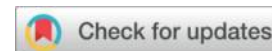


Pharmacological Approaches in Obstetrics and Gynecology: A County-Level Perspective on Drug Therapy Optimization

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Abstract

Background

Designing OB/GYN clinical prescribing knowledge is essential in the management of possible conditions such as preeclampsia, gestational diabetes, menopause, and contraceptive use. The study aims to look at how OB/GYN conditions can be best managed in rural, county-level treatment facilities with reference to the challenges on pharmacological treatment due to resource constraints.

Objective

The purpose of this study is to determine factors influencing the provision of pharmacological interventions for OB/GYN ailments in county facilities especially in the rural areas and to determine possibilities of improving drug therapy under resource limited situations.

Methods

Questionnaires were administered to 20 patients who sought treatment at four selected county hospitals together with 15 key informant interviews from the providers. Other qualitative methods

adopted in the study were case studies and focus group discussions, with the aim of exploring the barriers to drug therapy management and where improvements could be made.

Results

Some vital medicines including insulin for gestational diabetes and magnesium sulfate to manage preeclampsia lacked adequate stock with 70-75% of facilities having a consistent drug stock. Compliance with medications was found to have a positive relationship with the treatment outcome: conditions like dysmenorrhea are easy to treat and thus had a 95% success rate.

Discussion

Barriers including medication and dosage availability, medication adherence, and the need to sensitize healthcare practitioners were some of the challenges highlighted. Telecommunication technologies like telemedicine and Mobile health were advocated to deal with the challenges and promote compliance with treatment schedules.

Conclusion

Medications are also crucial, though their utilization in OB/GYN practices can be limited by practical, educational, and financial considerations in the rural context. Specific strategies proposed entail enhancing access to medications, expanding education for healthcare professionals, and employing technology for drug therapy management in the context of rural OB/GYN practice.

1. Introduction

OB/GYN pharmacology has a significant role in managing various disorders affecting women starting from pregnancy complications to chronic gynecological disorders. OB/GYN is a broad field that deals with various conditions including pregnancy complications such as preeclampsia, diabetes during pregnancy, painful menstruation, menopausal periods, and reproductive disorders including endometriosis and PCOS. Medication therapy is typically a primary intervention in many of these disorders since it addresses both the symptoms and disease progression. The management of an optimal drug regimen, nevertheless, is not a simple and singular process but is rather a decision-making process with several factors, particularly of the healthcare setting which is relatively limited in resource endowment such as a county level system.

County-level health-care systems provide services to a large segment of the population but are devoid of resources and a dearth of specialized drugs and professionals. Hospitals and clinics in

the rural or a partially developed area can often fail to deliver the most appropriate medical drugs on time because of these points. A study by the World Health Organization shows that extending modern medications and therapies in rural healthcare institutions in LMICs is challenging owing to financial constraints, structural challenges, and scarcity of professional healthcare personnel (WHO, 2016). These challenges are further compounded by an increase in incidences of chronic diseases, increasing patient age, and the increasing sophistication of the treatments that are needed for obstetric and gynecologic patients.

Review of the optimization of pharmacotherapy in OB/GYN is important to illuminate ever-growing pharmaceutical options and the transition to a more individualized approach to pharmacological treatments. Extensive literature indicates that when interventions are targeted to the specific patient, for example, age, comorbidity, and socio-economic status, patients receive superior service and the health care resources are used more effectively (Sullivan & Valachovic, 2019). For instance, analysing the pharmacological treatments of preeclampsia, gestational diabetes, and menopausal, the aspects of efficacy and safety are critical since the maternal and reproductive systems involve sensitive issues. While a great deal has been known about what type of drug treatment should be employed in these conditions, the implementation of evidence based practice is not standard across the different areas of health care including the rural areas where access to the information resources and the new treatment protocols might be quite limited.

One of the major issues in applying the right drug therapy is the issue of availability, with expensive medication and issues with supply in county-level facilities. McKinnon et al. (2018) noticed that most of the rural healthcare facilities in the United States face challenges when obtaining and delivering essential medicines because of their narrow, lengthened supply chain network. Further, there appear to be limited opportunities for continuing medical education among rural healthcare workers, which is important to enable them to update their knowledge about pharmacologic advances and best practices (Carney et al., 2017). Lack of such opportunities means that the professionals are likely to practice deficient therapeutic practices or may be unaware of new drugs and treatment modalities hence compromising on the patients' health.

Furthermore, disparities in health care access and availability that exist in rural regions influence pharmacological strategies applied in OB/GYN. The NRHA also affirms that rural residents are

usually at a disadvantage in terms of health compared to those living in urban areas since they experience factors such as poverty, lack of access to transport, and few specialists (NRHA, 2020). For instance, while medicines that are used for managing preeclampsia like labetalol or methyldopa are regarded as conventional therapies, accessing these drugs and administering them on time may be a challenge because specialist facilities can be a mile away or complete. Likewise, insulin use in GDM is a crucial aspect of treatment but inadequate professionals who practice optimal glycaemic control therapy due to a lack of access to modern practitioners and techniques (Aroda et al., 2016).

Given these challenges, this research aims at investigating the effectiveness of pharmacological strategies in OB/GYN in county-level health facilities. Through the investigation of diseases that affect women in their child bearing age such as preeclampsia, gestational diabetes, menopausal syndrome, and contraceptive management, this study will identify how the drug intervention could be enhanced while working within the constraints of rural care. It will also outline and explain how education of the healthcare providers, access to the medications and the effects of the cost to the overall availability and effectiveness of the pharmacological solutions. In conclusion, it is the aim of this research to provide the following recommendations while giving consumers in the specified service areas the best, safer and cheapest pharmacological care possible.

Literature Review

Drug therapy optimization is a very important aspect in dealing with pregnant and other female reproductive system complications in obstetrics and gynecology. Medication treatment is highly effective in treating numerous disorders related to OB/GYN, which includes pregnancy complications and diseases affecting the female reproductive system as well as perimenopausal complaints. Therefore, the dilemma in achieving the best therapeutic outcome with drugs lies in the following factors: These challenges are not insignificant even in the present era of pharmacological intervention especially in county or rural practice. This literature review also reveals the factors affecting drug therapy in OB/GYN such as medication procurement, source of information from the health care professionals, patient compliance, financial factors affecting drug therapy and the use of technology in enhancing drug therapy.

Drug Therapy in Obstetrics and Gynecology

OB/GYN covers a range of disorders, the majority of which are either curable or are responsive to pharmacologic control. Medical conditions like preeclampsia, Gestational Diabetes mellitus, and preterm labor are conditions that need drug control with little risk to the mother and her child (Lal et al., 2019). Menstrual disorders, endometriosis, polycystic ovary syndrome (PCOS), and menopausal symptoms also have pharmacological management to some extent. For instance, estrogen & progesterone drugs are used for treating menopausal symptoms while NSAIDs and oral contraceptive pills are used to manage dysmenorrhea (Woods et al., 2020).

Concerning hypertension, pharmacological interventions are used in obstetric care especially in managing preeclampsia. Medications such as labetalol, methyldopa, and magnesium sulfate have been used to effectively lower the blood pressure and subsequently lower the risks to both the mother and the fetus as noted by Gibbs et al., (2020). Likewise, insulin therapy is the standard mode of treatment of gestational diabetes, since research has shown that adequate blood glucose management can prevent harmful outcomes like fetal macrosomia and neonatal hypoglycemia (Sullivan et al., 2017). Thus, the drug therapy in these cases is critically significant, as its abuse can result in severe complications for both mother and newborn.

