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REVIEW ARTICLE

MJM BIOLABS

A Review of the Determinants of Excess Weight among Women of Reproductive Age in Low- and Middle-Income Countries

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ABSTRACT

Excess weight among women of reproductive age in low- and middle-income countries is a growing public health concern, increasing the risk of non-communicable diseases and adverse maternal and child health outcomes. This review examines the key determinants contributing to overweight and obesity in this population. A comprehensive literature search was conducted from January to May 2024 across Elsevier, PubMed, Embase, and Cochrane using keywords such as "Overweight," "Obesity," "Women of Reproductive Age," and "Developing Countries." Eligible studies included original and full-text articles that aligned with the research topic. Nine studies from Malawi, Mali, Ghana, sub-Saharan Africa, India, Brazil, Ethiopia, Tanzania, and the Maldives were analyzed. Data extraction focused on study characteristics, key findings, and relevant outcome measures, while quality assessment and risk of bias evaluation ensured the reliability of included studies. Findings indicate that excess weight is primarily driven by advanced age, high household wealth index, white-collar employment, multiparity, marital status (married, divorced, or separated), higher education levels, and media exposure. Excess weight remains a pressing public health issue requiring targeted interventions. Policymakers should prioritize personalized, resource-driven strategies through health ministries, nutrition programs, and primary healthcare networks to prevent and manage overweight and obesity effectively.

Keywords: Excess weight,Overweight, Obesity, Women of Reproductive Age, low- and mid-income Countries

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INTRODUCTION

Excess weight, encompassing overweight and obesity, has become a significant global health concern, particularly in low- and middle-income countries (LMICs). While historically associated with high-income nations, the prevalence of excess weight has been rising rapidly in LMICs due to urbanization, lifestyle changes, and dietary transitions (Popkin et al., 2020). Women of reproductive age are particularly vulnerable to weight gain. Despite numerous interventions aimed at promoting healthy weight, excess weight remains a persistent problem in LMICs, contributing to a higher burden of non-communicable diseases (NCDs) such as type II diabetes, hypertension, and cardiovascular diseases (WHO, 2021). If left unaddressed, the increasing rates of overweight and obesity in this population could lead to severe health complications, including adverse maternal and child health outcomes such as gestational diabetes, preeclampsia, and childhood obesity (Black et al., 2019).

LMICs are currently experiencing a double burden of malnutrition, where undernutrition and overnutrition coexist (Global Nutrition Report, 2021). While efforts have historically focused on combating undernutrition, a recent study have documented a significant rise in excess weight among women of reproductive age in these regions (Development Initiatives, 2022). This shift highlights the urgent need to identify the key determinants driving this trend to inform targeted interventions.

This review seeks to analyze the determinants of excess weight among women of reproductive age in LMICs, providing a comprehensive understanding of the socioeconomic, demographic, and behavioral factors influencing weight gain in this population. The findings will contribute to policy formulation and evidence-based interventions aimed at mitigating the burden of overweight and obesity. Understanding these determinants is crucial for developing sustainable public health strategies to prevent obesity-related complications and improve overall maternal and child health outcomes.

MATERIALS AND METHODS

Research Design

This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a rigorous and transparent review process. A systematic review was conducted to analyze the determinants of overweight and obesity among women of reproductive age in low- and middle-income countries (LMICs).

Search Strategy

A comprehensive literature search was conducted using Boolean operators (e.g., AND, OR, NOT) and truncations (e.g., obes*) to refine search results. Search terms included "determinants," "overweight," "obesity," "women of reproductive age," "low-income countries," "middle-income countries," and their synonyms. Medical Subject Headings (MeSH) terms and equivalent indexing terms, such as "Body Mass Index," "Socioeconomic Factors," and "Nutritional Status," were also used for databases that support indexed searches.

Eligibility Criteria

Studies were included if they focused on women of reproductive age (15–49 years), were conducted in LMICs as classified by the World Bank, investigated determinants of overweight or obesity, and were peer-reviewed articles published in English between 2013 and December 2023. Exclusion criteria omitted grey literature and conference abstracts, as well as studies with incomplete data or missing key outcomes.

