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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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APPETITIVE TRAITS AND QUALITY OF LIFE IN WOMEN WITH OBESITY USING GLUCAGON-LIKE PEPTIDE-1 RECEPTOR AGONISTS: INSIGHTS FROM A PCOS-ENRICHED SAMPLE

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Abstract.

Background: Polycystic ovary syndrome (PCOS) is often associated with obesity and disrupted eating behaviors, which can reduce quality of life (QOL). While glucagon-like peptide-1 receptor agonists (GLP-1RAs) are widely used for weight management and show promise in PCOS care, their impact on patient-reported outcomes like QOL is less explored. This study aims to examin how body mass index (BMI), eating traits, and PCOS status relate to QOL in women using GLP-1RAs.

Materials and Methods: In a cross-sectional study, 204 women in Iraq who had been using GLP-1RAs completed the Arabic versions of the Quality of Life, Obesity, and Dietetics (QOLOD) scale and the Adult Eating Behavior Questionnaire (AEBQ). Statistical analyses included nonparametric tests, Spearman correlations, linear and logistic regression models, and cluster analysis of eating behavior profiles.

Results: Higher BMI, emotional overeating, hunger, and food responsiveness were each independently linked to poorer QOL. Women with PCOS had higher BMI and more impaired QOLOD scores compared to those without PCOS. However, in adjusted models, QOLOD scores—not BMI—were independently associated with PCOS. Cluster analysis identified a "food-approach" group with significantly worse QOL than the "food-avoidant" group. Type of GLP-1RA was not associated with differences in QOL or eating traits.

Conclusion: In women using GLP-1RAs, QOL is shaped not just by BMI but also by underlying appetitive traits such as hunger and emotional overeating. These findings emphasize the importance of addressing behavioral as well as physiological factors in PCOS care. Understanding eating behavior profiles may improve treatment personalization and outcomes.

Key words. PCOS, GLP-1 receptor agonists, quality of life, BMI, eating behavior, emotional overeating, hunger, food responsiveness.

Introduction.

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders among women of reproductive age, affecting an estimated 8% to 13% globally [1]. It's often linked to obesity, insulin resistance, and adverse reproductive and metabolic outcomes. In some Middle Eastern populations, prevalence rates exceed 30% [2]. Obesity and central adiposity are frequently comorbid, exacerbating reproductive, metabolic, and psychological complications [3,4]. In Iraq, community-based studies report notably high prevalence rates of PCOS, reaching 28.9% in Al-Hilla city [5,6] and 32% in Hawler city [7] underscoring the need for targeted interventions that address not just the clinical aspects of PCOS, but also its broader impact on well-being.

Many women with PCOS report reduced quality of life (QOL), driven not only by physical symptoms like menstrual irregularities and weight gain but also by emotional and social challenges [8-10]. While lifestyle modification remains the cornerstone of management, with evidence showing benefits for both QOL and depressive symptoms in overweight and obese women with PCOS [11], pharmacologic agents—particularly glucagon-like peptide-1 receptor agonists (GLP-1RAs)—have shown promise for supporting weight loss and potentially restoring ovulation [12,13].

Despite growing evidence of the metabolic benefits of GLP-1RAs, their impact on patient-centered outcomes such as QOL remains underexplored. Most research focuses on weight or glycemic control, with limited attention to how these medications affect day-to-day functioning. Moreover, individual differences in eating behaviors—like emotional overeating or food responsiveness—could shape the way GLP-1RAs affect QOL [14-16].

These behavioral traits matter, especially since PCOS often coexists with disordered eating patterns and disrupted appetite regulation. Non-homeostatic eating—driven by emotion or food cues—is increasingly recognized in the persistence of obesity, independent of caloric intake. While GLP-1RAs may help modulate appetite, the extent of their impact on specific eating traits and QOL hasn't been systematically studied.

This study aimed to fill that gap by exploring how BMI, PCOS status, and eating behavior traits relate to QOL among women using GLP-1RAs. We examined whether physiological or behavioral factors better predict QOL, and whether specific traits influence outcomes. This real-world sample provides insight into how GLP-1RA treatment may affect not just weight, but well-being. Understanding how GLP-1RAs influence not only weight but also eating behavior and well-being is critical for optimizing pharmacotherapy in obesity and PCOS.

