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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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EVALUATION OF SERUM VASPIN LEVEL IN IRAQI WOMEN WITH GESTATIONAL DIABETES MELLITUS

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Abstract.

Background: Gestational diabetes mellitus (GDM) traditionally refers to abnormal glucose tolerance with onset or first recognition during pregnancy.

The objectives: The study is designed to measure vaspin in the serum of women with GDM and estimate its association with insulin resistance, HbA1c, HDL, LDL, triglyceride and total cholesterol.

Methods: This study was a case-control study conducted on 90 pregnant women (26 weeks and more), 60 of them patients with GDM, and 30 normal pregnant women as the control group, The blood sample was taken from participating women, and an interview was carried out with them using questionnaire form. vaspin and insulin were measured by ELISA technique, HbA1c was measured by ichroma™, lipid profile, and fasting blood glucose was measured by colourimetric method.

Result: Vaspin was increased significantly in the patient group in comparison to control (268.98± 154.02) ng/ml. Insulin level increased significantly in the patient group (27.88± 19.69) ng/ml, HbA1c and blood glucose also increased significantly in the patient group in comparison to the control respectively (5.08 ± 0.613) (126.47 ± 29.05) mg/dl. However, there was no significant difference in insulin resistance, HDL, LDL, TG, and TC.

Conclusion: The study shows that vaspin was increased in GDM but there is no negative correlation with HbA1c, insulin resistance, and lipid profile.

Key words. Gestational diabetes, vaspin, insulin resistance, HbA1c.

Introduction.

Gestational diabetes mellitus (GDM) is a common complication during pregnancy, and the incidence of GDM is rapidly increasing worldwide [1]. Pregnancies accompanied by GDM have a risk of incurring serious obstetric complications such as abnormal fetal growth, shoulder dystocia, macrosomia, large-for-gestational-age infants, birth injury, premature birth and increased caesarean section rate, which may confer short-term and long-term effects on the health of both mothers and offspring [1-4]. It is estimated that 85% of live births worldwide (21.3 million) were affected by GDM in 2017 [5]. Moreover, due to inadequate exercise and improper diet, the number of obese individuals is expanding; concurrently, the incidence of GDM has increased sharply, which has become a substantial societal burden [6,7]. Hyperglycaemia during pregnancy can lead to adverse perinatal and pregnancy outcomes. Moreover, there exists a linear relationship between maternal glucose concentration and various adverse neonatal outcomes [8,9].

Gestational diabetes mellitus (GDM) is characterized by glucose intolerance with the onset or first recognition during pregnancy. GDM represents the most common complication of pregnancy, affecting 3–14% of pregnancies globally [10]. Hyperglycemia of GDM is closely associated with significant risk for a vast array of maternal and fetal outcomes during pregnancy, delivery, and beyond. Apart from pre-eclampsia and other severe short-term complications in women with GDM, long-term maternal risks include a high risk of GDM recurrence, metabolic syndrome and cardiovascular disease, as well as an increased incidence of antenatal or postpartum depression [11]. During normal pregnancy, there is a progressive increase in the insulin/glucose ratio based on the oral glucose tolerance test and hyperinsulinemic-euglycemic clamp. In addition, 6–9% of pregnant women developed GDM, showing increased risk for high blood pressure and preeclampsia [13] as well as for future development of type II diabetes in mothers and children [13].

Vaspin, a novel adipocytokine, is a serine protease inhibitor derived from the visceral adipose tissue and the serine protease inhibitor (SERPIN) gene family [14,15]. Studies have shown that vaspin can increase insulin sensitivity by reversing the changes in gene expression associated with insulin resistance [15]. Current research has found that vaspin is closely related to GDM [16]. However, how glucose causes changes in vaspin levels is still unknown. Therefore, this study observed mainly changes in serum vaspin in pregnant women after glucose load during the oral glucose tolerance test (OGTT), to analyze the effect of blood glucose level on serum vaspin secretion in pregnant women with GDM [15], so this study was designed to evaluate the association of serum vaspin with insulin resistance in Iraqi women with gestational DM.

