

# GEORGIAN MEDICAL NEWS

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ISSN 1512-0112

NO 10 (343) Октябрь 2023

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ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

## GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.  
Published since 1994. Distributed in NIS, EU and USA.

**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 ВИНТИ 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 ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

### WEBSITE

[www.geomednews.com](http://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](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. Корректур авторам не высылаются, 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 computer-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.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](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 საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ 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 შედეგის 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 ფხიხლებში 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.

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## EVALUATION OF FETUIN-A LEVEL IN POLYCYSTIC OVARY SYNDROME AND ITS ASSOCIATION WITH ASPROGIN AND SOME BIOCHEMICAL PARAMETERS

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### Abstract.

An ovarian cyst is a common hormonal disorder that affects the ovaries in females of reproductive age. Environmental and genetic factors may contribute to the beginning of the disease, although the lack of a clear aetiology. Menstrual irregularities, increased hair growth, and acne are some of the most important signs. In order to control symptoms and prevent the development of chronic medical disorders, early identification is essential. The goal of this study was to assess fetuin-A levels and relationships in polycystic ovary syndrome (PCOS) patients. The connection between fetuin-A and asprosin and several biochemical parameters, including fasting blood sugar, insulin, cholesterol, and triglycerides in women patients with polycystic ovarian syndrome. Ninety females were included in the trial; 60 individuals (females) were selected who were diagnosed with PCOS by a gynaecological specialist and ranged in age from 15 to 45. The result was a change in the ovulation-inducing hormones LH and FSH as well as an increase in the proteins fetuin-A and Asprosin. On the other hand, 30 individuals (all female) were used as a control group. Their ages were recorded as well as the fact that they did not have PCOS. For all groups, laboratory tests were done to determine the levels of fetuin-A, Asprosin, fasting blood sugar, Insulin, total cholesterol, and triglyceride. For parents and a control group, investigators performed an asprosin analysis, The findings of the comparison were statistically not significant (P value =0.115). performed a Fetuin-A analysis as well, the results were statistically highly significant with a P value of 0.0002 when compared to the outcomes of the two sick groups and the healthy controls.

**Key words.** Fetuin-A, Asprosin, Fasting blood sugar, Insulin, Cholesterol, triglyceride.

### Introduction.

Polycystic ovary syndrome (PCOS), a hormonal disorder affecting millions of women worldwide, is a common female gynaecological endocrinopathy disorder Anovulation, PCOS, and hirsutism are the hallmarks of the widespread endocrine disorder known as PCOS. Obesity, dyslipidemia, and insulin resistance are typically seen in these disorders [1]. PCOS is an inflammatory condition. which can occur in up to 20% of women of reproductive age, is the most common endocrine disorder. Due to its effects on reproduction, metabolism, and mental health, PCOS constitutes an important public health problem [2-4]. Women with PCOS face irregular menstrual periods in addition to hirsutism, acne, being overweight, and impotence. An important element contributing to PCOS has been identified as long-term, low-grade inflammation. Mononuclear cells (MNC), which ordinarily do not rely on fat, may experience oxidative stress and a negative reaction in females with PCOS when blood

glucose levels increase [3]. The disease's cause is still unknown, and subjective phenomenology makes it challenging for doctors to reach a consensus on a diagnosis. It appears to be a hereditary genetic syndrome brought on by a confluence of genetic and environmental variables [4].

Asprosin is a new peptide hormone released from white adipose tissue; it stimulates the G protein camp-PKA pathway to promote glucose production from the liver. Recent research has revealed that people with insulin resistance have higher levels of the asprosin produced from white adipose tissue [5]. Asprosin metabolism may be dysregulated in PCOS individuals because they are more likely to develop dyslipidemia and/or insulin resistance. Therefore, we looked at asprosin levels in serum [6]. One recently identified peptide hormone is asprosin, which is connected to insulin resistance. The peptide encourages the liver to produce more glucose. A metabolic condition known as PCOS; a key part of the disease's development is played by insulin resistance [7].

