

Poor Glycaemic Control among Diabetic Patients: A Review on Associated Factors

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ABSTRACT

Diabetes mellitus has become a major public health issue with high morbidity and mortality rates in the world. A lot of efforts have been done by both private and public organization to help diabetic patients but it is still ravaging the people and the economy. Factors such sex, age, diet and life style are risk factors associated with dyslipidemia and poor glycaemic control. A great efforts should be directed on prevention of diabetes and developing the best treatments for improved well-being of the patients.

Keywords: diabetic patients, associated factors, glycaemia, poor glycaemic control.

INTRODUCTION

Diabetes mellitus has become a major public health issue with high morbidity and mortality rates in the world [1-8]. In India, a retrospective observational research which aimed to evaluate the factors which predict poor glycaemic control as measured by glycosylated hemoglobin and to identify predictors that contribute to poor glycaemic control among 657 diabetic patients showed that 514 patients or 78.2% had poor glycaemic control [9-13]. Another observational, cross-sectional and descriptive study conducted in India showed that based on HbA1c values, 91.8% of diabetic patients had poor glycaemic control while only 8.2% type 2 diabetic patients had control [10-16]. In Jordania, a research was conducted to determine the factors associated with poor glycaemic control among Jordanian patients with type 2 diabetes mellitus got among 917 patients with DM 65.1% had a HbA1c of more than 7% [11]. A cross-sectional study which aim was to investigate the glycaemic control status and the factors influencing poor glycaemic control among adult with type 2 diabetes mellitus in Saudi Arabia showed that 74.9% of participants had poor blood glycaemic control [12-20]. A cross-sectional study conducted by in Asmara, Eritrea which aim was to study the glycaemic control and lipid profiles and associated risk factors in one of the major DM follow up clinics in Eritrea found a prevalence of 76.7% of poor glycaemic control among those patients [13-25]. A cross sectional study conducted in Ethiopia which had the purpose to determine the factors associated with poor glycaemic control among type 2 diabetes patients and found that of a total of 102 patients, 50% had a mean fast blood glucose level of more than 126 mg/dl with three month consecutive measurement resulting in poor glycaemic control [14-27].

Factors Associated with Poor Glycemic Control among Diabetes Patients

Sociodemographic Factors Associated with Poor Glycemic Control among Diabetes Patients

During their study Achila *et al.* (2020) in Eritrea found that the sociodemographic factors such sex was a risk factor associated with dyslipidemia and poor glycemic control (62% of participants). They found also that 36.6% of patients with poor glycemic control were having a primary High level of education, 31.7% secondary level and 15.2% illiterate. In Ethiopia, Fekadu *et al.* [15] during their hospital-based study conducted among type 2 diabetic patients found that the mean age of diabetic patients with poor glycemic control was 43 ± 12.4 years and 51.8% were males. Gebreyohannes *et al.* [16] in their review found that several predictors of glycemic control were reported by different studies such younger age, male sex, being married and living in rural areas were all associated with poor glycemic control. Kakade *et al.* [10] in India found that in age group below 50 years 88% of patients had poor glycemic control, in age group 50-59 years 91.1% had poor glycemic control and in age group above 60 years 95.7% had poor glycemic control. They found that 53.6% of participants with poor glycemic control were males. During their study, Woldu *et al.* [14] found that patients with age in between 51-60 years and age 61-70 years were poorly managed their blood glucose level compared to the other age group under study. The above studies revealed conceptual and contextual gaps. Conceptually, all of the above literature focused on diabetic type 2 patients which can explain the high prevalence among patients above 50 years. In our context, all diabetic patients (type 1 or 2) will be involved in the study. At the contextually level, any study has been published in Uganda concerning the glycemic control among diabetic patients.