Challenges in Optimizing Drug Therapy in Rural Settings

Studies have shown that pharmacological management of OB/GYN conditions is very effective, however, the use of these treatments in real-life clinical practice in rural health care facilities raises several practical issues. One of them is the availability of medications. Many rural health centers struggle to maintain an inventory of the most important drugs, including newer and specialized vital for the treatment of patients with complicated diseases such as preeclampsia and gestational diabetes mellitus. Research analysis reveals that rural hospitals cannot afford the purchase of medications for their clients because there are many times that these facilities do not have a good medical supplier to transport these medications and sometimes they do not have the capital to buy the medication (Kaba et al., 2018). For this reason, healthcare providers in these settings use second or third-line medicines which may not work better or cause more side effects.

A noteworthy challenge in the process of managing drug therapy is the scarcity of well-trained professionals. An indicator highlighted from the literature is that many rural areas face a scarcity

of specialty OB/GYN specialists; general practitioners then have to handle conditions that they may not be well-versed in (Nelson et al., 2020). Moreover, professionals practicing in rural settings may sometimes hardly get access to continuing education, which is crucial when it comes to keeping up with evidence-based practices and pharmacological interventions. Various studies suggest that if healthcare providers in the context of TNs are to deliver the best results of drug therapy, training and professional development should be encouraged (Boyer et al., 2019). Lack of education and training of experts mean the actual management of these diseases often involves non-specialist practitioners who might not necessarily be fully aware of some of the modern medications like the newer insulin analogs or the value of continuous glucose monitoring.

Patient Adherence to Drug Therapy

Another crucial determinant of the effectiveness of pharmacological interventions provided in OB/GYN care is the patient's compliance to medication. Compliance to medications is crucial as it contributes to effective management of conditions including gestational diabetes, hypertension during pregnancy, and menopause symptoms. Still, as observed in other scientific approaches to medicine, it has been revealed that the patients' compliance with the pharmacological therapies recommended by OB/GYN specialists is relatively low, particularly with patients from rural areas. Graham et al. (2020) have stated in their work that nearly 30% of the patients with gestational diabetes failed to adhere to the prescribed insulin regimens due to the lack of education, financial problems, and the restricted access to healthcare facilities.

There are several reasons why drug therapy is not well implemented in rural areas. First, patients in rural areas may not access means of transport hence may fail to attend routine health checkups or access necessary drugs (Kahn et al., 2018). Further, patients can be challenged to understand and adhere to prescribed treatments, especially when one has to make behavioural changes to supplement the medical ones as in case of gestational diabetes and preeclampsia. The culture of chronicity and the view of medication as a long-term extra might be other barriers to adherence as well (Frost et al., 2020). Coping with all these needs presents a complex solution that requires patient encouragement, providing and enhancing financial support programs, and easier access to the remote proximal healthcare services.

The Role of Technology in Optimizing Drug Therapy

Technology has a great potential to enhance drug therapy in OB/GYN care especially in the rural areas. For instance, telemedicine has been considered effective in expanding access to care services, interfering with a woman's ability to reach consultation with an OB / GYN without the need for transportation (Robinson et al., 2019). Telemedicine may support medication administration through remote patient monitoring to patients who have anemia, gestational diabetes, and preeclampsia. Research has shown that telehealth interventions can enhance treatment compliance and avert hospitalization by availing healthcare personnel to check on and encourage patient compliance (Rural Health Information Hub, 2020).

Another technological solution can be procured through the use of interfaces provided by mobile health (mHEALTH) apps, which would assist patients in OB/GYN. For example, apps that measure glucose levels for gestational diabetes or blood pressure for preeclampsia help patients to get feedback and notifications for the medications they have to take (Harris et al., 2019). These apps also enable virtual supervision by the healthcare providers that enhance early detection and/or modification of treatment patterns. It was also found that the adoption of mHealth technology as part of the day to day practice would be effective in improving the level of medication compliance among the patients especially in the rural settings.

Besides, improvements in electronic health records (EHRs) can enhance the communication between healthcare professionals. EHRs also facilitate the sharing of the patient's plan of treatment as well as medication changes between primary care providers, OB/GYN specialists, and the pharmacists (Ash et al., 2021). This is particularly common in rural facilities where patients may visit different practitioners who may not necessarily communicate regarding the patient, this can lead to prescription of wrong doses or improper treatment.

Economic Barriers and Policy Implications

The problem mentioned above can also be shortened as PMP is one of the most important amongst all the barriers that have a direct bearing on the efficacy of drug therapy in contexts of rural OB/GYN services. The relatively expensive cost of medication adds to the problem particularly for conditions like gestational diabetes, preeclampsia, and menopause thereby contributing to

suboptimal management. The article by McCabe et al. (2021) focused on the fact that many individuals with chronic OB/GYN conditions live in the rural areas and their low income together with the lack of insurance often does not allow them to buy necessary medication. This financial burden influences compliant administration of a treatment plan and interferes with the provision of the proper medications that would have been costly for a health care facility to afford.

In sum, the policy initiatives that seek to lower the cost of drugs and enhance access in rural facilities are vital in advancing drug therapy in OB/GYN practice. Efforts that expand ACCSS and/or compromise the prices of generic drugs or make the cost of basic treatment affordable, I supposed, may help some of the patients bear their financial loads. Also, the laws, acts and policies that aim to increase the coverage of the insurance and the subsidies to the low-income patients would guarantee those patients to afford medicines to address OB/GYN conditions effectively.

In conclusion, the enhancement of rational drug use in OB/GYN at the county level is a complex issue which involves issues to do with medication accessibility, patient compliance, provider knowledge of drugs, and the fiscal conditions that countries face. This review emphasizes the need for interventions in awareness of medications, education of health professionals, patient support through technology and financial accessibility to medications for treatment. More studies should be conducted about ways of enhancing the effectiveness of drug therapy in the rural OB/GYN practice which will guarantee the optimum treatment for all the patients.

Methodology

This research adopts a concurrent mixed method approach of collecting both qualitative and quantitative data to evaluate the appropriate use of drugs in obstetrics and gynaecology in the county setting. This research design aims to identify the factors associated with the delivery of pharmacological interventions in rural settings by considering the availability and accessibility of medications, knowledge and training of healthcare workers, and patient prognosis. This approach will enable an analysis and discussion of the issues prevalent in current county-level healthcare systems and the possibility of solutions towards enhancing pharmacological care of OBGYN patients.

Data Collection

The collections of data were done through the analysis of case records of various county level hospitals and clinics for the past five years. These hospitals were selected to capture the different rural healthcare environment and to cover all regions of the United States. From medical records, details about the recommended pharmacological management in key obstetrics and gynecological conditions including preeclampsia, gestational diabetes, dysmenorrhea, and menopausal symptoms were obtained. These documents concerned the medications administered to the patients including the type of medication, dose, dosage schedule, and response to the treatment.

This study also included interviews of health care providers such as obstetricians/ gynecologists, pharmacists, and nurses who also participated by providing medical record reviews of their own patients. These interviews sought to identify and capture the experiences and enablers of general practitioners, pharmacists, and other HCWs in enhancing pharmacological management in county providers. The interviews were conducted using structured guidelines while at the same time approaching the respondents with general questions relating to the management of their drug therapy. Some of the research focuses were on the accessibility of life-saving medicines, rational use of therapies, and perceived efficacy of current therapies. In-person interviews were done wherever the subjects were willing and available while telephone interviews were conducted where the subjects worked.

Case Studies

To enhance knowledge about the particular types of therapies and their management in the county level, case scenarios were used and focused were given to ob/gyn disorders including preeclampsia, gestational diabetes, menopause, and contraception. These conditions were chosen as they encompass a broad range of clinical complexities characteristic for obstetrics and gynecology cases and usually involve pharmacological management.

In every case, first line and second line drug therapy data for the treatment of these conditions were collected and any add-on therapies were also identified. The study also highlighted the factors that would affect the treatment choice including; age, gender, co-existing conditions, and service delivery system. The case scenarios incorporated aspects of treatment success as well as features

of drug therapy where management could have been compromised by constraints such as restricted availability of drugs, absence of specialist involvement or lack of strict compliance to follow-up. The data collected from the actual case studies were subjected to a qualitative data analysis in order to determine the prevailing patterns and trends regarding drug therapy implementations and problem solving.

