



## **Nigerian Physicians' Knowledge, Attitude and Practices Regarding Diabetes Mellitus in the Paediatric Age Group.**

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### **ABSTRACT**

**Background:** Despite the increasing prevalence of diabetes in the paediatric age group, information concerning Nigerian physicians' knowledge, attitude and practices with regard to diabetes care in children and adolescents is scarce.

**Objective:** To assess the knowledge, attitude and practices of physicians working in Nigeria.

**Methods:** The study examined several aspects of diabetes-related knowledge, attitude and practices of Nigerian physicians. A cross-sectional survey was conducted among physicians in four towns in four different States in Nigeria, using a self-administered questionnaire to obtain data. Statistical analysis was performed using SPSS version 16.

**Results:** A total of 288 medical practitioners from four towns in four different states in Nigeria filled the questionnaires. The distribution of participants was as follows: 25, 28, 85 and 150 from Benin (Edo State), Kano (Kano State), Ado-Ekiti (Ekiti State) and Gwagwalada (Federal Capital Territory), respectively. Questions answered correctly by more than half of the participants were: fasting plasma glucose diagnostic criterion for diabetes, 161(55.9%); best test for monitoring glycaemic control (72.9%); diabetic ketoacidosis (DKA) is an immediate complication (93.5%); insulin therapy is important in the control of childhood diabetes (86.5%); and diabetes is a dangerous disease (91.3%). Questions answered correctly by less than half of the participants were: the stronger hereditary nature of type 2 diabetes (39.6%) 10.1% and 2.8% knew that diabetes can present with fast breathing and abdominal pain respectively. Only 36.8% of the participants knew that children with diabetes should eat family diet. Concerning risk factors for diabetes, majority (82.6%) of the participant believe that eating too much sugar is a risk factor. Only 25.3% knew the correct method of storing insulin and 39.6% of participants stated that they do not know. This paucity of knowledge was more pronounced among physicians with less than ten years of medical practice experience after graduation from the medical school. Only a quarter (24.7%) of the respondents will allow an adolescent with diabetes to adjust his insulin dose.

**Conclusions:** Knowledge gaps, ambivalent attitudes and suboptimal practices regarding diabetes mellitus in childhood and adolescence were found among Nigerian physicians, irrespective of duration of practice post-graduation from the medical school. Our results suggest that most physicians require additional education, focusing on DM in order to provide an acceptable level of care to children and adolescents with diabetes mellitus.

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## **INTRODUCTION**

Worldwide, in the paediatric age group, the prevalence of type 1 diabetes mellitus (T1DM) is increasing.<sup>1-3</sup> African countries are also experiencing increase in the prevalence of T1DM in children and adolescents.<sup>1,4,5</sup> Despite the increasing prevalence of diabetes, information concerning Nigerian physicians' knowledge, attitude and practices regarding diabetes care is scarce. The general medical practitioners are front-line

healthcare providers in Nigeria. They, therefore, have an important role to play in the management of diabetes mellitus, particularly in this era of rapidly increasing prevalence of diabetes. Studies in Europe and South Asia that have assessed diabetes-related knowledge of physicians have revealed significant deficiencies.<sup>6,9</sup> Two separate studies in USA, one in Baltimore and the other in Pennsylvania, also revealed deficiencies in knowledge of physicians in the field of diabetes.<sup>10,11</sup>

In a pilot study in Iran, Peimani et al.,<sup>13</sup> found a significant deficiency in physicians' knowledge, attitude and practice with regard to diabetes.

To the best of our knowledge, there is no published study that has assessed the knowledge, attitude and practices of physicians in Nigeria regarding diabetes mellitus in childhood and adolescence. This represents a serious gap when we take into consideration the fact that Nigeria is among the top five countries with diabetes in Sub-Saharan Africa.<sup>4</sup> In addition, a review of the literature revealed that assessment of diabetes knowledge among physicians is underrepresented, even in developed countries. Khan et al.,<sup>12</sup> in their study explored several aspects of diabetes-related knowledge, attitude and practices of physicians in Saudi Arabia and concluded that there was a need for improvement in their knowledge, attitude and practices.