Patients and Methods.

Case-control study carried out in Iraq, Salah Alden city from 20th of November 2022 to 15 April 2023 (Figure 1). The study included 90 pregnant women who attended private clinics for follow-up the pregnancy, 60 of them complained of gestational DM (between 26 weeks and labour) as cases and 30 of them were healthy women with healthy pregnancies) as control, a blood sample was taken from them and an interview was carried out with these patients using questionnaire form designed by the investigator including their demographic characteristics, age, weight, the patient included in the study are pregnant women with fasting plasma glucose 5.1-6.9 mmol/l (92 -125 mg/dl), HbA1c ≥48 mmol/mol (6.5%), gestational age > 24 weeks. And Patients with anaemia, liver disease, renal disease, congenital disease, hemolytic sample, haemoglobin variant were excluded from the study. Five ml of blood sample was taken by vein puncture from each subject included in this study. Blood samples were placed into sterile gel tubes after blood clotting, centrifuged at 3000 for 15 minutes and the obtained serum was aspirated using a mechanical micropipette and transferred into

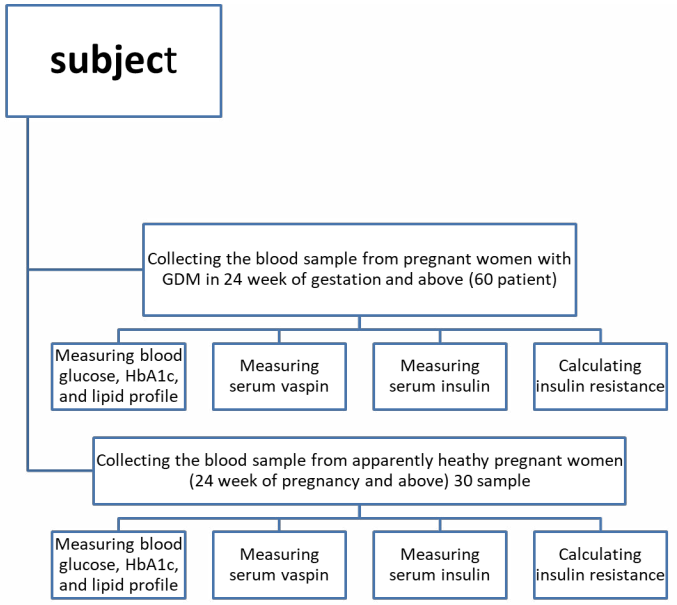

Figure 1. *The workflow chart of the study design.*

clean test tubes which were labelled and stored in deep freeze temperature at -20 c for biochemical measurement. The levels of glucose, Insulin, vaspin, and lipid profile were measured. One ml of blood was placed in an EDTA tube and HbA1c were measured. The methodology of the research included the collection of blood samples, serum examination, and measuring the biochemical parameters illustrated in the scheme (1), Insulin resistance calculated by Glucose/insulin ratio (G/I ratio): The G/I ratio has become very popular since its first description in 1998 as an accurate index of insulin sensitivity in women with PCOS. The ratio of glucose to insulin is easily calculated, with lower values depicting higher degrees of insulin resistance. A G/I ratio of less than 4.5 is sensitive (95 per cent) and specific (84 per cent) for insulin resistance.

SPSS v26 (Statistical Package for Science Services), was used to perform computerized statistical analysis using Comparison, and this was carried out using; a T test, one-ANOVA and Probability (P-value). The P-value $\leq$ 0.05 was considered statistically significant (S), less than 0.01 was considered very significant (VS) and greater than 0.05 was considered non-significant.

Results.

This is a comparative control study conducted on (90) pregnant women who visited the out clinic in Tikrit city to receive antenatal care, (60) of them complained of gestational DM, and the remaining (30) women had normal healthy pregnancies as the control group. The mean age of participants was (26.71±3.33) years with a range of (20-37) years, the mean weight was (84.56±9.99) Kg, range of (67-125) Kg and the mean height of participants (was 161.56±5.6) cm and a range of (148-172) cm.

