

Level of Knowledge and Practice of Orthotics in the Diabetic Foot Management in Nigeria

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ABSTRACT: Orthotists are trained to have the specialist skill and ability to make prescriptions as well as fabricate devices to achieve these offloading goals in the management of the diabetic foot. The IWGDF has been promoting sound guidelines for efficient management (offloading) of the DF and has been updating these from time to time since 1999. These guidelines could also be used as a yardstick to measure the level of knowledge and orthotic practice as well as an appraisal tool of same among group or groups of orthotic practitioners. For an efficient care of the DF, a multidisciplinary teamwork is necessary and can include the following: Diabetologist/Endocrinologist, Surgeons, specialized Nurse, Podiatrist, Orthotist (Pedotist), Physiotherapist, etc.

The cross-sectional descriptive research design was adopted for the present study in describing the level of Knowledge and practise of orthotic-conservative management of DF/DFU in Nigeria. Participants included Orthotists working in Nigerian healthcare institutions whether or not they are engaged in the conservative/offloading management of DF/DFUs.

Out of 50 questionnaire mailed out, 30 responses were obtained. More than 70% of the responding Orthotists were working in centres without a Diabetic Foot Management Team (DFMT). Only 7% of the Orthotists were well-informed of their role as spelt out in the IWGDF Guidelines. 33% were not aware of the guideline but know to an extent the orthotic roles in the DF management while 60% were not. There was no implementation of the digital technologies in the processes of diabetic foot management. Analysis showed that knowledge and awareness of the offloading guidelines was an important factor influencing the practice.

Having diabetic foot management teams in our health institutions is important to the enhancement of the skill, knowledge and success of the management of the diabetic foot. Utilization of digital technologies in the healthcare sector including orthotics could help Orthotist in Nigeria to improve the success of their offloading practices as well as generate researches in this area.

INTRODUCTION

The orthotic role in the management of the diabetic foot is becoming common around the world (McCartan and Rosenblum, 2014, Pinzur and Dart, 2001; Robinson et al., 2015). Such role aim to either prevent the progression of a diabetic foot ulcer (DFU) or target towards early treatment of DFU (AOPA 2016). According to the International Working Group on the Diabetic Foot (IWGDF), the most important aspect of DFU management is offloading (Bus et al., 2020a; Bus et al., 2020b). This entails plantar pressure redistribution or reduction on a diabetic foot (DF) and DFU respectively (AOPA 2016). Orthotists are trained to have the specialist skill and ability to make prescription as well as fabricate devices to achieve these offloading goals (AOPA 2016; Robinson et al., 2015). The IWGDF has been promoting sound guidelines for efficient management (offloading) of the DF and has been updating these from time to time since 1999

(Monteiro-Soares et al., 2020; Bus et al., 2020a; Bus et al., 2020b)

These guidelines contain general principles that can be adopted by different countries based on their peculiarities like culture, economy, pattern of DF deformities and ulcers (Kaminski et al., 2022; Tharumaraja et al., 2021). These guidelines could also be used as a yardstick to measure the level of knowledge and orthotic practice as well as an appraisal tool of same among group or groups of orthotic practitioners who are burdened with the task of offloading the DF/DFU, with the overall aim of ensuring efficient practise (Malone et al., 2021)

While some countries have not only adopted the IWGDF guidelines or related guidelines, but have also adopted same to their national peculiarities (Kaminski et al., 2022; Tharumaraja et al., 2021), there seem to be no such intervention in Nigeria. Also, there has not been any previous study to determine whether the Nigerian Orthotic community

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have the knowledge, skill and training of these offloading guideline, adequate enough to efficiently manage citizens living with DF.

The nature of the clinical setting and access to patient is also a factor worthy of discussion. For an efficient care of the DF, a multidisciplinary teamwork is necessary and can include the following: Diabetologist/Endocrinologist, Surgeons, specialized Nurse, Podiatrist, Orthotist (Pedotist), Physiotherapist, etc. (Botros *et al.*, 2017; Brocco *et al.*, 2018). The team works closely in order to address the complexity of the DF including glycemic control, infection control, peak pressure offloading, deformity and wound care, rich patient education on foot care and footwear adherence (Botros *et al.*, 2017; Yesil *et al.*, 2009).

This study therefore aimed to evaluate the level of knowledge and orthotic practise among Nigerian Orthotists in the management of DF/DFU. This study becomes relevant considering that if offloading is not appropriately done, DF might easily develop to DFU; while DFU healing might delay or lead to amputation (Bus *et al.*, 2016).