This is despite the rising prevalence of diabetes and the attendant substantial health-economic burden which it imposes on the resources of various African countries. For instance, reports of studies in Tanzania<sup>13</sup> and Nigeria<sup>14</sup> indicate that treatment of type 1 diabetes place a great stress on the finances of families with children suffering from diabetes. This is because of a poorly functional national health insurance scheme which force families to pay out-of-pocket for treatment of their children.<sup>15</sup> In addition, the clinical profile of African children and adolescents with diabetes mellitus is known to differ from that of their non-African counterparts. The peculiarities among Africans include high frequency of DKA in newly diagnosed cases,<sup>16-18</sup> late presentation,<sup>16,18</sup> missed diagnosis,<sup>19,20</sup> and default to clinic follow-up visits.<sup>16</sup>

Missed diagnosis is attributable to inadequate knowledge on the part of physicians and the populace.

Optimal care of children and adolescents with diabetes mellitus relies heavily on numerous diagnostic and treatment standards. Therefore, physicians must have sufficient knowledge of

these guidelines and the right attitude to deliver optimal, or at least, an acceptable level of care to such patients. This is important given that diabetes-care teams are not readily available in many healthcare facilities in Nigeria. Assessment of physicians' knowledge, attitudes and practices will be useful in identifying areas of deficiency, thereby guiding improvement in educational programmes on diabetes care among physicians. This pilot study was designed to provide an insight in that regard.

## **PARTICIPANTS AND METHODS**

This pilot survey (cross-sectional study) was conducted between August 2013 and March 2014 and involved four towns in four different states in Nigeria: Ado-Ekiti (Ekiti State), Benin (Edo State), Gwagwalada (Federal Capital Territory), and Kano (Kano State). The participants were derived from the home institution of the paediatric endocrinologist-in-training at the Paediatric Endocrinology Training Centre for West Africa, Lagos, Nigeria. A self-administered questionnaire was employed in obtaining data from physicians in those towns. Inclusion criteria were basic medical education (MBBS) and having a past clinical experience. Physicians with a specialty in endocrinology were excluded. The questionnaire was in three sections and had questions aimed at determining the participant's knowledge, attitudes and practices with regard to T1DM in the paediatric age group. The questionnaire was reviewed by two of the co-authors who are trained paediatric endocrinologists (AOO and EEO) and was also pretested on 20 doctors at the Lagos University Teaching Hospital (LUTH). Ethical approval was obtained from the Ethics and Research Committee of the LUTH. Consent was obtained from the participants after explaining the purpose of the study.

In our study, to allow for simplifying of application and interpretation of results, we considered 50% as a cut-off point, a criterion for desirable level of physicians' knowledge, attitude and their practice.

The statistical method was descriptive and the responses were analyzed, using SPSS statistical software version 16.0.

## RESULTS

A total of 288 medical practitioners from four towns in four different states in Nigeria filled the questionnaires. The distribution of participants was as follows: 25, 28, 85 and 150 from Benin (Edo State), Kano (Kano State), Ado-Ekiti (Ekiti State), and Gwagwalada (Federal Capital Territory), respectively. The mean duration of practice post-graduation from the medical school among participants was  $8.0 \pm 4.7$  years (95% confidence interval, CI = 7.46 - 8.54). The other socio-demographic characteristics of the participants are depicted in Table I. A positive family history of diabetes mellitus was present in 21.9% of the participants.

### Knowledge of physicians

As shown in Table II, questions answered correctly by more than 50% of the participants were questions on best test for diabetes mellitus (DM), diagnostic fasting blood glucose, clinical manifestations of DM, co-morbidities, treatment, immediate and long term complications. Questions on dangerous nature of DM, risk factors, management of DM, care of diabetic child, insulin administration, HbA1c and management of DM in pregnancy.

