

A prospective observational study on Drug Utilization Evaluation of Metformin in the Management of Polycystic Ovarian Dysfunction

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ABSTRACT

Background: Polycystic ovarian disease (pcod) is an endocrinopathy characterized by increased resistance to insulin. Metformin is one of the longest-established oral insulin sensitizing agents. However, in the past two decades, its properties as an insulin sensitizing agent have been explored in relation to its applicability for women with pcod. Metformin is an effective ovulation induction agent for non-obese women with pcod.

Objective: This study was conducted in the endocrinology department at Sriramineni Institute of Medical Sciences, and the main objective of the study is to check the efficacy of metformin in pcod patients.

Methodology: This is a prospective observational study conducted in sriramineni institute of medical sciences, narasaraopet. A total of 100 sample of female out patients are included in our study who are under the metformin therapy. To assess the drug utilization of metformin in drug profile form that october 2021 - march 2022 i.e., period of 6months.

Results: In 100 sample study population that who are affected with PCOD is considered that the 21-30 (n=48) 48% years of age female patients were more susceptible for the risk of getting a disease when compared to the other age groups and the disease related complications in study population shows that thyroid (n=56) 56% of patients are more prone to the disease followed by miscarriage (25%). By observing the brands Myotrend-m was the most extensively prescribed brand (n=43) 43% when compared to the other brands and mostly the obesity (n=46) 46% it is the major risk factor to PCOD. According to the marital status shows that married patients are more prone to the PCOD (n=66) 66% when compared to the unmarried patients (n=34) 34%.based on the BMI that

overweight and obese patients are more affected with PCOD (n=30) 30%.

Conclusion: Our study provides an insight on usage of metformin in PCOD and also to prevent further complications, risk factors in PCOD patients. It has a good safety profile and associated with low cost. Myotrend-m was the most prescribed brand and it has a good clinical effect.

I. INTRODUCTION

Drug Utilization Review (DUR) is defined as an authorized, structured, ongoing review of prescribing, dispensing and use of medication. DUR encompasses a drug review against predetermined criteria that results in changes to drug therapy when these criteria are not met. It involves a comprehensive review of patients' prescription and medication data before, during and after dispensing to ensure appropriate medication decision-making and positive patient outcomes.

Importance of DUE:

DUR programs play a key role in helping managed health care systems understand, interpret, evaluate and improve the prescribing, administration and use of medications. Pharmacists play a key role in this process because of their expertise in the area of medication therapy management. DUR affords the managed care pharmacist the opportunity to identify trends in prescribing within groups of patients whether by disease-state such as those with asthma, diabetes or high blood pressure, or by drug- specific criteria.

Objectives of DUE are as follows:

- Ensuring that the pharmaceutical therapy meets current standards of care.
- Promoting optimal medication therapy.
- Preventing medication-related problems.

- d. Identifying specific medicine use problems that require further evaluation.
- e. Creating guidelines (criteria) for appropriate medicine use.

Classification of DUE:

Drug Utilization Evaluation is typically classified in three different categories:

1. Prospective DUE
2. Concurrent DUE
3. Retrospective DUE

1. Prospective DUE:

Prospective review involves evaluating a patient's planned drug therapy before a medication is dispensed. This process allows the pharmacist to identify and resolve problems before the patient has received the medication.

Issues commonly addressed by Prospective DUE:

- a. Clinical abuse/misuse
- b. Drug dosage modification, Drug-drug interactions (when two or more different drugs interact and alter their intended effects, often causing adverse events)
- c. Drug-patient precautions (due to age, allergies, gender, pregnancy, etc.)
- d. Formulary substitutions (e.g., therapeutic interchange, generic substitution).

Concurrent DUE:

Concurrent review is performed during the course of treatment and involves the ongoing monitoring of drug therapy to foster positive patient outcomes. It presents pharmacists with the opportunity to alert prescribers to potential problems and intervene in areas such as drug-drug interactions, duplicate therapy, over or underutilization and excessive or insufficient dosing.