RESULTS

Years of Practice experience

	N	Minimum	Maximum	Mean	Std. Deviation
NUMBER OF YEARS OF ORTHOTIC PRACTICE	30	2	25	8.00	5.849

A total of 50 questionnaire were mailed out to the Orthotists sourced from various Whatsapp Platforms for Orthotists in Nigeria practising at different healthcare institutions. However, 30 responses were obtained showing a response

MATERIALS AND METHODS

Participants for this survey included Orthotists working in Nigerian hospitals across the six geopolitical zones and are (or not) engaged in the conservative/offloading management of DF/DFUs. Research area included all the hospitals, rehabilitation centres where there are Orthotic interventions ranging from Primary to tertiary healthcare facilities. Data was collected through the administration of a questionnaires to Clinical Orthotists working across government owned health facilities in Nigeria. The main instrument used for the data collection was a well-structured questionnaire, self-developed by the researcher following a review of literature. The cross-sectional descriptive research design was adopted for the present study in describing the level of Knowledge and practise of orthotic-conservative management of DF/DFU in Nigeria. Statistical Package for Social Sciences (SPSS) version 23 for windows was used to input, arrange, present and analyse the data the data collected.

rate of 60%. Table 4.1 shows that the minimum years of their Orthotic practice was 2 years, maximum is 25 years and mean, 8 ± 5.85 years.

Spread of Respondents across the 6 Geographical Zones of Nigeria

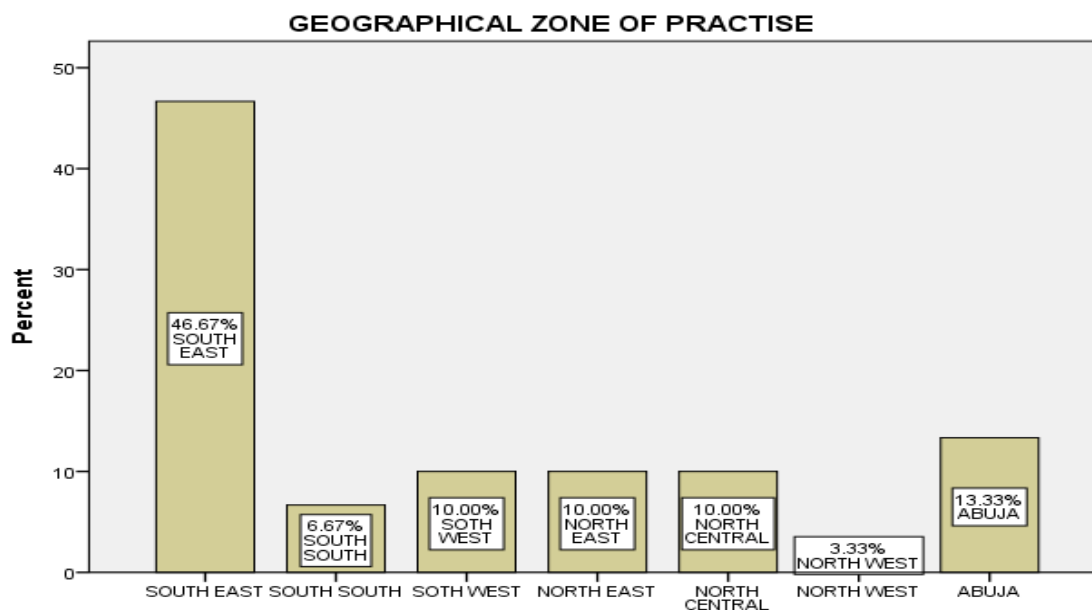


Chart 4.1: The Geographical Spread of the responding Orthotists in Nigeria

Chart 4.1 above shows that the responding Orthotists were well spread across the different zones of Nigeria and the FCT;

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with the largest spread in the South-East and least in the North-West.