On the other hand, questions answered wrongly by more than 50% of the participants bothered on inheritance DM, eating the same family diet by the child with DM, self adjustment of insulin by adolescents and methods of storage of insulin. Only 2.1% of participants knew overweight is a risk factor for diabetes.

Concerning method of storage of insulin, a significantly greater proportion (37.0%) of physicians who have practiced for more than 10 years knew the correct answer compared with their counterparts (23.0%) whose medical practice was 10 years and below;  $\chi^2 = 4.046$ ,  $df = 1$ ,  $p = 0.044$ .

In addition, with regard to whether or not diabetic adolescents should be allowed to adjust their insulin, a greater proportion (36.7%) of physicians who have practiced for more than 10 years answered correctly compared with their counterparts (22.2%) whose medical practice was 10 years and below. The difference was statistically significant ( $\chi^2 = 4.640$ ,  $df = 1$ ,  $p = 0.031$ ).

### Attitude and practices of physicians

A greater proportion (49%) of doctors with > 10 years of medical practice experience compared to 34.3% of those with medical practice experience  $\leq$  10 years will rightly allow diabetic children to partake in all family diets. But was not significant ( $\chi^2 = 3.76$ ,  $df = 1$ ,  $p = 0.05$ ).

A significantly higher proportion (31.8%) of doctors working in paediatrics and medicine departments compared to 20.2% of those in other departments correctly will allow diabetic adolescents to adjust their insulin;  $\chi^2 = 4.919$ ,  $df = 1$ ,  $p = 0.027$ . Also, a significant higher proportion physicians (44.5%) from paediatrics and medicine departments compared to 32.0% of doctors from other departments will rightly allow diabetic children to partake of all family diet;  $\chi^2 = 4.584$ ,  $df = 1$ ,  $p = 0.032$ .

Table I: Sociodemographic characteristics of the participants  $N=288$

| Parameter         | Categories         | Number | Percentage |
|-------------------|--------------------|--------|------------|
| Gender            | Male               | 173    | 60.1       |
|                   | Female             | 115    | 39.9       |
| Age in years      | 21-30              | 108    | 37.5       |
|                   | 31-40              | 145    | 50.3       |
|                   | 41-50              | 25     | 8.7        |
|                   | 51-60              | 8      | 2.8        |
|                   | > 60               | 2      | 0.7        |
|                   | Total              | 288    | 100.0      |
| Marital status    | Married            | 151    | 52.4       |
|                   | Single             | 127    | 44.1       |
|                   | Separated/Divorced | 10     | 3.5        |
| Years of practice | $\leq 10$          | 239    | 83.0       |
|                   | $> 10$             | 49     | 17.0       |
| Place of practice | Public/Government  | 257    | 89.2       |
|                   | Private/NGO        | 31     | 10.8       |