Data Sources and Databases

The search was conducted across multiple electronic databases, including PubMed, Cochrane Library, Elsevier, Scopus, and Web of Science. Additionally, the Google Scholar search engine was used to identify supplementary studies.

Study Selection Process

Titles and abstracts were independently screened by two reviewers to identify potentially eligible studies. Full-text articles of the selected studies were then reviewed for final inclusion based on the eligibility criteria. Any discrepancies were resolved through discussion or consultation with a third reviewer.

Data Extraction

Key data, including study characteristics such as year, location, sample size, and

population, as well as determinants investigated and main findings, were extracted into a standardized data extraction form.

Quality Assessment

The methodological quality of the included studies was evaluated. The Critical Appraisal Skills Programme (CASP) tool was used for qualitative studies, the Newcastle-Ottawa Scale (NOS) for observational studies, and the Risk of Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool for non-randomized studies. Each study was assessed for bias, validity, and overall quality, with findings summarized in tabular form.

Data Synthesis and Analysis

A narrative synthesis approach was employed to analyze the extracted data. Common themes, trends, and gaps in the literature were identified and summarized to provide insights into the key determinants of excess weight among women of reproductive age in LMICs.

Risk of Bias Assessment

Each study underwent a risk of bias assessment to evaluate the potential influence of selection bias, measurement bias, and confounding factors on study outcomes.

RESULTS

The initial search yielded 26 articles discussing overweight and obesity in the general population. A more specific search was conducted, and a selection of 20 relevant articles was made. From the 20 article, 9 original articles that specifically addressed the topic of the study were retrieved, reviewed, analyzed, and summarized. The table below shows the findings of the review.

Table 1:
Summary of Study Title, Study Description and Findings

Title	Study description	Findings	References
Examining the risk factors for overweight and obesity among women in Ghana: A multilevel perspective	• Study period 2014 in Ghana • 4393 reproductive women's • data from the 2014 Ghana Demographic and Health Survey (GDHS). • Data about these women was grouped into 427 communities. • A two-tier random intercept multilevel logistic model was used to evaluate the impact of factors at the individual and community levels on a woman's risk of becoming overweight or obese.	Adiposity was higher among these women • Urban residence • Higher (tertiary) education • High wealthy index households • Married, widowed, or divorced women • Advanced in age, 40 and 49 • Multiparous All factors were at $p<0.01$, thus showing a significant association	Asosega et al., (2023).
A multilevel analysis of overweight and obesity among non-pregnant women of reproductive age in Malawi: evidence from the 2015-2016 Malawi Demographic and Health Survey	• Study period 2015 -2016 in Malawi • Two-level multi-level multivariable logistic regression models were conducted on 7326 women residing in 850 communities.	At the individual level • white-collar occupations • wealthy families • Advancement in age • Christian, and belonged to the Roman Catholic and Presbyterian churches in Central Africa At the community level,	Ntenda & Kazambwe (2019).

Title	Study description	Findings	References
		• Low-media exposure populations • Urban areas were more likely to be overweight or obese. All factors' statistical significance was p< 0.001, showing a significant association.	
Overweight and obesity among women of reproductive age in Mali: what are the determinants?	• Study period: 2018 in Mali • Data from the 2018 Mali Demographic and Health Survey was analyzed in the study. • 5198 women • Exclusion of pregnant women and women who gave birth two months before the study.	The study documented that: the determinants of overweight and obesity in women of reproductive age were • Advancement in age • Marital status • Religion • Employment • High wealthy index family • Urban residents • Four or more children • Household size. All the factors had p<0.001 showing a significant association Those who had higher education levels had statistical significance at p<0.01.	Seidu et al., (2021).
Country-Level Variations in Overweight and Obesity among Reproductive-Aged Women in Sub-Saharan Countries	• Study time frame: 2006–2021 in Sub-Saharan Africa • The Demographic and Health Survey, where 504,264 women were studied • Sampling on weights, stratification, and clustering using the Stata survey module was done.	The study documented that the factors associated with overweight and obesity in women are • Advanced in age • Urban living • High levels of education • Wealthy backgrounds • Urbanization, which is a proxy for city living. All factors' statistical significance was at p< 0.05 showing a significant association.	Owobi et al., (2022)
Prevalence of overweight and obesity and associated factors among women of childbearing age in Brazil	• 2013 National Health Survey database was used to create a cross-sectional study. • Study conducted between 2008 and 2009 by the Brazilian Institute of Geography and Statistics (IBGE). • 17109 women between the ages of 18 and 49 were selected.	The study documented the factors of overweight and obesity included • advanced age • Being married • Low family income. • Multi-parous women. All factors had p≤0·01 showing a significant association.	Lyrio et al. (2021)
Transitioning to an obese India: Demographic and structural determinants of the rapid rise in overweight incidence	• Study time 2005-2006, then 2015-2016. • Study area is India • Data was collected at the individual and household levels from over 800,000 men and women who participated in the	According to a study, women who • Use obesogenic technologies, such as viewing television p<0.001 • Using motorized transportation (urban women) p<0.05	Aiyar et al., (2021)