Level of Centre of Practise

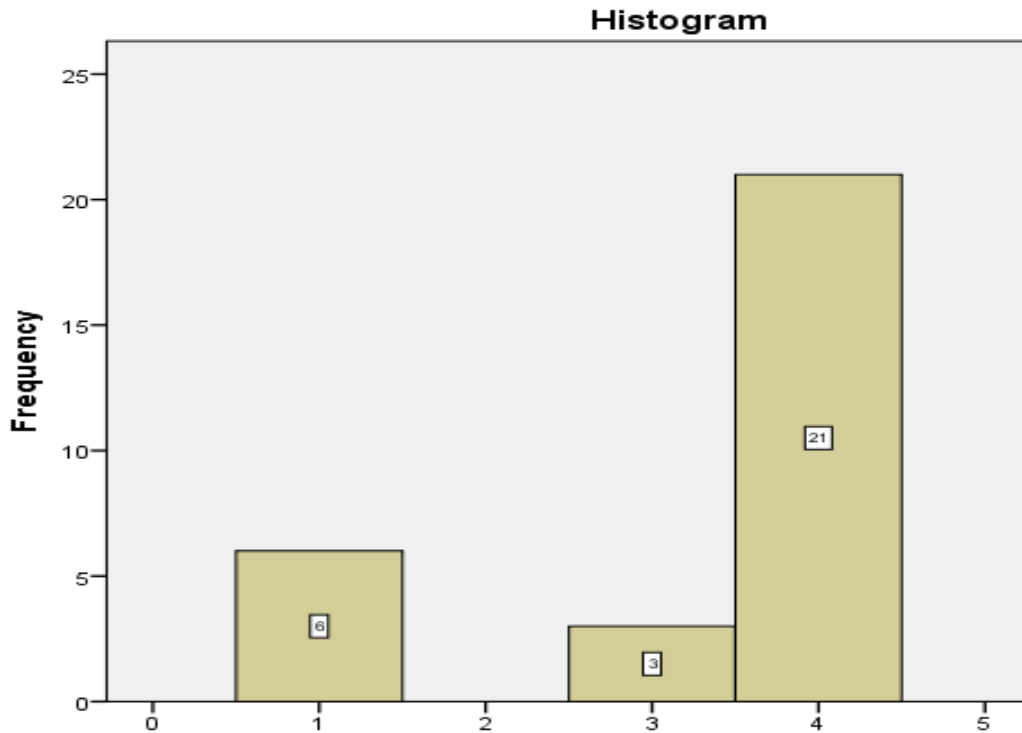


Chart 4.2: Histogram showing the Level of the Orthotist's Centre of Practice in line with the Nigerian Healthcare System.

The Chart 4.2 above shows that about 70% of the responding orthotists worked in the Orthotics Unit/Department of

Tertiary Healthcare Centres like the Federal Medical Centres, Teaching Hospitals, and National Orthopaedic Hospitals. None was found in the Primary Healthcare level. There were more practitioners in the Prosthetics and Orthotics institution than in the Secondary healthcare level.

Orthotists that are part of a specialized Diabetic Foot Management Team (DFMT)

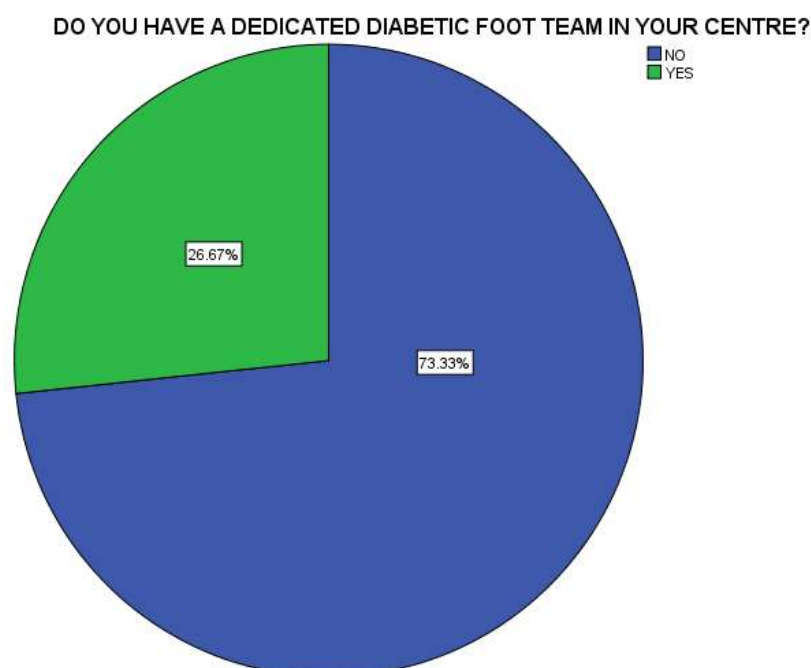


Chart 4.3: Percentage distribution of Orthotists practising as members of a functional DFMT

The chart above shows that more than 70% of the responding Orthotists are working in centres without a DFMT.

