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Manuskrip diketik pada kertas berukuran A4 (210 x 297 mm) dengan batas tepi 254 mm (*margin Normal*), huruf diketik dengan tipe huruf (*font*) *Times New Roman*, besar huruf (*font size*) 12 point dengan menggunakan spasi rangkap 2 (*double space*). Setiap bagian dari manuskrip dimulai pada halaman baru dengan urutan sebagai berikut: halaman judul, abstrak dan kata kunci (*keywords*), teks keseluruhan, ucapan terima kasih, daftar pustaka, tabel dan gambar (setiap tabel dan gambar pada halaman terpisah). Nomor halaman dicantumkan secara berurutan dimulai dari halaman judul pada sudut sebelah kanan bawah. Manuskrip sebaiknya ditulis maksimal 16 halaman.

Halaman judul

Halaman judul mencakup: a) judul manuskrip yang dibuat sesingkat mungkin, spesifik informatif dan ringkasan judul tidak lebih dari 40 karakter (hitung huruf dan spasi) yang dicantumkan dibawah judul, b) nama penulis disusun berurutan dengan nama mahasiswa sebagai pengarang pertama, diikuti oleh Pembimbing sebagai pengarang kedua. Nama penulis ditulis lengkap tanpa gelar dan dicantumkan seperti aslinya, tidak dibalik seperti pada daftar pustaka dan sitasi, c) alamat setiap penulis, nama departemen dan lembaga afiliasi penulis, d) nama dan alamat penulis untuk korespondensi serta nomor telepon, nomor faksimili, alamat email. Judul penelitian dibuat jelas, singkat, spesifik, informatif, dan sesuai dengan topik manuskrip. Jumlah kata tidak lebih dari 12 kata agar mudah dan cepat dipahami pembaca.

Abstrak dan kata kunci

Abstrak berjumlah 200-250 kata ditulis dalam bahasa Indonesia dan Inggris. Abstrak berisikan latar belakang termasuk tujuan penelitian, metode, hasil, dan kesimpulan. Kata kunci dicantumkan di bawah abstrak pada halaman yang sama sebanyak 4-6 kata. Bagian abstrak merupakan ringkasan dari isi makalah yang dibuat secara singkat, informatif, dengan menekankan pada aspek baru dan penting dari penelitian.

Teks

Teks makalah manuskrip dibagi dalam beberapa bagian dengan judul sebagai berikut: *Pendahuluan, Metode, Hasil, Pembahasan, Kesimpulan dan saran.*

Pendahuluan

a. Latar belakang merupakan bagian yang menjelaskan alasan mengapa masalah ini penting untuk diteliti. Bagian ini memuat penjelasan mengapa masalah itu dipandang menarik, penting, dan perlu diteliti untuk mencari pemecahannya. Penjelasan dapat diperoleh dari penelusuran pustaka yang berkaitan erat dengan

masalah yang diteliti.

b. Keaslian penelitian dikemukakan dengan menunjukkan bahwa masalah yang dihadapi belum pernah dipecahkan oleh peneliti terdahulu atau dinyatakan dengan tegas perbedaan penelitian ini dengan penelitian terdahulu.

c. Tujuan penelitian yang menjelaskan hasil yang akan dicapai.

Metode

Metode penelitian berisi uraian terpadu dan sistematis mengenai bagaimana penelitian akan dilaksanakan. Metode terdiri dari :

a. Desain

b. Populasi / sampel (subjek) penelitian

Diuraikan kriteria inklusi dan eksklusi subjek penelitian, cara pemilihan sampel (subjek penelitian) secara random atau non-random, serta besar sampel yang akan di pilih. Teknik pemilihan sampel harus dijelaskan secara rinci. Bila perlu dibuat alur pemilihan sampel.

c. Bahan dan alat serta pengukuran

Bahan dan alat yang harus disajikan pada laporan terbatas pada bahan (materi) dan alat utama yang diperlukan untuk penelitian dan harus disebutkan spesifikasinya. Prosedur pengukuran perlu dijelaskan sesuai dengan tahapan yang dilakukan.

d. Alur kerja penelitian

Jalannya penelitian perlu dijelaskan mengenai jenis pendekatan yang dipakai untuk mendapatkan data, melalui pendekatan laboratorium, klinik, komunitas, observasi, dll.

e. Analisis data

Perlu dijelaskan jenis teknik statistik yang digunakan untuk menjawab masalah dan mencapai tujuan penelitian. Data yang diperoleh dapat dianalisis menggunakan teknik statistik secara parametrik dan non-parametrik.