The mean serum Vaspin level for the cases group (268.98± 154.02) ng/ml and control group (208.71± 80.91) ng/ml showed statistically significant results, p = 0.04. The mean serum Insulin level for the cases group (27.88± 19.69) ng/ml and the control group (12.27± 5.365) ng/ml showed statistically significant results, p < 0.05. The mean serum HbA1c level for the cases group (5.08 ± 0.613) and control group (4.46 ± 0.584) showed statistically significant results, p < 0.05. The mean serum Insulin resistance level for the cases group (6.985 ± 3.922) and control group (9.511 ± 5.385) showed statistically non-significant results, p = 0.22. The mean serum blood glucose level for the cases group (126.47 ± 29.05) mg/dl and control group (98.00 ± 11.95) mg/dl showed statistically high significant results, p < 0.0001 (Table 1).

Table 1. Vaspin and glycemic parameters in the studied groups.

Parameters		**Mean±SD**	**P value**
Vaspin (ng/ml)	Patient	268.98±154.02	**0.04**
	Control	208.71±80.91	
Insulin (ng/ml)	patient	27.88±19.69	**0.05**
	control	12.27±5.365	
HbA1c (%)	patient	5.08±0.613	**0.05**
	control	4.46±0.584	
GLu./Insulin %	patient	6.985±3.922	**0.22**
	control	9.511±5.385	
FBG (mg/dl)	patient	126.47±29.05	**0.0001**
	control	98±11.95	

Comparison between study groups regarding serum LDL, HDL, TG, and TC Levels was performed using T-test. Cases were compared with controls. The mean serum LDL level for the cases group (113.97 ± 44.308) mg/dl and control group (124.73 ± 44.818) mg/dl showed statistically non-significant results, p = 0.282. The mean serum Triglyceride level for the cases group (211.12 ± 115.047) mg/dl and control group (192.17 ± 58.822) mg/dl showed statistically non-significant results, p= 0.399. The mean serum total cholesterol level for the cases group (210.15± 41.76) mg/dl and control group (189.47± 38.18) mg/dl showed statistically significant results, p = 0.02. The mean serum HDL level for the cases group (mean ± S.E) (39.03 ± 10.721) mg/dl and control group (mean ± S.E) (41.97 ± 11.361) mg/dl showed statistically non-significant results, p = 0.234 (Table 2).

Table 2. Serum lipid profile level comparison between cases and control groups.

LDL mg/dl	Patient	113.97±44.308	**NS**
	Control	124.73±44.818	
Triglyceride mg/dl	patient	211.12±115.047	**NS**
	control	192.17±58.822	
total cholesterol mg/dl	patient	210.15±41.76	**0.02**
	control	189.47±38.18	
HDL mg/dl	patient	39.03±10.721	**NS**
	control	41.97±11.361	

The study reveals that there is no significant correlation between serum insulin resistance and serum vaspin level at p> 0.05 level R2 linear= 0.0007. The study reveals that there is no significant correlation between serum HbA1c and serum vaspin level at p> 0.05 level R2 linear= 0.090 (Figure 2).

Discussion.

Vaspin, a novel adipocytokine, is a serine protease inhibitor derived from the visceral adipose tissue and the serine protease