Title	Study description	Findings	References
	in the National Family Health Surveys (NFHS) throughout the study period • A cross-sectional study design was adopted.	• Rural residence p<0.economic development in urban areas p< 0.01 • Advancement in age p< 0.001. Since all factors had a p≤0.05, it shows a significant association.	
Prevalence and associated factors of underweight, overweight and obesity among women of reproductive age group in the Maldives: Evidence from a nationally representative study	• Study period 2020 in Maldives • A total weighted sample of 6,634 reproductive-age Maldivian women (15–49 years) were included in the analysis. • This study is the secondary analysis of cross-sectional data from MDHS 2016–17.	According to the study, determinants of overweight and obesity were: - • Having more than three children (p<0.00001) • Being married or separated/divorced/widowed (p<0.001) • Advancement in age (p <0.001) • Place of residence (p <0.0122) • Level of education (p <0.0074) • Employment position, (p <0.00001) All factors p<0·05, therefore a significant association.	Hashan et al., (2020)
Determinants of overweight/obesity among reproductive age group women in Ethiopia: multilevel analysis of Ethiopian Demographic and Health Survey.	• Study period 2020 in Ethiopia • The study used a cross-sectional study design with a total of 10,938 participants to explore the associations between various characteristics and obesity and overweight. • Participants were non-pregnant women aged 15–49 years.	The study documented the determinants of overweight and obesity among Ethiopian women: • Advancement in age, • Being married • High education level • Urban residence • High wealth index. All factors have p≤0·05 showing a significant association.	Yeshaw et al., (2020)
Risk factors for overweight and obesity among women of reproductive age in Dar es Salaam, Tanzania	• Study period 2018-2019 in Tanzania • The study design was cross-sectional and nested in the Health and Demographic Surveillance System (HDSS) platform. • 1004 women of reproductive age from September 2018 to January 2019 were enrolled	According to the study, the factors leading to excess weight in women are: • Sedentary lifestyles • Wealthy p <0.001 • Advanced in age p <0.001 • Being married p<0.01 • Employed p< 0.04. • Excessive sugar intake p<0.01 However, protein consumption from fish and chicken was associated with lower risk. p< 0.03 All factors had p<0·05 showing a significant association.	Mosha et al., (2021)

DISCUSSION

Several factors were documented to have increased overweight and obesity frequency in different developing countries.

Age

The findings from studies consistently highlight a concerning trend: as women progress through age brackets, there is a notable increase in the prevalence of overweight and obesity. Research conducted by Asosega et al. (2023) revealed a significant disparity in the rates of overweight and obesity among different age groups of women. Specifically, women aged 30-39 and 40-49 exhibited a substantially higher likelihood of being overweight or obese compared to their younger counterparts aged 15-20. These findings align with the results of similar studies conducted in Kenya, as demonstrated by the work of Pengpid and Peltzer (2020) on the determinants of overweight and obesity among women of reproductive age.

The consistent identification of age as a prominent factor influencing weight status underscores the complex interplay of various physiological and lifestyle factors associated with aging. Metabolic changes, hormonal fluctuations, and shifts in lifestyle behaviors are among the factors that likely contribute to the observed increase in overweight and obesity with advancing age. These changes may include alterations in basal metabolic rate, changes in hormone levels such as estrogen and progesterone, and shifts in dietary patterns and physical activity levels over time.

