KNOWLEDGE, PERCEPTION AND PRACTICE ON MANAGEMENT OF CLUBFOOT AMONG HEALTH CARE PROVIDERS IN SELECTED HEALTH CARE FACILITIES IN KIGALI, RWANDA

Alain MUNYESHURI

[1]*, Erigene RUTAYISIRE[1],

Onesmus MARETE[1]

1. School of Public Health (Global Health), Mount Kenya University, Kigali, Rwanda

*Corresponding author

Alain MUNYESHURI

 Email: alaishuri@gmail.com

Tel: +250788668100

Abstract

Introduction: In developing countries some public health problems are related to the burden of childhood disability and sometimes are not recognized. Clubfoot is among childhood disabilities that if left untreated lead to permanent disability and affect people's ability to participate in community activities. This research aims at assessing knowledge, perception and practice on management of clubfoot among health care providers in selected health care facilities in Kigali, Rwanda. The results provided the snapshot of the extent to which medical professionals are aware of the management process of the Clubfoot in Rwanda, hence enabling stakeholders on designing how best the management of the neglected conditions can be dealt in Rwandan Context from policy to practice levels

Methods: A cross-sectional research design with both quantitative and qualitative was undertaken to achieve objectives of the study. A sample of 139 health care providers at least of one year working experience in departments related to child health were part of the study. The data were collected by means of adapted questionnaire from other settings and self-administered to the participants. The data were entered in IBM SPSS Version 21 after coding and analyzed. The quantitative data were analyzed by descriptive and inferential statistics, relationship between demographic variables, knowledge, perception and practices were reported by chi-square test at the level of significance < or = to 0.05 and confidence intervals. Thematic analysis was used to analyze qualitative data related to respondents' perceptions.

Results: The respondents were mostly in age range between 30-45 (66%), those over 10 years of working experience (45%) dominated the sample while female constitute the majority of those who responded (61%). The majority 101(73%) of the participants have poor knowledge about clubfoot condition and its management reported it. Only 38(27%) have good knowledge about club foot condition and its management. The study reported relatively

good perception towards the management of clubfoot whereby the majority 73% reported positive perceptions while only 27% reported negative perceptions towards the causes of clubfoot. The majority of the participants 85(61%) reported poor practices with regards the management of clubfoot, while only 54(39%) reported good practices. The results reported that working experience above 10 years was 7 times more likely to have good practices towards the management of clubfoot (AOR= 7.721; 95% CI= 1.887-31.595; P= 0.004). Participants with poor knowledge were likely to have poor practices though its likelihood to influence the effect was very low (AOR= 0.068; 95% CI=0.014- 0.338; P= 0.001). Negative perception was likely to influence poor practices (AOR= 9.495; 95% CI=2.467- 36.542; P= 0.001) where participants with negative perception were 9 times more likely to have poor practices towards the management of clubfoot. The levels of knowledge of health care providers on the management of clubfoot were relatively low and influence practices.

Conclusion: The present study highlighted the need to increase awareness of clubfoot condition among health care workforce; therefore, strengthening efforts in prevention and management of the condition is requisite to prevent disabilities. Basing on the results, awareness raising manuals and further training are required to boost knowledge about management of clubfoot. Further research also needs to be conducted to point out in depth picture of the condition countrywide and review treatment protocols available.

Key words: Knowledge, Perception, Practice, Clubfoot, Rwanda

1. Background of the study

Clubfoot is one of the most common anomaly in pediatrics orthopedics, affecting approximately 1–2 per 1 000 live births worldwide(Munambah, Chiwaridzo, & Mapingure, 2016). The incidence of clubfoot varies around the world. In Sweden 1.4 in 1000 children with congenital abnormalities presented Clubfoot as diagnosis (Wallander, Hovelius, & Michaelsson, 2006).

The incidence increases in population with higher density whereby the study conducted in Denmark reported 1.2 in 1,000 to be associated with clubfoot (Krogsgaard *et al.*, 2006). In Australia, 1.25 in 1000 general population had Clubfoot while in aboriginal 3.49 and 1.11 in 1000 in Caucasian population respectively (Carey, Bower, Mylvaganam, & Rouse, 2003); on the other hand 1.6 per 1000 in Belgium (Paton, Fox, Foster, & Fehily, 2010).

In developing countries some public health problems are related to the burden of childhood disability and sometimes are not recognized. The evidence shows that one out of 750 children born in the world suffer from Clubfoot among them 80% are in low

and middle income countries (Alam *et al*., 2015).

The Center for Diseases Control (CDC) reports that in the United States, among the birth defects affecting bones and muscles, clubfoot is leading with 1 in every 593 births (CDC, 2020).