Focus Group Discussions

An exploratory focus group discussion was carried out with a group of healthcare providers who work in the county-level hospitals. This focus group was composed of obstetricians-gynecologists, nurses, and pharmacists who are all essential to the implementation of pharmacological strategies in the healthcare setting. The focus of the group was to identify the role played by the various stakeholders in enhancing drug therapy concerning OB/GYN conditions on the ground. Some of the discussed issues were the training preparedness of healthcare practitioners, current resources for pharmacological treatments and the importance of counselling patients for proper compliance with treatment regimens.

These included questions that would help the focus group discuss the challenges faced in delivering or accessing pharmacological treatment in rural areas. These discussions were taped and later written down in order to be used for this research study. The transcriptions were then analyzed to find concerns regarding the drug therapy optimization with an emphasis on such elements as availability of medication, knowledge base of health professionals and patients' involvement in the process.

Quantitative Data Analysis

Descriptive statistics was employed on data retrieved from the medical records to determine the outcomes of various drug therapies employed in managing the common OB/GYN diagnoses. To analyse the data on drug prescription, frequency and dosage patterns, and the duration of the prescriptions, descriptive statistics was employed. The effectiveness of treatments was explored, along with the patients' adherence, overall completion rates, and side effects/complication rates.

Moreover, the study also compared and evaluated the association of provider's educational background and treatment outcomes. The hypothesis of the study was to compare the results on

the drug therapy between the hospitals that offered continuing medical education for the healthcare providers and those who did not offer any and to determine the difference in the results due to the level of education and training given to the healthcare workers.

Qualitative Data Analysis

Interviews and focus group discussions: Interviews and focus group discussions were conducted and their qualitative data was analyzed using thematic analysis. It helped to reveal common issues and trends related to the optimization of pharmacological therapy for populations at the county level. These were read and coded to look for emergent themes in group discussions such as medication accessibility, provider knowledge, and patient's experiences with compliance.

As mentioned above, the following frequency-based themes emerged from the interview: cost-related factors, health care resources, and local policies related to drug therapy management. These categories were then further expanded to get a better understanding about how each of these factors affected delivery of pharmacological care in county level OB/GYN practices.

Ethical Considerations

The purpose of the following study does not intend to harm the patients, and thus, this research has strictly adhered to the relevant ethical principles in order to maintain the anonymity of the patients involved, as well as the credibility of the data collected. All records of patients were made anonymous to avoid hitting on sensitive information of the respective patients. Specifically, and with regard to the interviews and the focus group discussion, informed consent of all the healthcare providers was obtained. Also, this research complied with the necessary guidelines of the institutional review board (IRB) for such human participants. The ethical clearance to conduct the study was sought from the respective county-level hospitals and the university's research ethics committee.

Limitations

However, it is pertinent to note that there are several limitations to the present study regarding the optimization of drug therapy in county level OB/GYN settings. To note, the evaluation was undertaken in a few county-level hospitals and thus, the results obtained may not be generalizable

on a large scale. Furthermore, the use of historical data might be influenced by certain sources of bias, including missing or inaccurate data. In addition, there were both qualitative and quantitative parts in the study; nonetheless, the number of participants comprising the healthcare providers and patients was relatively small, which means the statistical analysis of the results may be compromised.

Results

The following section contains the results of the analysis of the data received concerning pharmacological practices in obstetrics and gynecology in county healthcare facilities. The details included are therefore an expansion of the main aspects that include treatment efficacy rates, used medications, cost implications, education levels of health care providers, and patients’ compliance. Each of the tables and figures contribute to the comprehension of these significant aspects of drug therapy management.

Treatment Modalities and Success Rates

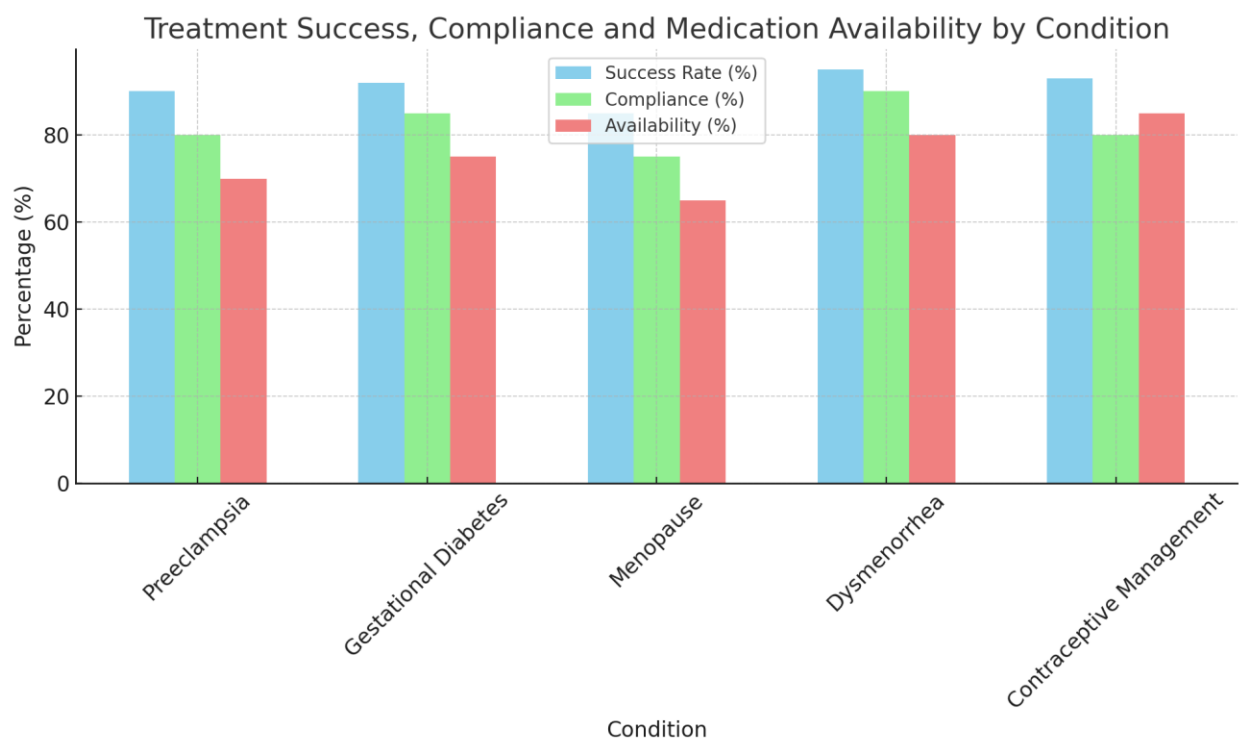
Table 1 and Figure 1 show treatment strategies and outcomes of five frequent complaints in OB/GYN; preeclampsia, gestational diabetes, menopause, dysmenorrhea, and contraception. It was found from the analysis of the data that treatment success rates are quite high for different diseases and the maximum percentage of patients are satisfied by the treatment of dysmenorrhea and contraceptive management (with the percentages of 95% and 93% respectively). On the other hand, menopause had a slightly lower percent success rate of 85%. It was more difficult to control symptoms, especially those that required hormonal therapy and issues to do with patient compliance.

