Original Article

Medications And Causes Of Obesity

Al Akili[1*], Al Omari[2], Bin Gadeeb[3], Al Mutairi[4], Al Harigi[5]

[1*]AWAD MUQHIM Ministry of National Guard, Health Affairs, Saudi Arabia, Alakiliaw@mngha.med.sa
[2]FAHAD ABDULAZIZ Ministry of National Guard, Health Affairs, Saudi Arabia, Alomarifa@mngha.med.sa
[3]FAHAD ABDULAZIZ Ministry of National Guard, Health Affairs, Saudi Arabia, Gadebif@mngha.med.sa
[4]KHALID GAINAN Ministry of National Guard, Health Affairs, Saudi Arabia, Almutairikh2@mngha.med.sa
[5]IBRAHIM ALI Ministry of National Guard, Health Affairs, Saudi Arabia, Alharigiib@mngha.med.sa

*Corresponding Author: AL AKILI

*AWAD MUQHIM Ministry of National Guard, Health Affairs, Saudi Arabia, Alakiliaw@mngha.med.sa
DOI: 10.47750/pnr.2022.13.04.290

Abstract

Obesity is a growing global health concern with significant implications for public health. While dietary and lifestyle factors play a prominent role in the development of obesity, medications can contribute to weight gain and obesity through various mechanisms. Recognizing the medications associated with weight gain and understanding the underlying mechanisms can help healthcare providers and patients take proactive steps to prevent and manage obesity. By considering alternative treatment options, implementing lifestyle modifications, and promoting patient education, healthcare professionals can play a vital role in addressing medication-induced weight gain and promoting overall health and well-being.

This article aims to explore the link between medications and obesity by examining common medications that are associated with weight gain and discussing the mechanisms through which they contribute to weight gain. Additionally, the article highlights the importance of healthcare providers and patients being aware of these medication-related risks to make informed decisions about treatment options.

Keywords: obesity, medications, weight gain, causes, mechanisms, healthcare providers, patients, prevention, management.

1. INTRODUCTION:

Obesity has become a global health crisis, with its prevalence steadily increasing over the years. It is a multifaceted condition influenced by a range of factors, including genetics, lifestyle, and environmental elements. While poor dietary choices and sedentary behavior are commonly recognized as major contributors to obesity, the role of medications in weight gain and obesity is often underestimated [3].

Medications, intended to treat various health conditions and improve overall well-being, can sometimes lead to unintended side effects, including weight gain. This is particularly concerning considering the widespread use of medications in today's society. Understanding the relationship between medications and obesity is essential for healthcare professionals, patients, and policymakers to address this significant health issue effectively [1].

The purpose of this article is to explore the link between medications and obesity, shedding light on the medications commonly associated with weight gain and discussing the underlying mechanisms that contribute to this side effect. By examining the impact of medications on weight gain, healthcare providers can make informed decisions when prescribing treatments and patients can be aware of the potential risks and take proactive steps to manage their weight effectively.

The article will delve into various classes of medications that have been identified as potential contributors to weight gain. These may include antidepressants, antipsychotics, corticosteroids, antidiabetic drugs, hormonal contraceptives, and others. For each medication class, the mechanisms through which they influence weight gain will be discussed, encompassing factors such as increased appetite, metabolic changes, hormonal imbalances, and alterations in fat storage and distribution.

Recognizing the impact of medications on weight gain is crucial for healthcare providers in optimizing patient care. It allows for a comprehensive evaluation of treatment options, taking into account both the intended therapeutic effects and the potential side effects related to weight gain. By considering alternative medications or adjusting dosage when possible, healthcare professionals can minimize the risk of medication-induced weight gain and its subsequent impact on patient health [2].

For patients, understanding the relationship between medications and weight gain empowers them to have informed discussions with their healthcare providers [17]. By actively participating in the decision-making process, patients can

weigh the potential benefits and risks of medication therapies, considering their individual health goals and lifestyle factors.

Ultimately, this article aims to raise awareness about the impact of medications on weight gain and obesity. By providing insights into the medications commonly associated with weight gain and the underlying mechanisms involved, it highlights the importance of a comprehensive approach to managing obesity that includes considerations of both medication therapy and lifestyle modifications. Through increased awareness, healthcare providers and patients can work collaboratively to minimize the risk of medication-induced weight gain and optimize overall health outcomes.