Hasil

Suatu hasil penelitian hendaknya disajikan dengan jelas, logis, runut, sehingga mudah untuk dimengerti. Hasil penelitian sebaiknya ditampilkan selain dalam bentuk narasi dapat pula berupa gambar, tabel, foto, dan grafik sehingga memudahkan untuk dipahami. Hasil dan interpretasi analisis statistik dituliskan secara jelas dalam uraian hasil penelitian.

Pada tahap awal disajikan distribusi karakteristik subjek penelitian, yang biasanya dibuat pada sebuah tabel. Kemudian disajikan temuan penting yang diperoleh, kalau cukup banyak sebaiknya pada sebuah tabel. Bila terbatas misalkan hanya satu atau dua temuan cukup dalam bentuk narasi/teks.

Tabel, bagan/gambar, grafik dibuat dengan jelas, diberi nomor urut serta keterangan yang jelas. Keterangan

tabel diletakkan di atas tabel dan keterangan gambar diletakkan di bawah gambar. Maksimal tabel dan gambar 5. Semua tabel, grafik dan gambar diberi nomor dan keterangan yang jelas. Setiap tabel dianalisis dan diinterpretasi secara sistematis, dan hasilnya ditulis di bawah tabel tersebut. Perhitungan statistik detail tidak perlu ditulis dalam bagian hasil ini. Bila perhitungan statistik dianggap perlu ditulis, maka sebaiknya diletakkan dalam lampiran saja.

Pembahasan

Langkah awal harus diuraikan temuan penting yang diperoleh dari penelitian sesuai dengan tujuan penelitian. Kemudian bandingkan hasil penelitian yang diperoleh dengan hasil-hasil penelitian sebelumnya. Perlu dijelaskan kesesuaian dan ketidaksesuaian hasil penelitian yang didapat terhadap kerangka teori atau hasil penelitian lain yang telah dilakukan sebelumnya. Selanjutnya menggunakan teori-teori yang ada uraikan mekanisme terjadinya hasil penelitian tersebut. Bagian pembahasan juga menjelaskan mengenai kelemahan dan kelebihan penelitian yang telah dilakukan. Uraikan implikasi dari hasil penelitian yang diperoleh.

Kesimpulan

Kesimpulan hendaknya dibuat dalam bentuk narasi dan menguraikan secara singkat, jelas, padat menurut urutan yang sistematis. Bagian ini memuat tentang hasil penelitian yang telah diperoleh untuk menjawab tujuan penelitian. Saran menguraikan perlunya dilakukan penelitian lebih lanjut untuk memperbaiki kelemahan/keterbatasan dari penelitian yang telah dilakukan.

Ucapan terima kasih

Ditujukan kepada pihak-pihak yang memberikan bantuan dana dan dukungan antara lain dukungan dari bagian dan lembaga, para professional yang memberikan kontribusi dalam penyusunan makalah, dan untuk penguji I maupun penguji II. Pembimbing tidak perlu dicantumkan pada Ucapan Terima Kasih karena sudah dicantumkan sebagai penulis.

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Daftar referensi/rujukan hanya mencatumkan rujukan yang telah digunakan dan ditulis menurut sistem Vancouver.

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3. Setelah terdaftar silakan unggah naskah manuskrip dan isi form yang terdapat di dalam website, dan ikuti langkah selanjutnya.