Clubfoot is a complex, congenital deformity mostly prevalent in developing countries characterized by hind foot equinus, mid foot cavus and forefoot adduction which affect children (Mkandawire & Kaunda, 2004).

The reported studies show that it affects around 150,000 – 200,000 babies globally with approximately 80% in low and middle income countries(Global Clubfoot Initiative, 2020)

The incidence in developing countries show a slight increase whereby the study conducted in Malawi showed that Clubfoot affect 2 per 1000 births in a studied Queen Elizabeth Central Hospital (QECH)(Kaunda & Mkandawire, 2004); in Uganda, clubfoot accounts for 1.2 per 1000 births in a studied

population(Mathias, Lule, Waiswa, & Naddumba, 2010).

In Rwanda, since 2009 up to 2020 a number of 6350 new babies with clubfoot has been enrolled in only 13 Hospitals (Rwanda Clubfoot Program, 2019). Clubfoot can be treated with early parents awareness and early intervention with medical team involved in its management (Alsiddiky *et al*., 2019).

General public and community studies were conducted to report on awareness of clubfoot in different parts of the globe. Awareness of clubfoot among general population is reported to be low especially in parents of the child with the condition and this lead to be a lifelong disability. (Rasheed, Zaidi, Rasheed, & Hussain, 2017)

Studies reporting medical team level of awareness tend to focus on congenital deformities in general and put less emphasize on clubfoot. A study conducted in Brazil to assess performance of doctors and nurses from primary health facilities on

how they prevent congenital defects reported a fragile nature of professional knowledge about birth defects in pre-conception phase whereby 81.9% of health professionals provided health-care assistance based on protocols, and only 46.2% professionals were aware of the presence of the topic in the protocol(Ferreira, Akiba, Júnior, Figueiredo, & Abrahão, 2015). In France, a study was conducted to assess medics awareness of congenital cytomegalovirus (Ferreira *et al.*, 2015).

Rwanda as a country recognizes disability as a crosscutting area in fourth sector strategic plan of July 2018 to June 2024 (*MINISTRY OF HEALTH FOURTH HEALTH SECTOR July 2018 – June 2024*, 2018). The country ratified both the United Nations Convention on Rights of Persons with Disabilities (UNCRPD) and its optional protocol and has put in place a law to protect disabled persons in general, In addition, the country' effort to achieve SDGs include disability and social inclusion as a core element to achieve the set

vision by the United Nations (Ministry of Finance and Economic Planning Rwanda, 2019).

The concern of health workers in disability and inclusion is pivotal, and this includes awareness of neglected conditions including congenital malformation like clubfoot(Bale, Stoll, & Lucas, 2003). Studies done on awareness of congenital malformation are accumulated in general public and parents of children with deformities while this is a concern even among health care providers. The scarcity of published literature on this topic in Rwanda leads to question at which extent health care providers are aware of the condition so as early interventions are done with multidisciplinary approach.

2. Methods

Study Design:

A cross sectional design using both quantitative and qualitative approaches was used to report on knowledge, perception and practice on management of clubfoot among health care providers in selected health care facilities in Kigali, Rwanda.

3. Study setting and population

The quantitative part was conducted on medical doctors, nurses and midwives that are involved in management of diverse cases from child delivery to follow ups of the child's development. On the other hand, the qualitative part was followed up on purposively selected health care providers with administrative roles in their department, so that the researcher gets their perception on management of clubfoot decision making. Four health facilities namely Muhima Hospital, Gatenga Health center, La croix du sud Hospital and Mugendo Health Post. All were located in Kigali and purposively selected to be part of the study.

4. Sample size determination

The sample size was calculated using the formula of Taro Yamane:

$$n = \frac{N}{1 + N(e)2}$$

With

n: sample size

N: Total population

e: margin error (0.05%)

Therefore,

$$n = \frac{229}{1 + 229(0.05 * 0.05)} = 145.6$$

$$\approx 146$$

Using this above information, the calculated sample size is n= 146 participants

5. Data collection tools

Two data collection tools were used to capture the responses from the study participants.

The quantitative data collection was through a structured questionnaire. The questionnaire was adapted from other studies in the context of Rwanda and used for the present study. A permission to use the questionnaire was given by the original authors(Alsiddiky *et al*., 2019).

The questionnaire was composed by four sections: The first section was on socio-demographic variables, the second section was on knowledge regarding clubfoot, the third section on perception, the fourth section on the practices of health care workers in related to the management of

clubfoot. The second instrument was an interview guide that was structured with open ended questions to provide the deep insights on the actual meaning of the quantitative data in context.

