006 [4]. In sub-Saharan Africa, a man was accorded respect and honour based on the number of children in his household. This view, as well as the African system of raising children in the extended family, has change a great deal with the advent of industrialization and globalization [3].

Many studies have associated single-motherhood, [5] step-parent households [6] and conflictual marriages with many adverse effects on children's well-being relative to children raised in two-biological parent households [1]. Adverse consequences of single-motherhood which can negatively impact the health outcome of children include inadequate financial resources, [7,8] lack of access to benefits such as health and life insurance provided by a husband's employment, reduced social network and social support, low education [8], inadequate supervision of children, lack if intimate companion in the home with whom children's health problems can be promptly discussed, and social insecurity [1,3,7].

Bonesetter's gangrene, the iatrogenic limb gangrene complicating fracture management by traditional bonesetters (TBS), is prevalent in many developing countries particularly in sub-Saharan Africa [9]. In Nigeria, up to 85% of patients with fractures present first to the TBS before coming to the hospital [10], and distal limb gangrene constituted 60% of the resulting complications in one study [11]. Children are often not exempted from this preventable tragedy [9], depending on the health-seeking behaviour of their caregivers. The decision on the choice of health provider for a child's illness is a complex process which usually involves consultation with family members, friends, elders, neighbours and clergy, but also between both parents [12,13]. However, it has been reported that fathers are usually the ultimate decision makers in choosing where the child would be taken for treatment [13]. Nonetheless, availability of the father may either aid or hinder his decision-maker role, in that where the father is absent, mothers would usually consult someone else, the advice of who they may not be able to decline [13]. Hence, children's lives are influenced by the number of parents that they live with, as well as by whether their parents are married.

However, there is dearth of studies in sub-Saharan Africa on the influence of family structure and characteristics, particularly the availability of the biological father on care-seeking for children's musculoskeletal injuries from TBS. We present four cases of limb gangrene complicating treatment by the TBS of children whose mothers had separated from their biological fathers.

2. PRESENTATION OF CASES

2.1 Case 1

OS was a 4-year old Yoruba boy who was brought from a suburb of Ogbomoso to our Emergency Room by his mother with complaints of pain and swelling of the right elbow and arm, for 10 days, pus-discharging wounds on the right upper limb, for 5 days and fever for 3 days. His right elbow and distal arm were said to have become painful and swollen following a fall on the elbow while playing on a heap of sand in the neighbourhood 10 days before presentation. There was no bleeding or open injury in any part of his body but he subsequently could neither move nor use the right upper limb.

Heeding the advice of friends and neighbours who had sympathy for her financial constraints and difficult family situation, the mother took OS to a traditional bonesetter (TBS) who claimed the child had fracture, and tied split bamboo sticks around the limb. The tied part got swollen and ulcerated after 5 days. The sticks were subsequently removed and OS was allowed home by the TBS, having reassured his mother that the swelling would soon resolve. Fever and body weakness started two days after the ulcerations. The ulcers continued to discharge pus, and were been dressed at home before black discoloration of the fingers and offensive odour prompted presentation in our hospital.

OS, the first born of his uneducated, unemployed 22-year old mother's two children, was born out of wedlock by teenage parents who did not marry each other afterwards but his biological father took responsibility for his financial needs and got him treated for his occasional ailments in the hospital until the mother got pregnant for another man and moved with OS into the man's home. Subsequently, his father disserted OS and his mother and got married to another woman, thereby putting OS' care in jeopardy since his step-father refused to assume responsibility for his care.

Physical examination revealed a toxic-looking, dehydrated, febrile child, with wet gangrene of the right hand and forearm up to the elbow (Fig. 1). Paradoxically, the plain radiograph of his right upper limb showed no fracture or dislocation. Since OS' father could not be reached, the mother had to secure the authorization of her father and an uncle of OS before she could give consent for the proposed amputation. He subsequently had above elbow amputation, treated for septicaemia with parenteral antibiotics, and got prophylaxis for tetanus. A great financial constraint due to the mother's abject poverty and lack of full financial commitment by available relations attended OS's care throughout his hospital admission.

2.2 Case 2

SK, a 4-year old Yoruba girl, was brought from Ogbomoso to our Emergency Room by her mother on account of pain, swelling and difficulty in bearing weight on the right lower limb for 10 days as well as discoloration of the same limb for two days. The initial symptoms resulted from a fall at home during power outage 10 days before presentation. There was no bleeding or open injury on the limb.