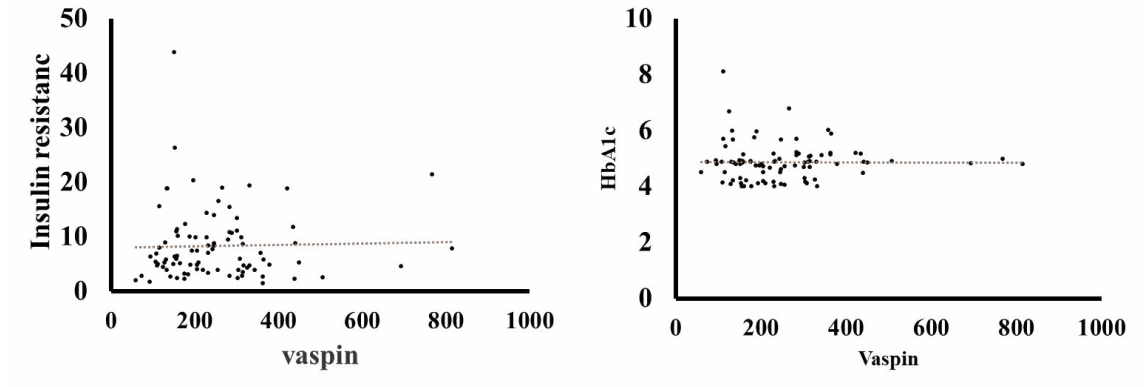

Figure 2. *Correlation between insulin resistance and HbA1c versus vaspin.*

inhibitor (SERPIN) gene family. Studies have shown that vaspin can increase insulin sensitivity by reversing the changes in gene expression associated with insulin resistance [12]. This study comparison of serum vaspin levels between pregnant women with GDM and healthy women revealed that its level increased in patients with statistically significant results, this agrees with Huo et al. [15] found During the OGTT, the vaspin levels were higher in the GDM group than in the NGT group. And agree with other studies [13,14], showing that the maternal serum levels of vaspin increased in women with GDM compared with normal controls in the second trimester of pregnancy.

This research result is different from the previous findings [15,16], showing that the serum vaspin levels were significantly lower in the GDM group than in the controls. Similarly, it was different from some research results [17,18], Which showed that there were no significant differences in serum vaspin concentrations between patients with GDM and non-GDM, The discrepancy between this study and the other reports might be explained by the differences in research design and the research objects or by that the body increases the vaspin secretion as a compensatory mechanism to increase insulin sensitivity to decrease blood glucose level.

GDM is thought to originate when beta cell function cannot be sufficiently upregulated relative to the increased insulin resistance [19]. On the contrary, an excessive gestational rise in insulin resistance with normal beta cell function also relates to disturbed glucose handling [20]. This study comparison of serum insulin levels between pregnant women with GDM and healthy women revealed that its level increased in patients with highly statistically significant results, this agrees with Jonas Ellerbrock et al. [21], who revealed that high insulin resistance and beta cell dysfunction increase the risk of GDM. It also agrees with previous studies [22,23] that found that insulin is increased in GDM than the normal pregnant women.

This study comparison of serum HbA1c levels between pregnant women with GDM and healthy women revealed that its level increased in patients (even its still at an upper normal level) with highly statistically significant results, this agrees with Ingrid Hov Odsæter et al. study which found that HbA1c increase in GDM, and it could potentially reduce the number of OGTTs [24]. It also agrees with Rajput et al. [25] study who have also found that HbA1c is significantly higher in GDM than in normal pregnancies.

There are no studies found that HbA1c is low in GDM but the level of it is deferred from one to another, which may be due to genetic deference or ethical, environmental or study conditions. Insulin resistance is identified as an impaired biological response to insulin stimulation of target tissues, primarily the liver, muscle, and adipose tissue. Insulin resistance impairs glucose disposal, resulting in a compensatory increase in beta-cell insulin production and hyperinsulinemia [26,27].

This study comparison of insulin resistance levels between pregnant women with GDM and healthy women revealed that its level decreased in the control group with statistically non-significant results, this agrees with other studies [22,27,28] This study disagrees with Inoue et al. [29] study that found that there is no significant difference in insulin resistance between GDM and the control group. This deference may be due to study conditions, deference in insulin resistance, assessment method, genetic factors and environmental factors.