The tool was adapted to fit the context of Rwanda especially on factors associated with the development of PTSD. In addition to the experience of flood and landslides, the variables were broadened to fit the purpose of the present research, and variables such as age, gender, socio-economic status (Level of education, family income, destruction of property,) health (Injury, death to family members), experience with previous disasters were added to the questionnaire. Other variables remained as there are but translated in the local language.

6. Data analysis

Quantitative data analysis was used to analyze the data. First, the data was entered in SPSS Version 21, coded and cleaned for data analysis. Knowledge scores was generated using the scale in the questionnaire. The cut-off point of knowledge levels was set basing on how best a participant is knowledgeable about the subject. In principle, measure of knowledge stipulates that 50% is the cutoff to determine the levels at which a person is knowledgeable about the subject or not. A percentage score was generated and classified as poor knowledge (<50%) and good knowledge (>50%)

In order to rate the practice, the overall practice score was generated by aggregating the scores for practice questions. Practice questions are 5 therefore, the maximum attainable total score was 5 and the minimum was 0. A percentage score was generated and classified as poor practice (<50%), and good practice (≥50%).

The qualitative data was analyzed thematically where themes emanating from the interviews were coded to arranged in themes

Descriptive statistics was used to give a clear picture of background variables such

as age, gender and other demographic variables. In order to report on relationship between variables, cross tabulation was generated. The relationship between independent and dependent variables was reported at 95 level of significance where the margin error was set at 5% (P Value ≤ 0.05). Chi-square tests was performed to report on different associations.

7. Ethical considerations

Data collection approval was obtained from the Mount Kenya University. In addition, the permission was sought from all study sites. All selected participants signed a written consent form before their participation in the study. There was no renumeration to participate in the study.

Results findings and discussions

1. Demographic characteristics

A total of 139 (95%) participants participated in the study out of 146 predetermined sample, while those who did not participate are only 5%.

The results in table 1 reveal that the majority of the participants fall in the age range between 30-45 (66%) while the majority have working experience over 10 years (45%), female constitute the majority of those who responded(61%), those who are married dominated the participants 105 (76%), the dominant education level of the participants was high school diploma (55%) while the majority of them work in maternity (42%) and they occupied nurses and midwifery profession(79%), participants who work in maternity were the most responded compared to their counterparts (42%).

Table 1. Socio-demographic variables

Variables		N	%
Age of the participants	<30	25	18
	30- 45	92	66
	>45	22	16
Working experience	1-5 Years	38	27
	6-10 Years	39	28
	> 10 Years	62	45
Sex of the participants	Female	85	61
	Male	54	39
Marital status of the participants	Single	34	24
	Married	105	76
Education of the participants	High school	77	55
	Degree Holder	50	36
	Postgraduate	12	9
Professional of	Medical Doctor	29	21

participants	Nurse / Midwife	110	79
Working department	Maternity	59	42
	Pediatrics	29	21
	OPD	20	14
	Vaccination	18	13
	Neonatology	13	9

2. Levels of knowledge on management of clubfoot among health care providers

The results in table 2 report the descriptive responses of the participants on questions measuring the knowledge of the participants on the management of clubfoot. The majority of the participants agreed that they have heard or read about club foot (94%). The big majority know that Clubfoot is an abnormality usually presents at birth in baby's foot which is twisted out of shape or position (94%). It is again reported that the majority (70%) know that clubfoot is not an abnormality that affect the adults characterized by adduction and plantar flexion of the foot. The big percentage are informed about the Clubfoot because they have treated or received a child with Clubfoot (56%). More than a half of the

participants know that clubfoot treatment should be best initiated between Birth and the first 12 months (63%).

In order to report the levels of knowledge; the knowledge scores were calculated whereby a composite variable was generated to sum up all knowledge questions which provides the total scores of all questions which later used to rate the levels of knowledge.

Table 2. Levels of knowledge on management of clubfoot among health care providers

Variables		N	%
Have you ever heard or read about Clubfoot?	No	8	6
	Yes	131	94
Clubfoot is an abnormality usually presents at birth in baby's foot which is twisted out of shape or position	No	8	6
	Yes	131	94
Clubfoot is an abnormality that affect the adults characterized by adduction and plantar flexion of the foot	Yes	42	30
	No	97	70
Information about the Clubfoot due to the fact that you have treated or received a child with Clubfoot	No	61	44
	Yes	78	56
Clubfoot treatment should be best initiated between Birth and the first 12 months	No	52	37
	Yes	87	63
Clubfoot treatment should be best initiated between 1 year and 4 years	Yes	34	24
	No	105	76
Clubfoot components are Midfoot Varus and Cavus ; Hindfoot Equinus and Adductus	No	52	37
	Yes	87	63
Clubfoot components are Midfoot Cavus and Adductus ; Hindfoot Varus and Equinus	Yes	79	57
	No	60	43