Awareness of the Orthotic role in the DFMT/IWGDF guidelines

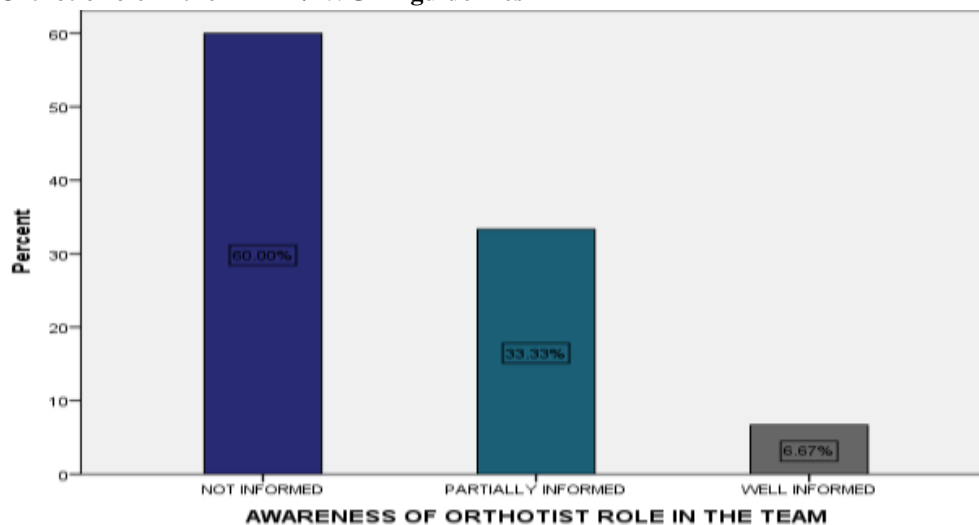


Chart 4.2: Are the Orthotists Practicing in Nigeria aware of their role in DF Management/IWGDF Guidelines?

an extent the orthotic roles in the DF management. 60% were not aware to a reasonable extent about the role orthotists play in the management of DF. Hence, 40% of respondents were aware of the roles of an Orthotists in the management of the diabetic foot (DF) whether such roles were as posited in the IWGDF guidelines or not.

Chart 4.2 above shows that only about 7% of the Orthotists were well-informed of their role as spelt out in the IWGDF Guidelines. 33% were not aware of the guideline but know to

How do the Orthotists access patients?

HOW DO YOU ACCESS PATIENTS FOR DFM?

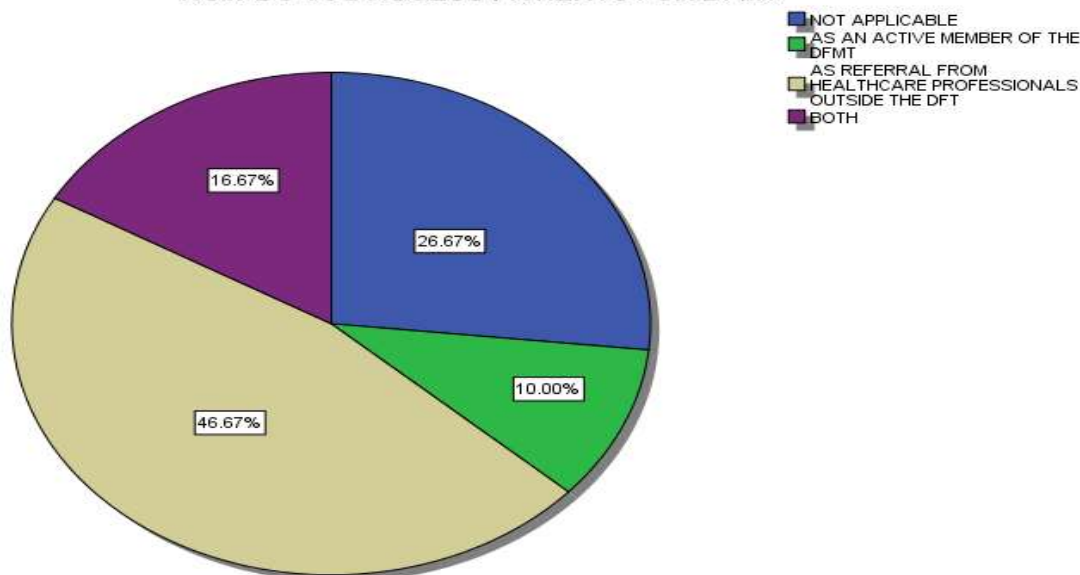


Chart 4.5: Pie chart showing the Percentage distribution on How the Orthotists access patients.