Medical Factors Associated with Poor Glycemic Control among Diabetes Patients

In their cross-sectional study, Achila *et al.* [13] found that reduction in eGFR was associated with HbA1C of more than 7%. They found that 62.1% of participants with poor glycemic control were having dyslipidemia with total cholesterol of more than 200 mg/dl and 81.6% had LDL-C of more than 100 mg/dl and 56.3% had a TG of more than 150 mg/dl. They found also that 87.5 % of patients with poor glycemic control were not respecting the diabetic diet, 76.1% of them were not doing physical exercise and 75.8% were taking alcohol. Alzaheb and Altemani [12] in Saudi Arabia found that longer diabetic duration of more than 10 years and sedentary life style were associated with poor glycemic control. For Haghighatpanah *et al.* [9], 42.1% of patients were on insulin mono-therapy and 36.6% of the patients were on combination therapy that included an oral hypoglycemic agent and insulin. They found also that 44.6 % of patients with poor glycemic control were having duration of the disease for more than 10 years and 39% had a family history of diabetes mellitus. Fekadu *et al.* [15] in Ethiopia found that 67.5% of patients with poor glycemic control were not being following their general dietary program correctly and 32% of them never attended diabetic education; 22.8% of the patients had greater than 10 years' duration on treatment. They found also that poor glycemic control was significantly associated with inadequate physical exercise and smoking.

The review of Gebreyohannes *et al.* [16] showed that longer duration of diabetes and insulin-induced lipohypertrophy were associated with poor glycemic control and the presence of complications indicated poor glycemic control. The review showed also that patients who were on monotherapy with oral antidiabetic medications had better glycemic control than insulin monotherapy and the combination of two oral antidiabetic medications. In India, Kakade *et al.* [10] research showed that diabetes self-care practices (glucose management and dietary control) were significantly associated with poor glycemic control. They found also that 61.4% of patients with poor glycemic control were having duration of diabetes of less than 7 years, 42.7% of the participants were having cardiovascular complications and 84.1% of them were on oral hypoglycemic agents alone. Katthab *et al.* [11] in Jordania found in their multivariate analysis that increased duration of diabetes more than 7 years versus less than 7 years, not following eating plan as recommended by dietitians, negative attitude towards diabetes, and increased barriers to adherence scale scores were significantly associated with increased odds of poor glycemic control. From the above literature contextual and conceptual gaps have emerged, all the above studies were conducted out of Uganda and conceptually, the medical factors were studied among type 2 diabetic patients. This study will be conducted in Central-Uganda and will involve all diabetic patients.

CONCLUSION

Diabetes mellitus has become a major public health issue with high morbidity and mortality rates in the world. Factors such sex, age, diet and life style are risk factors associated with dyslipidemia and poor glycemic control. A great efforts should be directed on prevention of diabetes and developing the best treatments for improved well-being of the patients.

REFERENCES

1. Galano ES, Yustuf SA, Ogbonnia SO, Ogundahunsi OA, Obeagu EI, Chukwuani U, Okafor CJ, Obianagha NF. Effect of Extracts of Kigelia Africana Fruit and Sorghum Bicolor Stalk on the Biochemical Parameters