Figure1. Levels of knowledge

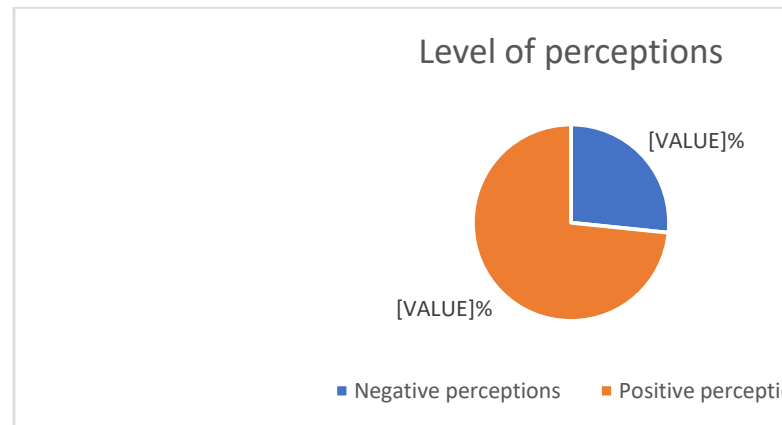**Figure 2. Levels of perceptions towards the management of clubfoot**
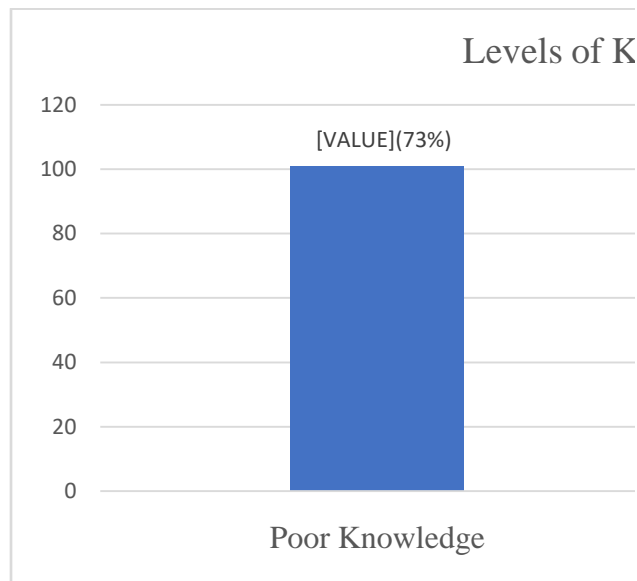
The results in figure 1 illustrates that the majority of the participants have poor knowledge about clubfoot condition whereby 101(73%) reported it. While only 38(27%) had good knowledge about clubfoot condition.

3. **Perception towards management of clubfoot among health care providers**

The level of perception in figure two shows that 73% of the participants had positive perception towards clubfoot while only 27% had negative perceptions.

Qualitative perception on management of clubfoot

The qualitative view of participants towards the perception on the cause of clubfoot

The participants were qualitatively asked insight on management of clubfoot in their respective departments and what might be their perceptions of their colleagues towards clubfoot management, and these are the themes emanated from the study:

Among the 4 interviewed participants, three of them narrated:" *congenital malformation are the reasons behind the development of clubfoot*"

Other highlighted whether the condition needs special attention in terms of care and narrated that: "*Yes it needs it because the child will be able to walk properly*"

Availability of service to manage clubfoot at health facilities

Among 4 interviewed participants, two of them confirmed that " *the participants get required medical treatments*"

Referral system in place

Participants agreed that referral is necessary for better management of people with clubfoot for quick recovery

Recommendations on a well-structured clubfoot management

Participants recommended that awareness should be increased to increase awareness on the symptoms where one participants said: "…*Establishing different offices that help those affected, to sensitize the community that it is a condition when managed on time, it heals very well*".

8. Practices towards management of clubfoot among health care providers

The results in figure 3 show that the majority of the participants 85(61%) reported poor practices with regards the management of clubfoot, while only 54(39%) reported good practices.