Methods.

Study Design and Participants:

This was a cross-sectional study conducted between November 10, 2024, and March 30, 2025, involving adult women using GLP-1RAs, including liraglutide (Saxenda)®, semaglutide (Ozempic)®, and tirzepatide (Mounjaro)®, for weight management. Eligible participants were women aged 18 or older who had been on a GLP-1RA for at least three months. Women who were pregnant, breastfeeding, or diagnosed with major psychiatric or unrelated medical conditions were excluded. Participants were recruited from dietetic and endocrinology clinics in Baghdad and Mosul, Iraq. PCOS was diagnosed

using the Rotterdam criteria by specialist gynecologists prior to referral. Informed consent was obtained from all participants.

Measures.

Anthropometrics and Demographics: Participants' anthropometric measures were automatically obtained by digital weight and height scale, from which BMI was calculated as weight in kilograms divided by height in meters squared (kg/m²). BMI categories followed WHO classification [17]. Additional information on age, education level, employment status, and use of non-GLP-1RA weight-loss products or GLP-1RAs were self-reported by the participants.

Quality of Life: The Arabic-translated and culturally validated version of the Quality of Life, Obesity, and Dietetics (QOLOD) rating scale was used to assess health-related quality of life. The scale consists of 25 items across three domains: physical functioning, psychosocial/emotional impact, and dieting experience. Items are scored on a 5-point Likert scale, with higher scores indicating greater impairment in quality of life [18,19].

Eating Behavior: Appetitive traits were assessed using the Arabic version of the Adult Eating Behavior Questionnaire (AEBQ), which has been validated for use in Arab populations. The questionnaire includes six core subscales: enjoyment of food (EF), emotional overeating (EOE), hunger (H), satiety responsiveness (SR), food fussiness (FF), and slow eating (SE). In addition to the six standard AEBQ subscales and the derived composites of Food Approach and Food Avoidance, we also calculated Food Responsiveness (FR), a two-item derived measure reflecting cue-driven appetite. This derived measure reflects the extent to which individuals respond to external food cues, and has been used in previous AEBQ-based studies as an important marker of appetitive drive. FR was computed from specific EF and H items that best capture cue-driven appetite. For consistency and transparency, this variable was treated as an independent predictor in our regression models. Composite indices for food approach (EF + EOE + H) and food avoidance (SR + FF + SE) were also derived to capture broader behavioral tendencies.

Validation:

The reliability (internal consistency) of the Arabic versions of the AEBQ and QOLOD rating scales were measured using Cronbach's alpha. Most subscales show acceptable–excellent internal consistency as follow; the AEBQ subscales EF=0.81, EOE=0.93, H=0.76, SR=0.72, FF=0.70, SE=0.77 and AEBQ total=0.83. Similarly, the QOLOD subscales also showed satisfactory levels of internal consistency: Physical function=0.83, Psychosocial emotional=0.90, Dieting experience=0.77, and QOLOD total=0.92.

Statistical Analysis:

All analyses were conducted using IBM SPSS version 26 and Python (v3.11).

Descriptive Analysis: Means, standard deviations (SD), medians, and interquartile ranges (IQR) were computed for continuous variables. Categorical variables were summarized using frequencies and percentages. Shapiro–Wilk tests were used to assess normality. Internal consistency was evaluated using Cronbach's alpha for all AEBQ and QOLOD subscales.

Group Comparisons: Mann–Whitney U tests were used to compare AEBQ and QOLOD scores between PCOS and non-PCOS participants. Kruskal–Wallis tests were used for comparisons across GLP-1RA types. Effect sizes were reported using rank-biserial *r* (for Mann–Whitney) and epsilon-squared (for Kruskal–Wallis).

Correlational Analysis: Spearman's rank correlations were used to assess associations between age, BMI, weight, QOLOD scores, and AEBQ subscales. Benjamini–Hochberg corrections were applied to adjust for multiple comparisons.

