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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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THE THERAPEUTIC EFFECT OF ORAL INSULIN SENSITIZER METFORMIN ON LIPID PROFILE IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

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Abstract.

Objective: A patient with polycystic ovary syndrome suffered from hyperinsulinemia and consequently lipid profile problems. This study evaluated the effects of metformin on lipid profiles.

Study design: In a case-control study, a total of one hundred women were included in the study, fifty women that don't take metformin as the control group and fifty women that took metformin as the case group, Blood Samples were taken to know the effect of metformin on total cholesterol, LDL-C, HDL-C, and triglyceride, the dose of metformin was (500-850 mg daily) taken for 3-6 month. **Results:** The Result of this study shows a significant difference in TC (Mean Difference=0.38), TG (Mean Difference =0.18), LDL (Mean Difference =0.3), and a nonsignificant difference (Mean Difference=-0.027) in HDL value. **Conclusion:** The present study supports the idea that metformin improves lipid profiles, so metformin may be considered as prophylactic therapy lowering cardiovascular risks in women with polycystic ovary syndrome.

Key words. Lipids, metformin, polycystic ovary syndrome, hyperinsulinemia.

Introduction.

Polycystic ovary syndrome (PCOS) is a heterogenous condition affecting up to 20% of women of reproductive age [1,2]. PCOS is characterized by signs and symptoms of androgen excess and an increase in cardiovascular risk [3,4]. Although the pathophysiology behind this syndrome is unclear, it has been linked to hormone overproduction, environmental variables, and weight gain [3]. UP to 70% of women with PCOS have dyslipidemia , Which is characterized by raised triglycerides(TG), low density lipoprotein cholesterol (LDL-C), total cholesterol (TC) and decreased high – density lipoprotein cholesterol (HDL-C) [5,6] A characteristic of the metabolic syndrome linked to PCOS and a factor in lipid diseases, insulin resistance is also more prevalent in obese women with polycystic ovary syndrome [7,8]. By promoting the metabolic dysfunction associated with polycystic ovary syndrome and increasing intra –abdominal fat deposition, hyperandrogenism is an atrait of PCOS that is also linked to ahigh risk of poor metabolic outcomes [7]. The risk of cardiovascular disease is enhanced by dyslipidemia [8]. In addition, it has been discovered that anovulation in women with PCOS is linked to higher TC,TGs,LDL-C,and lower HDL-Clevels due to an increased generation of reactive oxygen species (ROC), which causes ovarian damage and follicular atresia [9,10]. Long term complications of PCOS include increased risk of type2diabetes mellitus, atherosclerosis, coronary artery diseasese, and myocardial infraction [11,12]. The use of insulininomimetic/insulin-sensitizing drugs has been influenced by new understandings of the connection between insulin resistance, compensatory hyperinsulinemia, and the emergence of PCOS. The most known of these is biguanide metformin, which is widely used to treat type 2 diabetes [13]. Metformin treatment for PCOS appeared to reduce insulin resistance and improve lipid metabolism, according to certain randomized clinical trials [14-16], Banaszewka et al. (2006) concluded that metformin medication may be used as a preventive measure to lower cardiovascular risk factors in hyperinsulinemic women [17]. with the use of metformin, circulating testosterone levels and body weight were dramatically lowered as the occurrence of more regular menstrual cyclicity and ovulation, Metformin therapy has therefore demonstrated benefits for patients with PCOS and hyperinsulinemia, correcting several difficulties including menstrual cyclicity, fertility, hormone levels, and metabolic syndrome (MS) in the presence or absence of type2 diabetes mellitus [18].

This study aims to investigate the effect of metformin on lipid profiles which include total cholesterol, low-density lipoprotein, high-density lipoprotein, and triglyceride level.

Materials and methods.

Diagnosed cases of PCOS, attending the outpatient clinic and from Alsalam Teaching and Albatool teaching hospital from October 2021 to April 2022 were included in the study, the study was a case-control study, the biochemical analysis was made in a private laboratory, and PCOS was diagnosed by oligomenorrhea, obesity, hirsutism and by us followed Rotterdam criteria. A total number of 100women in the reproductive age (the age 18-35years) were enrolled in the present study. The scientific committee of the University of Mosul, the College of Pharmacy, and the Nineveh Health Directorate approved the study protocol, informed consent was obtained from the subjects before the study, and the study subjects were randomly assigned into two groups:

Group I: the women that don't take metformin (control group)

Group II: the women that took metformin(case group). The dose of metformin (500-850mg two or three times daily) for 3-6 months. Patients having PCOS with coexisting diseases (Diabetes mellitus, Heart diseases), congenital adrenal hyperplasia, PCOS women with pregnancy and getting treatment with clomiphene citrate were not included.