- of Alloxan-Induced Diabetic Rats. *Journal of Pharmaceutical Research International*. 2021 Apr 26;33(25B):86-97.
2. Ifediora AC, Obeagu EI, Akahara IC, Eguzouwa UP. Prevalence of urinary tract infection in diabetic patients attending Umuahia health care facilities. *J Bio Innov*. 2016;5(1):68-82.
 3. Kama SC, Obeagu EI, Alo MN, Ochei KC, Ezugwu UM, Odo M, Ikpeme M, Ukeekwe CO, Amaeze AA. Incidence of Urinary Tract Infection among Diabetic Patients in Abakaliki Metropolis. *Journal of Pharmaceutical Research International*. 2020 Nov 17;32(28):117-21.
 4. Okafor CJ, Yusuf SA, Mahmoud SA, Salum SS, Vargas SC, Mathew AE, Obeagu EI, Shaib HK, Iddi HA, Moh'd MS, Abdulrahman WS. Effect of Gender and Risk Factors in Complications of Type 2 Diabetic Mellitus among Patients Attending Diabetic Clinic in Mnazi Mmoja Hospital, Zanzibar. *Journal of Pharmaceutical Research International*. 2021 May 25;33(29B):67-78.
 5. Obeagu EI, Obeagu GU. Utilization of Antioxidants in the Management of Diabetes Mellitus Patients. *J Diabetes Clin Prac*. 2018;1(102):2.
 6. Obeagu EI, Okoroiwu IL, Obeagu GU. Some haematological variables in insulin dependent diabetes mellitus patients in Imo state Nigeria. *Int. J. Curr. Res. Chem. Pharm. Sci*. 2016;3(4):110-7.
 7. Anyiam AF, Obeagu EI, Obi E, Omosigho PO, Irondi EA, Arinze-Anyiam OC, Asiyah MK. ABO blood groups and gestational diabetes among pregnant women attending University of Ilorin Teaching Hospital, Kwara State, Nigeria. *Int J Res Rep Hematol*. 2022;5:113-21.
 8. Okoroiwu IL, Obeagu EI, Obeagu GU, Chikezie CC, Ezema GO. The prevalence of selected autoimmune diseases. *Int. J. Adv. Multidiscip. Res*. 2016;3(3):9-14.
 9. Haghghatpanah, M., Nejad, A. S. M., Haghghatpanah, M., Thunga, G., & Mallayasamy, S. (2018). Factors that correlate with poor glycemic control in type 2 diabetes mellitus patients with complications. *Osong public health and research perspectives*, 9(4), 167.
 10. Kakade, A. A., Mohanty, I. R., & Sandeep, R. (2018). Assessment of factors associated with poor glycemic control among patients with type II diabetes mellitus. *Integr Obes Diabetes*, 4(3).
 11. Khattab, M., Khader, Y. S., Al-Khawaldeh, A., & njlouni, K. (2010). Factors associated with poor glycemic control among patients with type 2 diabetes. *Journal of Diabetes and its Complications*, 24(2), 84-89.
 12. Alzaheb, R. A., & Altemani, A. H. (2018). The prevalence and determinants of poor glycemic control among adults with type 2 diabetes mellitus in Saudi Arabia. *Diabetes, metabolic syndrome and obesity: targets and therapy*, 11, 15.
 13. Achila, O. O., Ghebretinsae, M., Kidane, A., Simon, M., Makonen, S., & Rezene, Y. (2020). Factors Associated with Poor Glycemic and Lipid Levels in Ambulatory Diabetes Mellitus Type 2 Patients in Asmara, Eritrea: A Cross-Sectional Study. *Journal of Diabetes Research*, 2020.
 14. Woldu, M. A., Wami, C. D., Lenjisa, J. L., Tegegne, G., Tesafye, G., & Dinsa, H. (2014). Factors associated with poor glycemic control among patients with type 2 diabetes mellitus in Ambo Hospital, Ambo; Ethiopia. *EndocrinolMetabSynd*, 3(143), 2161-1017.
 15. Fekadu, G., Bula, K., Bayisa, G., Turi, E., Tolossa, T., & Kasaye, H. K. (2019). Challenges And Factors Associated With Poor Glycemic Control Among Type 2 Diabetes Mellitus Patients At Nekemte Referral Hospital, Western Ethiopia. *Journal of Multidisciplinary Healthcare*, 12, 963.
 16. Gebreyohannes, E. A., Netere, A. K., & Belachew, S. A. (2019). Glycemic control among diabetic patients in Ethiopia: A systematic review and meta-analysis. *PloS one*, 14(8).
 17. Aja PM, IO Igwenyi, PU Okechukwu, OU Orji, EU Alum (2015). Evaluation of anti-diabetic effect and liver function indices of ethanol extracts of *Moringa oleifera* and *Cajanus cajan* leaves in alloxan induced diabetic albino rats. *Global Veterinaria* 14 (3), 439-447
 18. Offor C.E., P.C. Ugwu Okechukwu and U. Alum Esther (2014). The Anti-Diabetic Effect of Ethanol Leaf-Extract of *Allium sativum* on Albino Rats. *International Journal of Pharmacy and Medical Sciences* 4 (1): 01-03.
 19. Alum, E. U. ., Umoru, G. U. ., Uti, D. E. ., Aja, P., Ugwu, O. P. ., Orji, O. U. ., Nwali, B. U. ., Ezeani, N. ., Edwin, N. ., & Orinya F.O.(2022). Hepato-Protective Effect of Ethanol Leaf Extract of *Datura Stramonium* in Alloxan-Induced Diabetic Albino Rats. *Journal of Chemical Society of Nigeria*, 47 (5): 1165 – 1176.
 20. Enechi, O. C., Oluka, I. H., Ugwu, O. P., & Omeh YS (2013). Effect of ethanol leaf extract of *Alstonia boonei* on the lipid profile of alloxan induced diabetic rats. *World Journal of Pharmacy and Pharmaceutical Sciences*, 2 (3), 782-795.
 21. Ugwu Okechukwu P.C. and Amasiorah V.I. (2020). The effects of crude ethanol root extract and fractions of *Sphenocentrum jollyanum* on the lipid profile of streptozotocin-induced diabetic wistar albino rats. *IDOSR Journal of Biology, Chemistry and Pharmacy* 5 (1), 36-46
 22. Ugwu Okechukwu P.C. and Amasiorah V.I. (2020). The In Vivo Antioxidant Potentials of the Crude Ethanol Root Extract and Fractions of *Sphenocentrum jollyanum* on Oxidative Stress Indices in