Issues Commonly Addressed by Concurrent DUE:

- a. Drug-disease interactions
- b. Drug-drug interactions
- c. Drug dosage modifications
- d. Drug-patient precautions (age, gender, pregnancy, etc.)

Retrospective DUE:

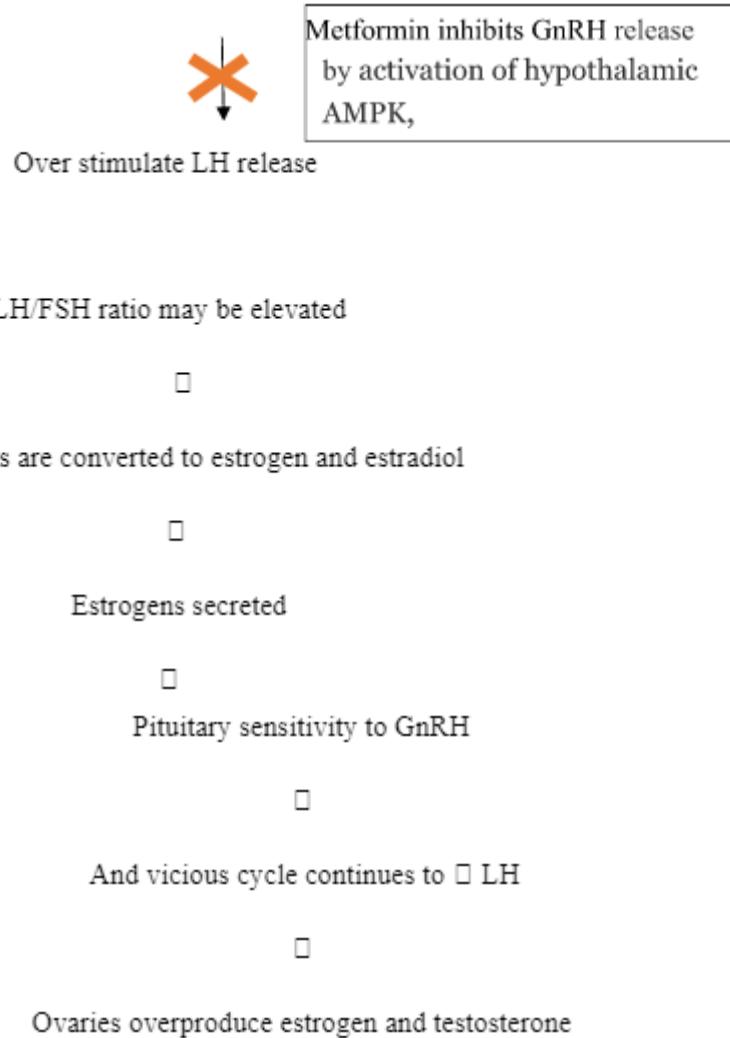
A retrospective review aims to detect patterns in prescribing, dispensing or administering drugs, based on current patterns of medication use, prospective standards and target interventions can be developed to prevent recurrence of inappropriate medication use or abuse.

Issues commonly addressed by Retrospective DUE:

- a. Appropriate generic use
- b. Clinical abuse/misuse
- c. Drug-disease contraindication
- d. Drug-drug interactions
- e. Inappropriate duration of treatment
- f. Incorrect drug dosage
- g. Therapeutic appropriateness and/or duplication.

MECHANISM OF ACTION OF METFORMIN IN PCOD:

Metformin likely plays its role in improving ovulation induction in women with PCOD through a variety of actions, including reducing insulin levels and altering the effect of insulin on ovarian androgen biosynthesis, theca cell proliferation, and endometrial growth. Also, potentially through a direct effect, it inhibits ovarian gluconeogenesis and thus reduces ovarian androgen production. Metformin has been shown to inhibit GnRH release by activation of hypothalamic AMPK, Abnormal Pituitary gland increases more GnRH



Aim: The main Aim of the study is to assess the drug utilization of Metformin in patients with polycystic ovarian dysfunction..

Objectives:

To check and evaluate the efficacy of metformin in PCOD patients by identify the Risk factors and complications among PCOD patients.To improve therapeutic outcome given in the prescription and improve medication adherence.