Foot Management Team (DFMT). While only 10% access patients as members of the DFMT only, 16.67% access patients from both the DFMT and outside the DFMT. Hence, 26.67% access patients from the DFMT while 63.34% access

Chat 4.5 shows that the most of the responding Orthotists access patients on a referral basis, but not from the Diabetic

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theirs from outside the DFMT. On the other hand, 26.67% do not receive referrals at all.

Table 4.2: Respondent’s Membership of relevant professional association and Trainings in DF management.

Do you belong to any specialized association for the orthotic management of the DF?		
	Frequency	Percent
NO	28	93.3
YES	2	6.7
Total	30	100.0
Do you receive specialized training on the orthotic management of the DF?		
NO	29	96.7
YES	1	3.3
Total	30	100.0

The Table 4.2 above aimed to assess whether the Orthotists are developing themselves in the orthotic management of the DF by belonging to any specialized group that discusses

same, and, whether they do receive trainings on same. More than 93% of respondents replied ‘No’ to both questions.

Method used in estimating plantar pressure distribution of the foot

Table 4.3: Distribution of Respondents based on the method used by responding Orthotists in assessing the Plantar Pressure distribution of the foot.

Method	Yes	No	Total
Performs assessment of the Plantar pressure distribution of the foot	22 (73.3%)	8 (26.7%)	30 (100%)
Observation/Assumption only (no device is used)	22 (73.3%)	8 (26.7%)	30 (100%)
Harris Mat (Analogue)	7 (23.3%)	23 (76.7%)	30 (100%)
Plantar Pressure Measurement/Detection Device (Digital)	0 (0%)	30 (100%)	30 (100%)

From Table 4.3 above, about 73% of respondents are involved in the assessment of the DF irrespective of the method used. However, all of these percentage included observation/visual inspection as a method in the process;

while only 23.3% uses Harris Mat device to estimate areas of high PP. However, there was no respondent using the digitalized method of Plantar pressure measurement/monitoring.

Method used in capturing the shape of the foot

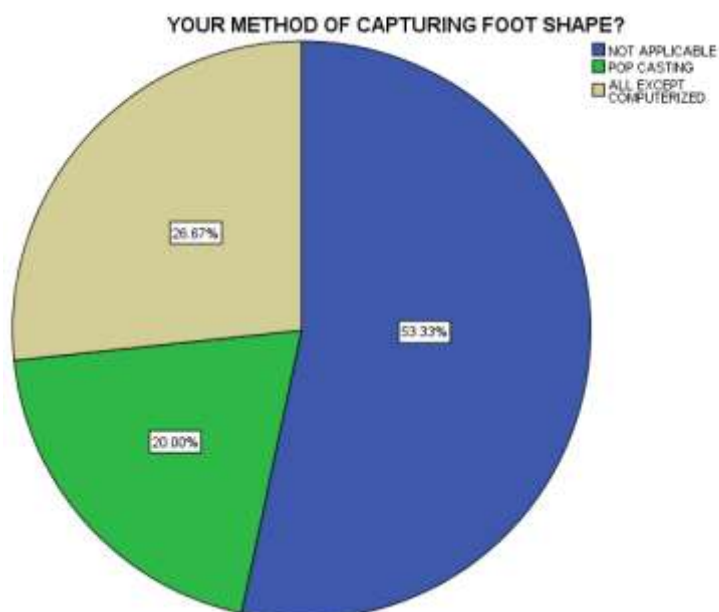


Chart 4.6: Percentage distribution of Respondents according to the method(s) they use in capturing the shape of the foot. The chart is showing only the non-zero distributions. There were 0 (zero)% for Computerized foot shape capture, 20%

utilizes POP casting only, 26% utilizes POP casting and at least one of Foot tracing and Foot impression foam. More than 50% do not capture the foot shape in their management

