Final Report

7th Wael Almahmeed and IAS Research Training Fellowship

Fellow: Dr. Eyosiyas Abreham Anjajo (MD, MPHE, Assistant Professor)

Project title: The Role of Central Obesity in Atherosclerotic Cardiovascular Disease Risk Assessment among Type 2 Diabetic Patients in Southern Ethiopia

Host Institution: Addis Ababa University

Supervisor: Prof. Senbeta Guteta, MD,MPH

Introduction

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of global mortality and a major cause of morbidity. These include major risk factors that are usually included in the Atherosclerotic cardiovascular disease (ASCVD) risk calculators, such as cigarette smoking, hypertension, diabetes mellitus (DM), dyslipidemia, and obesity. Periodic risk assessment offers the opportunity to identify ASCVD risk factors and offer guidance on the appropriate management (1). Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and relative insulin deficiency. Central obesity, defined by excess visceral fat accumulation, is a significant risk factor for the development and progression of T2DM (2).

Consequently, abdominal obesity emerges as the primary contributor to cardio metabolic risk, even among individuals with a normal BMI (3). Notably, studies have highlighted waist circumference as a particularly effective measure of central adiposity for predicting CVD risk among adults (4). Excessive abdominal fat emerges as a standalone predictor for the risk factors and morbidity associated with obesity-related ailments like type 2 diabetes, hypertension, dyslipidemia, and cardiovascular diseases. Central obesity is a known risk factor for complications in diabetic patients, including cardiovascular diseases and metabolic syndrome (5, 6).

The 7th Wael Almahmeed and IAS Research Training Fellowship provided a timely and important platform to evaluate the role of central obesity in atherosclerotic cardiovascular disease (ASCVD) risk assessment among patients with type 2 diabetes in Southern Ethiopia. Through this fellowship, the study was designed to determine the prevalence of central obesity and identify its associated

factors among type 2 diabetic patients in southern Ethiopia. Waist circumference was utilized as a key measure, given its sensitivity in predicting cardiovascular disease and metabolic syndrome risk.

The fellowship was hosted under the mentorship of Prof. Senbeta Guteta, at Addis Ababa University whose expertise in atherosclerotic cardiovascular disease (ASCVD), Central Obesity, type 2 diabetes, public health, and epidemiology offered critical guidance throughout the research project. The research includes data collection by interviewing the study participants and extraction from medical records of patients using structured questionnaire, laboratory tests, statistical analysis, and scientific dissemination, ensuring a well-rounded research experience. This report provides a comprehensive account of the fellowship activities, key findings, and contributions to advancing understanding of the role of central obesity in ASCVD risk assessment among patients with type 2 diabetes in southern Ethiopia.

Objectives of the fellowship

The main objective of the fellowship is to empower the next generation of researchers and clinicians in the Middle East and Africa through this fellowship. The fellowship enhanced my technical, analytical, and research capacity in atherosclerotic cardiovascular disease (ASCVD), with a strong emphasis on resource limited setup like Ethiopia.

The objective the research conducted during the fellowship was to assess central obesity and associated factors among type 2 diabetic patients in Southern Ethiopia. The findings of the research contribute to scientific knowledge and dissemination, through the preparation of peer-reviewed publications, conference presentations, and collaborative research outputs. The research fellowship also helped to strengthen institutional and international collaboration, particularly with networks affiliated with the International Atherosclerosis Society, thereby promoting knowledge exchange and capacity building in cardiovascular research.

Activities of the fellowship

The fellowship comprised a comprehensive set of activities designed to integrate theoretical knowledge with hands-on research experience. The first phase involved structured training in research methodology. This component strengthened my ability to systematically design, conduct, analyze, and report scientific studies. It covered the full research cycle from problem identification

and study design to data analysis and ethical dissemination ensuring that research outputs are rigorous, valid, and reliable.

The second phase focused on data collection and field implementation. Data were gathered through participant interviews and medical record reviews using a structured questionnaire with three components: (I) socio-demographic and clinical profile; (II) behavioral and nutritional risk factors; and (III) physical measurements, laboratory findings, and diabetes-related complications. Prior to data collection, training was provided to data collectors and supervisors. Continuous supervision, along with daily feedback from the principal investigator and supervisors, ensured data quality. Regular checks were conducted to maintain completeness, accuracy, consistency, and clarity.

All type 2 diabetic patients who meet the eligibility criteria were selected using systematic random sampling. Data were analyzed using descriptive statistics (frequency tables and summary measures). Bivariate logistic regression, followed by multivariable logistic regression, was employed to identify factors associated with central obesity.