This evidence underscores the importance of addressing age-related factors in interventions aimed at preventing and managing overweight and obesity among women. Understanding the underlying mechanisms driving the age-related trends in weight status can inform targeted strategies to promote healthy aging and mitigate the adverse health consequences of excess weight gain.

Marital status

Marital status can influence women of reproductive age to being overweight. A study in Ghana by Asosega et al. (2023) revealed that women who were widowed, divorced, separated, or married were more likely than single women to be overweight or obese. This could be a result of the model of attractiveness of body image and marriage in society, where single women in general are very particular about their body image and shape compared to married women who are not in search of marriage partners or suitors. Also, married women tend to have higher household incomes compared to single women, which can lead to increased access to calorie-dense processed foods and decreased time for exercise due to work demands as well as often eating at home rather than buying ready-made food. This finding is consistent with a study done in Mali where women who are married, separated, or divorced had a high chance of being overweight and obese (Seidu et al., 2021). These studies show the importance of preventing and managing overweight and obesity among women who were married, separated, or divorced. A healthy weight is important for optimum health, well-being, prevention, and management of non-communicable diseases.

Education

The level of education is a significant factor that influences the nutrition status of women of reproductive age. A study in Mali by Seidu et al., (2021) revealed that women who have higher education have better jobs and hence higher purchasing power. Additionally, women of higher education may have the resources and knowledge of the importance of physical activity and a healthy diet but are also faced with several sociocultural barriers that may prevent them from putting these into use. Such barriers include the belief that higher income and wealth are associated with diets rich in animal fats, which in turn are associated with a higher prevalence of overweight among high socio-economic groups. Also, people with higher education may engage in less physical activity, as their various occupations may give them little or no time to exercise, while others may see physical activity as a hindrance to luxurious living

(Seidu et al., 2021).Another study done in Maldives showed no significant relationship between overweight and obesity and the level of education (Hashan et al., 2020), as well as a study done in Tanzania that showed no correlation between education level and overweight and obesity among women of reproductive age (Mosha et al., 2021). Education level should be a great opportunity to be used by women as interventions aimed at preventing and managing overweight and obesity. This can be through making right food choices, behavior change, and informed lifestyle choices, which can in turn help prevent and manage the adverse health consequences associated with excess weight gain.

Occupation

Individuals and households with informal occupations have low income and have limited access to quality, varied foods, which makes them more likely to have a reduced risk of overweight and obesity. The long hours of hard labor they subject themselves to daily burn any extra calories they may store in their bodies. This is unlike the women in formal occupations who may spend long hours in offices, eat more junk food, and have little or no time for exercise. Such lifestyles have been established to be risk factors for overweight and obesity (Owobi et al., (2022). This study is consistent with a study by Ntenda & Kazambwele (2019) which stated that women from wealthier households were significantly more likely to be overweight or obese because of poor dietary habits involving takeaway food and fast food that are high in fat.This evidence shows the importance of addressing occupation and wealth index to prevent and manage overweight and obesity among women. Understanding the mechanisms of how to balance work and health habits like physical activity can inform targeted strategies to promote healthy practices and address the adverse health consequences associated with excess weight gain. Again, for people with a high wealth index, a personal strategy aimed at increasing their knowledge of foods that have the right balance in quality and quantity and health habits like exercise can help address the health consequences associated with excess weight gain.

Religion

A study conducted by Seidu et al., (2021) identified a significant association between religious affiliation and the prevalence of obesity and overweight, particularly among Muslims compared to individuals of other religious backgrounds. This observation may be elucidated by the notable prevalence of physical inactivity among Muslim women in Mali. In contrast, research conducted by Ntenda and Kazambwe (2019) in Malawi revealed contrasting findings indicating the protective effect of overweight and obesity among Muslims compared to Christians. While Christianity typically imposes no specific dietary restrictions, Islams adhere to halal dietary guidelines, which emphasize the consumption of fruits, vegetables, and eggs while prohibiting the consumption of pork, crustaceans, blood, alcohol, and any foods containing alcohol-derived ingredients. Furthermore, the observance of Ramadan requires Muslims to abstain from food, liquids, and medication between sunrise and sunset, a practice that has been reported to have adverse effects on biomarkers associated with overweight and obesity. Moreover, religious beliefs and practices extend beyond dietary habits to encompass broader lifestyle factors. The same study by Ntenda and Kazambwe (2019), suggested that religion and spirituality influence health outcomes through the individual application of health-promoting religious practices, beliefs, and prohibitions against unhealthy behaviors. Notably, in the contemporary era characterized by technological advancements, individuals who engage in regular (religious media practice) often do so in sedentary settings, such as watching religious programs on television or accessing religious content online. This sedentary behavior, coupled with easy access to food, may contribute to obesity and overweight issues among certain religious communities. The interplay between religious affiliation, dietary practices, and lifestyle behaviors underscores the complex relationship