NEED OF THE STUDY

The polycystic ovarian disease (PCOD) is a common endocrinopathy, affecting 6.8% of reproductive-aged women. Anovulation and androgen excess have been considered the hallmark diagnostic criteria of the disease.Insulin resistance

(IR) has been identified as a significant contributor to the pathogenesis of PCOD that is exacerbated by obesity.Metformin is a biguanide currently used as an oral antihyperglycemic agent to manage T2DM.The need of our study is to get insight on usage of Metformin and its efficacy in PCOD patients. In small studies, metformin improves outcomes such as hyperinsulinemia, ovulation and menstrual cyclicity.It does not affect insulin secretion but can improve insulin action So, we have to choose the drug metformin for;
Restoring ovulation,
Reducing weight,
Reducing circulating androgen levels
Reducing the risk of miscarriage
Reducing the risk of getting gestational diabetes

OUTCOMES OF THE STUDY:

To reduce PCOD related complications after the using of Metformin and with less ADR's.and improve the patient quality of life.To assess the efficacy of the Metformin in PCOD patients and to achieve proper therapeutic outcome.

II. MATERIALSANDMETHODS

A system of methods used in a particular area of study or activity in order to develop an approach that matches our objectives. This is a prospective observational study conducted in Gynaecology department for a period of 6 months at Sriramineni Institute of Medical Sciences, Narasaraopet along with other secondary care hospitals to analyse the records of patients who had any courses of antibiotics are included for the study.A total of 100 patients from Gynaecology Department, those who fulfilled the inclusion and exclusion criteria were selected for the study.

Study Criteria:

Inclusion Criteria:

From the first occurrence of menstruation to 40 years of age

For both diabetic and non-diabetic PCOD

Exclusion Criteria:

The period in life of a female preceding the establishment of menstruation

In a women's life when menstrual periods stop permanentl

Ethical Clearance:

This study was approved by the Institutional Ethics Committee of Narasaraopeta Institute of Pharmaceutical Sciences, Narasaraopet
 IEC Approval number: IEC-NIPS/PPP/2021-22/004.

III. RESULTS AND DISCUSSION:

Table 5.1: Categorization Based on Age of the Patient in Study Population:

It reveals that 21-30 years of age patients (48%) were more susceptible for the risk of getting a disease when compared to other age groups.

S.No	AGEin(Yrs)	NO.OFCASES (n=100)	PERCENTAGE(%)
1.	13-20	12	12
2.	21-30	48	48
3.	31-40	40	40

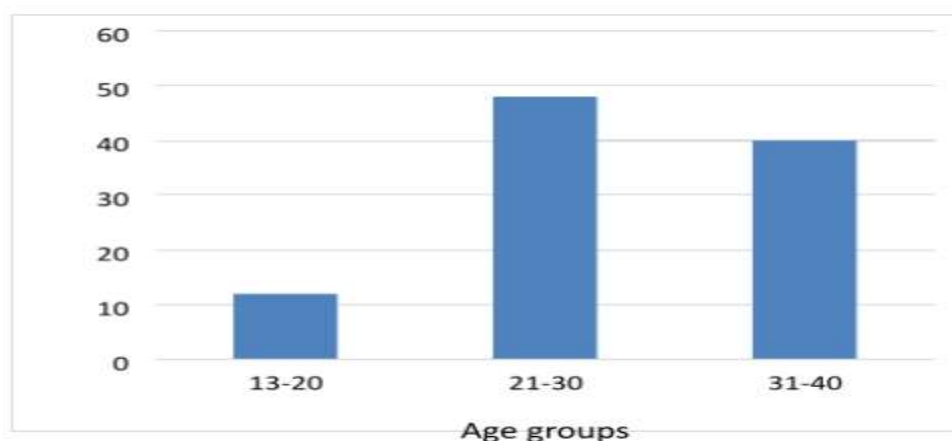


Figure5.1:Classification based on Age

Table 5.2 Categorization Based on Disease Related Complications:

It shows that Miscarriage (56%) followed by Hyperlipidemia (25%) are More Susceptible risk for PCOD.