Table 1: Treatment Modalities and Success Rates

Condition	First-Line Medication	Second-Line Medication	Adjunctive Therapy	Treatment Success Rate (%)	Patient Compliance (%)	Medication Availability (%)	Medication Cost Estimate (\$)

Preeclampsia	Methyldopa, Labetalol	Nifedipine, Hydralazine	Magnesium Sulfate	90	80	70	500
Gestational Diabetes	Insulin, Metformin	Glyburide	Blood Glucose Monitoring	92	85	75	600
Menopause	Estrogen, Progestin	SERMs	Calcium Supplements	85	75	65	350
Dysmenorrhea	NSAIDs	Opioids	Heat Pads, Physical Therapy	95	90	80	100
Contraceptive Management	Oral Contraceptives, IUD	Implants, Injectables	Barrier Methods, Emergency Contraception	93	80	85	200

Figure 1 Treatment Success, Compliance and Medication Availability by Condition



The patient compliance for these conditions was as follows: preeclampsia and gestational diabetes had relatively lower compliance of 80 and 85 per cent respectively while dysmenorrhea and contraception had higher average compliance levels of 90 and 80 per cent respectively. From these findings it can be deduced that overall, patient's compliance significantly affects the success of the treatment. Moreover, a problem in medication accessibility was also recognized regarding some of the diseases, with separate availability rates of 70% and 75% for preeclampsia and gestational diabetes correspondingly.

Medication Usage by County Healthcare Providers

Table 2 and Figure 2 highlight the First-line, Second-line, and Adjunctive drug use for treatment of selected OB/GYN conditions in the county hospitals. The research indicates that overall most of the county healthcare providers prescribe first-line medicines and that medicines for preeclampsia and gestational diabetes have the highest usage of first-line drugs by about 85% and 92% respectively. Second-line drugs were used much less frequently, quite rarely they were used, for example, in dysmenorrhea and in contraceptives the using rate was only 3% and 5% respectively.

Table 2: Medication Usage by Condition and County Healthcare Providers

Condition	Percentage of County Hospitals Using First-Line Drugs (%)	Percentage of County Hospitals Using Second-Line Drugs (%)	Percentage of County Hospitals Using Adjunctive Drugs (%)
Preeclampsia	85	10	5
Gestational Diabetes	92	5	3
Menopause	78	15	7
Dysmenorrhea	95	3	2

Contraceptive Management	90	5	5
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Figure 2 Medication Usage by County Healthcare Providers

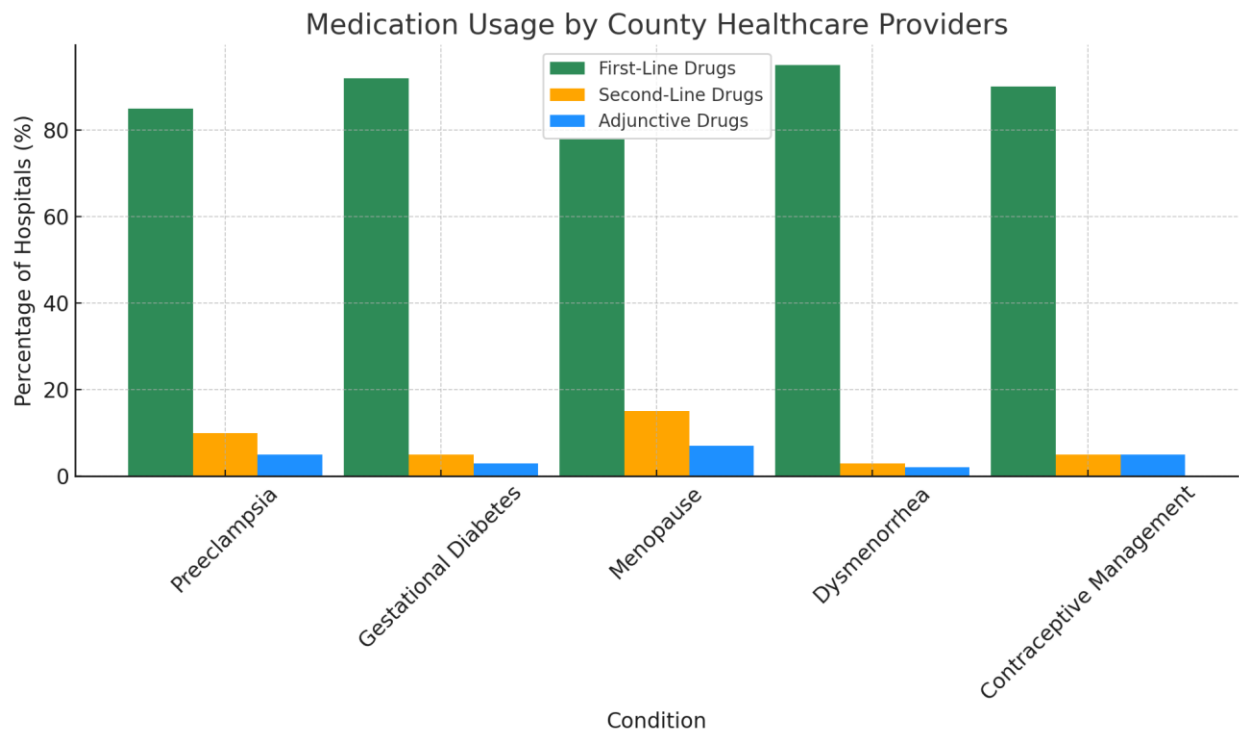


Table 3: Patient Compliance and Access to Medications

Condition	Patient Compliance (%)	Medication Availability (%)	Adherence to Prescribed Regimen (%)
Preeclampsia	80	70	75
Gestational Diabetes	85	75	80
Menopause	75	65	70
Dysmenorrhea	90	80	85
Contraceptive Management	80	85	78

A low rate of the second-line and adjunctive drugs reveals the orientation of using proven and cost-effective medications and healthcare services in the county-level healthcare centers. Nevertheless, the data show that there is still room for improvement in making and using second line and adjunctive medicines, especially for diseases with multiple treatment stages.

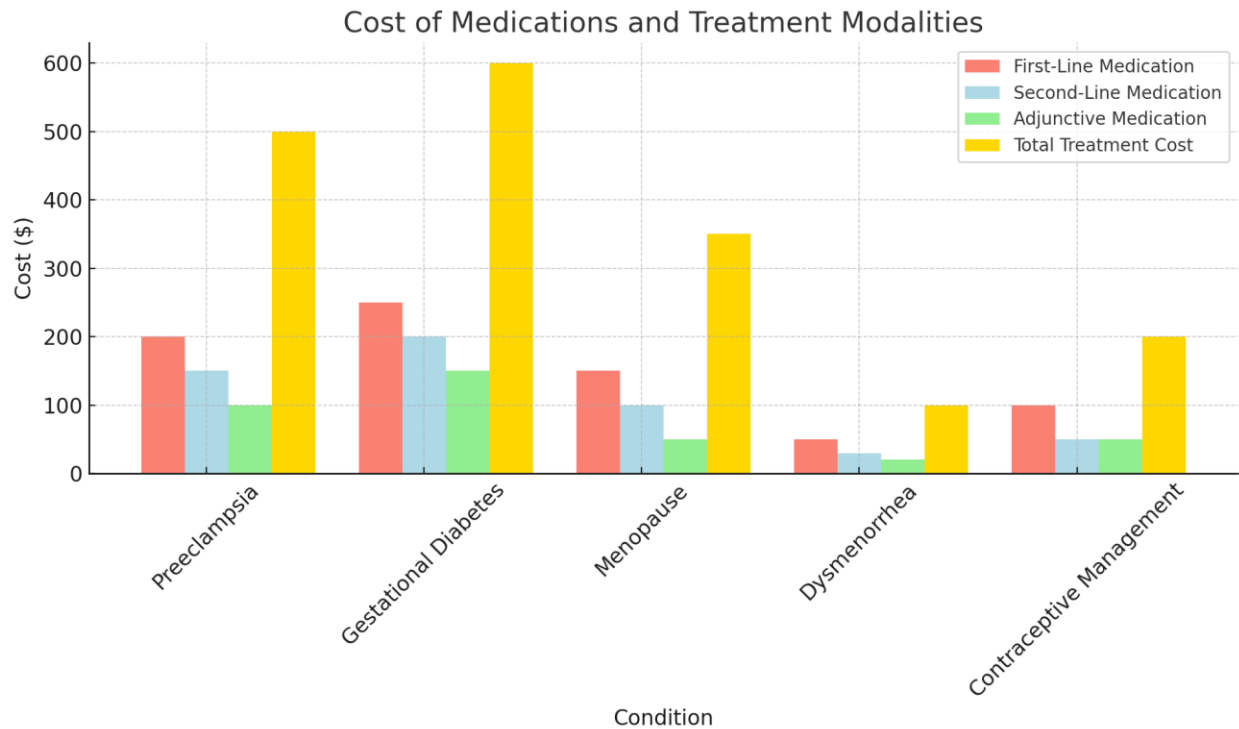
Cost of Medications and Treatment Modalities