Regression Models: Two sets of regression analyses were conducted:

Multiple linear regression: was used to identify predictors of QOLOD total scores. Predictor variables included BMI, PCOS status, GLP-1 type, and all AEBQ subscales. Standardized beta coefficients (β), confidence intervals, and partial R^2 values were reported. Diagnostic tests for multicollinearity (VIF), normality of residuals (Shapiro–Wilk, Jarque–Bera), and heteroskedasticity (Breusch–Pagan, White tests) were performed. Robust standard errors (HC3) and sensitivity analyses (e.g., exclusion of low-reliability subscales, high-influence points) were used.

Logistic regression: was used to examine predictors of PCOS status (binary outcome). Models included age, BMI, QOLOD score, AEBQ subscales, GLP-1RA type, and use of weight-loss products. Odds ratios (ORs), 95% confidence intervals (CIs), and average marginal effects (AMEs) were reported. Model performance was evaluated using area under the curve (AUC), McFadden R^2, Tjur R^2, Brier score, and calibration slope. Sensitivity analyses included L2-penalized logistic regression and exclusion of influential observations.

Cluster Analysis: K-means clustering (k = 2) was applied to standardized AEBQ subscale scores to identify behavioral profiles (food-approach vs. food-avoidance). Mann–Whitney U tests were used to compare QOLOD outcomes between clusters. The significance threshold was set at $\alpha = 0.05$ for all inferential analyses.

Results.

Participant Characteristics:

The study included 204 adult women undergoing treatment with GLP-1RAs for weight management. The average age was 32.4 years (SD = 7.3), and mean BMI was 32.6 kg/m² (SD = 5.4), with most participants classified as obese. About one-third of the participants (31.4%) had PCOS, while 18.1% reported hypothyroidism. The most commonly prescribed GLP-1RA was semaglutide (Ozempic®) (44.1%), followed by liraglutide (Saxenda®) (35.3%) and tirzepatide (Mounjaro®) (20.6%). Approximately one in four reported additional use of non-GLP-1 weight-loss products or GLP-1RAs. Full descriptive characteristics are shown in Table 1.

Eating Behaviors and Quality of Life:

Participants reported high enjoyment of food (mean = 3.75, SD = 0.69) and moderate scores on emotional overeating and hunger. Lower mean scores were observed for slow eating (2.67, SD = 0.85) and food fussiness, indicating faster and less selective eating patterns. The mean QOLOD score was 3.19

(SD = 0.68), reflecting moderate impairment in obesity-related quality of life. Descriptive statistics for AEBQ and QOLOD scores are presented in Table 2.

As shown in Table 2, median subscale scores were generally moderate, with higher values for enjoyment of food and emotional overeating. Notably, food responsiveness, presented as a derived subscale, had a median of 3.50 [1.00], indicating a clear clustering of responses around the mid-to-high range.

Group Differences by PCOS and GLP-1RA Type:

Compared to women without PCOS, those with PCOS had significantly higher BMI (U = 4116.5, p = 0.043) and more impaired QOLOD scores (U = 5757.0, p = 0.001). Enjoyment of food was significantly higher in semaglutide (Ozempic®) users (H = 11.75, p = 0.003), but no other eating traits or QOLOD scores differed by GLP-1RA type.

Correlations Between BMI, Eating Behavior, and Quality of Life:

BMI was positively correlated with poorer QOLOD scores, including physical and emotional domains. Emotional overeating also showed a modest positive association with body weight. Age was not significantly related to BMI or QOLOD scores but was inversely associated with food fussiness and food avoidance, suggesting some behavioral shifts with age.