Figure.3. Level of practice on the management of clubfoot

Practices on the management of clubfoot

[VALUE](39%)   [VALUE](61%)

■ Poor practice   ■ Good practice
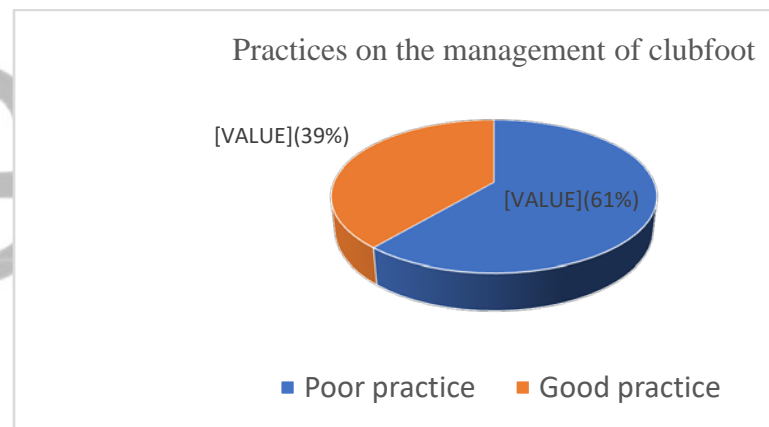
9. Factors associated with practices on clubfoot management of healthcare providers

The results in table 3 on bivariate analysis of factors associated with clubfoot management highlight that age of the

participants (X^2= 17.341, P<0.001), working experience (X^2= 29.176, P<0.001), working department (X^2= 29.950, P<0.001), level of knowledge (X^2= 7.985, P=0.005), and the level of perception (X^2= 9.016, P=0.003), are associated with practices on the management of clubfoot.

Five variables were associated with practices therefore, they were entered into multiple logistic regression analysis to confirm its association.

Table 3. Bivariate analysis of factors associated with clubfoot management

Variables		Practices on the management of clubfoot		Total	Pearson Chi-square Test	P_Value
		Poor practice	Good practice			
Age of the participants	<30	22	3	25		
	30-45	45	47	92	17.341	<0.001
	>45	18	4	22		
Participants working experience	1-5 Years	27	11	38		
	6-10 Years	10	29	39	29.176	<0.001
	> 10 Years	48	14	62		
Sex of the participants	Female	56	29	85		
	Male	29	25	54	2.062	0.151
Education of the participants	High school	46	31	77		
	Degree Holder	29	21	50	2.759	0.252
	Postgraduate	10	2	12		
Professional of participants	Medical Doctor	19	10	29		
	Nurse/Midwife	66	44	110	0.294	0.588
Working department	Maternity	23	36	59		
	Pediatrics	18	11	29		
	OPD	19	1	20	29.950	<0.001
	Vaccination	15	3	18		
	Neonatology	10	3	13		
Levels of Knowledge	Poor Knowledge	69	32	101		
	Good Knowledge	16	22	38	7.985	0.005
Level of perceptions	Negative perceptions	15	22	37	9.016	0.003

| Positive perceptions | 70 | 32 | 102 |

Multivariate analysis of factors associated with clubfoot management

In multivariate analysis, among five variables with its 15 sub-variables, only three were significant while other 12 sub-variables were not significant. Participants with above 10 years working experience were 7 times more likely to have good practices towards the management of clubfoot (AOR= 7.721; 95% CI= 1.887-31.595; P= 0.004). Participants with poor knowledge were likely to have poor practices towards the management of clubfoot though its likelihood to influence the effect was very low (AOR= 0.068; 95% CI=0.014- 0.338; P= 0.001). Negative perception was likely to influence poor practices (AOR= 9.495; 95% CI=2.467-36.542; P= 0.001) where participants with negative perception were 9 times more

likely to have poor practices towards the management of clubfoot.

Table 4. Multivariate analysis of factors associated with clubfoot management

Variables	AOR	Practices on the management of clubfoot		P-Value
		95% C.I.		
		Lower	Upper	
Age of the participants				
<30	Ref			
30- 45	.203	.013	3.113	.252
>45	3.749	.603	23.320	.156
working department				
Maternity	Ref			
Pediatrics	4.904	.559	43.049	.151
OPD	4.760	.467	48.526	.188
Vaccination	.052	.002	1.168	.063
Neonatology	2.554	.180	36.184	.488
Working experience				
1-5 Years	Ref			
6-10 Years	1.289	.245	6.771	.765
> 10 Years	7.721	1.887	31.595	**.004**
Level of knowledge				
Poor Knowledge	.068	.014	.338	**.001**
Good Knowledge	Ref			
Level of perception				
Negative	9.49	2.467	36.54	**.001**

| perception | 5 | 2 |
| Positive perception | Ref | .296 |

Discussion

The study measured the level of knowledge of the study participants on their levels of knowledge on the management of clubfoot and found out that the majority of the participants 101(73%) have poor knowledge about clubfoot condition. While only 38(27%) are knowledgeable about clubfoot condition. The reported levels of knowledge concur with the existing literature on the topic. A study conducted in Bangladesh to assess knowledge on clubfoot revealed that clinicians who treat children with clubfoot need to have an improved knowledge and skill in spreading information. This due to the results from 95 respondents shows that 93.1% of them didn't know about clubfoot before visiting health facilities and then 97% knew it after diagnosis (Alam *et al*., 2015).