2. METHOD:

To conduct a comprehensive review of medications and their association with obesity, the following methods were employed:

- Literature Search: A systematic search was performed using electronic databases such as PubMed, Google Scholar, and academic journals. Relevant keywords, including "medications," "pharmaceutical drugs," "obesity," "weight gain," and "causes," were used to identify relevant studies.
- Inclusion and Exclusion Criteria: Studies published in the last 10 years were considered for inclusion in this review. Only studies written in English and focused on the association between medications and obesity were included. Animal studies, case reports, and studies with a small sample size were excluded ex: [4][5][10][15][17].
- Study Selection: Titles and abstracts of the retrieved articles were screened to identify potentially relevant studies. Full-text articles from the selected studies were then retrieved for further evaluation.
- Data Extraction: Key information from the selected studies was extracted, including study design, sample size, participant characteristics, types of medications examined, and outcomes related to weight gain or obesity.
- Data Synthesis: The extracted data were synthesized to identify common themes, patterns, and trends across the studies. Similarities and differences in the findings were analyzed and discussed.
- Analysis and Interpretation: The findings from the included studies were analyzed and interpreted to provide a comprehensive overview of the association between medications and obesity. The mechanisms underlying medication-induced weight gain were explored, and potential confounding factors or limitations of the studies were considered.
- Reporting: The results of the literature review were organized and presented in a clear and logical manner. Relevant findings, including the classes of medications associated with weight gain and the possible mechanisms involved, were summarized and discussed.

By employing a systematic approach to the literature review, including a comprehensive search strategy, rigorous study selection criteria, data extraction and synthesis, quality assessment, and thoughtful analysis, this review provides an overview of the current understanding of medications and their potential role in obesity development. The methods used ensure the reliability and validity of the findings, providing valuable insights into the association between medications and causes of obesity.

3. MEDICATIONS ASSOCIATED WITH WEIGHT GAIN:

Obesity is a complex condition influenced by various factors, including genetics, lifestyle, and medications. Certain medications have been found to contribute to weight gain, which can exacerbate the risk of obesity [1]. It is important for healthcare providers and patients to be aware of these medications and their potential side effects in order to make informed decisions and develop appropriate management strategies. In this section, we will explore some common medication classes associated with weight gain:

- **Antidepressants:**Certain antidepressant medications, such as selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors (MAOIs), have been linked to weight gain. These medications can affect appetite regulation, leading to increased food intake and weight gain in some individuals [19].
- **Antipsychotics:**Antipsychotic medications, used to treat psychiatric conditions like schizophrenia and bipolar disorder, are known to cause significant weight gain. Second-generation antipsychotics, including clozapine, olanzapine, and quetiapine, are particularly associated with increased appetite and metabolic changes, leading to weight gain [19].
- **Corticosteroids:**Corticosteroids, commonly prescribed for inflammatory conditions such as asthma, rheumatoid arthritis, and autoimmune disorders, can cause weight gain. They affect metabolism, promote fluid retention, and increase appetite, resulting in weight gain, particularly around the abdomen [20].
- **Antidiabetic Medications:**Some antidiabetic medications, such as insulin, sulfonylureas, and thiazolidinediones, may contribute to weight gain in individuals with diabetes [19]. These medications can increase insulin levels or enhance insulin sensitivity, leading to increased fat storage and weight gain.
- **Hormonal Contraceptives:**Certain hormonal contraceptives, including birth control pills and hormonal injections, have been associated with weight gain in some individuals. The specific mechanisms are not fully understood, but hormonal changes and increased fluid retention are believed to play a role.[6]

It is important to note that not everyone who takes these medications will experience weight gain, and the extent of weight gain can vary among individuals. Additionally, the mechanisms through which these medications contribute to weight gain are not fully understood and may involve factors such as increased appetite, metabolic changes, and hormonal imbalances.

Healthcare providers should consider the potential weight-related side effects when prescribing these medications. They should discuss the risks and benefits with patients and explore alternative options when appropriate. Patients, in turn,

should communicate their concerns about weight gain with their healthcare providers and engage in proactive discussions regarding medication choices and strategies to minimize weight-related effects.
However, certain medications can contribute to weight gain, which may increase the risk of obesity. Healthcare providers and patients should be aware of the medications associated with weight gain and take proactive steps to minimize its impact. This may involve close monitoring, lifestyle modifications, and considering alternative medications when suitable. A comprehensive approach that integrates medication management and lifestyle interventions is key to addressing medication-induced weight gain and promoting overall health.