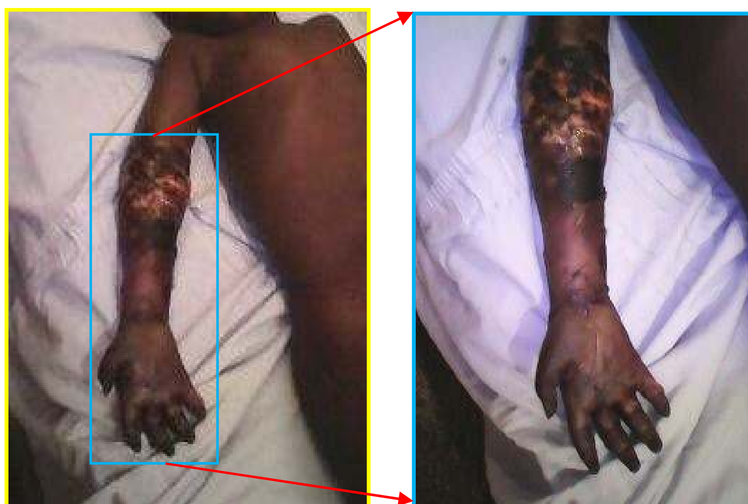

Fig. 1. OS' gangrenous right hand and forearm

The mother who thought her daughter had sustained only a minor injury decided to take SK to a TBS who tied sticks around the distal half of the injured leg and allowed the child to be taken home. Six days later, the mother noticed blisters on the tied part of the leg and alerted the TBS who reassured her that the blisters were part of the healing process. However, when dark discoloration of the forefoot was noticed two day after the formation of blisters, a nurse acquaintance was informed who counselled the mother to take SK to the hospital.

SK was the last born of her mother's five children who were being single-handedly raised by their mother since she separated from their father about 2 years earlier. Their 43-year old mother, who had only minimal support from her parents and siblings, was a petty trader with only primary school education. She had not remarried and lived with her children in another section of town apart from her husband who lived with his newly married wife. When they were together, SK's mother reported that her husband would usually decline people's advice to seek treatment for their children's health problems from non-orthodox practitioners and give her money to take them to the hospital for care.

Physical examination revealed an irritable, pale, febrile child with wet gangrene of the right forefoot and multiple blisters up to the mid leg, as well as dark skin discoloration, and indentations on the mid leg by the sticks that had been tied around the leg (Fig. 2a). The plain radiograph of her right leg showed undisplaced oblique comminuted fractures at the distal third of the right tibia (Fig. 2b). Supported by siblings and friends, the mother gave consent for guillotine amputation of SK's forefoot. She also received prophylaxis for tetanus and antimicrobial therapy for septicaemia, and later underwent stump refashioning. The support by siblings and friends, and the fact that SK was able to walk on the hind foot without the need for a prosthetic device helped lessen the financial and psychological distress of SK's mother.

2.3 Case 3

AA was a 6-year old Yoruba girl brought to our Emergency Room by his mother with complaint of blackish discoloration of her left foot and leg for 6 days. She sustained a pedestrian injury to the left leg 10 days earlier when a motorcycle hit her while crossing a road without adult supervision, with resultant pain, bleeding from a small wound at the leg and inability to bear weight on the left leg.

Yielding to the maternal grandfather's counsel, the mother sought care for AA'a injury from a TBS who bandaged the wound and tied sticks around the injured leg. Four days later, the finger toes and foot distal to the bandage were notice to have turned blackish, with associated offensive discharge from underneath the bandage. She was then taken away from the TBS to seek remedy from other non-orthodox health practitioners before the lack of improvement prompted presentation in our hospital.

