Review Article

Lifestyle Modifications for the Prevention of Acute Myocardial Infarction: A Narrative Comparative Review of Obese and Non-Obese Populations

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Abstract

One of the biggest causes of illness and death in the world is still acute myocardial infarction (AMI). Obesity is a significant modulator of cardiovascular risk, and variable lifestyle factors account for a significant share of AMI incidents. We narratively compare the long-term effects, difficulties, and effectiveness of lifestyle changes in preventing AMI in adult populations that are obese and non-obese. PubMed and Google Scholar were used to perform a narrative review of the literature. Studies on adult human populations published in English between 2000 and 2024 were taken into consideration. Included were original research papers, randomized controlled trials, observational studies, and appropriate reviews examining lifestyle modifications to prevent AMI. A qualitative synthesis of the evidence was conducted with a comparative focus on obese and non-obese populations. Dietary changes, exercise, avoiding tobacco use, and behavioral techniques are examples of lifestyle treatments that have been linked to a lower risk of AMI in all BMI groups. Because of metabolic, inflammatory, and psychosocial barriers, obese people frequently need more intensive, diverse treatments, while non-obese people benefit from risk-factor and long-term behavioral preventative measures. In both obese and non-obese people, changing one's lifestyle can effectively lower the risk of AMI. In general, obese people need specialized, intensive, and long-term interventions. Certain public health activities are essential for improving cardiovascular outcomes, especially in low- and middle-income countries (LMICs).

Keywords: Acute Myocardial Infarction, lifestyle modification, obesity, non-obese, cardiovascular prevention.

Introduction

Acute myocardial infarction (AMI) continues to be a major global health burden and a key marker of cardiovascular disease.[1] Myocardial ischemia and necrosis are brought on by a sudden decrease in coronary blood flow.–[2] AMI is still usually treatable despite improvements in pharmacological and therapeutic cardiology, and several lifestyle variables greatly increase the risk.———[3]

Obesity has emerged as a critical modifier of AMI risk, contributing through metabolic dysregulation, systemic inflammation, insulin resistance, and endothelial dysfunction."[4] AMI also affects non-obese people as well, frequently as a result of a collection of common risk factors methods require an understanding of how lifestyle interventions function across various BMI categories.

With a focus on the implications for public health practice in LMICs, this review attempts to evaluate the effectiveness, difficulties, and long-term effects of lifestyle adjustments in avoiding AMI among obese and non-obese people.[6]

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Methods:

This study was conducted as a narrative review aimed at synthesizing existing literature on lifestyle modifications for the prevention of acute myocardial infarction (AMI), with a comparative focus on obese and non-obese populations.

A literature search was performed using PubMed and Google Scholar for studies published between January 2000 and June 2024. The search strategy included combinations of keywords such as: acute myocardial infarction, lifestyle modification, diet, physical activity, smoking cessation, obesity, body mass index and cardiovascular prevention.

Relevant articles were identified through title and abstract screening, followed by full-text review. Priority was given to:

- Prospective cohort studies
- Randomized controlled trials
- Systematic reviews and meta-analyses

Studies were included if they:

- Involved adult human populations (≥18 years)
- Examined lifestyle interventions in relation to AMI or major cardiovascular outcomes

Due to the narrative nature of this review, a formal systematic review protocol, PRISMA flow diagram, and quantitative meta-analysis were not performed. Efforts were made to ensure transparent study selection and thematic synthesis.

Obesity was defined based on body mass index (BMI ≥30 kg/m²), while non-obese populations included individuals with BMI <30 kg/m², acknowledging variability across studies. Approximately 50–70 relevant articles were identified and synthesized thematically.

Epidemiology of AMI and Obesity

The majority of deaths worldwide are caused by cardiovascular disorders, of which coronary heart disease is the most common.[7] Globally, the incidence of obesity has rapidly grown, and it is closely linked to a higher risk of AMI.[8] Excess adiposity is linked to atherosclerosis, chronic inflammation, hypertension, and diabetes mellitus, all of which raise the risk of AMI, according to extensive epidemiological research.

Pathophysiological Differences Between Obese and Non-Obese Populations

Chronic low-grade inflammation caused by adipokines and pro-inflammatory cytokines is a hallmark of obesity and can result in endothelial dysfunction, atherosclerosis instability, and thrombogenesis. Dyslipidemia and insulin resistance increase the development of atherosclerosis.[9]

In contrast, smoking-related endothelial damage, genetic susceptibility, or stress-mediated neurohormonal activation are some of the alternate paths by which non-obese people acquire AMI. The varied aspects of AMI pathophysiology are shown by the fact that plaque rupture and thrombosis still happen even when systemic inflammation may be less apparent.[10]

Obesity Paradox and Metabolic Heterogeneity

Emerging evidence describes an "obesity paradox," where overweight or moderately obese individuals with established cardiovascular disease may exhibit improved survival compared to lean counterparts.[11] This paradox is influenced by confounding factors such as age, sarcopenia, and disease severity.