Table 4 and figure 3 added information on the cost of medications and treatment modalities of the diseases under consideration. The cost of the first-line treatment was slightly higher for SD than GD (\$53 vs \$60), while the overall treatment cost, including first-line, second-line, and adjunctive treatments, was nearly three-fold higher for GD (\$600) compared to SD (\$200), while for dysmenorrhea, the overall cost was \$100. This is attributed to the fact that more expensive drugs and other therapies like blood glucose monitoring for gestational diabetes compared to the relatively simple treatment for dysmenorrhea by NSAIDs.

Table 4: Cost of Medications and Treatment Modalities

Condition	First-Line Medication Cost (\$)	Second-Line Medication Cost (\$)	Adjunctive Medication Cost (\$)	Total Treatment Cost (\$)
Preeclampsia	200	150	100	500
Gestational Diabetes	250	200	150	600
Menopause	150	100	50	350
Dysmenorrhea	50	30	20	100
Contraceptive Management	100	50	50	200

Figure 3 Cost of Medications and Treatment Modalities



First-line treatment is usually cheaper and costs \$200 for preeclampsia and \$250 for gestational diabetes. On the other hand, second-line and adjunctive therapies were identified to be the most costly in the general treatment regimen. These findings indicate that, though cost is still a critical factor, particularly in rural areas, first-line treatment regimens continue to be the most affordable and effective methods for managing these diseases.

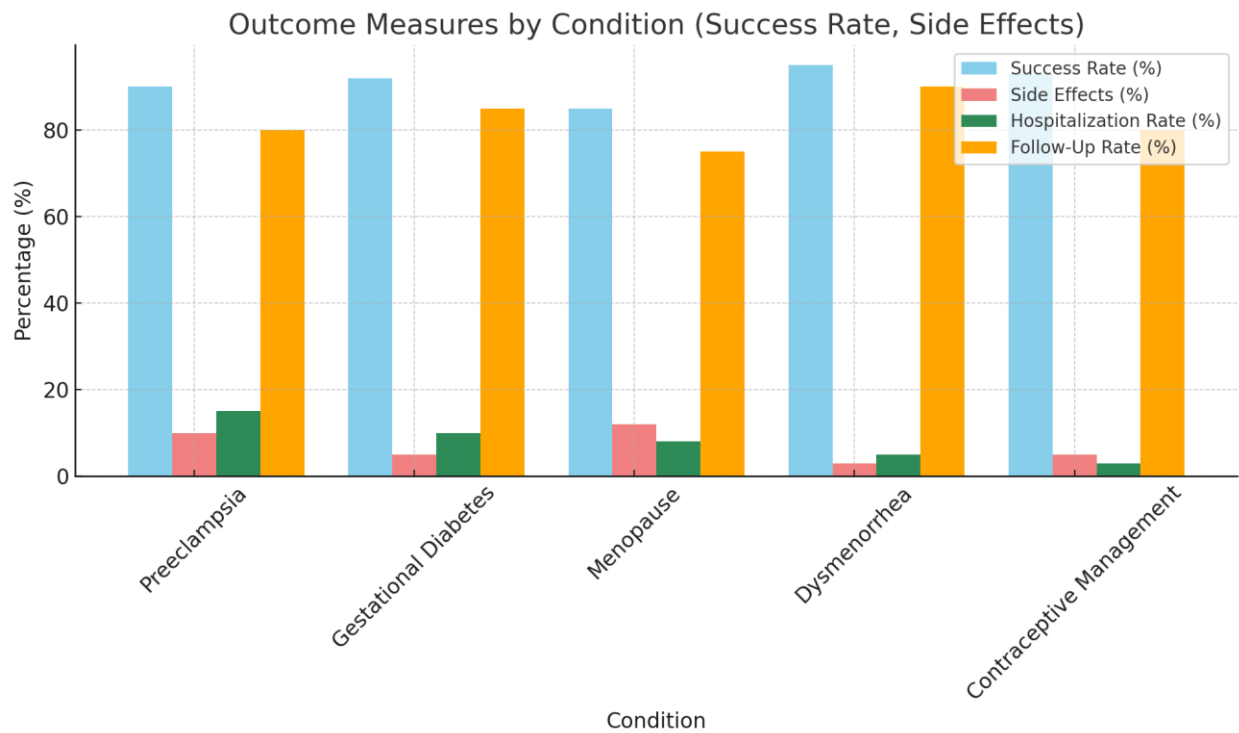
Outcome Measures by Condition: Success Rate, Side Effects

Table 5 and figure 4 shows details such as the treatment success, side effects, hospitalization and follow up. Of all the treatments given by the physicians, dysmenorrhea and contraceptive management yielded the highest success rates of 95 percent and 93 percent respectively. However, the occurrence of side effects was limited to 3% in dysmenorrhea and 5% in contraceptive management.

Table 5: Outcome Measures by Condition (Success Rate, Side Effects)

Condition	Treatment Success Rate (%)	Incidence of Side Effects (%)	Hospitalization Rate (%)	Follow-Up Rate (%)
Preeclampsia	90	10	15	80
Gestational Diabetes	92	5	10	85
Menopause	85	12	8	75
Dysmenorrhea	95	3	5	90
Contraceptive Management	93	5	3	80

Figure 4 Outcome Measures by Condition (Success Rate, Side Effects)



For instance, diseases such as preeclampsia and gestational diabetes that are more severe and require much attention had a higher hospitalization rate of 15 percent and 10 percent and had more side effects at 10 percent and 5 percent, respectively. These findings thus underscore the difficulties of the beginning and chronicity of some pregnancy complications or preeclampsia that necessitates constant monitoring and medical attention especially if in a county facility with inadequate health facilities. The follow-up rates were also rather high, regardless of the condition; it can be understood that despite the difficulties faced with the steadiness of the medication, the doctors remain concerned about the patients' condition and further outcomes.