S.No	COMPLICATIONS	AGE (years)	WT (kg)	O. OF CASES(n=100)	PERCENTAGE(%)
1	DIABETESMELLITUS	25-35	65-79	8	8
2	THYROID	16-35	63-85	9	9
3	MISCARRIAGE	23-35	59-65	56	56
4	HYPERLIPIDEMIA	24-35	52-75	27	27

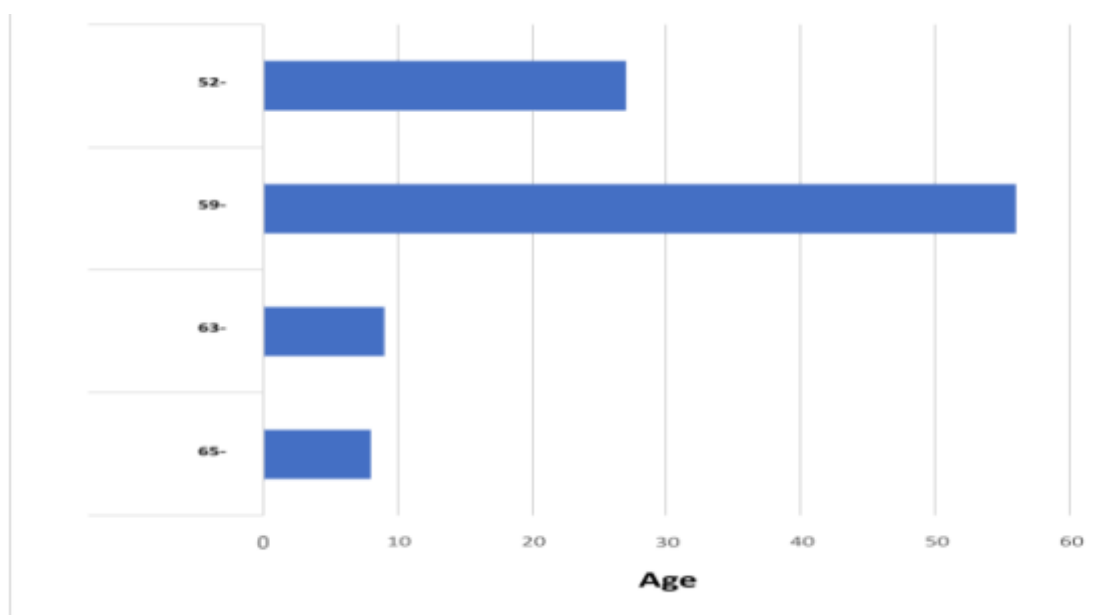


Figure5.2:Classification based on Complications

Table 5.3 Categorization Based on Brands:

By observing the above table, it is observed that Myotrend-M was the most extensively prescribed brand (43%) when compared to other brands

S.NO	BRANDS	NO.OF CASES PRESCRIBED(n=100)	PERCENTAGE(%)
1	RIOMET	13	13
2	MYOTREND-M	43	43
3	FORTAMET	23	23
4	REJUMET	11	11
5	GLUCOPHAGE	7	7
6	GLUCOMETZA	3	3