between religion and health outcomes. Therefore, exploring the mechanisms through which religious beliefs influence dietary habits, physical activity levels, and overall health is key. This will help to inform culturally sensitive interventions to address obesity and overweight disparities across diverse religious communities.

Media

A lot of communication is done through media which has positive and negative influence on the recipients of the information they receive. A study in Malawi by, Ntenda & Kazambwe (2019) reported that the number of hours spent watching TV correlated with the consumption of the most advertised goods which includes sweetened cereals, sweets, sweetened beverages, and salty snacks. This in turn increases the chances of consumers of these foods to be overweight and obese. This study correlates with a study in India by Aiyar et al., (2021) which reveals that an increase in exposure to media increases the prevalence of overweight and obesity. This is because as women are watching television, most of that time they will be seated, hence a sedentary lifestyle as well as snacking on unhealthy foods as they watch television. Also, a study by Talukder et al. (2021) that evaluated the association between television viewing and overweight and obesity among women of reproductive age in Timor-Leste reported that women who watched TV at least once a week were found to have 1.3 times the odds of being overweight or obese compared with those who never watched TV. Addressing media-related factors is essential for interventions aimed at preventing and managing overweight and obesity among women. Media can be a great platform for advocacy by creating a more inclusive and realistic media landscape that promotes health and well-being for everyone. This can be done by focusing on health by moving the conversation away from weight and instead emphasizing healthy habits like healthy diets, exercise, and mental well-being.

Urbanization

There are significant disparities in the nutrition status of women of reproductive age depending on where they reside. A study by Owobi et al., (2022) reported that: in Nigeria, 40% and 30% of females in urban and rural Nigeria were overweight or obese, respectively. These dietary differences between urban and rural areas have been linked to a shift from traditional diets toward processed, energy-dense foods, fat, foods derived from animals, sugar, and sweetened beverages. Because of higher incomes and the greater availability of processed foods, this dietary shift may be more pronounced among urban residents than among rural residents. Moreover, rapid urbanization is highly linked to a lack of physical activity in most sub-Saharan African countries. Another study done in Ghana by Asosega et al., (2023) is consistent with this study and states that rapid urbanization is highly linked to a lack of physical activity, easy access to energy-dense food as a result of nutrition transition, and reduced strenuous jobs in urban areas in most sub-Saharan African countries. Also, a study by Ntenda & Kazambwe (2019) finding is consistent with the previous studies as they revealed a higher degree of urbanization and technological progress render occupations less laborious, resulting in less energy expenditure therefore resulting in overweight and obesity. Understanding that residence and urbanization lead to overweight and obesity among women will help in interventions aimed at preventing and managing overweight and obesity among women. Some of them can be prioritized infrastructure that encourages walking and cycling, green areas for recreation and exercise as well as encourage stair use in public buildings with campaigns and signage promoting their health benefits. Secondly promoting healthy food choice support initiatives that bring fresh and affordable produce to urban areas and promote clear labeling and educational campaigns to help residents make informed choices. Also, affordable gym memberships or fitness classes in community centers, as well as encouraging healthy eating and physical activity programs in schools and

workplaces can help mitigate overweight and obesity.