After the selection of the subjects, an appointment was given and advised to come on the appointed day in fasting condition (12 hours fasting). fasting blood samples for each subject were collected. for this purpose, 5ml of the blood sample was drawn from the patient, blood samples are allowed to clot and centrifuged for 10 minutes at a rate of 3000 rpm and kept in deep frozen, for the analysis of triglyceride, total cholesterol, low-density lipoprotein, and high-density lipoprotein., determination of total cholesterol, HDL-C, triglyceride was done by enzymatic method using(BioLabo kit, France).

Estimation of serum LDL-C:

LDL-C determination was made according to the Friedewald equation:

LDL = Total cholesterol – HDL-C – (TG/5).

This equation holds only if the triglycerides value is below 4.5 mmol/L, and the patient does not have type III hyper – lipoproteinemia.

The fasting glucose concentration was analyzed by the glucose oxidase method supplied by Biolab glucose kit (Biolabo, France)., Height was measured in centimetres (cm), weight in kilogram (kg) with light clothing and without shoes, body mass index (BMI) was calculated as weight in (KG) divided by square meter (m2) [17].

The data obtained in the current study were analyzed using Micro soft Excel to evaluate data for all mathematical and statistical studies, all values are expressed as (mean±standard deviation) for comparison of the parameter between the cases and the control, and an unpaired t-test was utilized in the differences were considered significant statistically if $p<0.05$, and Pearson (r- factor) correlation is used to show the correlation between the parameters of the cases and control group.

Results.

A total of one hundred women were included in the study, fifty patients with PCOS that don't use metformin as a control group were included, (fifty) patients with PCOS that use metformin (the case group) were also included, the dose of metformin were 500 tidor850 bid for three to sixth month.

The result show significant difference in BMI (Mean Difference=3.57), (95%CI,2.26-4.89) (p value=.001) and show non-significant difference in FSG (Mean Difference =.22) (95%CI-.002,.450) (p value=0.05).

Table 1. *Comparison of BMI and glycemic control parameters between the two group.*

Parameter	Control (mean± SD)	Cases (mean± SD)	P value*
BMI (kg/m2)	29.23±3.79	25.65±2.74	0.001
FSG (m mole/l)	4.87±0.64	4.65±0.48	0.05
*Independent t-test of two means was used (Significant difference if p<0.05)			

Table 2. *Comparison of lipid profile parameters between the two group.*

Lipid profile parameters	control {n=50} mean±SD	Cases(n=50) Mean±SD	p-value*
Total Cholesterol (mmol/L)	4.61±0.33	4.23±0.29	0.00
LDL-c(mmol/l)	2.74±0.55	2.43±0.31	0.001
HDL-cmmol/l	1.25±0.46	1.28±0.09	0.69
TGmmol/l	1.28±0.168	1.10±0.167	0.00
*independent t-test of two means was used			

This table (2) show significant difference in LDL-c (p value=0.001), and total cholesterol(p=0.00), and triglyceride value (p value=0.00) and non-significant difference in HDL value (p value=0.69).

Table (3) shows significant differences in TC (Mean Difference =.37740), TG (Mean Difference =.17638), LDL (Mean Difference =.30370) and non -significant difference (Mean Difference = -.02650) in HDL value, the 95% confidence interval as shown in the table above.

Table 3. *Effect of metformin on lipid profile between the two group.*

Lipid profile parameters	control {n=50} mean SD	Cases(n=50) Mean SD	p-value*
Total Cholesterol (mmol/L)	4.61±0.33	4.23±0.29	0.00
LDL-c(mmol/l)	2.74±0.55	2.43±0.31	0.001
HDL-cmmol/l	1.25±0.46	1.28±0.09	0.69
TGmmol/l	1.28±0.168	1.10±0.167	0.00

Table 4. *Correlation of measured lipid parameters.*

Parameter		BMI	FSG	TC	TG	LDL
FSG	R	0.058				
	p	0.570				
TC	R	0.363**	0.161			
	p	0.000	0.110			
TG	R	0.164	-0.001	0.311**		
	p	0.103	0.994	0.002		
LDL	R	0.213*	0.174	0.675**	0.039	
	p	0.033	0.083	0.000	0.967	
HDL	R	0.045	-0.099	0.058	0.018	-0.662**
	p	0.653	0.328	0.568	0.863	0.000
**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).						