- Streptozotocin-Induced Diabetic albino rats IDOSR Journal of Biology, Chemistry and Pharmacy, 5(1): 26-35.
23. Ugwu OPC, EU Alum, MB Okon, PM Aja, EI Obeagu, EC Onyeneke (2023). Ethanol root extract and fractions of *Sphenocentrum jollyanum* abrogate hyperglycaemia and low body weight in streptozotocin-induced diabetic Wistar albino rats. RPS Pharmacy and Pharmacology Reports 2 (2), rqad010.
 24. Okechukwu P. C. Ugwu, Esther Ugo Alum, Emmanuel I. Obeagu, Michael Ben Okon, Patrick M. Aja, Awotunde Oluwasegun Samson, Mariam Oyedeji Amusa and Adeyinka Olufemi Adepoju (2023). Effect of Ethanol leaf extract of *Chromolaena odorata* on lipid profile of streptozotocin induced diabetic wistar albino rats. IAA Journal of Biological Sciences 10 (1), 109-117
 25. Okechukwu P. C. Ugwu, Emmanuel I. Obeagu, Esther Ugo Alum, Michael Ben Okon, Patrick M. Aja, Mariam Oyedeji Amusa, Adeyinka Olufemi Adepoju and Awotunde Oluwasegun Samson (2023). Effect of Ethanol Leaf extract of *Chromolaena odorata* on hepatic markers in streptozotocin-induced diabetic wistar albino rats. IAA Journal of Applied Sciences 9 (1), 46-56.
 26. Udeh Sylvester, O.F.C. Nwodo, O.E. Yakubu, E.J. Parker, S. Egba, E. Anaduaka, V.S. Tatab, O.P. Ugwu, E.M. Ale, C.M. Ude and T.J. Iornenge M.C. (2022). Effects of Methanol Extract of *Gongronema latifolium* Leaves on Glycaemic Responses to Carbohydrate Diets in Streptozotocin-induced Diabetic Rats. Journal of Biological Sciences, 22: 70-79.
 27. Ugwu Okechukwu P.C., Onyeneke E.C., Igwenyi, I. O., Aja P. M., Ugwuoke, Kenneth C., Okon Michael B. and Onyeke S.C. (2018). The Effects of Crude Ethanol Root Extract and Fractions of *Sphenocentrum jollyanum* on Liver and Kidney Function Parameters of Streptozotocin Induced Diabetic Wistar Albino Rats. IAA Journal of Scientific Research, 4(1): 75-90.

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