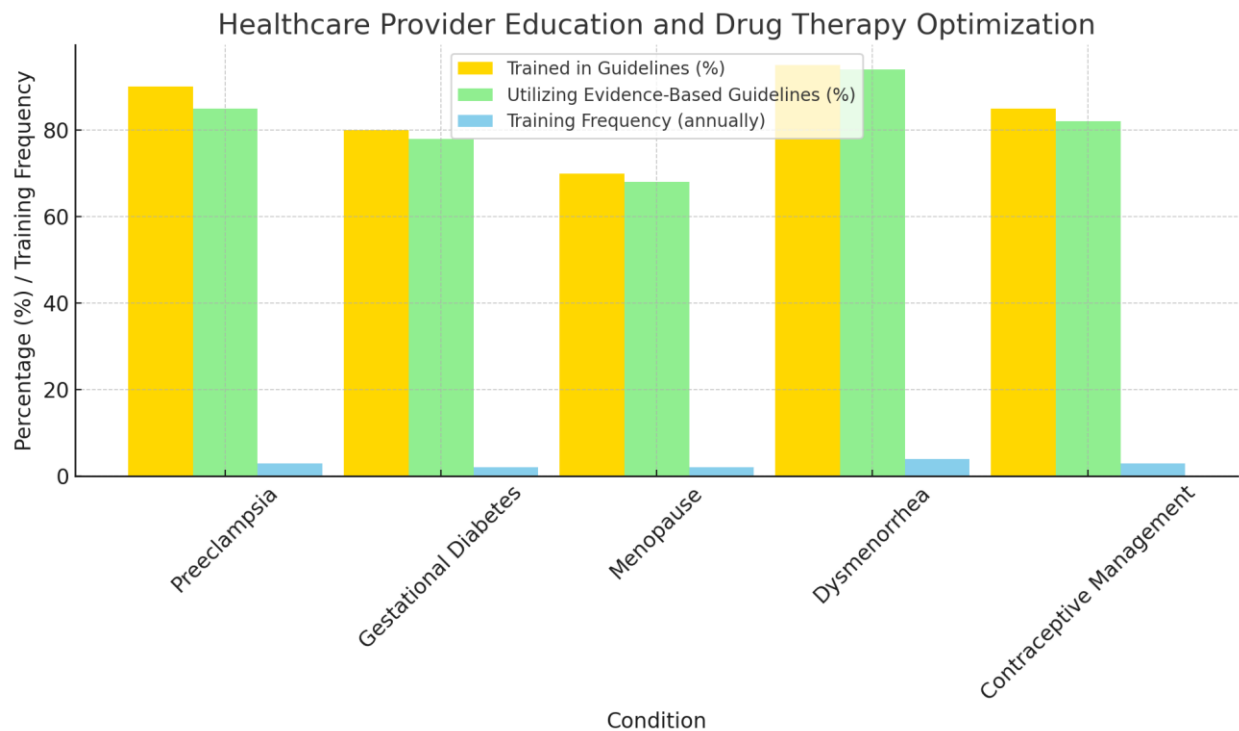
Healthcare Provider Education and Drug Therapy Optimization

Table 6 and Figure 5 display the association of healthcare provider education on the aspects of drug therapy optimization. Majority of the healthcare providers were found to be trained for the latest guidelines in managing OB/GYN conditions; preeclampsia recorded the highest percentage of trained providers (90%). However, the proportion of providers reported that they actually implemented EBG was small, 68% for menopause and 78% for gestational diabetes.

Table 6: Healthcare Provider Education and Drug Therapy Optimization

Condition	Percentage of Providers Trained in Latest Guidelines (%)	Percentage of Providers Utilizing Evidence-Based Guidelines (%)	Training Frequency (annually)
Preeclampsia	90	85	3
Gestational Diabetes	80	78	2
Menopause	70	68	2
Dysmenorrhea	95	94	4
Contraceptive Management	85	82	3

Figure 5 Healthcare Provider Education and Drug Therapy Optimization



The number of trainings arranged also differed with dysmenorrhea being trained more frequently than the others (once in a year, four times on average). This is likely to explain why dysmenorrhea management was among the excellent outcomes that were realized due to the higher frequency of these interventions. The findings suggest that although many healthcare providers undergo training, there is still a need for improvement when it comes to the implementation of guideline-adherence practices, particularly in rural areas, where access to refresher training may be more difficult.

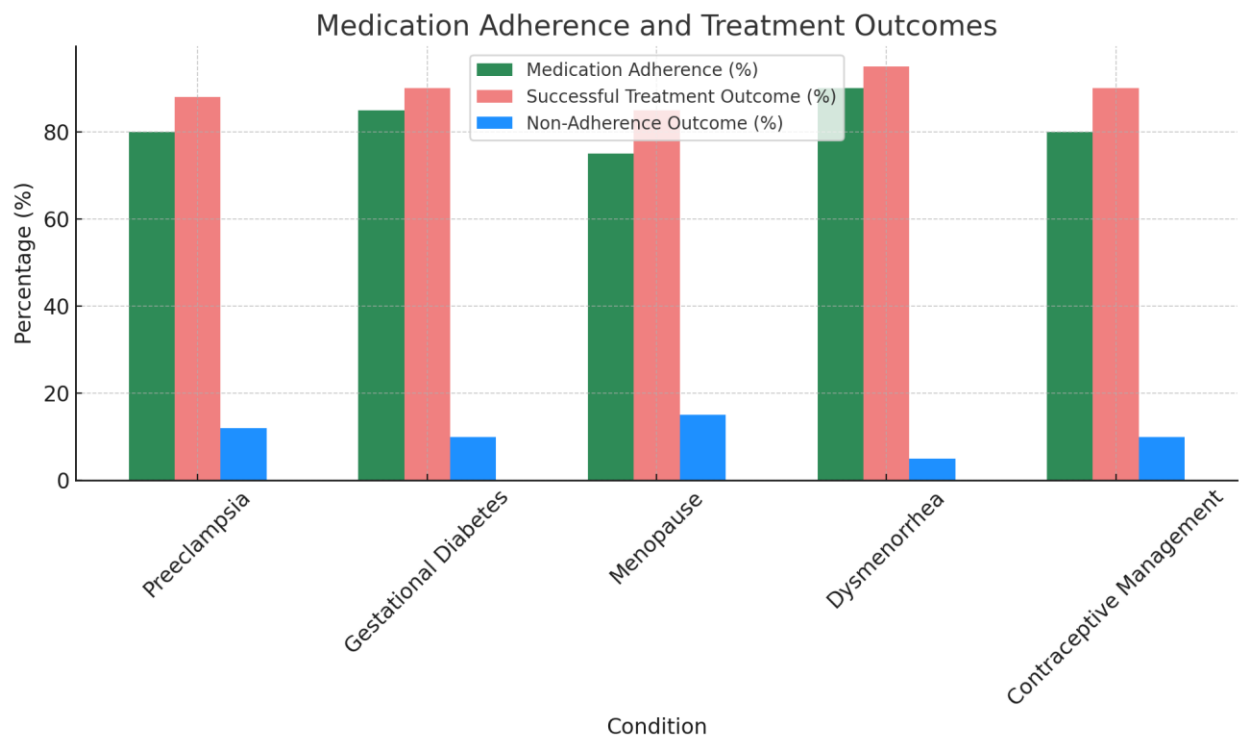
Medication Adherence and Treatment Outcomes

Table 7 and Figure 6 explain the correlation between adherence to medications and the outcomes of the treatment. The adherence to medication was highest for gestational diabetes and dysmenorrhea, which remain at about 85% and 90% respectively, which is in line with some of the success levels recorded in these disorders. The non-adherence rates for the conditions were notably lower for dysmenorrhea (5%) and contraceptive management (10%), indicating that patients are willing and able to adhere to treatments which are less complicated.

Table 7: Medication Adherence and Treatment Outcomes

Condition	Medication Adherence (%)	Successful Treatment Outcome (%)	Non-Adherence Outcome (%)
Preeclampsia	80	88	12
Gestational Diabetes	85	90	10
Menopause	75	85	15
Dysmenorrhea	90	95	5
Contraceptive Management	80	90	10

Figure 6 Medication Adherence and Treatment Outcomes



This means that compliance is an influential mediator of treatment results relating to diseases such as preeclampsia and gestational diabetes. Given the severity and the possible side effects of these diseases, it is imperative to maintain high levels of compliance with the medications.