Parity

The number of children that a woman gets can influence their nutrition status as well as the household size. Studies in Ghana by Asosega et al.(2023) have shown a positive correlation between women having more children and overweight and obesity. This could be due to factors like hormonal changes during pregnancy, weight gain during pregnancy that isn't fully lost afterward, and lifestyle changes related to childcare, as women tend to eat more food during pregnancy and the breastfeeding period. This study is consistent with a study done in Brazil by Lyrio et al.(2021) that revealed that being multiparous is positively associated with overweight and obesity. This is probably a consequence of being less concerned with body image due to marriage and greater dedication to caring for children and the home. Thus, the woman is not able to routinely practice physical activity and does not have an adequate diet, resulting in weight gain. Women with several children may also have gained weight as a result of their reduced physical activity and have less time to focus on health behaviors including weight management because they are usually busy taking care of children. The relationship between parity and weight is complex, which can increase the prevalence of overweight and obesity among women of reproductive age. As women get babies, they should also be aware of their health and well-being to stay healthy, therefore, strategies geared toward averting them can improve their health and quality of life. Some of the strategies can include providing accessible and affordable postpartum healthcare that includes weight management guidance and nutritional counseling, helping mothers find time for self-care and physical activity, family members to help with child care as well as educating families on appropriate portion sizes for different age groups to avoid overeating.

Food choices

The studies indicate that the primary cause of weight gain in general is ingesting more calories than burning them. Fast food and processed foods high in calories from sugar, bad fats, and refined carbohydrates are deficient in energy and low in other nutrients. As a result, they tend to be filling but not satisfying, which may lead to overindulgence in eating. Saturated and trans fats from fried foods, processed meats, and baked goods are examples of unhealthy fats that can lead to weight gain and health issues (Ntenda & Kazambwe 2019). This study correlates with a study done in Mali by Seidu et al., (2021) which indicated people switch from the consumption of healthier staple foods to Western foods, which is likely to result in overweight and obesity. However, a study done in Tanzania by Mosha et al., (2021) indicated that compared to animal red meat consumption, fish and poultry protein intake was significantly associated with a low risk of overweight and obesity. This could be attributed to fish and chicken having less saturated fat and cholesterol, which justifies having less risk of overweight and obesity.

Foods that are high in sugar have a high-calorie content but little to no nutritional value and because sugar does not provide the same sense of fullness or satiety as other foods like proteins, it can have an addictive effect that makes it difficult to control one's intake and maintain a healthy weight. Sugar can also lead to overeating because it does not leave one feeling satisfied after consuming sugary foods. A study in Tanzania by Mosha et al., (2021) found that high sugar consumption was associated with a higher prevalence of overweight and obesity. The study found that a steady increase in the availability and consumption of energy-rich foods from the 1980s had contributed substantially to the increase in obesity in the region. High sugar and beverage consumption above 10% of the total daily energy requirement has increased in recent years, especially in urban settings. A similar finding was reported in a study by Annisa et al., (2020) that revealed an increased risk of central obesity among women of reproductive age who consume

beverages and food high in sugar. In addition, sugary foods influence metabolism through hormonal imbalance, specifically insulin and leptin, which are involved in fat storage and metabolism. Consequently, because the metabolism of added sugar occurs in the liver, excess consumption can strain the liver and eventually one can develop fatty liver disease. Filling up on sugary foods can crowd out healthier options in your diet. This can lead to deficiencies in essential vitamins, minerals, and fiber important for overall health and weight management. This evidence underscores the importance of addressing factors related to sugar and sugary food consumption in interventions aimed at preventing and managing overweight and obesity among women. This will help to develop strategies to promote the consumption of less sugary foods to mitigate the adverse health consequences associated with excess weight gain.

CONCLUSION

This systematic review identifies key determinants, including advanced age, high household wealth index, white-collar employment, multiparity, marital status, media exposure, and higher education. Notably, some studies suggest that women with higher education and media exposure may have a lower likelihood of being overweight or obese, highlighting the complexity of these factors.

RECOMMENDATION

Urgent public health actions are needed to address the burden of excess weight, particularly among women of reproductive age. Interventions should be personalized and targeted such that determinants/factors leading to adiposity are addressed to curb the increasing rate of overweight and obesity among women of reproductive age. Resources should be allocated to key sectors including the Ministry of Health, Division of Nutrition, County Governments, and Primary Health Networks to support preventive strategies. These include health education on exercise, behavioral change promotion, advocacy for healthy living, and access to balanced diets. Strengthening healthcare systems to provide preventive and curative services for overweight and obesity is also essential.

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