Hyperglycemia during pregnancy is the primary clinical manifestation and characteristic of GDM. Patients with GDM have a consistently elevated fasting glucose level or glucose intolerance during the second trimester, although this will normalize post-partum. In a healthy pregnancy, maternal glucose metabolism undergoes an adaptive response regulated by increased insulin secretion from pancreatic β-cells to maintain euglycemia in the mother and sufficient nutrition for the fetus [30]. This study comparison of serum glucose levels between pregnant women with GDM and healthy women revealed that its level increased in patients with highly statistically significant results, this agrees with other studies [29,31,32], this result is expected as the hyperglycemia is main manifestation of GDM

During pregnancy, fat metabolism undergoes physiological changes that increase the production of lipid profiles [33]. Increased estrogen levels and insulin resistance in pregnant women can increase the production of lipids in the liver [33]. These changes in fat metabolism indicate a physiological adaptation in the body of pregnant women that shifts the priority of lipid metabolism over glucose metabolism, and lipids are used as a source of energy for pregnant women so that they can preserve glucose for the growth and development of fetal development. Lipids also make it possible to produce embryonic cell membranes, bile acids, and steroid hormones [33].

This study comparison of serum HDL levels between pregnant women with GDM and healthy women revealed that HDL was

lower in GDM than in normal pregnant women, but the result is non-significant statistically, which agrees with some studies [34-36], who found lower levels of HDL in GDM, while other studies [37-40] did not find a significant difference in HDL-C levels between groups. In addition, other studies [41,42] found that HDL is higher in GDM than in non-GDM women. This difference in result may be due to differences in genetic factors, environmental factors, diet of women, and study conditions.

Also, this study comparison of serum LDL levels between pregnant women with GDM and healthy women revealed that no significant difference in serum level of LDL between GDM and healthy pregnant women. Koukkou et al [37] found that lower LDL concentration was reported in the third trimester of pregnancy in the GDM group compared to controls. Moreover, other studies [38,43,44] showed that maternal serum cholesterol and LDL-C levels did not differ between control pregnancies and those with GDM. No significant difference in serum level of triglyceride between GDM and healthy pregnant women was revealed by this study, this result agrees with other studies [41,42,45], which found that there are no significant differences between GDM and non-GDM. While other researchers [34,37,46,47] found that women with GDM had significantly higher serum TG concentrations compared to controls; these results were in contrast with findings of the Grissa et al study [44].

By this study, there is a significant increase in serum level of total cholesterol between GDM and healthy pregnant women. Abnormal lipid profile in pregnant women with GDM has been reported [36,37]. Koukkou et al. [37] found that total cholesterol concentration was not significantly different between pregnant women with GDM and normal pregnant women. In contrast, other researchers [39,40,48] found that a higher proportion of pregnant women with GDM had high levels of total cholesterol compared to controls. This result may be due to differences in study conditions the test and lab differences and personal and genetic factors.

This study revealed that no relationship between vaspin and insulin resistance, this result agrees with other studies [14,49,50] that found that there is no significant correlation between vaspin and insulin sensitivity, while other studies found that vaspin is significantly increased with increased insulin resistance [51,52], so this study result may be explained by that the vaspin had different relation with GDM [17,18], that may affect its correlation with other parameters in GDM, also BMI of the patient, genetic difference, personal factors may affect the result.

This study also found no relationship between vaspin and HbA1c, this result could be explained by that the HbA1c is not a diagnostic test for gestational DM as recommendations by WHO, that because the Hb is affected by many factors that change during pregnancy, so it was expected that there is no relations between vaspin and HbA1c, also this result is agree with Saleem and Sahab found that There was no significant links between serum vaspin and HbA1c [53]. On the other hand, Khoshaba et al. studied the relation of visfatin (which is an adipokine hormone secreted from adipose tissue and affects glucose metabolism) with gestational diabetes mellitus in pregnant women and found that it was increased in pregnant women whose HbA1c is high in comparing with normal HbA1c women [54].

Conclusion.

This study revealed that Vaspin, Insulin, and HbA1c significantly increased in GDM women in comparison with healthy pregnant women, but no significant difference was revealed in insulin resistance between GDM women and non-GDM women and no significant correlation between serum vaspin and insulin resistance, also no difference was revealed in HDL, LDL, and TG between GDM women and non-GDM, but TC was increased in GDM women.

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