Fetuin-A is a remarkable protein with a multitude of functions, is also known as  $\alpha$ -2 Heremans-Schmid glycoprotein (AHSG) - a member of the cystatin superfamily of protease inhibitors mostly secreted by the liver Fetuin-A is a multifunctional protein that, through various mechanisms, has a positive effect on unhealthy conditions such as calcification, cardiovascular disease, and tumour progression. On the other hand, it has negative effects on processes related to obesity, diabetes, and fatty liver [8]. A glycoprotein made by hepatocytes, called fetuin-A, has been implicated in insulin resistance and postnatal bone development. Insulin resistance is a feature of the illness known as gestational diabetes mellitus (GDM) [9]. Obesity and type 2 diabetes have been connected to the Hepatokines fetuin-A (Fet-A) [10]. Humans develop insulin resistance due to fetuin-A, a natural inhibitor of the insulin receptor tyrosine kinase [11,12]. In humans, high Fetuin-A levels are linked to obesity, metabolic syndromes, and diabetes [13]. Recent research showed that Fet-A, obestatin, and adiponectin are an adipokine, however, their expression in adipose tissue is still unknown because it depends on the kind of cells and species examined [14,15]. The study's focus will mostly be on asprosin and fetuin-A as well as a few molecular markers that are associated with PCOS.

### Patients and Methods.

A case-control study was conducted in Mosul in Al Salam Teaching Hospital and AlKuwair Health Centre in Makhmour district and, the maternity hospital in Erbil from December 2022 to the end of April 2023 on women infected with the PCOS, 60 patients (females) aged between (15-45) years were taken and women that diagnosed with the PCOS, by a gynaecological specialist. The result was a disruption in the hormones



responsible for ovulation, such as LH, and FSH, as well as an increase in the protein fetuin-A and asprosin. On the other hand, 30 people as a control group (females) were taken and their ages were also and were not infected with PCOS. Laboratory tests were conducted for both groups to determine the level of fetuin-A, asprosin, fasting blood sugar, insulin, total cholesterol, and triglyceride.

Fasting blood sugar was measured for patients, as well as this analysis was conducted on a control group. When comparing the results between these two groups, the result was statistically significant at  $p$  value=0.021. Regarding insulin analysis for patients as well as a control group. When comparing the results of these two groups, patients and healthy subjects, the results were statistically highly significant at  $p$  value=0.0001. Regarding cholesterol analysis for patients, as well as conducting this analysis on a group of healthy people. When comparing the results of these two groups of patients and healthy controls, the results were statistically highly significant at  $p$  value=0.0003. conducting triglyceride analysis has been done on patients as well as also conducted this analysis on a group of healthy people. When comparing the results were statistically highly significant at  $p$  value=0.0003.

In addition to what was mentioned above, the study conducted a Fetuin-A analysis. When comparing the results of these two groups of patients and healthy controls, the results were statistically highly significant at  $p$  value=0.0002. also conducted an asprosin analysis for patients and a control group. When comparing the results were statistically no significant at  $p$  value =0.115.

The blood samples were centrifuged at 3000 g for 10 min. Serum plasma was analyzed using an ELISA analyzer, Genotik USA with sandwich Elisa method for the determination of serum insulin. For analyses, Biolabo diagnostic kits are used for the determination of fasting blood sugar, cholesterol, and triglyceride.

Compliance with ethical standards: Before the study began, all participants were given information about the procedure and risks that they may later face as a result of their participation, and they gave their informed permission. The ethical committee of the Director of Health Mosul accepted the study, and all practices conformed to the Declaration of Helsinki.

Statistical Analysis: GraphPad version 9 and the SPSS statistic programmer version 29 were both used for computerized statistical analysis. Utilizing one-way ANOVA T-Test probability (P value), a comparison was conducted. P values < 0.05 were considered statistically significant, whereas P values > 0.05 were considered non-significant. When using Pearson correlation, the correlation coefficient is used to determine the relationship between the researched markers.

## Results.

Table 1 shows the relation of the number of PCOS with Age Those whose ages ranged between 15-45, where we found that the highest rate of PCOS was between the ages of 26-35, with a rate of 39% out of a total of 60 people, which numbered 24 women. Also, about 20 women that the ages of 36-45 are infected at a rate of 35%, (Table 2).

Table 2 shows the relation of the number of PCOS with BMI Where the number of women under the mass index was 7 by

11%, which was within the normal limit, their number was 10, by 17%, and those who were above the mass index were 22, by 35%, and those who had obesity were 23, by 37%, (Table 2).