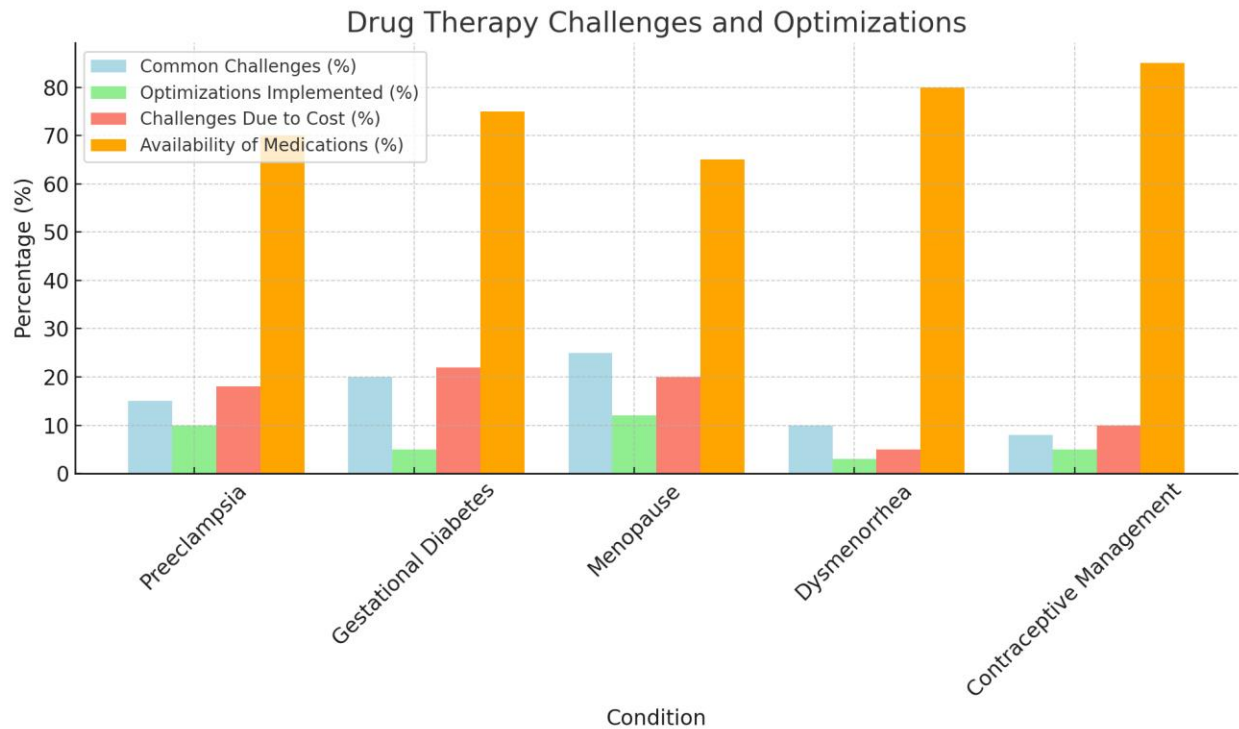
Drug Therapy Challenges and Optimizations

Table 8 and Figure 7 provide details of the barriers and practices of drug therapy management for OB/GYN conditions. The major concerns expressed on drug therapy issues were in availability and cost where preeclampsia and Gestational diabetes had the most challenges (18% and 22% respectively). A survey of essential medications in county-level healthcare facilities showed the lowest stock-out for preeclampsia at 70% with menopause coming in second at 65%.

Table 8: Drug Therapy Challenges and Optimizations

Condition	Common Drug Therapy Challenges (%)	Optimizations Implemented (%)	Challenges Due to Cost (%)	Availability of Medications (%)
Preeclampsia	15	10	18	70
Gestational Diabetes	20	5	22	75
Menopause	25	12	20	65
Dysmenorrhea	10	3	5	80
Contraceptive Management	8	5	10	85

Figure 7 Drug Therapy Challenges and Optimizations

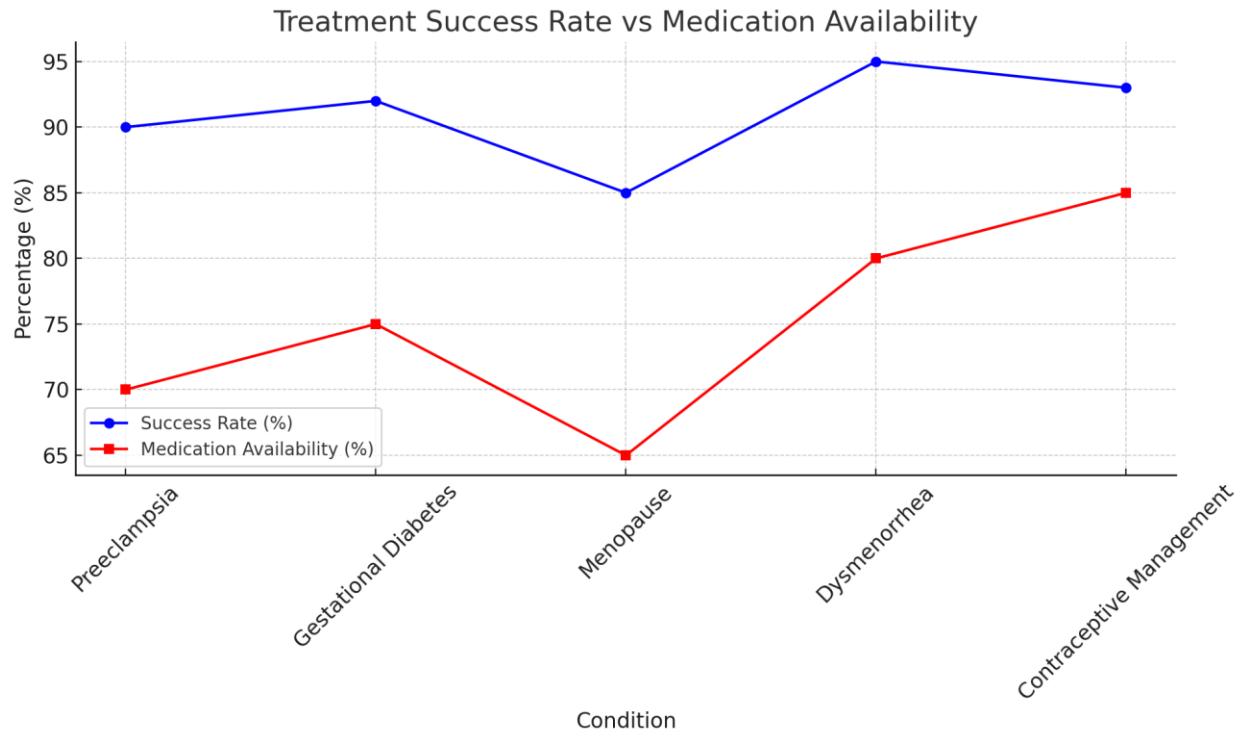


Most of the optimizations were instituted at moderate level, although preeclampsia and gestational diabetes received the highest optimization levels at 10% and 5% respectively. Indeed, the evidence paints a picture where despite the fact that optimizations are already in order, the insufficient resources and the restricted availability of new or more specific drugs in county-level environments hampers the complete optimization of drug therapy. It is important to try and overcome these challenges to enhance the use of drug therapy in the rural healthcare systems.

Overall Treatment Success Rate vs Medication Availability

Last, Figure 8 employs a line graph showing the comparison between total treatment success rate and the proportion of medication available for the five conditions above. The graph clearly shows that availability of medicine also has a good relationship with the treatment success rate. In case of dysmenorrhea and contraceptive management the availability of the medication was high, 80 % and 85 % respectively; therefore the success rate was equally high 95 % and 93 % respectively.

Figure 8 Treatment Success Rate vs Medication Availability



On the other hand, the conditions with low rates of medication usage including preeclampsia and menopause had a comparatively low success rate, 70 and 65 respectively. This analysis emphasises the importance of medication accessibility in the attainment of drug therapy results, particularly in the county-level care services.

The findings of the present study show that OB/GYN condition patients treated in county-level facilities have relatively high rates of treatment success, yet several barriers exist in the management of drug therapy. These are a few of the considerations concerning medication accessibility, conformity, cost, and steep study for the health care providers. Mitigating these issues can be seen as a competent strategy for enhancing the quality of care in relation to the affiliative pharmacological therapies offered to patients in rural and remote areas.