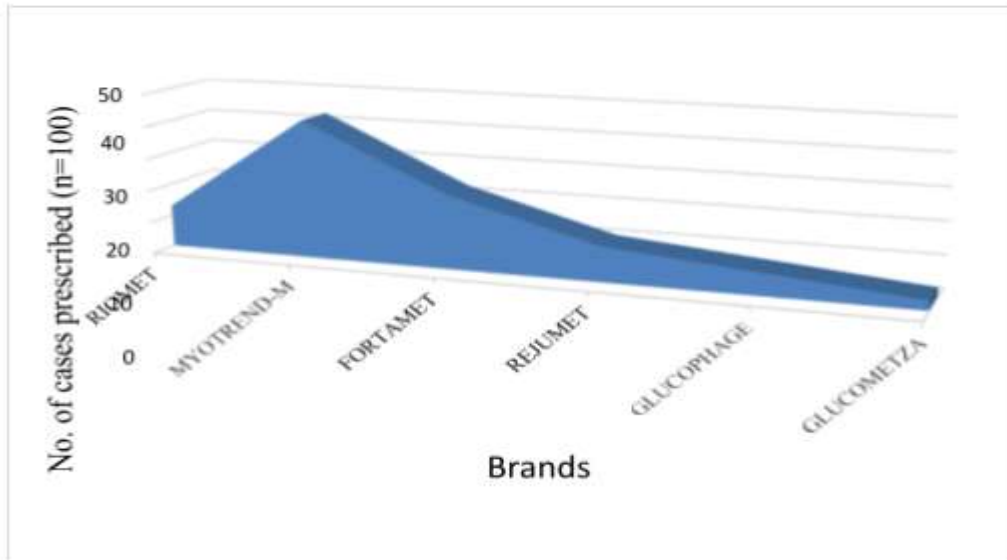


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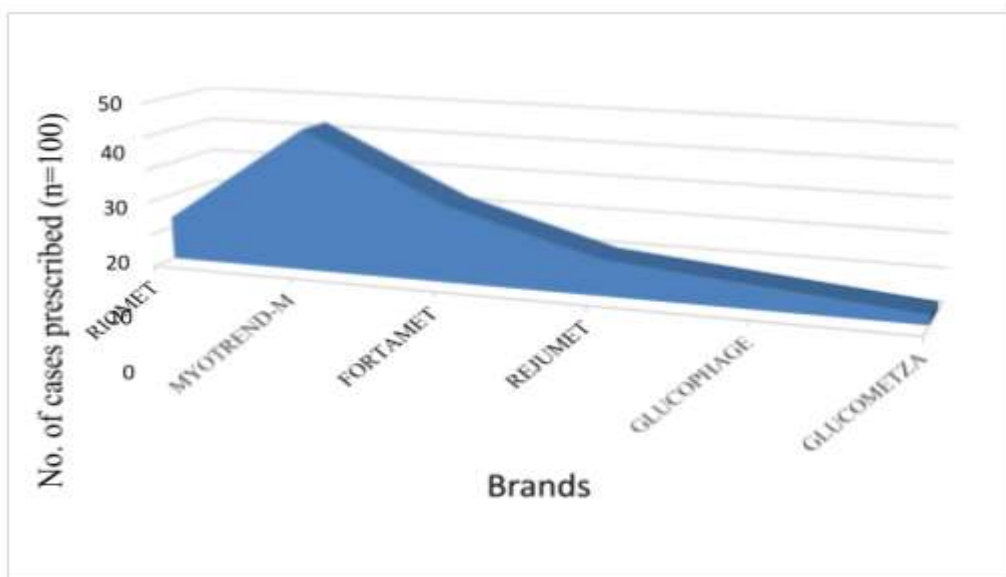


Figure5.4:Classification based on Brands

Table 5.5 Classification Based on Marital Status:

Shows that Married patients (66%) were more prone to disease than Unmarried patients (34%)