**Table II: Summary of responses to questions used in assessing the knowledge, attitude and practices of participants.**

| Questions  | Options                       | Responses (%) |
|--|-------------------------------|---------------|
| <b>Related To Knowledge</b>  |                               |               |
| What is the fasting blood glucose level for diabetes mellitus?       | 110mg/dl                      | 18.1          |
|  | 126mg/dl*                     | 55.9          |
|  | 140mg/dl                      | 16.3          |
|  | Do not know                   | 9.7           |
| What test is best for monitoring diabetes control?                   | Urine glucose                 | 0.3           |
|  | Blood glucose*                | 72.9          |
|  | HbA1C                         | 25.3          |
|  | Do not know                   | 1.5           |
| Which type of diabetes is strongly hereditary in nature?             | Type 1 diabetes               | 57.3          |
|  | Type 2 diabetes*              | 39.6          |
|  | Gestational diabetes          | 1.4           |
|  | Do not know                   | 1.7           |
| Diabetes mellitus can present with the following symptoms            | Abdominal pain                | 2.8           |
|  | Fast breathing                | 1.4           |
|  | Recurrent genital candidiasis | 10.1          |
|  | All of the above*             | 84.7          |
|  | Do not know                   | 1.0           |
| What other co-morbid conditions may be associated with diabetes      | Hypertension                  | 3.1           |
|  | Obesity                       | 2.4           |
|  | Hyperlipidaemia               | 0.3           |
|  | All of the above*             | 92.4          |
|  | Do not know                   | 1.8           |
| A child diagnosed of diabetes mellitus should be treated with:       | Oral glucose-lowering agent   | 5.9           |
|  | Diet alone                    | 3.8           |
|  | Insulin injection*            | 86.5          |
|  | No treatment                  | 0.7           |
|  | Do not know                   | 0.7           |
| Which of the following is not an early symptom of hypoglycaemia?     | Palpitation                   | 13.9          |
|  | Sweating                      | 2.4           |
|  | Polyuria*                     | 73.3          |
|  | Dizziness                     | 5.6           |
|  | Do not know                   | 4.8           |
| Which of these is not a long-term complication of diabetes mellitus? | Neuropathy                    | 1.0           |
|  | Nephropathy                   | 1.7           |
|  | DKA*                          | 93.5          |
|  | Retinopathy                   | 1.0           |
|  | Do not know                   | 2.8           |
| A child with diabetes mellitus should:                               | Have special diet             | 46.9          |
|  | Avoid carbohydrate            | 1.0           |
|  | Eat regular family diet*      | 36.8          |
|  | None of the above             | 9.4           |
| The following are risk factors for developing diabetes except:       | Do not know                   | 5.9           |
|  | Overweight                    | 2.1           |
|  | Family history of diabetes    | 0.7           |
|  | Eating too much sugar*        | 2.7           |
|  | Autoimmune disorders          | 8.3           |
| Do not know  | 6.2                           |               |
| <b>Related to attitude</b>   |                               |               |
| Do you think diabetes is a dangerous disease?                        | Yes*                          | 91.3          |
|  | No                            | 6.9           |
|  | Do not know                   | 1.8           |
| Should an adolescent be allowed to adjust insulin on his own?        | Yes*                          | 24.7          |
|  | No                            | 65.           |
|  | Do not know                   | 9.7           |
| What is most important in the management of diabetes?                | Oral drugs                    | 0.7           |
|  | Education*                    | 91.           |
|  | Insulin                       | 3.5           |
|  | None of the above             | 1.7           |
|  | Do not know                   | 2.4           |

**Table II continued**

| Questions   | Options                       | Responses (%) |
|---|-------------------------------|---------------|
| Who should be involved in the care of a diabetic patient?     | Teacher                       | 1.0           |
|   | Parents                       | 4.9           |
|   | Friends                       | 0.3           |
|   | All of the above*             | 93.8          |
| Childhood diabetes  | Is a life-time disease*       | 81.9          |
|   | Can be overcome with age      | 4.9           |
|   | Limits academic potential     | 1.0           |
|   | All of the above              | 6.2           |
| Do not know   | 6.0                           |               |
| <b>Related to practices</b>                                   |                               |               |
| In the administration of insulin, it should be given:         | Intramuscularly               | 7.6           |
|   | Intradermally                 | 3.5           |
|   | Subcutaneously*               | 82.3          |
|   | Do not know                   | 6.6           |
| The following is/are important in the management of diabetes: | Exercise                      | 1.0           |
|   | Self-blood-glucose monitoring | 0.3           |
|   | Healthy dietary habit         | 0.7           |
|   | All of the above*             | 97.2          |
|   | Do not know                   | 0.8           |
| Insulin may be stored in the following ways:                  | Room temperature              | 12.8          |
|   | Deep freezer                  | 12.2          |
|   | Clay water pot*               | 25.3          |
|   | All of the above              | 39.6          |
|   | Do not know                   | 10.1          |
| HbA1C assesses blood glucose control over:                    | 6 to 8 months                 | 14.9          |
|   | 2 to 3 months*                | 63.5          |
|   | 2 to 3 weeks                  | 3.5           |
|   | None of the above             | 5.6           |
|   | Do not know                   | 12.5          |
| Pregnant diabetic patient should be treated with:             | Oral glucose-lowering agent   | 8.3           |
|   | Diet                          | 3.8           |
|   | Insulin*                      | 75.7          |
|   | Do not know                   | 12.2          |

