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Effect of Exercise Versus Metformin among Nigerians with Prediabetes: A Randomised Controlled Trial

Effet de l'exercice physique versus la metformine chez les Nigériens atteints de prédiabète: un essai contrôlé randomisé

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ABSTRACT

BACKGROUND: Prediabetes is an important risk factor for the development of type 2 diabetes and is common in Nigeria. Prediabetes often progresses to type 2 diabetes but effective intervention can reverse the carbohydrate intolerance associated with the condition. No studies have been reported among Nigerians on the natural outcome or effect of intervention in prediabetes.

OBJECTIVE: To determine and compare the effect of moderate exercise and metformin on glucose tolerance among the participants with prediabetes.

METHODOLOGY: Using a randomized placebo-controlled design, 54 Nigerians with prediabetes were selected using simple random sampling. They were offered treatment with metformin, moderate exercise, or placebo and followed up for 12 weeks. Plasma glucose levels were assessed before and after the interventions and the outcome was compared.

RESULTS: Forty-nine participants with prediabetes completed the study. Compared to placebo the exercise group had a significant decrease in glycaemic level from the baseline, FPG=5.1mmol/L (6.4% reduction) and 2HPGL=7.6mm/L (20.5% reduction) p-value<0.05. The metformin group also had a significant decrease in glycaemic level from the baseline, FPG=5.1mmol/L (13.3% reduction) and 2HPGL=7.9mmol/L (12.4% reduction) p-value<0.05. Diabetes risk reduction for exercise and metformin interventions were 50% and 40% respectively.

CONCLUSION: Among Nigerians with prediabetes, moderate exercise, and metformin interventions have significantly higher efficacy than placebo in improving glucose tolerance. However, moderate exercise and metformin have comparable efficacy in improving glucose tolerance and diabetes risk reduction. Participants in this study need to be followed up for a longer period to assess the long-term effects of these interventions. **WAJM 2024; 41 (5): 499 - 504**

KEYWORDS: Type 2 diabetes mellitus, Prediabetes, Exercise, Metformin, Nigerians

RÉSUMÉ

CONTEXTE: Le prédiabète est un facteur de risque important du développement du diabète de type 2 et est fréquent au Nigeria. Le prédiabète évolue souvent vers le diabète de type 2, mais une intervention efficace peut inverser l'intolérance aux glucides associée à cette affection. Aucune étude n'a été rapportée chez les Nigériens sur l'évolution naturelle ou l'effet de l'intervention dans le prédiabète.

OBJECTIF: Déterminer et comparer l'effet de l'exercice modéré et de la metformine sur la tolérance au glucose chez les participants atteints de prédiabète.

MÉTHODOLOGIE: Selon un plan randomisé contrôlé par placebo, 54 Nigériens atteints de prédiabète ont été sélectionnés par échantillonnage aléatoire simple. Ils ont reçu un traitement par metformine, de l'exercice modéré ou un placebo et ont été suivis pendant 12 semaines. Les niveaux de glucose plasmatique ont été évalués avant et après les interventions et les résultats ont été comparés.

RÉSULTATS: Quarante-neuf participants atteints de prédiabète ont terminé l'étude. Par rapport au placebo, le groupe exercice a présenté une diminution significative du taux de glycémie par rapport à la valeur de base, FPG = 5,1 mmol/L (réduction de 6,4 %) et 2HPGL = 7,6 mmol/L (réduction de 20,5 %), p-value < 0,05. Le groupe metformine a également présenté une diminution significative du taux de glycémie par rapport à la valeur de base, FPG = 5,1 mmol/L (réduction de 13,3 %) et 2HPGL = 7,9 mmol/L (réduction de 12,4 %), p-value < 0,05. La réduction du risque de diabète pour les interventions exercice et metformine était respectivement de 50 % et 40 %.

CONCLUSION: Chez les Nigériens atteints de prédiabète, les interventions d'exercice modéré et de metformine ont une efficacité significativement supérieure au placebo pour améliorer la tolérance au glucose. Cependant, l'exercice modéré et la metformine ont une efficacité comparable pour améliorer la tolérance au glucose et réduire le risque de diabète. Les participants à cette étude doivent être suivis sur une plus longue période pour évaluer les effets à long terme de ces interventions. **WAJM 2024; 41 (5): 499 - 504**

MOTS-CLÉS: Diabète de type 2, Prédiabète, Exercice, Metformine, Nigériens

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Abbreviations - AUGC: Area Under Glucose Curve (AUGC); **DM:** Diabetes Mellitus (DM); **DPP:** Diabetes Prevention Program; **DPS:** Diabetes Prevention Study; **IFG:** Impaired Fasting Glucose; **IGT:** Impaired Glucose Tolerance; **IBM:** International Business Machines; **OGTT:** Oral Glucose Tolerance Test; **SPSS:** Statistical Package for the Social Sciences; **UDUTH:** Usman Danfodiyo University Teaching Hospital