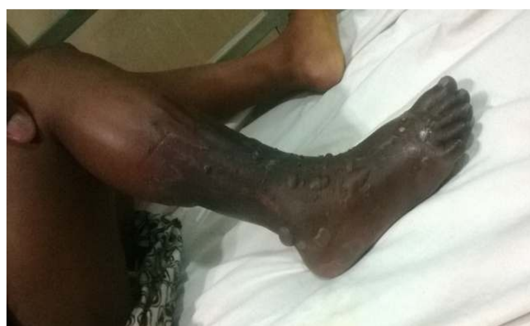

Fig. 2a. SK's right foot, showing wet gangrene of the foot and blisters at the ankle and leg

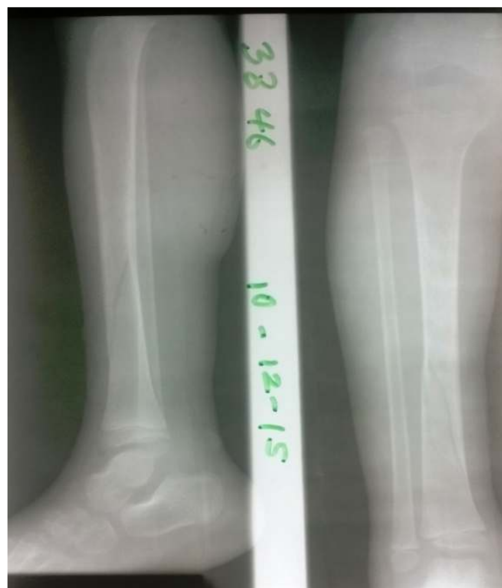

Fig. 2b. Plain radiograph of SK's right foot showing undisplaced oblique fractures of the distal tibia

Her younger sister, AA and her mother were at the time of the injury living at Ogbomoso (the home town of both parents) with the maternal grandfather because of a marital discord between her parents. Her father had not remarried but was living in another South-Western state of Nigeria, having refused to report to his in-laws who hoped to help resolve the conflict with his wife. He was not aware of AA's injury until she was brought to our hospital.

Physical examination showed a calm but febrile, mildly dehydrated child with wet gangrene of the left foot and distal half of the leg (Fig. 3). There was abnormal motion and angulation at the junction of the normal and abnormal part of the leg. When informed, the father came to see AA at the hospital to take up the financial responsibility for her care and to give the informed consent for the proposed guillotine below-knee amputation of AA's leg. She received prophylaxis for tetanus and antimicrobial therapy for septicaemia, and was discharged after the refashioned stump had healed. The elders in both families seized the opportunity of the father's presence for AA's care to convene a marital conflict resolution meeting that subsequently reunited AA's biological parents.

Fig. 3. AA's legs and feet showing wet gangrene and deformity of the left foot

2.4 Case 4

SS, a 14-year old Yoruba boy, was brought to our Emergency Room by his mother accompanied by some acquaintances, having been referred from the General Hospital of a neighbouring town on account of right leg gangrene. He was struck down by a truck while he was riding a motorcycle 10 days earlier and sustained a non-bleeding injury to the proximal part of his right leg. His mother took him immediately to a TBS since he could no longer walk following the accident. When the TBS notice blackish discoloration of the leg after 9 days of treatment, he asked the mother to seek treatment for SS at the General Hospital.

The mother was a 50-year old, uneducated, financially poor, divorced, petty trader. SS was the 5th of her six children, the first three of whom were married. The last three were being raised by the mother, supported insignificantly by her married children. Their father, who divorced SS's mother about 6 years earlier, was a polygamist who was living with the other wives. Because of financial difficulty of his mother following the divorce, SS was withdrawn from school and enrolled as a technical apprentice of a motorcycle repairer. His road traffic injury occurred when he was testing a motorcycle repaired at their workshop.

During physical examination at presentation, he was found to be in painful distress from the injured leg, mildly pale but afebrile. He had wet gangrene of the right leg up to the knee, with exudation of pus from multiple areas of the leg as well as proximal tibiofibular fractures. An above-knee amputation was done, and he was discharged home on biaxillary crutches after two week of hospital admission rife with a great financial limitations.

3. DISCUSSION

Studies in sub-Saharan Africa have shown that majority of amputations among children were as a result of limb gangrene complicating treatment of traumatic injuries by TBS [9]. The four cases presented in this series corroborate this previous finding. It has also been documented that, for diverse reasons, many patients with musculoskeletal injuries in this region first present to the TBS before ever considering orthodox practitioners [14]. This case series looked at the influence of the availability of a

child's biological father on the patronage of TBS. It was observed that for certain reasons, some of which are highlighted below, children in our environment who are being raised in families devoid of their biological fathers are more likely to be taken by their mothers to the TBS for treatment with consequent increased risk of grave complications like limb gangrene.