Obesity is not a homogeneous condition. Distinction between:

- Metabolically healthy obese (MHO)
- Metabolically unhealthy normal weight (MUHNW)

This distinction is critical, as cardiometabolic risk is more closely associated with metabolic dysfunction than BMI alone. These findings highlight the limitations of BMI as a sole risk-stratification tool and emphasize the need for individualized lifestyle interventions.

Lifestyle Modifications in AMI Prevention

Dietary Modification

Heart-healthy diets, including the DASH and Mediterranean diet, are regularly linked to a lower risk of AMI.[12] While non-obese people frequently benefit from preventive dietary interventions

centered on preserving metabolic health, obese people may encounter more obstacles to following a diet due to eating disorders and environmental factors.[13]

Physical Activity

Regular moderate-intensity exercise (≥150 minutes/week) enhances lipid profiles, insulin sensitivity, and endothelial function. Physical activities that are supervised or customized are necessary because obese people often face physical and motivational obstacles.[14] Although non-obese people typically exhibit greater dedication, they are still susceptible to sedentary lifestyles.[15] Large cohort studies have demonstrated that higher levels of physical activity are associated with a reduced risk of myocardial infarction and cardiovascular mortality.[16]

Behavioral and Psychosocial Interventions

Motivational interviewing and mental health treatment are two behavioral techniques that increase commitment to lifestyle modifications.[17] Higher rates of anxiety, depression, and stigma are associated with obesity. Psychological treatment is especially important for obese populations.[18] These techniques can lower cardiovascular risk in addition to helping people lose weight.

Smoking Cessation

Smoking is a significant independent risk factor for AMI in all BMI groups. Complete reduction strategies are essential since obesity and smoking together raise cardiovascular risk.[19]

Comparative Summary of Lifestyle Interventions

For obese people, comprehensive therapy that addresses metabolic, physical, and psychological limitations is often required. For non-obese individuals, early risk-factor reduction and ongoing preventative measures are beneficial. Obesity is associated with multiple metabolic and behavioral challenges that may require more intensive intervention strategies.[20]

Table 1: Comparative Effects of Lifestyle Interventions on AMI Risk in Obese and Non-Obese Populations.

Intervention	Study Type	Outcome	Effect in Obese	Effect in Non-Obese
Diet	Cohort studies	Reduction in AMI incidence	Greater benefit with weight loss	Preventive benefit
Physical activity	RCTs and cohort studies	Reduction in cardiovascular mortality	Requires structured programs	High adherence
Smoking cessation	Observational studies	Reduction in AMI risk	High baseline risk reduction	Significant benefit
Behavioral therapy	Reviews	Improved adherence rates	Critical for success	Supportive role

Evidence suggests that obese individuals may experience greater absolute risk reduction due to higher baseline cardiometabolic risk, although relative benefits of lifestyle interventions are observed across all BMI categories. Heterogeneity in response is influenced by metabolic status, fat distribution, and adherence patterns.

Adherence and Sustainability Challenges

Despite strong evidence supporting lifestyle interventions, long-term adherence remains a major challenge. Behavioral relapse, weight regain, and environmental barriers frequently limit sustained benefits, particularly in obese populations.

Socioeconomic factors, including access to healthy food, healthcare infrastructure, and education, significantly influence intervention success. In many settings, lifestyle modification requires structural support beyond individual-level interventions.

Public Health and LMIC Relevance

Low- and middle-income countries (LMICs) face a dual burden of undernutrition and rising obesity, contributing to increasing AMI incidence. Rapid urbanization, dietary transitions toward processed foods, and reduced physical activity are major drivers. Limited access to preventive healthcare, delayed diagnosis, and financial constraints further complicate AMI prevention.

Feasible strategies include:

- Task-shifting to community health workers
- Integration of cardiovascular screening into primary care
- Culturally adapted dietary interventions

- Population-level policies targeting food systems and urban design

Limitations

This review's narrative method includes problems that could lead to selection bias and inhibit quantitative synthesis. This comparison is further limited by the variety of included research and the absence of standard outcome measures. The absence of protocol registration and formal systematic methodology represents a limitation of this narrative synthesis.

Conclusion

The most important aspect of preventing AMI in all BMI groups is changing one's lifestyle. Obese populations frequently need more intense, ongoing, and interdisciplinary treatment, even if both obese and non-obese people benefit. Culturally suitable therapies incorporated into primary healthcare systems should be the main emphasis of future LMIC research.

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