S.NO	MARITALSTATUS	NO.OFCASES	PERCENTAGE(%)
1.	UNMARRIED	34	34
2.	MARRIED	66	66

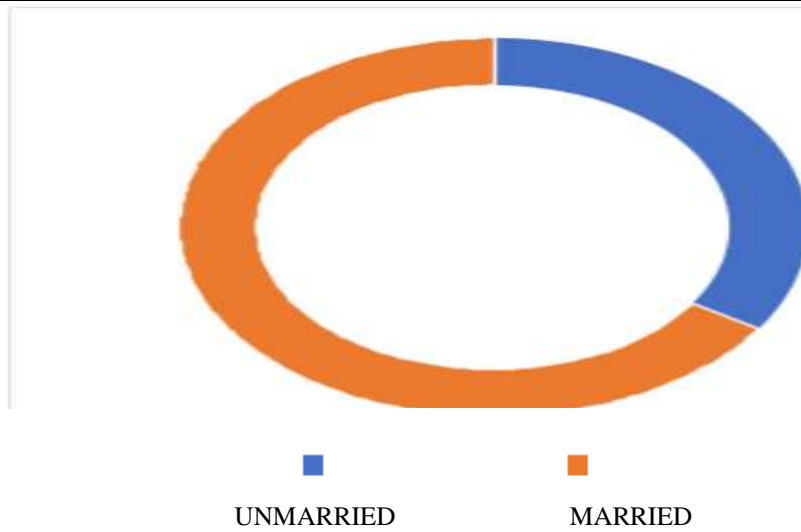


Figure 5.5: Classification based on marital status

Table 5.6 Distribution of the Patients Based on their BMI:

Reveals that both obese (30%), and overweight (30%) patients were more prone to PCOD when compared to normal weight and underweight patients.

S.No	BMI(kg/m ²)	NO.OF CASES (n=100)	PERCENTAGE (%)
1.	<18.5 (under weight)	25	25
2.	18.5-24.9 (normal weight)	15	15
3.	25-29.9 (over weight)	30	30
4.	>30 (obese)	30	30

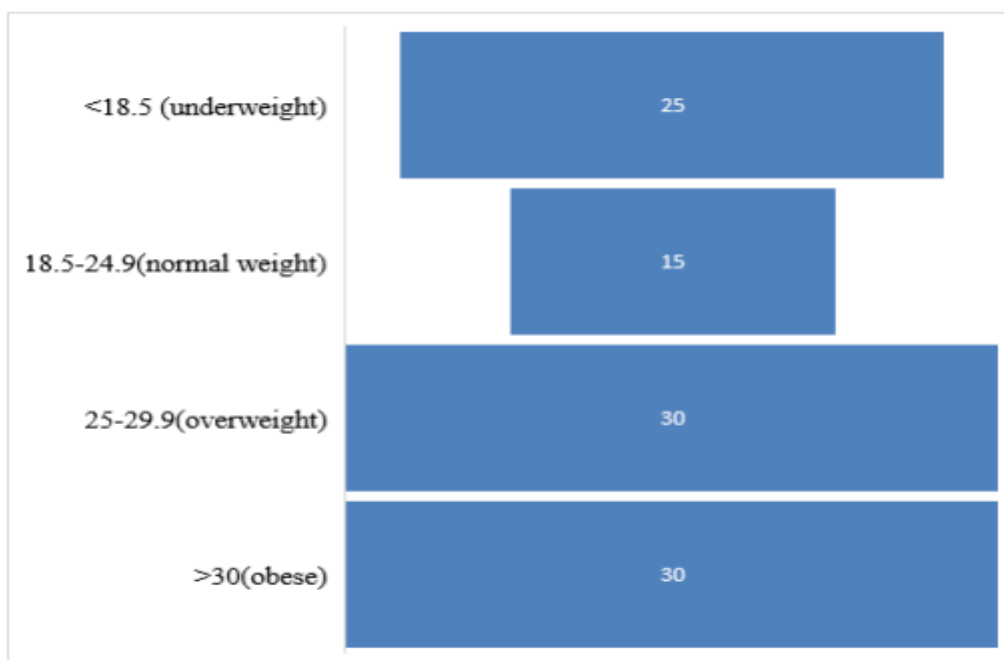


Figure 5.6: Distribution of patients based on their BMI

Table 5.7: Assessment of efficacy of metformin based on laboratory investigations

Metformin efficacy was assessed by evaluating the laboratory parameters such as FSH, LH, PROLACTIN, and TESTOSTERONE. Abnormal

levels of these hormones were observed before the administration of metformin, on a course of metformin therapy these hormone levels tend to become normal after the therapy.