From the result of this table (5) there is a significant positive correlation between FSG and BMI (P value=0.57), there is a positive correlation between TC and BMI (P value =0.001), and also between TC and FSG (P value =0.11). Also, there is a positive correlation between TG and BMI (P=0.103), TG and TC (P value =0.002), there is a negative correlation between TG and FSG (P value =0.994), there is a positive correlation between LDL and BMI (P value =0.033), between LDL and FSG (p=.083), between LDL and TC (p=.000), LDL and TG (P value =.967). There is positive correlation between HDL and BMI (P value =0.653), HDL and TC (P value =0.568), HDL and TG (P value =0.863), there are negative correlation between HDL and FSG (P value =0.325), and between HDL and LDL (P value =.001).

Discussion.

The prevalence of PCOS, also known as polycystic ovarian syndrome (PCOS), is thought to range between 5 and 10% in women [18], cardiovascular disease is the leading cause of death in women, and those who have polycystic ovarian syndrome have a 7.4 fold relative of risk for the myocardial infraction, as determined by risk factor analysis, due to the prevalence of central obesity, hypertension, insulin resistance, glucose intolerance, and dyslipidemia [19]. The latter may explain their cardiovascular issues because it is characterized by elevated triglycerides and low HDL cholesterol, low high-density lipoprotein (HDL) cholesterol appears to be the most significant lipoprotein predictor of CVD in women [20]. Around 70-80% of people with PCOS are obese. All of the ladies in this study had BMI>25, making them all overweight or obese. Obesity and insulin resistance are known to be linked,

but PCOS patients have evidence of insulin resistance that goes beyond that of obese women in the general population [21], The study's findings involving serum lipid levels and fasting blood sugar are consistent with other research that shown that insulin resistance is highly correlated with serum levels of HDL, LDL, triglycerides, and total cholesterol in an obese patient with PCOS. These findings support the idea that lipid metabolic disturbances are primarily caused by obesity and insulin resistance [22,23].

In this study, there is improvement in lipid profile, and this is consistent with a study made by Banaszewska et al., (2006) who ascertained that metformin therapy in hyperinsulinemic women was linked to a substantial decrease in insulin level, total cholesterol, LDL, and TG. the study implying that this medication may be considered as a prophylactic therapy lowering cardiovascular risk factors in hyperinsulinemic women with PCOS [15]. Lord et al., (2006), documented the improvement of lipid profile [24]. Alternatively, another study verified serum levels of high-density lipoprotein cholesterol increased total cholesterol. On the other hand, the high-density lipoprotein cholesterol ratio decreased significantly, and a similar trend was observed in serum triglyceride levels during metformin treatment [25]. In another study made by Glueck et al., (2003), cholesterol and LDL serum levels decreased after metformin treatment, there was a non-statistically significant difference between before and after treatment in the case group, leading researchers to conclude that metformin treatment caused an increase in HDL and a decrease in triglyceride level. As a result, metformin therapy may reduce the long-term risk of diabetes and cardiovascular disease by addressing all or some risk factors and lipid profile changes [13]. Tang and co-workers have shown that with metformin treatment, there were no appreciable changes in lipid profiles or insulin sensitivity. Moreover, neither weight reduction nor menstruation frequency was improved by metformin in this study's PCOS participants [26]. Santana et al., (2004) have demonstrated that metformin decreases serum total cholesterol and LDL levels while increasing HDL values [27]. In addition to these characteristic features of metformin role in reducing lipid profile in PCOS, the effects further extend to involve anti-inflammatory activities of metformin [28] whether used alone or in combination with insulin or oral hypoglycaemic agents[29]. Nevertheless, the outcome could show variation in terms of response due to involvement of plethora of various factors secreted by the cells [30,31].

Conclusion.

Metformin – insulin sensitizers have been shown to improve lipid profiles leading to an increase the HDL cholesterol, the main protection against the cardiovascular diseases in women with PCOS, Also metformin decreases testosterone level so improve menstrual irregularity and hirsutism.

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Conflict of Interest.

No potential conflicts exist. we had full access to all the information in the study and take full responsibility for the integrity of the information and accuracy of the data analysis.

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