Table 1. *Demographic and clinical characteristics of participants (N = 204).*

Variable	Category	n	%	Mean (SD)	Median [IQR]	Normality (Shapiro p)
Educational level	University	131	64.2			
	Postgraduate	46	22.5			
	High school	21	10.3			
	Primary school	6	2.9			
Job	Employee	131	64.2			
	Not working	50	24.5			
	Student	23	11.3			
GLP-1RA use	Ozempic	90	44.1			
	Saxenda	72	35.3			
	Mounjaro	42	20.6			
Use of non-GLP-1 weight-loss products*	Never used	150	73.5			
	I used weight loss products	29	14.2			
	Used Orlistat	25	12.3			
Comorbidity	Nil	103	50.5			
	PCOS	64	31.4			
	Hypothyroidism	37	18.1			
Age (years)	—	204	—	32.43 (7.28)	32.00 [27.00–37.00]	0.0003
Height (cm)	—	204	—	162.15 (5.89)	162.00 [159.00–165.25]	0.0013
Weight (kg)	—	204	—	85.55 (13.24)	84.00 [76.00–92.00]	<0.0001
BMI (kg/m²)†	—	204	—	32.63 (5.44)	31.39 [28.54–35.25]	<0.0001

** Includes herbal supplements and pharmacological agents (e.g., Orlistat). † BMI calculated as weight (kg) / height (m)².*

Table 2. *AEBQ and QOLOD subscale scores.*

Subscale	Instrument	Items (n)	Scale range	Mean (SD)	Median [IQR]	N
Enjoyment of Food (EF)	AEBQ	6	1–5	3.75 (0.69)	3.83 [0.83]	204
Emotional Over-Eating (EOE)	AEBQ	5	1–5	3.44 (1.10)	3.60 [1.60]	204
Hunger (H)	AEBQ	4	1–5	3.04 (0.77)	3.00 [0.81]	204
Satiety Responsiveness (SR)	AEBQ	4	1–5	3.06 (0.83)	3.00 [1.25]	204
Food Fussiness (FF)	AEBQ	4	1–5	2.69 (0.76)	2.75 [1.00]	204
Slow Eating (SE)	AEBQ	4	1–5	2.67 (0.85)	2.50 [1.25]	204
Food Responsiveness (FR)*	AEBQ (derived)	2	1–5	3.48 (0.94)	3.50 [1.00]	204
Food Approach (EF+EOE+H)	AEBQ	15	1–5	3.46 (0.68)	3.40 [0.87]	204
Food Avoidance (SR+FF+SE)	AEBQ	12	1–5	2.81 (0.56)	2.83 [0.75]	204
Total (all 27 items)	AEBQ	27	1–5	3.17 (0.34)	3.19 [0.47]	204
Physical Function	QOLOD	10	1–5	3.05 (0.74)	3.10 [0.95]	204
Psychosocial/Emotional	QOLOD	10	1–5	3.16 (0.92)	3.05 [1.20]	204
Dieting Experience	QOLOD	5	1–5	3.53 (0.80)	3.50 [1.00]	204
Total (all items)	QOLOD	25	1–5	3.19 (0.68)	3.18 [0.92]	204

**Food Responsiveness (FR) is a derived AEBQ variable calculated from two items that capture cue-driven appetite. It is presented separately from the six standard AEBQ subscales and the composite scores (Food Approach, Food Avoidance).*

Table 3. *Significant correlations with QOLOD and AEBQ (Spearman ρ, BH-adjusted q).*

Outcome	Predictor	ρ	*Q*
QOLOD Total	BMI	0.33	<0.001
Physical Func.	BMI	0.30	<0.001
Diet Experience	Hunger	0.46	<0.001
QOLOD Total	Food Approach	0.42	<0.001
QOLOD Total	AEBQ Total	0.39	<0.001
Food Avoidance	Age	–0.26	0.001

Table 4. *Multiple regression predicting QOLOD Total Score.*

Predictor	β (Standardized)	95% CI	*p*
BMI	0.30	[0.18, 0.43]	<0.001
Food Responsiveness	0.24	[0.08, 0.40]	0.003
Hunger	0.19	[0.05, 0.32]	0.008
Emotional Overeating	0.14	[0.00, 0.27]	0.043

Table 5. *Logistic regression predicting PCOS status.*

Predictor	OR	95% CI	*P*
Age (per year)	1.07	[1.01–1.13]	0.024
QOLOD Total	1.81	[1.03–3.21]	0.041
Emotional Overeating	1.39	[0.97–2.00]	0.070
Slow Eating	1.43	[0.93–2.20]	0.103
Hunger	1.47	[0.89–2.42]	0.134

These associations are detailed in Table 3.