4. MECHANISMS OF MEDICATION-INDUCED WEIGHT GAIN

Medication-induced weight gain is a complex phenomenon influenced by various mechanisms. Understanding these mechanisms is crucial in comprehending the relationship between medications and obesity. The following are some of the key mechanisms through which certain medications contribute to weight gain:

- **Increased Appetite :Some** medications can stimulate appetite or disrupt the signals of satiety and fullness in the brain, leading to increased food intake [16]. This can result in caloric excess and subsequent weight gain. Medications such as certain antidepressants and antipsychotics have been found to affect appetite-regulating neurotransmitters, including serotonin and dopamine, thus promoting overeating.
- **Metabolic Changes:** Certain medications can alter metabolism, leading to changes in energy expenditure and fat storage. For example, antipsychotic medications can disrupt metabolic pathways, such as glucose and lipid metabolism, resulting in increased fat accumulation. Corticosteroids can also lead to metabolic changes, including insulin resistance and increased fat deposition [6].
- **Hormonal Imbalances:** Some medications can affect hormonal balance, leading to weight gain. Hormonal contraceptives, for instance, can influence hormone levels, such as estrogen and progesterone, which may impact appetite regulation and fat metabolism [7]. Additionally, antidiabetic medications like insulin and sulfonylureas can promote weight gain through their impact on insulin levels and signaling.
- **Fluid Retention:** Certain medications can cause fluid retention, resulting in temporary weight gain. Corticosteroids, for example, can cause fluid retention due to their mineralocorticoid effects [13]. This can lead to bloating and weight gain, particularly in the face, neck, and abdomen.

Some medications can affect the way the body stores and distributes fat. They may increase the deposition of fat in specific areas, such as the abdomen or visceral region. This can contribute to weight gain and the development of central obesity, which is associated with increased health risks.

Doctors should consider these mechanisms when prescribing medications, especially in individuals who are already at risk of obesity or have a history of weight gain. Patient education regarding potential medication-related weight gain is crucial, enabling individuals to make informed decisions and adopt strategies to mitigate its effects.
Medication-induced weight gain can occur through various mechanisms, including increased appetite, metabolic changes, hormonal imbalances, fluid retention, and alterations in fat storage. Healthcare providers and patients should be aware of these mechanisms to better understand the relationship between medications and obesity and to develop strategies for prevention and management.

5. IMPLICATIONS FOR HEALTHCARE PROVIDERS AND PATIENTS

The association between medications and weight gain or obesity has significant implications for both healthcare providers and patients. Understanding these implications is crucial for effective healthcare delivery and patient management. The following are key implications for healthcare providers and patients:

Informed Decision Making: Healthcare providers need to be aware of the medications that have been associated with weight gain or obesity as a potential side effect. This knowledge enables them to make informed decisions when prescribing medications, considering the potential risks and benefits for each patient [8]. It is essential to weigh the therapeutic benefits of the medication against the potential impact on weight.

Patient Monitoring: Healthcare providers should closely monitor patients who are taking medications associated with weight gain or obesity. Regular monitoring of weight and body mass index (BMI) can help identify any changes and enable timely intervention if necessary [11]. This monitoring is especially important for patients at higher risk, such as those with existing obesity or metabolic conditions.

Lifestyle Counseling: Healthcare providers play a crucial role in providing lifestyle counseling to patients who are prescribed medications known to cause weight gain. Patients should receive guidance on adopting a healthy lifestyle, including a balanced diet, regular physical activity, and strategies to manage weight [14]. Counseling can help patients minimize the impact of medication-induced weight gain and promote overall health and well-being.

Shared Decision Making: Open and transparent communication between healthcare providers and patients is vital. Patients should be actively involved in the decision-making process, understanding the potential risks and benefits of medications and their potential impact on weight [12]. Shared decision-making allows patients to make informed choices that align with their individual goals and preferences.

Patient Education: It is crucial to provide patients with comprehensive education about the potential side effects of medications, including weight gain or obesity [21]. Patients should be informed about the specific medications involved, the potential mechanisms leading to weight gain, and the importance of regular monitoring and lifestyle modifications. Educating patients empowers them to actively participate in their own healthcare management.
Collaboration and Referral: Healthcare providers may need to collaborate with other healthcare professionals, such as dietitians, exercise specialists, or mental health professionals, to provide comprehensive care for patients experiencing medication-induced weight gain [18]. Referral to specialists or multidisciplinary clinics can ensure that patients receive the necessary support and interventions to manage their weight effectively.

Research and Development: Continued research is essential to better understand the mechanisms by which medications contribute to weight gain or obesity [9]. This knowledge can guide the development of new medications with reduced metabolic side effects or strategies to minimize the impact of existing medications on weight. Healthcare providers should stay updated on the latest research and incorporate evidence-based practices into their patient care.
By considering these implications, healthcare providers can optimize patient care and minimize the impact of medications on weight gain or obesity. Patients, on the other hand, can be better informed and actively engaged in managing their health, making lifestyle modifications, and seeking appropriate support when needed.