S.No.	Laboratory investigations	No of subjects having high hormone levels before treatment	PERCENTAGE(%)
1	Follicle stimulating Hormone (FSH)	36	36
2	Luteinizing hormone (LH)	24	24
3	Prolactin	23	23
4	Testosterone	17	17

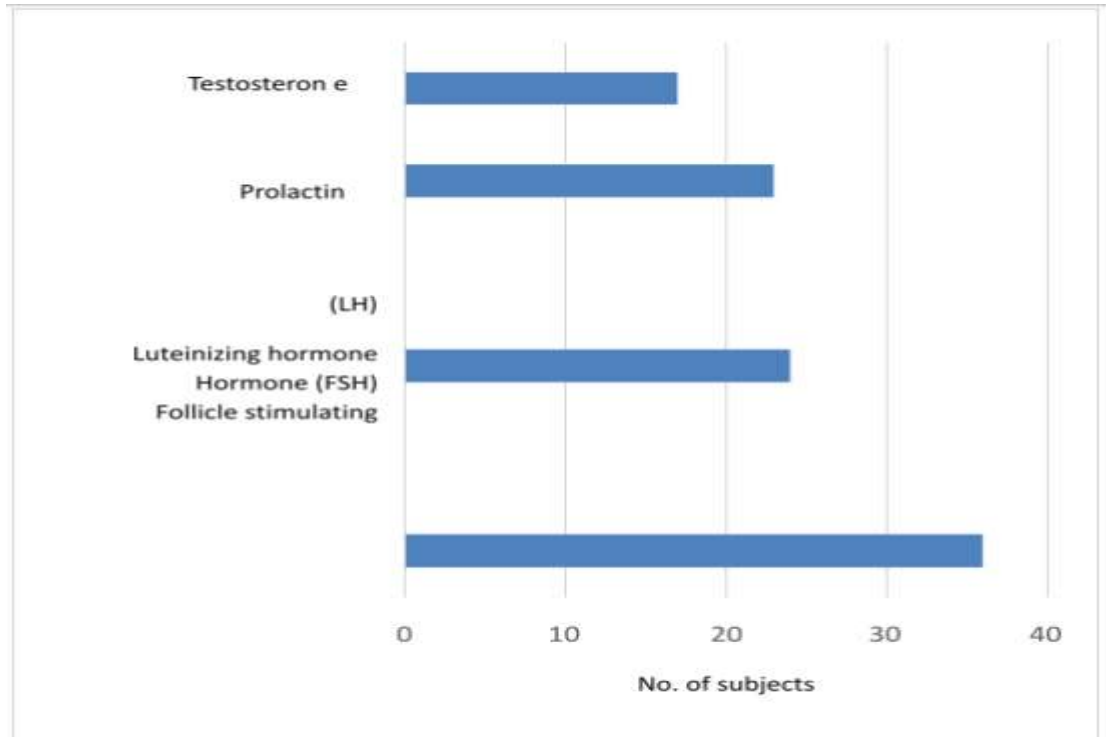
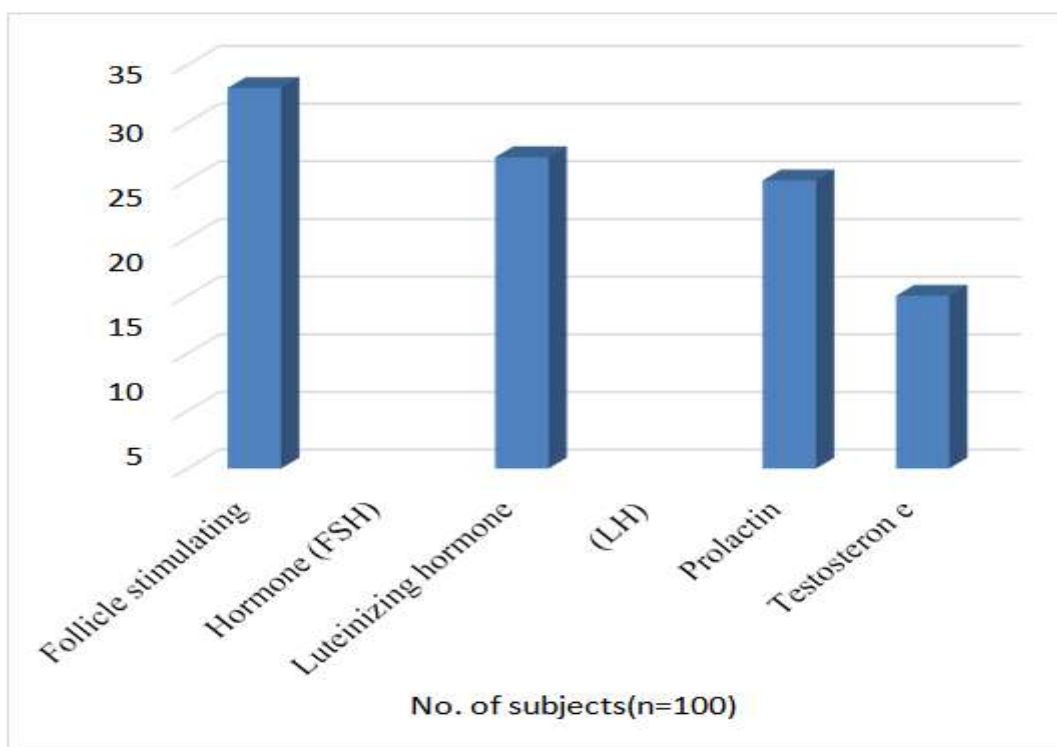