Method of Insole practise

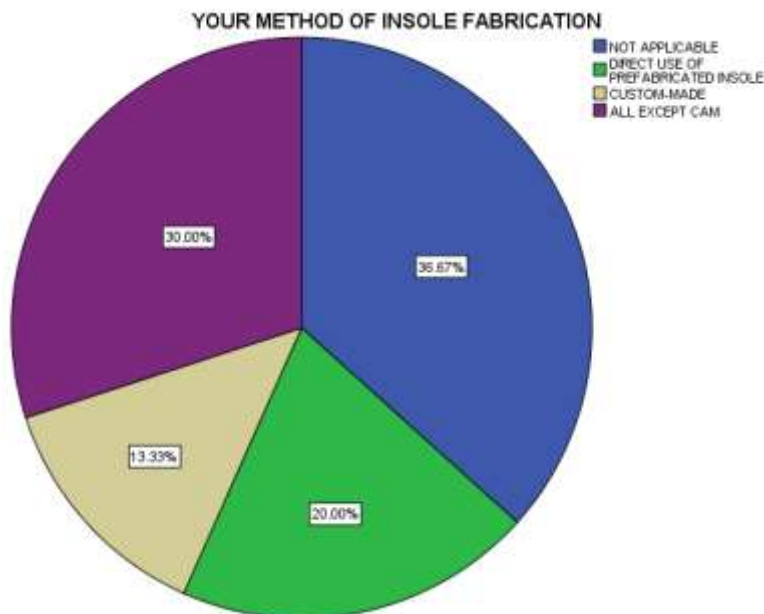


Chart 4.6: Percentage distribution of Respondents based on their method of insole fabrication

The chart 4.6 shows that while about 37% of Respondents do not implement the use of insole in their practise, 20% prefer using Prefabricated insoles while 13% use custom-made insoles. 30% utilizes a combination of insoles method (Custom-made or prefabricated or customized prefabricated insoles). None uses computer aided manufacture (CAM).

Responding Orthotists working in centres with a diabetic foot management team (DFMT) were more likely to be aware of the orthotic offloading guidelines of a diabetic foot (P = 0.001). “Number of years of orthotic practice” and “awareness of DF offloading guidelines” did not yield any significant correlation. (Correlation coefficient = 0.089; P = 0.639). There was a significant association between “awareness of the Orthotic offloading guidelines” and methods utilized in the assessment of the PP distribution of the foot” (P < 0.0001). Also, the insole practice was significantly associated with the “Awareness of the orthotic offloading guidelines” and “Method of insole fabrication” (P <0.0001).

DISCUSSION

The minimum year of practice among the respondents was 2 years. This study believes that this number of years is enough for a practitioner to understand the level of his practice. However, “number of years of practice” was not found to influence the knowledge and awareness of the orthotic

offloading guidelines of the diabetic foot (DF). The questionnaire was spread across all the 6 zones of Nigeria and the Federal Capital Territory. Also, the three National Orthopaedic Hospitals that house the 3 Government owned National Prosthetic and Orthotic Departments were also covered. Also, since they offer healthcare services at the highest level of specialization, with the tendency to have most of the medical and health specialties, the present study had about 70% coming from the tertiary healthcare centres. Only 3 respondents were found in Secondary healthcare level and none in Primary care.

Adeleye (2005) posited that there are no Orthotist, specialized foot clinic, no facility for customized footwear and offloading devices are inexistent, this could be true at the time of that study. The present study however showed that there are Orthotists in virtually all the geographical zones of Nigeria and most Tertiary healthcare centres. However, our study showed that today, orthotic practice in Diabetic foot management is still low; only 26% of institutions have a Diabetic Foot management Team/Programme. The importance of having a serious Diabetic footcare programme cannot be over-emphasized especially in this generation where diabetes is on the rise (IDF, 2021; Oguejiofor et al., 2014); and also in Nigeria where diabetes has the greatest burden in Sub-Saharan Africa (Mbanya et al., 2010; Oguejiofor et al., 2014); such burdens like hospitalization, diabetic foot disease, amputation and mortality (Oguejiofor., 2014; Ugwu et al., 2019). Although, the cost of DF and its

complications has not been estimated, it remains an issue of serious public health concern in Nigeria. Therefore, having a dedicate National Footcare programme can help in reducing this cost; just like it did in Brazil where their “Save the Diabetic Foot initiative helped to reduce limb amputation without expensive budget (Pedrosa et al., 2014).