The reported low levels of knowledge among the medical professionals in the present study was also reported amongst the parents and the medical team, where there was reported additional challenge to prevent clubfoot condition to become health threatening condition to the affected ones among managing teams. When the team managing clubfoot do not recognize it at the early stage, the consequences lead to end up a permanent disability to those affected one, foot pain and gait problems. These can lead to stigma from the society, limited education and employment (Global Clubfoot Initiative, 2020).

Another study conducted in this area in Uganda found that only 296 nurses and midwives of six hospitals were trained on clubfoot and then recommended reinforcement of early detection capacity among the nurses, midwives who manage the condition at early stage during child birth, immunization and follow up, and this can be done as well to boost levels of knowledge about the condition in health facilities (Naddumba, 2010).

The results show that participants have good perception towards the management of

clubfoot whereby the majority (73% %) reported positive perceptions while only 27% reported negative perceptions towards the causes of clubfoot.

The results in the present study are quite different from the study conducted elsewhere to study on perception of the community on clubfoot and its management. This is highlighted in a study conducted to assess perception and local knowledge about clubfoot in Pakistan among community members and health workers which had found out that respondents were unable to differentiate clubfoot to other foot deformities. The participants perceptions and believes were mainly confirming that lunar, solar eclipse, personal reasons, parental medical history and behavior, as well as genetically are the main causes of clubfoot (Burfat et al., 2013). In this line one community member in an interview narrated: "…*We used to hear [that a woman shouldn't move during an eclipse] when we were younger but that thinking has now changed...They say that education is*

becoming more common and, based on that, the thinking is changing. Previously, women used to say that the lunar eclipse [caused disability] but we don't think that……" (Burfat et al., 2013). In the present study only 10% of the participants agreed that evil eye and witchcraft increases the risk of clubfoot while the majority (81%) disagree with that. This is contrary to prior scholarship by (Burfat et al., 2013) that evil and eclipse can cause clubfoot. They are again contrary to the literature on local theories on clubfoot causation documented in Malawi which revealed that genetic conditions, curses and satanic actions to be the cause of clubfoot among parents/caregivers of children with clubfoot (Bedford, Chidothi, Sakala, Cashman, & Lavy, 2011).

Again in the lens with another study on perceived causes of clubfoot, the present study reported the different results where among studied 520 people who revealed that hereditary and genetic reasons were reported by 59.2% of the participants to be

the cause of clubfoot, this was followed by neurological disorders (40.8%), Twin pregnancy (8.8%), sex of the newborn, "Evil eye" and witchcraft Neurological disorders (4.8%), mispositioned fetus (24.6), cesarean section (7.7%), intrauterine deficient amniotic fluid (12.5)(Alsiddiky *et al*., 2019).

The results on practices of health care providers towards the management of clubfoot show that the majority of the participants 85(61%) reported poor practices with regards the management of clubfoot, while only 54(39%) reported good practices. This is in line with the research conducted in developing countries which reported inadequacy of treatment provisions which result into severe impairments of the condition(Owen & Kembhavi, 2012), and the main management focus was mainly surgical compared to other methods (He, Shao, & Hao, 2017). The treatment options again were the main discussed topic in developing countries, where it was reported that the efficacy of conservative treatment is

believed to be safe and efficient method to manage congenital clubfoot in view of surgical intervention and recommend that conservative management has to be the first option(He et al., 2017).

The reported poor practices in the present study can be attributed to the fact that clubfoot is a rare condition in Rwanda and might be not given much attention in assessment of the neonates, treatment and referral. In addition, the health care system itself is not considering the multiprofessional assessment of the condition at early stages. It is highlighted for better management of deformities, an interdisciplinary approach is key to determine which intervention is useful in treatment of congenital deformities. It was also added that in order to improve the management of clubfoot, shortage of trained staff in Ponseti management, missed diagnosis at birth; poor referral system and poor compliance with treatment appointments has to be taken into consideration, empowering service provider

with knowledge on clubfoot and its management. (Evans, Mamun, Chowdhury, & Kabir, 2016; Kingau & Sciences, 2012)

The present study has pointed out the good practices towards the management of clubfoot can be attributed to issues related to the factors ranging from whether the participants have enough working experience where participants with above 10 years working experience were 7 times more likely to have good practices towards the management of clubfoot (AOR= 7.721; 95% CI= 1.887-31.595; P= 0.004). Participants with poor knowledge were likely to have poor practices towards the management of clubfoot though its likelihood to influence the effect was very low (AOR= 0.068; 95% CI=0.014- 0.338; P= 0.001). Negative perception was likely to influence poor practices (AOR= 9.495; 95% CI=2.467-36.542; P= 0.001) where participants with negative perception were 9 times more likely to have poor practices towards the management of clubfoot.