**Table 1.** Relation the number of PCOS with Age.

Age group(years)	No.	%
15-25	16	26
26-35	24	39
36-45	20	35
Total	60	100%

**Table 2.** Relation number of PCOS with BMI.

BMI (Kg/m <sup>2</sup> )	Studied group (N)	PCOs%
Underweight (<18.5)	7	11
Normal weight (18.5 – 24.9)	10	17
Overweight (25 – 29.9)	22	35
Obese (≥ 30)	21	37
Total	60	100

**Table 3.** Comparison of Serum Level of Asprosin and Fetuin-A in Women with PCOS and Control Group.

Parameters	PCOS group (n=60)	control group (n=30)	p-value
Asporin (ng/ml)	1.196 ± 0.436	1.093 ± 0.178	0.115
Fetuin-A(ng/ml)	29.8 ± 10.5	21.99 ± 3.26	0.0002

Table 3. showed that no significant mean of Asprosin was recorded among PCOS (1.196 ng/ml) as compared with healthy control individuals (1.093) at  $p$ -value =0.115, (Table 3), also, the study showed that the highest significant mean of Fetuin-A was recorded among PCOS (29.8 ng/ml) as compared with healthy control individuals (21.99) at  $p$ -value =0.0002, (Table 3).

Table 4. shows the Comparison Serum Levels of FBS, insulin, cholesterol, and triglyceride in women with PCOS and the Control Group. The study showed that the significant mean of FBS was recorded among PCOS (115.1 ng/ml) as compared with healthy control individuals (108.1) at  $p$ -value =0.021, (Table 4), and showed that the highest significant mean of Insulin was recorded among PCOS (26.60 ng/ml) as compared with healthy control individuals (21.24) at  $p$ -value =0.0001, (Table 4), also showed that the highest significant mean of cholesterol was recorded among PCOS (215.9 ng/ml) as compared with healthy control individuals (192.3) at  $p$ -value =0.0003, (Table 4), and showed that the highest significant mean of triglyceride was recorded among PCOS (205.1 ng/ml) as compared with healthy control individuals (192.3) at  $p$ -value =0.0003, (Table 4).

Table 5 shows the correlation between several variables in PCOS-affected women. We will examine the curve of the table to determine whether or not the correlation is apparent. This table summarizes the interactions between asprosin and fetuin-A in PCOS patients with secondary parameters such as FBS, insulin, cholesterol, and triglycerides.

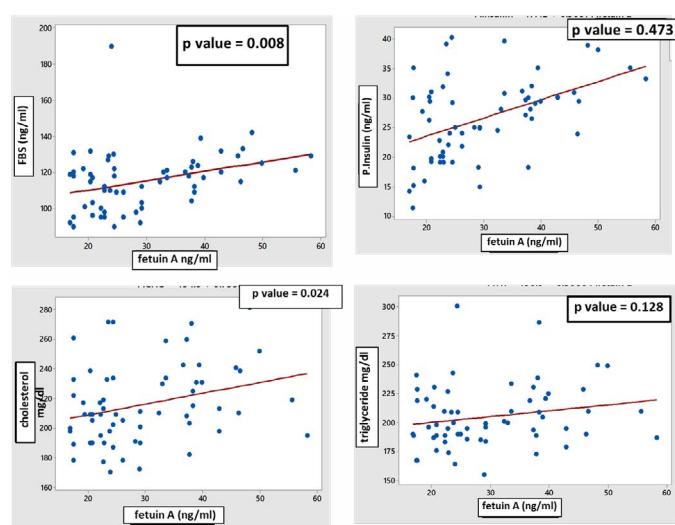
The study showed a significant positive correlation between fetuin-A and FBS ( $p$ -value = 0.008). The study showed a non-significant correlation between fetuin-A and insulin ( $p$ -value = 0.473). The study showed a significant positive correlation between fetuin-A and cholesterol ( $p$ -value = 0.024). The study showed a significant positive correlation between fetuin-A and triglyceride ( $p$ -value = 0.128) (Figure 1).