Daftar Cek Pengiriman Naskah Manuskrip

- Naskah manuskrip belum pernah dipublikasikan sebelumnya, juga tidak dalam pengajuan ke jurnal lain.
- File manuskrip harus berformat OpenOffice, Ms. Word atau RTF dokumen, *font* 12, *Times New Roman*, *double spacing*.
- Halaman judul harus memuat jelas judul, nama lengkap penulis tanpa gelar, departemen penulis, universitas, alamat lengkap, nomor telepon dan email.
- Pelaporan data manuskrip dari penelitian yang melibatkan manusia dan hewan memerlukan persetujuan formal (kaji etik) oleh dewan peninjau atau komisi etik institusi yang bersangkutan.
- Daftar rujukan memuat semua rujukan yang terdapat di dalam manuskrip dan ditulis sesuai urutan pengutipannya menggunakan sistem Vancouver.

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CASE REPORT

The Challenges in Treating Obesity Patients with Major Depressive Disorder (MDD) Treatment: a Case Report


Tantangan Pengobatan Pasien Obesitas Pada Terapi Gangguan Depresi Mayor (MDD): Laporan Kasus


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ABSTRACT

Depression and obesity are two disorders that profoundly impact worldwide health. This is primarily because of their high occurrence, which is linked to both illness and death. Obesity increases the likelihood of developing depression and vice versa. The susceptibility to depression in individuals with obesity implies the existence of linked mechanisms between both conditions, although the molecular processes involved are not well comprehended. We describe a 28-year-old man who sought help from a dietitian or nutrition specialist to address weight gain that occurred after he began taking medication for his major depressive disorder (MDD) three years ago. This case study aims to address the challenges of treating obesity in patients with major depressive disorder (MDD) treatment.

Keywords: depression; MDD medication; obesity

ABSTRAK

Depresi dan obesitas adalah dua gangguan penyakit yang sangat berdampak pada kesehatan dunia. Hal ini terutama disebabkan oleh tingginya angka kejadian kedua gangguan tersebut, yang berhubungan juga dengan angka kesakitan dan kematian. Obesitas meningkatkan kemungkinan terjadinya depresi dan sebaliknya. Kerentanan obesitas terhadap gangguan depresi menyiratkan adanya mekanisme terkait antara kedua kondisi tersebut, meskipun proses molekuler yang terlibat belum dipahami dengan baik. Kami menggambarkan seorang pria berusia 28 tahun yang mencari bantuan ke spesialis gizi untuk mengatasi penambahan berat badan yang terjadi setelah dia mulai mengonsumsi obat untuk gangguan depresi mayor (MDD) tiga tahun lalu. Studi kasus ini bertujuan untuk membahas tantangan dalam mengobati pasien obesitas dalam terapi gangguan depresi mayor (MDD).

Kata Kunci: depresi; pengobatan MDD; obesitas

INTRODUCTION

Over 340 million people worldwide currently suffer from major depressive disorder (MDD). The World Health Organization predicts that Major Depressive Disorder (MDD) will become the most significant worldwide health burden and escalate into a public health emergency by 2030.^{1,2} Worldwide, 39% of adults are overweight, 13% are obese, and over 264 million people of all ages have depression.³ Obesity and depression affect a significant portion of the population. It is believed that the immunological and endocrine systems, along with psychological and social factors, play a role in both of those disorders.⁴ Obesity and depression had a bidirectional relationship: obese individuals had a 55% chance of having depression, while individuals with depression had a 58% probability of developing obesity. Furthermore, the correlation between obesity and depression was stronger compared to the correlation between overweight and depression.²

CASE REPORT

A 28-year-old male sought the expertise of a nutrition specialist to achieve weight loss. Anamnesis indicates that he has been experiencing depression for the past three years, stemming from challenges he faced throughout his studies at the medical faculty. He was disheartened due to his family's expectation for him to pursue a career in medicine.

However, he visited a psychiatrist irregularly, and he lacked family support throughout his treatment. He only consulted his psychiatrist when his mental well-being was declining or he faced major challenges. Besides not following the treatment plan, the patient also worried about the drug's side effects, as he has experienced weight gain since he started medications for his major depression disorder (MDD) treatment. Before he started his MDD treatment, his nutritional status was already overweight.