The results concur with prior study which indicated that lack of training that can boost clinicians knowledge impact on standards, including the nurses and midwives attending to the child at birth that to be able to diagnose the condition, and the condition is not well managed when there is a lack of access to resources including a lack of casting materials braces, limited space as well as a shortage of healthcare professionals(Drew, Gooberman-hill, & Lavy, 2018). It was again observed in bivariate analysis that other factors such as age of the participants, working experience, and the level of perception can influence practices though they were not confirmed in multivariate model, therefore can be taken into consideration in different programs to boost the management of clubfoot. The results are quite different from the study conducted to report on factors affecting outcome after the use of the ponseti method for the management of the idiopathic clubfoot whereby the practices towards attributes of the patients associated with

poor outcome after use of Ponseti method in idiopathic clubfoot management reported that educational level (less than high school) of parents (36.7%) was the most important factor affecting the practices, and again differ from the fact that age and sex of the patients was not found to have a significant effect on practices towards the recurrence of the deformity(Dar et al., 2016).

The factors that affect the practices have to be dealt with, so as children with clubfoot deformity are treated on time. Studies suggest that by overcoming contextual barriers relating to service delivery, parental ability to adhere to treatment and safety is key to better manage deformities in general and clubfoot in particular(Owen & Kembhavi, 2012). Further in-depth studies are suggested to assess the determinants of the poor practices reported in the present study

Conclusion

The levels of knowledge of health care providers on the management of clubfoot were relatively low and therefore has a negative impact on practices. The reported practices were mainly poor tough the participants reported good perceptions towards clubfoot management. On the other hand, participants had good perception about clubfoot's causes. Therefore, further in-depth studies are suggested to assess the determinants of the poor practices reported in the present study.

completion of all activities in due time. The vote of thanks also goes to the health professionals from health facilities in Kigali City who sacrificed their time by completing the questionnaires.

CONFLICT OF INTEREST

All authors declare that no conflict of interest involves in this manuscript.

REFERENCES

Alam, Z., Haque, M. M., Bhuiyan, M. R., Islam, M. S., Haque, M., Islam, A. M., & Pradhania, M. S. (2015). Assessing Knowledge on Clubfoot Among Parents Having Children with Clubfoot Deformity. *Chattagram Maa-O-Shishu Hospital Medical College Journal*, *14*(1), 42–46. https://doi.org/10.3329/cmoshmcj.v14i1.22882

Alsiddiky, A., Alrwibaah, S., Alqahtani, A., Alnujidi, A., Alhomaidhi, A., Almasoud, A., & Alatassi, R. (2019). Assessing public awareness of clubfoot and knowledge about the importance of early childhood treatment: A cross-sectional survey. *BMC Pediatrics*, *19*(1), 1–6. https://doi.org/10.1186/s12887-019-1740-z

Bale, J. R., Stoll, B. J., & Lucas, A. O. (2003). *Reducing Birth Defects: Meeting the Challenge in the Developing World.*

Bedford, K. J. A., Chidothi, P., Sakala, H., Cashman, J., & Lavy, C. (2011). Clubfoot in Malawi : local theories of causation. *Tropical Doctor*, *41*(April), 65–67. https://doi.org/10.1258/td.2010.100261

Burfat, A., Mohammed, S., Siddiqi, O., Samad, L., Khan, M. A., & Chinoy, M. A. (2013). Understanding the knowledge and perceptions about clubfoot in Karachi, Pakistan: a qualitative exploration. *The Iowa Orthopaedic Journal*, *33*, 149–152.

Carey, M., Bower, C., Mylvaganam, A., & Rouse, I. (2003). *Talipes equinovarus in Western Australia*. 187–194.

CDC. (2020). Data & Statistics on Birth Defects.

Cloitre, M., Shevlin, M., Cr, B., Ji, B., Np, R., & Maercker, A. (2018). *The International Trauma Questionnaire : development of a self-report measure of ICD-11 PTSD and complex PTSD*. 1–11. https://doi.org/10.1111/acps.12956

Dar, R. A., Rashid, M., Bhat, M. R., Yaseen, M., Ashraf, A., & Kawoosa, A. A. (2016). Factors affecting outcome after the use of the Ponseti method for the management of idiopathic clubfoot, a retrospective study in an orthopaedic referral institute. *Acta Orthop Belg*,

82(4), 705-709. Retrieved from
https://pubmed.ncbi.nlm.nih.gov/29182
109/

Drew, S., Gooberman-hill, R., & Lavy, C.
(2018). What factors impact on the
implementation of clubfoot treatment
services in low and middle-income
countries ?: a narrative synthesis of
existing qualitative studies. *BMC
Musculoskeletal*, *19*(72), 1–10.