In addition, I actively participated in weekly seminars, interdisciplinary research discussions, and capacity-building workshops. These engagements provided opportunities to present findings, receive expert feedback, and refine analytical approaches. I also contributed to mentoring junior researchers and graduate students, promoting a collaborative and academically enriching research environment.

Results and Discussion

The analysis of the data collected during the fellowship yielded several important insights in to the role of Central Obesity in Atherosclerotic Cardiovascular Disease Risk Assessment among Type 2 Diabetic Patients in southern Ethiopia.

In this study, the prevalence of central obesity based on waist circumference was found to be 50.4% [95% CI (45.1, 55.8)]. The magnitude of central obesity was notably high among patients with type 2 diabetes mellitus. This study identified being female, residing in urban areas, lack of vigorous-intensity exercise, being overweight or obese, and having hypertension were significantly associated with central obesity. This finding highlights that relying solely on BMI can significantly underestimate the actual prevalence of central obesity and its associated health risks, which contribute to increased morbidity and mortality. Incorporating waist circumference

measurements alongside BMI can enhance the accuracy of diagnosis and facilitate the early detection of central obesity in individuals with type 2 diabetes.

Based on the findings of this study, it is crucial to implement targeted interventions aimed at reducing the high prevalence of central obesity among patients with type 2 diabetes mellitus. Healthcare providers should prioritize routine screening for central obesity using both waist circumference and BMI as part of regular diabetes care. This dual approach can ensure more accurate diagnoses and facilitate early identification of at-risk individuals, allowing for timely and tailored management strategies.

Public health programs should focus on creating and promoting community-based initiatives to address the modifiable risk factors associated with central obesity. These programs should emphasize the importance of engaging in vigorous-intensity physical activities, maintaining a healthy weight, and effectively managing hypertension. Particular attention should be given to urban populations and women, as these groups were found to be more vulnerable. Educational campaigns highlighting the role of lifestyle modifications, such as improved diet and regular exercise, can significantly contribute to mitigating the risk of central obesity in these populations.

Conclusion

The 7th Wael Almahmeed and IAS Research Training Fellowship has been an invaluable experience that has significantly advanced my expertise in atherosclerosis and cardio-cerebrometabolic research.

The fellowship also improved my scientific writing and communication skills. I gained experience in preparing manuscripts for peer-reviewed journals, structuring research findings, and presenting data in a clear and compelling manner. Participation in seminars and conferences further strengthened my ability to communicate complex scientific concepts to diverse audiences.

The study conducted during the fellowship highlights the need for targeted interventions to reduce the high burden of central obesity among patients with type 2 diabetes. Routine screening using both waist circumference and BMI should be integrated into standard diabetes care to improve early detection and guide timely, individualized management. At the population level, public health efforts should prioritize community-based strategies that address modifiable risk factors, including promotion of physical activity, healthy weight maintenance, and effective hypertension

control. Special focus should be given to high-risk groups, particularly urban residents and women. Strengthening health education on lifestyle modification especially balanced nutrition and regular exercise will be essential to reducing central obesity and its associated cardiovascular risks.

The fellowship has had a transformative impact on my research trajectory, both in terms of technical expertise and strategic direction. It has strengthened my ability to conduct high quality, context-specific research on atherosclerosis and related diseases, and has positioned me as an emerging leader in cardiovascular epidemiology in Africa.

Beyond technical skills, the fellowship has strengthened my professional network, research leadership capacity, and commitment to advancing health equity. It has reinforced the importance of collaboration, innovation, and evidence-based practice in addressing complex global health challenges.

Acknowledgment

I would like to express my sincere appreciation to the International Atherosclerosis Society (IAS) and Dr. Wael Almahmeed for their generous support and unwavering commitment to advancing cardiovascular research in the Middle East and Africa. This fellowship provides a vital platform for developing the next generation of clinical research leaders, particularly those dedicated to atherosclerosis and cardio-cerebro-metabolic diseases. It has been a great privilege to be part of this impactful initiative.

I am also deeply grateful to Professor Senbeta Guteta for the opportunity to conduct this research under his mentorship as part of the 7th Wael Almahmeed and IAS Research Training Fellowship. His expert guidance and continuous support have been invaluable in shaping both the direction and quality of this work.

Certification by Supervisor

I hereby certify that this report was prepared by Dr. Eyosiyas Abreham Anjajo under my supervision and accurately reflects the work conducted during the research fellowship.

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