The patient received treatment for his depression with antidepressants and atypical antipsychotics. The medications prescribed for the patient were Vortioxetine at a dosage of 10 mg per day and Quetiapine at a dosage of 100 mg per day. Since starting the medication for his depression, the patient has experienced an increase in appetite and body weight. This makes him often eat at restaurants or order food through delivery services to overcome the increase in his appetite. The main meal and 1-2 snacks were eaten three times daily. Most meals and snacks are calorie-dense and high in fat. The food consumption research varied from 3,000 to 4,000 calories daily.

Regarding his physical activity level, the patient is considered to have a sedentary lifestyle with minimal physical activity. During his initial visit to the dietitian, he weighed 150 kg and height of 186 cm, resulting in an obese and morbid classification with a BMI of 43.36 kg/m². Nutritional guidance from the dietitian includes a personalized meal schedule, food choices, portion sizes, and timing of meals. The dietitian recommended that the patient engage in 30-minute walks five times each week. She suggests using a low-dose combination of diethylpropion and or listat. After 6 months of treatment, the patient had weight reduction (about 12 kg), but he did not return to his dietitian regularly anymore. The patient did not routinely consult his dietitian because he felt that his weight

had decreased and he thought that he could control his diet. In addition, he felt that his depression was getting better.

DISCUSSION

Major depressive disorder is often identified by changes in appetite and weight, with some individuals experiencing increased appetites and others experiencing decreased appetites. This might be caused by mood changes, or it could also be caused by the effects of antidepressant medicine to overcome their depression. The brain regions responsible for experiencing pleasure from food are linked to depression.⁵ MDD is often linked with weight reduction, but MDD with atypical characteristics (MDD-AF) is defined by subsequent weight gain, increased hunger, and obesity.^{1,2}

The transition from losing weight to gaining weight in depressed patients can be seen. Weight loss can occur because some depression patients tend to lose their appetites. On the other side, many of them would increase their appetites when they felt depressed. One potential explanation is that individuals with depression may turn to “comfort foods” (often high in fat and sugar) for solace or to improve their mood. Recent pilot investigations indicate a correlation between a liking for sweet taste and depression in obese individuals.⁶

Obesity and major depressive disorder (MDD) are closely linked and important health conditions. Obesity increases the likelihood of major depressive disorder (MDD), while depression with atypical features (MDD-AF) contributes to obesity.^{7,8} A substantial fraction of the population experiences both obesity and depression simultaneously. An obesity study revealed a 55% increased likelihood of lifetime depression in obese individuals and a 58% higher chance of developing obesity in people with depression compared to the general population.⁸ Various factors, including biological, psychological, and behavioral aspects, can impact the intricate relationship between depression and obesity.⁹

The connection between the two conditions involves the immunological and endocrine systems, as well as psychological and social factors, which play a role in maintaining the two-way relationship.^{4,9} Depression and obesity, are both associated with the dysregulation of stress responses, particularly those involving the hypothalamic-pituitary-adrenal (HPA) axis. Adrenocorticotropin Releasing Hormone (ACTH) is made in the brain by the Corticotropin Releasing Factor (CRF). This hormone tells the adrenal gland to release glucocorticoids. Glucocorticoids have a negative feedback effect on their receptors, inhibiting ACTH and CRF synthesis. The obesity epidemic could be significantly influenced by the activation of the HPA axis due to elevated stress levels and easy access to high-calorie foods. Various physiological systems, such as the hypothalamus, pituitary adrenal axis, gonadal, growth hormone, leptin, sympathetic nervous system, and adrenergic, dopaminergic, and serotonergic central pathways, appear to be interrelated and have a role in obesity.¹⁰

Major depression, a high-stress condition, leads to weight gain by increasing the production of the key stress hormone cortisol, which elevates blood sugar levels.¹¹ Cortisol significantly influences the body's normal physiological functions by increasing blood sugar levels.¹² Twelve studies have demonstrated that activating hypothalamic serotonin receptors decreases an individual's consumption of dietary protein and fat rather than carbohydrates, depending on their propensity.