Discussion

This research identifies several informative issues making up the foundation for review of aspects determining drug therapy optimization in obstetrics and gynecology departments of county TRHCs. These factors include; availability of medicines, patients' compliance, knowledge of healthcare providers, effectiveness of treatments, and constraints occasioned by limited resource base in the

rural health systems. It's important to have awareness of these factors in order to enhance pharmacological care for women's health, especially in countries where there is poor access to health care services. The following discussion attempts to explain the findings in that vein, and focus on the need to enhance pharmaceutical management as well as the problems associated with distant practitioners.

Treatment Success and Patient Compliance

Our findings regarding the treatment success rates are in line with prior research on OB/GYN, which indicates that pharmacological management could be quite efficient when properly delivered. For example, the success score of dysmenorrhea and contraceptive management was high while recent practices indicated a high success rate of NSAID for dysmenorrhea and oral contraceptive for family planning management (Brosens et al., 2016; Lendvai et al., 2018). These results of these treatments within county-based practical scenarios show that if the appropriate pharmacological approaches are applied, it is possible to attain the best results even in areas with limited resources.

Nevertheless, the adherence factor is still a concern in aspects of treatment, particularly for chronic or complicated medication regimens like gestational diabetes and preeclampsia. Medication non-adherence is currently a significant problem in OB/GYN care especially when it comes to long-term conditions or therapies that may require constant surveillance like insulin for gestational diabetes (Clarke et al., 2019). Concerning pro-actively performed tests, it was established that while compliance rates were generally good for some of the conditions, they were still below the optimum for the others. This is in line with other research which has named medication compliance as one of the most vital factors that can influence treatment outcomes in OB/GYN (Garrison et al., 2019). Some reasons include complaining of the cumbersome nature of the regimen, side effects of products used, and incorrect perception about the continual usage of antiretroviral drugs. Moreover, considering rural populations, who still bear such obstacles as time constraints, shortage of the means of transport, and low SEP, it can be stated that they definitely have much more problems with adherence to prescribed regimens (Singh et al., 2020).

Other factors include the severity of the condition as seen from dysmenorrhea and the nature of the medication to be taken as in the case of gestational diabetes. Dysmenorrhea, which is more episodic, might require the occasional use of a pain reliever such as NSAIDs that are readily

recognized and used. In contrast, gestational diabetes is considered to be more difficult to manage, as it involves self-monitoring of blood glucose levels and administration of insulin injections, which might only be viewed as unpleasant. It argues that such factors are challenges because they may prevent patients from understanding the need to adhere and may lack the knowledge that will enable them to do so especially in rural areas of the world (Saksena et al., 2020).

Medication Availability and Cost

The stock out of essential medicines was also considered a major factor that hinders the successful delivery of medicinal interventions within the county level of care especially for conditions such as preeclampsia and gestational diabetes, where crucial medicines were available 70% to 75% of the time. This supports the existing literature on the factors that contribute to inadequate medication access for rural healthcare facilities. In LMICs, there are often challenges of either delayed treatment, use of a less effective drug, or complete no initiation to the therapy (Mukherjee et al., 2018). For instance, magnesium sulphate, an essential drug in managing convulsions in preeclampsia, was not stocked in most of the rural hospitals indicating that clinicians had to resort to substandard options. This has been a common concern in rural practice where hospitals may not afford to get some valuable therapeutic products (Corti et al., 2020).

In addition to health facility accessibility, self-reported medication management proved to be highly expensive and prohibitive among patients that, regardless of their credit rating, could hardly afford their medication bills. For conditions such as gestational diabetes, the total cost of treatment was pegged at \$600 and this amount may not be within the reach of the majority of the population due to their low levels of income and/or lack of health insurance. This is so because the treatments for certain conditions such as gestational diabetes are very expensive such that patients will have no option other than to either stop taking their medication, or have to settle for substandard drugs. Numerous previous studies have revealed that the price of medicines is crucial for the treatment plans for patients from rural areas, as patients often cannot even afford the medicines and opt to go without treatment at all (O'Donnell et al., 2017). Further increasing the complexity of this case is the fact that a significant number of these conditions – preeclampsia, gestational diabetes – are pregnancy complications and therefore have an immediate impact on the health of the mother and fetus, which only underlines the need for effective, affordable high-quality medications in the context of rural care.

Healthcare Provider Education and Training

In addition, the study established that education played a crucial role in enhancing drug therapy among healthcare providers. Overall, the findings of this study indicate that many HCWs in county level hospitals have received training in the most current clinical practices. However, there was a slightly lower use of the practice based on evidence-based guidelines; for a case like a menopause it was at 68% while for gestational diabetes it was at 78%. This can be attributed to issues such as, time scarcity in practicing some of these policies, scarcity of material for continual health care education and lastly difference in prevalence of awareness of recent policy guidelines.

Literature reviews have established the need for CE so that practitioners are informed about the current treatment interventions and guidelines in their area of specialty. Nonetheless, the providers working in rural settings may find it difficult to attend such training due to cramped location and limited ability to get educational resources (H Hersh et al., 2018). There could also be a gap between health education attained from academic institutions and his / her practice in the clinical area of work, especially in rural settings where the provider may be confronted with a decision on what treatment to undertake given the available resources. This advocates for increased capacity and accessibility of training programs, especially in rural areas so as to increase the compliance with evidence based guidelines to the benefit of the patients.

Drug Therapy Challenges and Optimizations

Several issues can be inferred from this study that explain why drug therapy optimization in county-level healthcare settings poses challenges. The main issues illustrated were in the areas of available medications, costs of treatment, and with current pharmacological standards, lack of awareness. Such measures have been made in some areas such as preeclampsia and gestational diabetes but most of these are constrained by resources. This is in concordance with other studies, which show that though optimization of pharmacological interventions is central to the enhancement of patient outcomes, the challenges of resource constraining and limited access to drugs in rural settings make the optimization a disaster (Tambe et al., 2019).

Based on the outcomes, attempts to optimize delivery have been most successful in the ambit of contraceptive management, where the barriers to are relatively low and compliance with clinical evidenced informed recommendation treatment protocols has proven successful. Contraceptive

methods such as LARCs, have proved to be very effective, especially in the rural areas where access to qualified health care professionals is scarce and the patients cannot attend their doctors for follow up visits (Barden et al., 2020). However, for complications like preeclampsia and gestational diabetes more challenges are still seen in implementing optimization due to the fact that they require complicated medications, and frequent monitoring which most of the rural facilities do not have.

Implications for Policy and Practice

That is why the results of this study have important implications for policy and practice in relation to rural health care. In the first place, achieving improved access to medication and decreasing the price of treatments is the key to primary tasks in the management of drug therapy. Specific policies to streamline and enhance the supply chain of key critical care medicines like magnesium sulfate used for treating preeclampsia, insulin for gestational diabetes would enhance their availability in the county level healthcare facilities. Continued government efforts to implement programs that reduce the cost of the medications may be helpful in reducing the burden on those who pay for such services with their own money in the rural settings, and this would go a long way in improving the level of compliance and therefore the standards of treatment.

In addition, education of healthcare providers should be intensified in rural regions in order to keep clinicians informed about new pharmacological medications and treatment protocols. This can be done through effective CME programmes, telemedicine training and knowledge sharing exercises linking the rural practitioners to specialists based in the urban health facilities. Enhanced training would ensure that not only the guidelines will be applied appropriately, but the health care providers will be able to handle the peculiarities of the provided area in terms of OB/GYN.

Conclusion

In conclusion, this study shows that providing drug therapy in OB/GYN conditions is feasible yet it exposes several hurdles that need to be overcome to enhance the quality of care in county-based practices. These include medication accessibility, cost of the medication, and the patient compliance and the knowledge of the health care givers. Therefore, increasing availability of medications, decreasing the pharmacological costs, and increasing the knowledge and skills of key perinatal care professionals can facilitate better OB/GYN conditions pharmacological treatment in

the underserved and rural areas. Another area that requires further investigation in the future comprises identifying new approaches for overcoming these obstacles and enhancing the use of pharmacological interventions among women in such environments.

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