Predictors of Quality of Life:

In the multivariate regression model (adjusted $R^2 = 0.312$), several factors independently predicted poorer quality of life. These included higher BMI ($\beta = 0.30$, $p < 0.001$), food responsiveness (FR, representing responsiveness to external cues) ($\beta = 0.24$, $p = 0.003$), hunger ($\beta = 0.19$, $p = 0.008$), and emotional overeating ($\beta = 0.14$, $p = 0.043$). Notably, once these behavioral traits were accounted for, neither GLP-1RA type nor PCOS status contributed significantly to quality-of-life outcomes. Full regression results are presented in Table 4.

Predictors of PCOS Status:

In the logistic regression model, age (OR = 1.07, p = 0.024) and QOLOD scores (OR = 1.81, p = 0.041) were both significantly associated with higher odds of PCOS. Emotional overeating and slow eating trended toward significance and became significant in sensitivity analyses excluding high-influence cases. BMI and GLP-1RA type were not significant predictors after adjustment. Full model estimates are summarized in Table 5.

Behavioral Profiles and Quality of Life:

Cluster analysis identified two distinct eating behavior profiles: a food-approach group (with higher scores for enjoyment, hunger, and overeating) and a food-avoidance group (with higher satiety and slow eating). Those in the food-approach cluster reported significantly worse QOLOD scores across all domains, particularly in dieting experience and emotional well-being. These differences were independent of BMI or age.

Discussion.

This study aimed to identify factors influencing quality of life among women using GLP-1RAs, with particular focus on BMI, PCOS status, and eating behavior traits. Our findings suggest that both physiological and behavioral factors contribute significantly to obesity-related quality of life, and that specific appetitive traits—namely food responsiveness (FR), hunger, and emotional overeating—play an independent role, beyond BMI alone.

Consistent with prior research, we found that women with PCOS had higher BMI and reported more impaired quality of life compared to those without PCOS. These results support earlier studies highlighting the physical and psychosocial burdens of PCOS, especially in populations with high obesity prevalence [20,21]. Importantly, while BMI was a significant predictor of lower quality of life, behavioral traits—particularly FR and hunger—also showed strong associations with QOLOD scores, aligning with the hypothesis that appetite dysregulation is a distinct factor in the lived experience of obesity and PCOS.

Our results echo findings from a short-term interventional study by Jensterle and colleagues [20], which demonstrated that GLP-1RA treatment with liraglutide improved eating behaviors in obese women with PCOS, particularly by reducing uncontrolled and emotional eating. This supports the idea that GLP-1RAs may exert benefits not only through weight reduction but also by modulating appetite-related traits, potentially enhancing adherence to lifestyle interventions.

While our participants were recruited from two cities in Iraq, the challenges they face—struggling with weight, emotional eating, and the emotional toll of PCOS—are shared by women across the Middle East and beyond. In many low- and middle-income settings, access to specialized care is limited, and weight-loss medications like GLP-1RAs are often used outside structured programs. Our findings may resonate particularly with populations where obesity and PCOS overlap heavily and where psychological and behavioral aspects of eating are rarely addressed in routine care.

The independent role of FR in predicting quality of life deserves special mention. FR captures responsiveness to external food cues, a behavioral trait that can undermine weight management even in the context of pharmacological support. While BMI reflects physiological burden, FR reflects the intensity of cue-driven appetite. This distinction is clinically important: strategies such as reducing exposure to food cues or adopting mindful eating practices may be particularly beneficial for women with high FR scores. Our results are consistent with prior AEBQ-based studies that have linked FR to reduced dietary control and poorer well-being [22-24].

Our cluster analysis further highlighted the relevance of eating behavior profiles. Women characterized by stronger food-approach tendencies (e.g., high hunger and emotional overeating) had significantly poorer quality of life scores compared to those with food-avoidant profiles, even after accounting for BMI and age. These results align with broader literature on appetitive traits, which increasingly recognizes the influence of non-homeostatic eating patterns—such as emotional or cue-driven eating—on weight management and psychological outcomes [25].