The patient was prescribed Vortioxetine at a dosage of 10 mg/day and Quetiapine at a dosage of 100 mg/day for his depression. Vortioxetine is a novel multimodal atypical antidepressant belonging to the class of Selective Serotonin Reuptake Inhibitors (SSRIs) for Major Depressive Disorder (MDD), with a recommended dosage range of 5–20 mg/day. Vortioxetine exerts its therapeutic effects by inhibiting serotonin transporters and directly modulating serotonin receptor activation.¹³ Studies demonstrated that activating serotonin receptors in the hypothalamus decreases the consumption of protein and fat in the diet, rather than carbs. The impact of each SSRI and Serotonin Norepinephrine Reuptake Inhibitors (SNRIs) on body weight varies because of their different levels of influence on the serotonergic, noradrenergic, dopaminergic, and histaminergic systems. SSRIs and SNRIs were linked to a minor weight loss in the short run and a weight increase in the long run.¹⁴

Meanwhile, Quetiapine, a second-generation antipsychotic, can be used as a supplement or adjuvant treatment for MDD, with the dose ranges from 50 to 300 mg daily with the immediate release (IR) form and 150 to 300 mg daily with the extended-release (ER) form, using similar titration schedules to a maximum of 300 mg daily. And this patient was given 100 mg of Quetiapine once a day by his psychiatrist. Preclinical studies have shown that atypical antipsychotics like Quetiapine may enhance the action and the therapeutic effect of the SSRIs, and it was found that depression patients who were treated with an atypical antipsychotic were more likely to experience remission or clinical response compared to those who received adjunctive placebo. On the other side, Quetiapine is also linked to short- and long-term side effects such as weight gain, altered lipid profile, and raised glucose levels. The average weight increase was 0.9 kg during 6 to 8 weeks of therapy.¹⁵ This was also the cause of the patient non-compliance while he undergoing depression therapy after he realized that he was gaining weight.

He also did not comply with the treatment plan that was already devised by his psychiatrist when he felt better, and the patient is also worried about the drug's side effects, as he has experienced weight gain since he began the medicine. However, when attempting to receive therapy from a dietician, the patient did not consistently follow the advice. The patient's treatment was unsuccessful due to his noncompliance with the therapeutic regimen prescribed by his psychiatrist and dietitian, as well as insufficient support from his family.^{16,17} The patient consulted his psychiatrist only when he felt very depressed or when he faced many problems. Besides that, he did not compile the treatment plan that was already devised by his psychiatrist when he felt better, and he worried about the side effects of his medication since he experienced weight gain after he started his depression treatment. However, when attempting to receive therapy from his dietitian, the patient did not consistently follow the advice. The patient's treatment was unsuccessful due to his non-compliance with the therapeutic regimen prescribed by his psychiatrist and dietitian, as well as a lack of support from his family with his problems.^{16,17}

The co-occurrence of depression and obesity (including obesity caused by medication's side effects) at the clinical level results in considerable suffering for the particular patient. This problem has substantial clinical ramifications since it may hinder the treatment of each ailment individually.⁴

Therefore, engaging in consistent exercise and undergoing psychotherapy, specifically cognitive behavioral therapy and interpersonal psychotherapy, including dietary changes resulting in weight loss can enhance mood ratings in obese patients with both clinical and subclinical

depression.⁴ An integrated approach to addressing obesity and depression is necessary for the growing number of individuals experiencing both conditions. Family support is also crucial for maintaining mental well-being, providing both direct advantages from familial connections and indirect protection against stressful situations.^{16,17} Collaboration between psychiatrists and dietitians is also crucial for achieving optimal therapeutic outcomes for individuals with obesity and depression.

CONCLUSION

Depression and obesity are two prevalent disorders with a substantial influence on worldwide health and are closely linked and important health conditions. Various factors, including biological, psychological, and behavioral aspects, can impact the intricate relationship between depression and obesity, and play a role in maintaining the two-way relationship.

Interactions between modern antidepressants and newer antipsychotic medications are often significant in clinical practice. Weight gain is a common side effect of antidepressants and antipsychotics. Therefore, it is crucial to educate patients about drug side effects, hunger regulation, the importance of family support, and regular exercise from the start of treatment for depression and obesity. It is also crucial for psychiatrists and dietitians to collaborate to get the best therapeutic outcomes for patients with obesity and depression.