\*Correct answer

## DISCUSSION

The results of our survey indicate that a significant proportion of the participants lacked important knowledge related to diabetes mellitus (DM). A major weakness was in the field of diagnosis of childhood DM. Although fast breathing and abdominal pain are well recognized features of DM, most of the participants were unaware of this. The implication in clinical practice is that most of these physicians will miss the diagnosis. Our finding is supported by the report of studies in Tanzania,<sup>19</sup> in Tunisia,<sup>20</sup> and in Iran,<sup>21</sup> all of which emphasized the frequent occurrence of missed diagnosis. A study in Kano, Nigeria also highlighted the problem of missed diagnosis.<sup>22</sup>



Missed diagnosis is an important risk factor for presentation in ketoacidosis in newly diagnosed cases of DM,<sup>23</sup> with a resultant threat to life. In addition, the results of our survey revealed that the participants' knowledge concerning correct fasting plasma glucose cut-off value diagnostic of DM was poor. In this regard, just above half of the participants knew the correct answer. A similar result was found in two separate studies – one in Pakistan<sup>7</sup> and the other in Iran.<sup>21</sup>

Knowledge strongly influences the attitude and practices of an individual physician. Only about one-third of the participants in our survey will allow a child with diabetes to eat the same food as other members of the family. Majority of the participants believed that a child with diabetes should eat a special “diabetes diet.” This is a reflection of inadequate knowledge of medical nutrition therapy with regard to management of DM. This finding is not surprising as similar observation has been reported from Israel<sup>24</sup> and Iran.<sup>21</sup> These findings reflect a general poor knowledge among physicians with regard to medical nutrition therapy in diabetes care. The clinical implication is that most physicians caring of children and adolescents with diabetes need education that focuses on nutrition. It is worthy of note that only a quarter of the participants in our survey will allow an adolescent with diabetes to adjust his insulin dose, reflecting suboptimal practice. Practice and attitudinal behaviours can be changed into more positive ones by improving knowledge. Despite the fact that majority of the participants considered insulin the most effective therapy in childhood diabetes, their knowledge regarding storage of insulin was poor. This is worrisome because insulin is considered one of the most effective therapies for achieving glycaemic control, thereby preventing immediate and long-term complications. Poor storage of insulin could result in impairment of its efficacy, resulting in poor prognosis.

Our survey revealed that the participants had a major weakness in knowledge regarding the risk

factors for DM. A significant number of the participants believed that eating too much sugar is a risk factor. This misunderstanding need to be corrected to enable such physicians to provide appropriate counselling to the patient/parents with regard to some myths and fallacies related to DM. This approach will remove blame from the parents and family of the patient, thereby creating a home environment conducive for a diabetes care team to thrive. This is important because it is recommended that the initial process of education of individuals with a newly diagnosed DM should involve dealing with myths and fallacies.<sup>25</sup> For the physician to do this, they need to equip themselves with the correct information. Also, most of the participants were unaware that overweight/obesity was a risk factor for diabetes in the paediatric age group. In order to prevent overweight/obesity in children and adolescents (and by extension, DM) healthy eating habits and exercise should be emphasized by the health care provider at every opportunity.

In conclusion, knowledge gaps, ambivalent attitudes and suboptimal practices regarding DM in the paediatric age group were found among physicians working in Nigeria, irrespective of duration of experience in medical practice. Our results suggest that most physicians require additional education, focusing on DM in order to provide an acceptable level of care to children and adolescents with DM. One limitation of the study was our inability to obtain information about the physicians' source of information. For example, whether the physicians had experiences in diabetes clinics or they participated in diabetes workshops and/or training courses.

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