

(Research) Article

Impact of Obesity on Knee and Ankle Joints among Adults in Ekpoma, Edo State, Nigeria

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Abstract: Background: Obesity has become a global epidemic, with substantial implications for musculoskeletal health, particularly in weight-bearing joints like the knee and ankle. Aim: To determine the prevalence of obesity with respect to age and gender and to assess its effect on the knee and ankle joints among adults in Ekpoma, Edo State. Materials and Methods: A descriptive cross-sectional study involving 60 obese adults was conducted using a structured, validated questionnaire. Ethical approval and informed consent were obtained. Results: Respondents were predominantly aged 40–45 years (35%) and female (80%). 65% reported pain in the knee and/or ankle joints; 56.7% reported joint stiffness or reduced range of motion. Conclusion: Obesity significantly affects the knee and ankle joints, contributing to pain, stiffness, and a reduced range of motion. These results reinforce the need for targeted public health interventions aimed at obesity prevention and management, particularly in populations at risk of joint-related complications.

Keywords: Descriptive Qualitative Research; Implementation; Islamic Boarding Schools; Madrasah; PE Learning

1. Introduction

Obesity is an increasingly prevalent condition with significant impacts on individual health and the healthcare system (Flegal et al., 2012). Globally, more than 1.9 billion adults were overweight in 2014, with at least 600 million considered obese (World Health Organization [Gupta and Garg, 2020]). In the United States, over two-thirds of adults are overweight and one-third are obese (Flegal et al., 2012; Ogden et al., 2013). By 2030, it is projected that 44% of American adults will be classified as obese (Tremmel et al., 2017).

Obesity, defined as a body mass index (BMI) greater than 30 kg/m² (Zamora-Kapoor et al., 2019), results in metabolic and biomechanical changes that negatively affect bone metabolism, cardiovascular health, and insulin resistance (Tremmel et al., 2017). It is also a known risk factor for musculoskeletal disorders such as osteoarthritis, low back pain, tendinitis, and plantar fasciitis (Orpana et al., 2007; Anandacoomarasamy et al., 2008).

Obesity increases mechanical loading on weight-bearing joints; for example, each additional pound of body weight adds four to six pounds of pressure on the knee joint

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(Tremmel et al., 2017). This leads to increased rates of soft tissue damage, osteoarthritis, and the need for surgical interventions such as total knee arthroplasty (Meng et al., 2017). Altered gait mechanics, poor balance, and increased risk of falls further compound joint damage in obese individuals (Mickle et al., 2015; Vakula et al., 2019; Fortunato et al., 2021).

Studies have shown a positive association between obesity and ankle fractures, with obese individuals exhibiting greater risks due to altered biomechanics and increased torque on joints (Reeves et al., 2017; Court-Brown et al., 2019). Obese patients are also at higher risk for surgical site infections after orthopedic interventions (Benedick et al., 2020).

While the biomechanical influence of obesity on gait and joint health has been extensively studied, findings remain inconsistent due to variations in study design and methodology (Cimolin et al., 2011; Russell et al., 2011; DeVita et al., 2013; Hulleck et al., 2022). This study aimed to determine the prevalence of obesity with respect to age and gender and assess its impact on the knee and ankle joints among adults in Ekpoma, Edo State, Nigeria.

2. Materials and Methods

Study Area

The study was conducted in Ekpoma, Edo State, Nigeria - the administrative headquarters of the Esan West Local Government Area and home to Ambrose Alli University. Ekpoma has a population of over 290,000 people.

Study Design

A descriptive cross-sectional design was adopted. The study was carried out between June and July, 2023.

Population and Sampling

The target population consisted of obese men and women aged 40 years and above living in Ekpoma. The minimum sample size of 60 was calculated using Fisher's formula for population proportions, assuming a 95% confidence interval. Simple random sampling was used to select participants.

Inclusion criteria:

1. Obese adults (BMI >30 kg/m²)
2. Aged 40 years and above

Exclusion criteria:

1. Non-obese individuals
2. Individuals younger than 40 years

Data Collection Instrument

Data were collected using a validated, self-administered questionnaire divided into five sections:

1. Section A: Sociodemographic characteristics
2. Section B: Obesity-related information
3. Section C: Knee and ankle joint health
4. Section D: Physical activity and lifestyle
5. Section E: Impact of joint health on daily living

Validity and Reliability

Face and content validity were established by expert review. The test-retest method was used to assess reliability by pretesting with 10% of the sample in a nearby community.

Data Collection Procedure

Participants provided written informed consent before data collection. A trained research assistant facilitated questionnaire administration and collection. Data collection occurred over a three-week period.

Data Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 22. Descriptive statistics were used for frequencies and percentages. Associations between variables were tested using Chi-square analysis at a 5% level of significance.

Ethical Considerations

Ethical approval was obtained from the Ambrose Alli University Research Ethics Committee. Participants were informed about the purpose of the study, confidentiality of their responses, and their right to withdraw at any stage. Written informed consent was obtained from all participants.

3. Results

Most respondents (35%) were between 40–45 years old, 31.7% were aged 46–50 years, and 23.3% were aged 51–55 years. Females comprised 80% of participants. A majority (65%) reported experiencing pain or discomfort in their knee and/or ankle joints. Pain severity varied: 46.2% moderate, 28.2% mild, and 25.6% severe. Additionally, 56.7% reported stiffness or reduced range of motion, and 88.2% noted movement restrictions due to joint pain.

Discussion

The present study demonstrates that obesity significantly affects the knee and ankle joints among adults in Ekpoma. The prevalence of obesity was highest among participants aged 40–45 years, consistent with Welton *et al.* (2016), who found higher obesity rates in middle-aged adults. This trend may be attributed to decreased physical activity, metabolic slowdown, and hormonal changes (Lee *et al.*, 2014).

The majority of respondents were female, aligning with findings from the National Health and Nutrition Examination Survey indicating a higher obesity prevalence among women (Ogden *et al.*, 2013). This could be due to biological, socio-cultural, and lifestyle factors.

Consistent with Mikesky *et al.* (2000) and Adams *et al.* (2006), the majority of respondents reported pain and functional limitations in their knee and ankle joints. Excess weight places significant stress on weight-bearing joints, resulting in cartilage degeneration and altered gait patterns (Meng *et al.*, 2017; Vakula *et al.*, 2019). This highlights the need for interventions focusing on weight reduction and muscle strengthening to alleviate joint stress.

These findings underscore the importance of targeted health education, lifestyle modifications, and accessible interventions for obesity management in this population.

4. Conclusion

This study shows that obesity significantly affects the knee and ankle joints, causing pain, stiffness, and limited mobility in adults in Ekpoma. Middle-aged women were most affected. Excess body weight places high stress on weight-bearing joints, increasing the risk of degenerative conditions. Targeted weight management and joint health programs are needed. Further research should expand these findings for broader public health action.

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Conflict of Interest

The authors declare no conflict of interest.

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