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AUTHORS CONTRIBUTION

EI and VS reviewed the results and approved the final version of the manuscript.

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CONFLICT OF INTEREST

The authors declare that the case report was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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**The challenges in treating obesity patients in major depressive disorder (MDD)
treatment:
a case report**

**Tantangan pengobatan pasien obesitas pada terapi gangguan depresi mayor (MDD):
laporan kasus**

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ABSTRACT

6 Depression and obesity are two disorders that profoundly impact worldwide health. This is primarily because of their high occurrence, which is linked to both illness and death. Obesity increases the likelihood of developing depression and vice versa. The susceptibility to depression in individuals with obesity implies the existence of linked mechanisms between both conditions, although the molecular processes involved are not well comprehended. We describe a 28-year-old man who seek help from a dietitian or nutrition specialist to address weight gain that occurred after he began taking medication for his major depressive disorder (MDD) three years ago. This case study aims to address the challenges of treating obesity in patients with major depressive disorder (MDD) treatment.

Keywords: depression, MDD medication, obesity.

ABSTRAK

Depresi dan obesitas adalah dua gangguan penyakit yang sangat berdampak pada kesehatan dunia. Hal ini terutama disebabkan oleh tingginya angka kejadian kedua gangguan tersebut, yang berhubungan juga dengan angka kesakitan dan kematian. Obesitas meningkatkan kemungkinan terjadinya depresi dan sebaliknya. Kerentanan obesitas terhadap gangguan depresi menyiratkan adanya mekanisme terkait antara kedua kondisi tersebut, meskipun proses molekuler yang terlibat belum dipahami dengan baik. Kami menggambarkan seorang pria berusia 28 tahun yang mencari bantuan ke spesialis gizi untuk mengatasi penambahan berat badan yang terjadi setelah dia mulai mengonsumsi obat untuk gangguan depresi mayor (MDD) tiga tahun lalu. Studi kasus ini bertujuan untuk membahas tantangan dalam mengobati pasien obesitas dalam terapi gangguan depresi mayor (MDD)

Kata Kunci : depresi, pengobatan MDD, obesitas

INTRODUCTION

Over 340 million people worldwide currently suffer from major depressive disorder (MDD). The World Health Organization predicts that Major Depressive Disorder (MDD) will become the most significant worldwide health burden and escalate into a public health emergency by 2030.^{1,2} Worldwide, 39% of adults are overweight, 13% are obese, and over 264 million people of all ages have depression.³ Obesity and depression affect a significant portion of the population. It is believed that the immunological and endocrine systems, along with psychological and social factors, play a role in both of those disorders.⁴ Obesity and depression had a bidirectional relationship: obese individuals had a 55% chance of having depression, while individuals with depression had a 58% probability of developing obesity. Furthermore, the correlation between obesity and depression was stronger compared to the correlation between overweight and depression.²

CASE REPORT

A 28-year-old male sought the expertise of a nutrition specialist in order to achieve weight loss. Anamnesis indicates that he has been experiencing depression for the past three years, stemming from challenges he faced throughout his studies at the medical faculty. He was despondent and disheartened due to his family's expectation for him to pursue a career in medicine.

However, he visited a psychiatrist irregularly, and he lacked family support throughout his treatment. He only consulted his psychiatrist when his mental well-being was declining or he faced major challenges. Beside did not follow the treatment plan, the patient also worried about the drug's side effects, as he has experienced weight gain since he started medications for his major depression disorder (MDD) treatment. Before started his MDD treatment, his nutritional status was already overweight.

The patient received treatment for his depression with antidepressants and atypical antipsychotics. The medication prescribed for the patient were Vortioxetine at a dosage of 10 mg per day and Quetiapine at a dosage of 100 mg per day. Since starting the medication for his depression, the patient has experienced an increase in appetite and body weight. This makes he often eat at restaurants or order food through delivery services to overcome the increase of his appetite. The main meal and 1-2 snacks were eaten three times daily. Most meals and snacks are calorie-dense and high in fat. The food consumption research varied from 3000 to 4000 calories daily.