From a clinical perspective, our findings suggest that BMI alone is not sufficient to identify women at higher risk for impaired quality of life. Assessing traits such as FR, emotional overeating, and hunger could help target behavioral or psychological interventions that complement pharmacological strategies like GLP-1 therapy. For example, cognitive-behavioral techniques or mindful eating programs may be especially beneficial for individuals scoring high on food-approach traits. Even in settings where GLP-1RAs are prescribed differently, our results suggest that asking women about how they eat—not just how much they weigh—can uncover hidden struggles. A simple conversation about emotional triggers or cue-driven eating might reveal more about a patient's well-being than BMI alone.

Notably, our logistic regression models showed that QOLOD scores—and not BMI—were independently associated with PCOS diagnosis after adjustment for confounders. This indicates that subjective impairments in functioning and well-being may be more closely linked to PCOS risk than weight alone. While this directionality cannot be confirmed in a cross-sectional design, it aligns with prior evidence suggesting that quality of life concerns often emerge before substantial metabolic decline [26,27].

An unexpected finding was the association between the use of non-GLP-1 weight-loss products and PCOS diagnosis. Women who had never used such products were more likely to have PCOS than those who had. However, this result was unstable in sensitivity analyses and should be interpreted with caution, possibly reflecting selection bias or unmeasured confounding.

Future multi-center studies across the Arab world—including in Jordan, Egypt, and Gulf countries—could help map how eating behaviors and quality of life vary by socioeconomic status, access to care, or cultural attitudes toward body weight. Such work would help build a more complete picture of PCOS care in our region.

Limitations.

This study has several limitations that should be acknowledged. First, its cross-sectional design precludes conclusions about causality; longitudinal data would be needed to determine whether changes in appetitive traits drive improvements in quality of life or vice versa. Second, although we employed validated instruments for both quality of life and eating behaviors, the possibility of response bias—such as socially desirable answering—cannot be ruled out. Third, while our regression models adjusted for a wide range of variables, we were not able to include potentially influential factors such as insulin resistance, depressive symptoms, or levels of physical activity, all of which may shape both appetite and well-being. Finally, information on GLP-1RA dosage and titration speed was not collected, which may have influenced appetite modulation and quality-of-life outcomes.

Future research should therefore aim for prospective designs, include a broader set of metabolic and psychological covariates, and examine treatment dose and duration in more detail. Addressing these gaps would provide a fuller picture of how GLP-1RAs interact with appetitive traits to influence long-term well-being in women with obesity and PCOS.

Conclusion.

Taken together, our findings highlight the complex interplay between physiological and behavioral factors affecting quality of life in women with obesity and PCOS. While BMI remains an important clinical marker, our results show that eating behavior traits—particularly emotional overeating, hunger, and food responsiveness—are equally, if not more, influential in shaping patient-reported outcomes. Food responsiveness, in particular, reflects a sensitivity to external food cues that is often overlooked in clinical care but may undermine weight management even in the context of GLP-1 therapy. Recognizing and addressing this trait could open the door to more tailored interventions, such as cue-exposure management or mindful eating programs, which complement pharmacological treatment.

Future longitudinal research should explore whether improvements in appetitive traits mediate the benefits of GLP-1RAs on both weight and quality of life, and whether targeted behavioral strategies can amplify these effects. By integrating both physiological and behavioral perspectives, clinicians may be able to deliver more holistic and patient-centered care for women with obesity and PCOS.

Ethical Approval.

This study was conducted in accordance with the principles of the Declaration of Helsinki, and ethical clearance was obtained from the Research Ethics Committee at the College of Pharmacy, University of Mosul (Approval No. PREC-25-4-1). All participants provided written informed consent before taking part, and they were assured that their responses would remain confidential and used solely for research purposes.

Conflict of Interest.

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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Data Availability.

Data will be made available on reasonable request.

Use of Artificial Intelligence.

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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