Table5.7:Assessment of efficacy of metformin before treatment

S.No.	Laboratory investigations	No of subjects controlling hormone levels after treatment	PERCENTAGE(%)
1	Follicle stimulating Hormone(FSH)	33	33
2	Luteinizing hormone (LH)	27	27
3	Prolactin	25	25
4	Testosterone	15	15



In our study Age wise distribution shows that 21-30 (48%), followed by 31-40 (40%).age group people were most admitted to the hospital than the other aged group people.Based on disease related complications, we have observed that most of the patients were more affected to miscarriage (56%) of 23-35 years of aged people when compared to other complications i.e., hyperlipidemia (25%), thyroid (11%) diabetes mellitus (8%).Based on brands we have observed that most of the patients were produce good therapeutic outcome by using Myotrend-M. This is the most prescribed brand by the physician. Myotrend-M (43%) will prescribe majorly when compared to other brands.In our study majority of the patients were getting this disease by being obese.The major risk factor of this PCOD is obesity (46%) when compared to other riskfactors.In our study we have observed that majority of married patients were more prone to this disease (66%) when compared to unmarried patients (34%).In our study Based on BMI (body mass index) we have observed that both obese (30%) and overweight (30%) patients were more prone to disease when compared to underweight (25%) and normal weight (15%) patients. Metformin efficacy was assessed by evaluating the laboratory parameters such as FSH, LH, PROLACTIN, TESTOSTERONE. Abnormal levels of these hormones were observed

before the administration of metformin, on a course of metformin therapy these hormone levels tend to become normal.

IV. CONCLUSION

A prospective observational study on drug utilization evaluation of metformin in the management of polycystic ovarian dysfunction was conducted. A sample size of 100 study participants was selected using n-master's formula and the study revealed that, out of 100 out patients the age of below 40 years female patients were more prone to disease.

Our study provides an insight on usage of metformin in PCOD and also to prevent further complications, risk factors in PCOD patients. It has a good safetyprofile and associated with low cost. Myotrend-M was the most prescribed brand and it has a good clinical effect.

Metformin is an oral anti-diabetic drug in the biguanide class for the treatment of type 2 diabetes mellitus, and it is also suitable for treating PCOD patients.

The benefits of metformin on insulin sensitivity have been demonstrated in non- DM women with PCOD. The use of metformin is associated with increased menstrual cyclicity, improved ovulation, and a reduction in circulating androgen levels.

Metformin has a role in improving long term health outcomes for women with PCOD, including the prevention of diabetes, cardiovascular disease and endometrial cancer.

The usage of Metformin was high in adult women, so there is a need to achieve appropriate use of Metformin. Our study also helps in improving the therapeutic outcome of the PCOD patients.

Finally, this study concludes that the usage of Metformin in polycystic ovarian dysfunction works effectively for the PCOD patients.

Metformin is used to cure endocrine disorders in patients with PCOD, in addition to it, it also regulates ovarian function and even reduce the weight of overweight women in PCOD.

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