**Table 4.** Comparison Serum Level of FBS, insulin, cholesterol and triglyceride in women with PCOS and control Group.

parameters	PCOS group (n=60)	control group (n=30)	p-value
FBS (mg/dl)	115.1±16.3	108.1±11.5	0.021
Insulin (mg/dl)	26.60±6.82	21.24±5.18	0.0001
TC(mg/dl)	215.9±26.8	192.3±18.0	0.0003
TG(mg/dl)	205.1±27.2	185.3±19.1	0.0002

**Table 5.** Correlation between parameters in women with PCOS.

PCOs		Asprosin	Fetui-A	FBS	Insulin	CHO	TG
Fetuin-A	p-value	0.124					
FBS	p-value	0.945	0.008				
Insulin	p-value	0.163	0.473	0.635			
TC	p-value	0.127	0.024	0.430	0.686		
TG	p-value	0.009	0.128	0.015	0.626	0.816	



**Figure 1.** Correlation between fetuin-A and measured parameters.

## Discussion.

The study showed a significant positive correlation between fetuin-A and FBS (p-value = 0.008). In agreement with our results Gerst et al. [16], it is apparent from all of these possible methods that fetuin-A is necessary for preserving glucose homeostasis. Studies have demonstrated a connection between serum fetuin-A and the risk of Type 2 diabetes, insulin resistance, and impaired glucose tolerance (IGT). (2020) discovered in their research that liraglutide, one of the drugs used to control blood glucose levels, caused a decrease in serum fetuin-A levels [17]. The study showed a non-significant correlation between fetuin-A and insulin (p-value = 0.473). In agreement with our results, Ochieng et al. [18] Diabetes is one of the subjects that has been studied the most about fetuin-A's impact on human health. Only two proteins directly interact with the extracellular area of the insulin receptor: insulin and fetuin-A. In response to insulin, tyrosine kinase is activated, which results in Fetuin-A is necessary for insulin signalling and glucose transport and works as an endogenous tyrosine kinase inhibitor by inhibiting tyrosine kinase autophosphorylation [19]. This interaction between insulin and fetuin-A is necessary for the control of glucose homeostasis [18].

The study showed a significant positive correlation between fetuin-A and cholesterol (p-value = 0.024). In agreement with our results, Komsa-Penkova et al. [20], Fetuin-A is produced by adipose tissue and Fetuin-A is produced by hepatocytes. The amount of fetuin-A in the blood is affected by several important tissues, including the liver and adipose tissue. In research, it has also been claimed that several dietary factors can influence fetuin-A levels. This is the result of an increase in the level of cholesterol as a result of the metabolism saturated with fats, which in turn leads to an increase in the level of fetuin-A. The study showed a significant positive correlation between fetuin-A and triglyceride (p value = 0.128), among recovered PCOS patients. In agreement with our results, Mancio et al. [21] found a positive correlation between fetuin-A and triglyceride among PCOS patients. Khadir et al. [22], showed that PCOS higher triglyceride levels are associated with a significantly increased fetuin-A level and risk in terms of cardiovascular. In PCOS, a rapid and dramatic increase of fetuin-A was observed more often in severe cases than in non-severe cases. In acute inflammation, elevated fetuin-A is also accompanied by abnormal lipids such as triglyceride, which may affect ovaries.

## Conclusion.

Fetuin-A proved to be a highly sensitive marker in estimating the severity and prognosis of PCOS. While Asprosin plays no significant role in the diagnosis of PCOS and its complications. Regarding this study We anticipate that the study we conducted will give doctors useful information and shed light on the connections between the abnormalities in metabolic and hormonal factors seen during PCOS.

## Conflict of interest.

The authors state no conflict of interest concerning the research, authorship, and/or publication of this article.

## Acknowledgements.

The authors would like to thank Alsalam Teaching Hospitals for providing data for the study.

## REFERENCES

1. Tawfeq M, Sarhat E. Metformin effects on neuregulin-1 in polycystic ovarian women. Georgian Medical News. 2023;337:56-62.
2. Allow S, Sarhat E. Metformin effects on blood levels of gremlin-1 in polycystic ovarian women. Georgian Medical News. 2023;337:51-5.
3. Mahmood MD, Merkhani MM. Role of Spironolactone in the Treatment of Female Patterns Hair Loss With Polycystic Ovarian Syndrome. Proceedings of 2nd International Conference on Research in Multidisciplinary Studies. 2023.
4. Sarhat ER, Abid IM, Kamel NA, et al. Changes of serum Interleukin and Chemerin levels in patients with Polycystic Ovary syndrome. J Adv Pharm Educ Res Oct-Dec. 2021;11:11-4.
5. Mohammed IJ, Sarhat ER, Hamied MA, et al. Assessment of salivary interleukin (IL)-6, IL-10, oxidative stress, antioxidant status, pH, and flow rate in dental caries experienced patients in Tikrit Province. Sys Rev Pharm. 2021;12:55-9.