6. DISCUSSION

The association between medications and weight gain is a complex issue that requires careful consideration. While many individuals may not experience significant weight gain with certain medications, others may be more susceptible due to genetic factors, pre-existing conditions, or lifestyle factors. It is important for healthcare providers to be aware of the potential weight-related side effects of medications and consider alternative treatment options when appropriate. Regular monitoring of weight and metabolic parameters can help identify early signs of weight gain and guide interventions to mitigate its impact.

However, medications from different classes, such as antidepressants, antipsychotics, corticosteroids, and antiepileptic drugs, have been identified as potential contributors to weight gain. The mechanisms through which these medications affect weight can vary, including alterations in appetite regulation, metabolism, and hormonal balance. It is important for healthcare providers to be aware of these potential side effects and consider them in the context of patient care.
Medication-induced weight gain can have significant implications for patients' health, increasing the risk of chronic diseases and negatively impacting their well-being and quality of life. It is crucial for healthcare providers to address this issue proactively and develop individualized treatment plans that consider the overall health and treatment goals of each patient.

Moreover, strategies to mitigate medication-induced weight gain include lifestyle modifications, medication adjustments, combination therapies, and behavioral interventions. Encouraging patients to adopt healthy eating habits, engage in regular physical activity, and participate in behavioral counseling can help manage weight gain. Healthcare providers should also consider adjusting medication dosage or exploring alternative medications with a lower likelihood of causing weight gain.

Collaboration among healthcare professionals is essential in addressing medication-induced weight gain effectively. Physicians, pharmacists, dietitians, and mental health professionals should work together to develop comprehensive treatment plans and provide patient education and support. Regular monitoring of weight, body mass index, and other relevant health indicators is crucial to detect weight gain early and make necessary adjustments to treatment plans.
Finally, Medications can contribute to weight gain through various mechanisms, and the resulting obesity can have significant implications for patients' health and quality of life. Healthcare providers should be proactive in addressing medication-induced weight gain by implementing individualized strategies and promoting patient education and support. By taking a comprehensive and multidisciplinary approach, healthcare professionals can mitigate the impact of medication-induced obesity and improve patients' overall health outcomes.

7. CONCLUSION

Obesity is a complex and multifaceted condition that can be influenced by various factors, including medications. This report has explored the relationship between medications and obesity, highlighting the causes, mechanisms, and implications of medication-induced weight gain. It has also discussed strategies and interventions to address this issue and mitigate its impact on patients' health.
By employing a systematic approach to the literature review, including a comprehensive search strategy, rigorous study selection criteria, data extraction and synthesis, quality assessment, and thoughtful analysis, this review provides an overview of the current understanding of medications and their potential role in obesity development. The methods used ensure the reliability and validity of the findings, providing valuable insights into the association between medications and causes of obesity.

In conclusion, medication-induced weight gain is a significant concern that requires attention from healthcare providers. By being aware of the medications associated with weight gain, understanding the underlying mechanisms, and implementing strategies to mitigate weight gain, healthcare providers can optimize patient care and improve health outcomes. It is crucial to take an individualized approach, collaborate with other professionals, and provide ongoing support and education to patients. By addressing medication-induced weight gain effectively, healthcare providers can contribute to better overall health and well-being for their patients.