Evans, A. M., Mamun, M., Chowdhury, H.,
& Kabir, M. H. (2016). Walk for life -
the National Clubfoot Project of
Bangladesh : the four-year outcomes of
150 congenital clubfoot cases following
Ponseti method. *Journal of Foot and
Ankle Research*, 1–10.
https://doi.org/10.1186/s13047-016-
0175-0

Ferreira, F. R., Akiba, R., Júnior, E. A.,
Figueiredo, E. N., & Abrahão, A. R.
(2015). *Prevention of birth defects in
the pre-conception period: knowledge
and practice of health care
professionals (nurses and doctors) in a
city of Southern Brazil*. *13*(10), 657–
663.

Fontalba-navas, A., Lucas-borja, M. E., Gil-
aguilar, V., & Arrebola, J. P. (2016).
Incidence and risk factors for post-
traumatic stress disorder in a
population affected by a severe flood.

Public Health, *144*, 96–102.
https://doi.org/10.1016/j.puhe.2016.12.
015

Global Club Foot Initiative. (2020). What is
clubfoot?

He, J., Shao, J. F., & Hao, Y. (2017).
Comparison of different conservative
treatments for idiopathic clubfoot :
Ponseti ' s versus non-Ponseti ' s
methods. *Journal of International
Medical Research*, *0*, 1–10.
https://doi.org/10.1177/0300060517706
801

Kingau, N. W., & Sciences, H. (2012).
*PERCEPTIONS REGARDING
MEDICAL MANAGEMENT OF
CLUBFOOT IN Master of Science in
Physiotherapy*. (November).

Krogsgaard, M. R., Jensen, P. K., Kjær, I.,
Husted, H., Lorentzen, J., Hvass-
Christensen, B., … Sonne-Holm, S.
(2006). Increasing incidence of club
foot with higher population density:
Incidence and geographical variation in
Denmark over a 16-year period - An
epidemiological study of 936,525
births. *Acta Orthopaedica*, *77*(6), 839–
846.
https://doi.org/10.1080/1745367061001
3114

Mathias, R. G., Lule, J. K., Waiswa, G., &
Naddumba, E. K. (2010). *Incidence of*

Clubfoot in Uganda. (August), 341–344.

Ministry of Finance and Economic Planning Rwanda. (2019). *Sustainable Development Goals .2019 Rwanda Voluntary National Review (VNR) Report*.

MINISTRY OF HEALTH FOURTH HEALTH SECTOR July 2018 – June 2024. (2018). (July).

Mkandawire, N. ., & Kaunda, E. (2004). Incidence and Patterns of Congenital Talipes Equinovarus (Clubfoot) Deformity At Queen Elizabeth Central Hospital, Banter, Malawi. *East and Central African Journal of Surgery*, *9*(2), 28–31.

Munambah, N., Chiwaridzo, M., & Mapingure, T. (2016). A cross-sectional study investigating impressions and opinions of medical rehabilitation professionals on the effectiveness of the Ponseti method for treatment of clubfoot in Harare, Zimbabwe. *Archives of Physiotherapy*, *6*(1), 1–9. https://doi.org/10.1186/s40945-016-0021-5

Naddumba, E. . (2010). Preventing neglected club feet in Uganda: A challenge to the health workers with limited resources. *East African*

Orthopaedic Journal, *3*(1), 23–28. https://doi.org/10.4314/eaoj.v3i1.62560

Owen, R. M., & Kembhavi, G. (2012). A critical review of interventions for clubfoot in low and middle-income countries : effectiveness and contextual influences. *Journal of Pediatric Orthopaedics B*, *21*, 59–67. https://doi.org/10.1097/BPB.0b013e3283499264

Paton, R. W., Fox, A. E., Foster, A., & Fehily, M. (2010). Incidence and aetiology of talipes equino-varus with recent population changes. *Acta Orthopaedica Belgica*, *76*(1), 86–89.

Rasheed, N., Zaidi, I. H., Rasheed, N., & Hussain, G. (2017). Awareness Regarding Clubfoot in Parents. *JPOA*, 90–94.

Rwanda Clubfoot Program. (2019). *Annual report*.

Wallander, H., Hovelius, L., & Michaelsson, K. (2006). Incidence of congenital clubfoot in Sweden. *Acta Orthopaedica*, *77*(6), 847–852. https://doi.org/10.1080/17453670610013123