Regarding to his physical activity level, patient is considered to have a sedentary lifestyle with minimal physical activity. During his initial visit to the dietitian, he had weight of 150 kg and height of 186 cm, resulting in an obese and morbid classification with BMI of 43.36 kg/m². Nutritional guidance from the dietitian includes a personalized meal schedule, food choices, portion sizes, and timing of meals. The dietitian recommended

that the the patient engage in 30 minutes walks five times each week. She suggests using a low-dose combination of diethylpropion and or listat. After 6 months of treatment, the patient had weight reduction (about 12 kg), but he did not return to his dietitian regularly anymore. The patient did not routinely consult his dietitian because he felt that his weight had decreased and he thought that he could control his diet. In addition, he felt that his depression was getting better.

DISCUSSION

Major depressive disorder is often identified by changes in appetite and weight, with some individuals experiencing increased appetites and others experiencing decreased appetites. This might be caused by mood changes, or it could also caused by the effects of antidepressant medicine to overcome their depression. The brain regions responsible for experiencing pleasure from food are linked to depression.⁵ MDD is often linked with weight reduction, but MDD with atypical characteristics (MDD-AF) is defined by subsequent weight gain, increased hunger, and obesity.^{1,2}

The transition from losing weight to gaining weight in depression patients can be clearly seen. Weight loss can be occurred because some of depression patients tend to lose their appetites. But at the other side many of them would increased their appetites when they felt depressed. One potential explanation is that individuals with depression may turn to “comfort foods” (often high in fat and sugar) for solace or to improve their mood. Recent pilot investigations indicate a correlation between a liking for sweet taste and depression in obese individuals.⁶

Obesity and major depressive disorder (MDD) are closely linked and important health conditions. Obesity increases the likelihood of major depressive disorder (MDD), while depression with atypical features (MDD-AF) contributes to obesity.^{7,8} A substantial fraction of the population experiences both obesity and depression simultaneously. An obesity study revealed a 55% increased likelihood of lifetime depression in obese individuals and a 58% higher chance of developing obesity in people with depression compared to the general population.⁸ Various factors, including biological, psychological, and behavioral aspects, can impact the intricate relationship between depression and obesity.⁹

The connection between the two conditions involves the immunological and endocrine systems, as well as psychological and social factors, which play a role in maintaining the two-way relationship.^{4,9} Depression and obesity are both associated with the dysregulation of stress responses, particularly those involving the hypothalamic-pituitary-adrenal (HPA) axis. Adreno-Corticotropin Releasing Hormone (ACTH) is made in the brain by the Corticotropin Releasing Factor (CRF). This hormone tells the adrenal gland to release glucocorticoids. Glucocorticoids have a negative feedback effect on their receptors, leading to the inhibition of ACTH and CRF synthesis. The obesity epidemic could be significantly influenced by the activation of the HPA axis due to elevated stress levels

and easy access⁸ to high-calorie foods. Various physiological systems, such as the hypothalamus, pituitary adrenal axis, gonadal, growth hormone, leptin, sympathetic nervous system, and adrenergic, dopaminergic, and serotonergic central pathways, appear to be interrelated and have a role in obesity.¹⁰

Major depression, a high-stress condition, leads to weight gain by increasing the production of the key stress hormone cortisol, which elevates blood sugar levels.¹¹ Cortisol significantly influences the body's normal physiological functions by increasing blood sugar levels.¹² Twelve studies have demonstrated⁴ that activating hypothalamic serotonin receptors decreases an individual's consumption of dietary protein and fat rather than carbohydrates, depending on their propensity.