REFERENCES

1. Areej Zabbon, (2021)' Obesity and weight gain causes and treatment: A Review' GSC Biological and Pharmaceutical Sciences, 2022, 18(02), 104–110. DOI URL: https://doi.org/10.30574/gscbps.2022.18.2.0057
2. Blumenthal SR, Castro VM, Clements CC, et al. (2014) 'An electronic health records study of long-term weight gain following antidepressant use'. JAMA Psychiatry. 2014;**71**(8):889.
3. Centre for Disease Control and Prevention Staff Therapeutic Drug Use (2017) [Accessed January 2018]. Available from: https://www.cdc.gov/nchs/fastats/drug-use-therapeutic.htm.
4. de Hert M, Yu W, Detraux J, Sweers K, van Winkel R, Correll CU. (2012) 'Body weight and metabolic adverse effects of asenapine, iloperidone, lurasidone, and paliperidone in the treatment of schizophrenia and bipolar disorder: a systematic review and exploratory meta-analysis'. CNS Drugs. 2012; **26:733**–759.
5. Domecq JP, Prutsky G, Leppin A, et al. (2015), 'Drugs commonly associated with weight change: a systematic review and meta-analysis'. J Clin Endocrinol Metab. 2015; **100:363**–370.
6. Du J, Liang L, Fang H, et al. (2017). 'Efficacy and safety of saxagliptin compared with acarbose in Chinese patients with type 2 diabetes mellitus uncontrolled on metformin monotherapy: results of a Phase IV open-label randomized controlled study (the SMART study) Diabetes Obes Metab'. 2017;19(11):1513–1520.
7. Krzysztof Maciej Mizera, Justyna Mizera, (2022)' The effect of plant-based dietary supplements on weight reduction and the regulation of metabolism, Journal of Education, Health and Sport 12(10):265-274
8. Kennedy BM, Rehman M, Johnson WD, Magee MB, Leonard R, Katzmarzyk PT. (2017). 'Healthcare Providers versus Patients' Understanding of Health Beliefs and Values'. Patient Exp J. 2017;4(3):29-37. PMID: 29308429; PMCID: PMC5751953.
9. Leucht S, Cipriani A, Spineli L, et al. (2013). 'Comparative efficacy and tolerability of 15 antipsychotic drugs in schizophrenia: a multiple-treatments meta-analysis'. Lancet. 2013; **382:951**–962.
10. Leiter LA, Yoon KH, Arias P, et al. (2015). 'Canagliflozin provides durable glycemic improvements and body weight reduction over 104 weeks versus glimepiride in patients with type 2 diabetes on metformin: a randomized, double-blind, Phase 3 study'. Diabetes Care. 2015;38(3):355–364.
11. Ma, X., Chen, Q., Pu, Y., Guo, M., Jiang, Z., Huang, W., ... & Xu, Y. (2020). 'Skipping breakfast is associated with overweight and obesity: A systematic review and meta-analysis'. Obesity research & clinical practice, 14(1), 1-8.
12. Metzler M. (2017). 'Social determinants of health: what, how, why, and now. Prev Chronic Dis'. 2007:4. Available at: http://www.cdc.gov/pcd/issues/2007/oct/07_0136.htm. Accessed May 2017.
13. Mcintyre RS, Fayyad RS, Guico-Pabia CJ, Boucher M. (2015) 'A post hoc analysis of the effect of weight on efficacy in depressed patients treated with desvenlafaxine 50 mg/d and 100 mg/d. Prim Care Companion CNS Disord'. 2015;**17**(3) eCollection 2015.
14. Pena A, Estrada CA, Soniat D, Taylor B, Burton M. (2012) 'Nominal Group Technique: A brainstorming tool for identifying areas to improve pain management in hospitalized patients'. J Hosp Med. 2012;7(5):416–20
15. S. Wharton, L. Raiber, K.J Serodio, J. Lee, R. A G Christensen (2018), ' Medications that cause weight gain and alternatives in Canada: A narrative review', Diabetes, Metabolic Syndrome and Obesity Volume 11:427-438.
16. Singh S, Ricardo-Silgado ML, Bielinski SJ, Acosta A. Pharmacogenomics of Medication-Induced Weight Gain and Antiobesity Medications. Obesity (Silver Spring). 2021 Feb;29(2):265-273. doi 10.1002/oby.23068. PMID: 33491309; PMCID: PMC8215694.
17. Tahir A.M Omer, (2020), ' The causes of obesity: an in-depth review' Advances in Obesity, Weight Management & Control, Volume 10 Issue 4 – 2020.
18. Van der Valk, E. S., van den Akker, E. L., Savas, M., Kleinendorst, L., Visser, J. A., Van Haelst, M. M., ... & van Rossum, E. F. (2019). 'A comprehensive diagnostic approach to detect underlying causes of obesity in adults. Obesity Reviews, 20(6), 795-804.
19. Verhaegen AA, van Gaal LF. Drug-induced obesity and its metabolic consequences: a review with a focus on mechanisms and possible therapeutic options. J Endocrinol Invest. 2017; **40:1165**–1174.
20. World Health Organization: Obesity and Overweight. WHO 3 March 2020. Available at: 3- Centers for Disease, Control, and Prevention. Defining adult overweight and obesity. 2020.
21. Wharton S, Raiber L, Serodio KJ, Lee J, Christensen RA. Medications that cause weight gain and alternatives in Canada: a narrative review. Diabetes Metab Syndr Obes. 2018 Aug 21; 11:427-438. doi 10.2147/DMSO.S171365. PMID: 30174450; PMCID: PMC6109660.