6. Chang CL, Huang SY, Hsu YC, et al. The serum level of irisin, but not asprosin, is abnormal in polycystic ovary syndrome patients. *Scientific reports*. 2019;9:6447.
7. Alan M, Gurlek B, Yilmaz A, et al. Asprosin: a novel peptide hormone related to insulin resistance in women with polycystic ovary syndrome. *Gynecological Endocrinology*. 2019;35:220-3.
8. Hamad M, Ahmed A, Ahmed S, et al. Serum lipocalin-2, and fetuin-A levels in patients with Alzheimer's disease. *Georgian Medical News*. 2023;337:25-9.
9. Kröger J, Meidtner K, Stefan N, et al. Circulating fetuin-A and risk of type 2 diabetes: a Mendelian randomization analysis. *Diabetes*. 2018;67:1200-5.
10. Mathews ST, Singh GP, Ranalletta M, et al. Improved insulin sensitivity and resistance to weight gain in mice null for the Ahsg gene. *Diabetes*. 2002;51:2450-8.
11. Sarhat ER, Abbas MQ. Estimation of the activity of Copeptin, insulin, and C-peptide from patients with polycystic ovary syndrome. *Tikrit Journal of Pure Science*. 2018;23:7-9.
12. Stefan N, Hennige AM, Staiger H, et al.  $\alpha$ 2-Heremans-Schmid glycoprotein/fetuin-A is associated with insulin resistance and fat accumulation in the liver in humans. *Diabetes care*. 2006;29:853-7.
13. Trepanowski JF, Mey J, Varady KA. Fetuin-A: a novel link between obesity and related complications. *International journal of obesity*. 2015;39:734-41.
14. Jialal I, Pahwa R. Fetuin-A is also an adipokine. *Lipids in health and disease*. 2019;18:1-2.
15. Mohammad JA, Fathi FH, Almulathanon AA, et al. Hyperlipidemia connoted vitiation of serum adipokines and redox imbalances. *Military Medical Science Letters/Vojenské Zdravotnické Listy*. 2023;92.
16. Gerst F, Wagner R, Kaiser G, et al. Metabolic crosstalk between fatty pancreas and fatty liver: effects on local inflammation and insulin secretion. *Diabetologia*. 2017;60:2240-51.
17. Zhang LY, Qu XN, Sun ZY, et al. Effect of liraglutide therapy on serum fetuin-A in patients with type 2 diabetes and non-alcoholic fatty liver disease. *Clinics and research in hepatology and gastroenterology*. 2020;44:674-80.
18. Ochieng J, Nangami G, Sakwe A, et al. Impact of Fetuin-A (AHSG) on tumor progression and type 2 diabetes. *International Journal of Molecular Sciences*. 2018;19:2211.
19. Song A, Xu M, Bi Y, et al. Serum fetuin-A associates with type 2 diabetes and insulin resistance in Chinese adults. *PloS one*. 2011;6:e19228.
20. Komsa-Penkova RS, Kovacheva KS, Golemanov GM, et al. Fetuin-A–Alpha2-Heremans-Schmid Glycoprotein: From Structure to a Novel Marker of Chronic Diseases Part 2. Fetuin-A–A Marker of Insulin Resistance and Related Chronic Diseases. *Journal of Biomedical and Clinical Research*. 2018;11:7-15.
21. Mancio J, Barros AS, Conceicao G, et al. Epicardial adipose tissue volume and annexin A2/fetuin-A signalling are linked to coronary calcification in advanced coronary artery disease: Computed tomography and proteomic biomarkers from the EPICHEART study. *Atherosclerosis*. 2020;292:75-83.
22. Khadir A, Kavalakatt S, Madhu D, et al. Fetuin-A levels are increased in the adipose tissue of diabetic obese humans but not in circulation. *Lipids in health and disease*. 2018;17:1-3.