The patient was prescribed Vortioxetine at a dosage 10 mg/day² and Quetiapine at a dosage of 100 mg/day¹¹ for his depression. Vortioxetine is a novel multimodal atypical antidepressant belonging to the class of Selective Serotonin Reuptake Inhibitors (SSRIs) for Major Depressive Disorder (MDD), with a recommended dosage range of 5–20 mg/day. Vortioxetine exerts its therapeutic effects by inhibiting serotonin transporters and directly modulating serotonin receptor activation.¹³ Studies demonstrated that activating serotonin receptors in the hypothalamus decreases⁴ the consumption of protein and fat in the diet, rather than carbs. The impact of each SSRIs and Serotonin Norepinephrine Reuptake Inhibitors (SNRIs) on body weight varies because of their different levels of influence⁴ on the serotonergic, noradrenergic, dopaminergic, and histaminergic systems. SSRIs and SNRIs were linked to a minor weight loss in the short run and a weight increase in the long run.¹⁴

Meanwhile Quetiapine, a second generation antipsychotic, can be used as supplement or adjuvant treatment for MDD, with the dose ranges from 50 to 300 mg daily with the immediate release (IR) form and 150 to 300 mg daily with the extended-release (ER) form, using similar titration schedules to a maximum of 300 mg daily.³ And this patient was given 100 mg of Quetiapine once a day by his psychiatrist.¹ Preclinical studies have shown that the atypical antipsychotics like Quetiapine may enhance the action and the therapeutic effect of the SSRIs, and it was found that depression patients who was treatment with an atypical antipsychotic were more likely to experience remission or clinical response compared to those who received adjunctive placebo.¹⁶ But at the other side Quetiapine is also linked to short- and long-term side effects such as weight gain, altered lipid profile, and raised glucose levels. The average weight increase was 0,9 kg during a period of 6 to 8 weeks during therapy.¹⁵ This was also the caused of patient non-compliance while he undergoing depression therapy, after he realized that he was gaining weight.

He also was not complied to the treatment plan that already devised by his psychiatrist when he felt better, and the patient is also worried about the drug's side effects, as he has experienced weight gain since he began the medicine. However, when attempting to receive therapy from a dietitian, the patient did not consistently follow the advice. The patient's treatment was unsuccessful due to his noncompliance with the

therapeutic regimen prescribed by his psychiatrist and dietitian, as well as insufficient support from his family.^{16,17} The patient consulted his psychiatrist only when he felt very depressed or while he faced many problems. Besides that he did not comply with the treatment plan that already devised by his psychiatrist when he felt better, and worried about the side effect of his medication, since he has experienced weight gain after he started his depression's treatment. However, when attempting to receive therapy from his dietitian, the patient did not consistently follow the advice. The patient's treatment was unsuccessful due to his non-compliance with therapeutic regimen prescribed by his psychiatrist and dietitian, as well as lack of support from his family with his problems.^{16,17}

The co-occurrence of depression and obesity (included obesity caused by medication's side effect) at the clinical level results in considerable suffering for the particular patient. This problem has substantial clinical ramifications since it may hinder the treatment of each ailment individually.⁴

Therefore, engaging in consistent exercise and undergoing psychotherapy, specifically cognitive behavioral therapy and interpersonal psychotherapy, including dietary changes resulting in weight loss can enhance mood ratings in obese patients with both clinical and subclinical depression.⁴ An integrated approach to addressing obesity and depression is necessary for the growing number of individuals experiencing both conditions. Family support is also crucial for maintaining mental well-being, providing both direct advantages from familial connections and indirect protection against stressful situations.^{16,17} Collaboration between psychiatrists and dietitians is also crucial for achieving optimal therapeutic outcomes for individuals with obesity and depression.

CONCLUSION

Depression and obesity are two prevalent disorders with a substantial influence on worldwide health, and are closely linked and important health conditions. Various factors, including biological, psychological, and behavioral aspects, can impact the intricate relationship between depression and obesity, and play a role in maintaining the two-way relationship.

Interactions between modern antidepressants and newer antipsychotic medications are often significant in clinical practice. Weight gain is a common side effect of antidepressants and antipsychotics. Therefore, it is crucial to educate patients about drug side effects, hunger regulation, the importance of family support, and regular exercise from the start of treatment for depression and obesity. It is also crucial for psychiatrists and dietitians to collaborate in order to get the best therapeutic outcomes for patients with obesity and depression.

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CONFLICT OF INTEREST

The authors declare that the case report was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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