The first reason identified, and which was common to all of our four patients, was the varying degree of financial difficulty of women who have taken up the role of singles-mothers due to divorce, separation or remarriage to a new husband who would not take responsibility for his step-children. Previous studies have documented that cost, including cost of care, transportation, time spent at the health provider, and inability to work while at the health provider, is a significant factor considered by families in their choice of health provider [12]. The implication of this is that a poor family is more likely to seek care for its members from a provider with perceived cheaper cost, and this means the TBS in cases of traumatic limb injuries. For example, the mother in *Case 1* believed that orthodox care was better based on her past experience when the biological father financed the health care needs of her son but poverty compelled her to heed the advice to go to the TBS. It has been shown that single-mother families are more likely to live in poverty than their married counterparts as marriage increases the economic well-being of members of the family [3,8].

Secondly, the decision on seeking health care is a complex one which often needs the decisiveness and firmness of a child's biological father to make [12,13], especially in face of arrays of conflicting and often unsolicited advice from members of the extended family, community elders, grandparents, older neighbours or friends. When the biological father is not available, the largely patriarchal African society frowns upon women who exercise strong-mindedness to choose an orthodox health provider for their children against such advice [13]. This was one of the challenges faced by AA's mother *(Case 3)*. In many of these societies, the existing social system is such that members of the extended family, friends and sometimes neighbours often contribute towards defraying the cost of treatment, making them a strong influence on the choice of the type of treatment an injured person would receive [15].

Thirdly, judging accurately the severity of musculoskeletal injuries appears to be another difficulty for single-mothers. This was the situation in *Case 2* in which SK's mother misjudged a comminuted tibia fracture a trivial injury that should require only little manipulation and application of herbal ointment by a TBS. Ogunlesi et al. [16] who studied 168 mother–child pairs in Nigeria found that the leading reasons for not utilizing orthodox health services at the onset of illnesses included non-recognition of the severity of the illness and poor finances among mothers who brought their children to the emergency room. For single-mothers, this will not be unexpected as life is often more demanding because the responsibilities that are supposed to be shared by both parents is borne by a single individual [3]. Low education, which is more common in women, may also contribute [8]. It is comforting to have someone with whom to discuss the problem that may arise concerning the health and other matter concerning the children.

Fourthly, children of mother-headed families are more likely to suffer injuries because of inadequate supervision. This was demonstrated by *Case 1* in which OS play at a dangerous site was not checked by any adult, and *Case 3* in which lack of adult supervision while crossing a road caused AA to be hit by a motorcycle. Studies have shown that single-parenting, marital discord, frequent family household moves which often occur following divorce or separation, are part of the recognized risk factors for paediatric injuries [17]. This may be because in addition to having fewer financial resources, a single mother may be less able to supervise their adolescent children [7], since they are primarily responsible for both child rearing and economic support [3].

Last but not the least, the need to care for the other children may mean choosing a care provider close to the home, or one who is well-known enough in the community as to be able to live a child with him and visiting only to provide food. This was aptly exemplified by the mother of SK (*Case 2*) who had other young children to cater for at home. For her, staying in health centre with AA would mean temporary but potentially risky abandonment of her other children at home. This difficulty was unlikely to have been encountered if the marriage was not broken because married couples are more easily able to draw help in difficult situations since marriage expands one's social network and social support [8].

4. CONCLUSION

Children are not exempted from the menacing tragedy of preventable iatrogenic limb gangrene that complicates traditional bone setting. Children that are raised in single-mother families, step-parent families or families with discordant marriages appear prone, both to traumatic injuries and being taken to the TBS for care. Therefore, interventions to protect children from bonesetter's gangrene should include strengthening of the traditional family system through provision of avenues for peaceful marital conflict resolution that preserves marital unions. In addition, both mothers and fathers should be actively involved in health interventions and education programmes so that they can make informed decisions on behalf of their children.

ETHICAL APPROVAL

Ethical clearance was obtained from the subcommittee on the ethics of human experimentation of Bowen University Teaching Hospital, Ogbomoso. The study was properly explained to the patients' parents. They all voluntarily granted the consent to publish the information and the photographs of their children's condition, having been assured that anonymity will be maintained when using the information and photographs.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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