The DFMT, in her efforts to achieve her goal of providing structured and integrated foot care pathway (Botros et al., 2017; Sushma et al., 2023; Vig et al., 2015), promotes a holistic objective assessment of the foot. The continuous teamwork intervention of a DF Management Team (DFMT) ensures intra-communication, education, research, updating of skills of the team members, the Orthotist inclusive (Botros et al., 2017). The low presence of orthotic practise in a DFMT in this study could mean that the orthotists are not getting enough clinical information about the patient to assist them in making good clinical decisions or maintain a health outcome measure in their orthotic practice.

The need for objectivity as well as standardization of protocols in the management of the DF led the IWGDF to establish well researched and evidence based guiding protocols on the management of the Foot at risk of developing DFU as well as DF (Bus et al., 2020a; Bus et al., 2020b; Schaper et al., 2020). Understanding and application of these guidelines will no doubt be a support to high-quality clinical management as well as outcomes of DFU interventions (Jarl et al., 2020). In this present study, only 7% of the Respondents were fully informed of the guidelines spelt out in the IWGDF while 93% were not. Of this 93%, 33% were partially aware of their role as orthotist in the management of the DF. The choice of Open ended questions on the questionnaire was to elicit an unadulterated response from the orthotists on their roles in the management of the DF, compare same to the IWGDF guidelines and ascertain the gaps. While many of the respondents gave answers that were close in comparison to the IWGDF guidelines, others gave answers based on their normal, routine practise of orthotics, others simply responded that they do not play any such role since there is no protocol or programme and logistics for the orthotic intervention in the management of the DF. According to Dorrestijn et al., (2010) lack of knowledge of appropriate practices could result to unnecessary morbidity and high health care costs.

Our study showed that Orthotists who are privileged to be practicing in a setting with a functional DFMT were significantly associated with awareness and knowledge of the orthotic offloading guidelines. Also a significant association between the methods of assessing PP distribution (Harris-mat as opposed to the subjective observation/assumption methods) and level of awareness of the orthotic offloading guidelines was observed. In the same vein, “method of insole treatment” was significantly associated with the level of awareness of the orthotic offloading guidelines. Hence, Awareness of the orthotic guidelines could be a significant

factor in determining the efficiency or level of orthotic intervention in DF management.

The poor proportion of membership of respondents to a professional orthotic group on DF management as well as continuous training and education of the orthotists on the Orthotic intervention in the management of the DF is well reflected in Table 4.2 of this study. These 2 parameters should not be underplayed and efforts should be made to ensure continuous update/upgrade of knowledge/skills to aid health care providers in reducing the global burden of diabetic foot disease (Schaper et al., 2020). Hence, continuous training and education of health care providers (Orthotists in this context) to ensure appropriate treatment practices, could help to ensure efficient treatments. Such could include workshops, development of treatment guidelines on diabetic foot management, membership of professional groups that will ensure periodic organization of such events.

This study also showed that none of the surveyed Orthotists utilized digital plantar pressure assessment devices in the assessment of the DF as well as in the insole design and fabrication. Reason for this could be due to the high cost and operational difficulties associated with existing commercial ones (Orlin and McPoil, 2000; Thimabut et al., 2014). The use of modern Technology for the orthotic interventions in the management of the diabetic foot would include the digitization of the process in order to quantify the process. This would therefore entail digitization of the foot assessment; for instance, using the plantar pressure assessment/measurement devices; foot shape capture (using the computer aided shape capture), model rectification and fabrication of the assistive devices using the computer aided design and manufacture (Telfer et al., 2012; Totah et al., 2017).

Little wonder there are no study from Nigeria on the biomechanical risk factors of diabetic feet (Ogbera et al., 2005); neither are there biomechanical studies comparing different orthotic interventions, since these digitized technologies can generate the data needed to make comparisons in research (Telfer et al., 2012). Also, researches investigating the biomechanical risk factors of DF and researches on the outcomes of various orthotic interventions in the DF management can only rely on the data generated from such digitized technologies (Fernando et al., 2015; Lamola et al., 2015; Patry et al., 2013). It therefore becomes obvious that until we embrace these digitized technologies in Nigeria, our ability to quantitatively predict the outcomes (evidence-based practice) of our orthotic interventions, especially in a critical area like the DF might continue to suffer and we might not be able to appraise, efficiently, our level of practice. It will continue to be a matter of a practitioners experience whether effective or not (i.e. subjectivity as opposed to objectivity (Totah et al., 2017)).

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