

LABORATORY SERVICES FOR PREGNANT WOMEN IN A MATERNITY HOSPITAL: A STUDY

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

By

Swarandeep Kaur

Under the Supervision and Guidance of

Dr Nutan P. Jain

2024

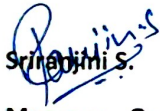
Dated: 03rd July 2024

CERTIFICATE

This is to certify that Dr. Swarandeeep Kaur in partial fulfilment of requirements for the award of the degree of MBA (Hospital and Health Management) from IIHMR University, Jaipur has successfully completed her internship at Cloudnine Hospital, Kanakpura Road during 01st April 2024 to 01st July 2024.

For Cloudnine

(A unit of Kids Clinic India Ltd.)



Srirajini S.

Manager - Operations
KIDS CLINIC INDIA LIMITED
No. 766&767, Narayana Nagar 1st Block,
Doddakallasandra Village, Kanakapura Road,
Bengaluru - 560 062.

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Laboratory services for pregnant women in a maternity hospital: A study** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

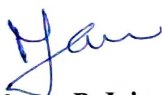
Swarandeeep Kaur

Dr. Swarandeeep Kaur

Date – 06/07/2024

CERTIFICATE

This is to certify that dissertation titled **Laboratory services for pregnant women in a maternity hospital: A study** is a record of the research work undertaken by Dr.Swarandeeep Kaur in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and ~~his~~[✓]her approach to the research study has been sincere, scientific, and analytical.

**Dr. Nutan P. Jain****IIHMR University, Jaipur****Date:06/07/2024****Dr. Sanjay Gupta****IIHMR University,Jaipur****Date: 06/07/2024**

Acknowledgement

I want to extend my sincere gratitude to everyone who helped finish this thesis titled **Building continuum of laboratory services for pregnant women in a maternity hospital: A study**. I would like to pay sincere regards to my faculty guide **Dr. Nutan P. Jain**, for her constant guidance and motivation during my dissertation. Secondly, I want to thank my industry mentors, **Ms. Sriranjini S. and Mr. Tej Singh Raypuria (Operations Manager & Unit Head respectively)** for the best learning opportunity any student can get.

I would like to thank my family and friends for their unwavering support and encouragement throughout the MBA curriculum. Thank you to all who have contributed directly or indirectly to the completion of this thesis. Your support is deeply appreciated. Finally, I would like to say cheers! To every one of my cherished batchmates for completing MBA with flying colors and for the lifetime friendships we have fostered over the past two years.

Dr. Swarandeeep Kaur

Table of Contents

Contents	Page No.
List of Figures	8
List of Tables	8
Abstract	9
Chapter 1: Introduction	10 - 11
Chapter 2: Literature Review	12 - 13
Chapter 3: Methodology	14 - 17
Chapter 4: Result	18 – 24
Chapter 5: Discussion	25 – 26
Chapter 6: Conclusion	27
References	28

List of Figures

Figure	Page No.
1. Figure 1: Two types of lab services	18
2. Figure 2: Organization follows the sample collection process within the Hospital in the following manner	18
3. Figure 3: the organization follows the home sample collection process in the following manner.	19
4. Figure 4: Week-wise Distribution of Laboratory services to the Pregnant women by its types (hospital or homebased)	20
5. Figure 5: Lab staff awareness of the SOPs and its' adherence	21
6. Figure 6: Patient Satisfaction with Laboratory Services (n=40)	22

List of Tables

Table	Page No.
1. Table 1: Current status of the laboratory services prescribed and availed by its types	20
2. Table 2: Difference in results between 2 months before and after	21

Abstract

Introduction

During pregnancy, laboratory services play a crucial role of diagnosing the health status of both mother and foetus in order to avail appropriate intervention. Nevertheless, some gaps in current practices work as a barrier to the achievement of the best standards in service delivery. Thus, the quality of care provided to patients is affected. The purpose of this research is to investigate these problems systematically and make recommendations on the same.

Objective

The study will therefore aim at evaluating the status of laboratories in the selected maternity hospital, potential problems affecting them and providing strategies for improvement.

Methodology

Evaluating this study will require a cross-sectional observational study design by including the review of guidelines, interviews among laboratory staff, and self-administered questionnaires among laboratory service availing women.

Key Results

It will compare the level of adherence to the guidelines and the models of service delivery that are either hospital or home based and usefulness, satisfaction and acceptability by the patients. SWOT analyses are constructed to point out the strength, weaknesses, opportunities and threats of the current provision of services.

Conclusion

Since the communication, implementation of tests, reporting, and follow-up of laboratory services can pose challenges to the maternal foetal medicine service delivery, this work will improve the quality of prenatal care. Examining the main advancements of better communication, technology usage and process integration thinking, it is necessary to meet increasing concern of maternity to attain timely and accurate laboratory services.

Chapter – 1: Introduction

The focus of the study is to improve the laboratory on service delivery to pregnant woman in a maternity hospital, acknowledging the importance of laboratory in prenatal care. Laboratory services help in determining the condition of the pregnancy, pregnant women, and complications hence monitoring the well-being of the mother and foetus. This being so, in the current society most maternity hospitals still encounter difficulties in the provision of efficient laboratory services. The objective of this research is to establish these challenges and come up with recommendation that can enhance the quality and efficiency of these services.

This is currently a major issue as the laboratory service delivery in the maternity hospitals is defective and inefficient. Several challenges related to the prenatal diagnostic services include inadequate time to get results, poor communication between laboratory staffs and clinicians, and absence of the state-of-the-art diagnostic instruments which hamper the proper care of women during pregnancy. These inefficiencies may result in late diagnosis and treatment hence have adverse effects on the health status of the patient. The current system has also been noted to fall short of supplying the growing need for laboratory services, thus worsening these problems.

One of the biggest fears is laboratory test result's waiting time and it results from staff shortages, old technology, and poor processes. Such lags may lead to complications associated with the mother and the foetus. Especially, different staff members' perceiving of laboratory results often failure to coordinate with clinical providers' expectations, as well as misinterpretation of test data and treatment delay. Insufficient diagnostic equipment and reliance on low technological solutions in most cases hinder the efficiency of the processes and require sending tests to other labs, which inevitably contributes to delayed outcomes.

There is nothing for improvement in this statement. The efficient laboratory services are crucial in a high activity and culturally diverse Maternity Hospital. They are needed for timely

diagnosis and intervention measures such as gestational diabetes, preeclampsia, and infections. This in turn implies that poor services prolong the time taken in diagnosing and treating diseases hence compromising the health of the woman and her unborn child.

There are several reasons why outpatient laboratory services can help increase patient satisfaction, establish credibility in the healthcare institution, and guarantee that patients receive quality treatment. When certain tests are conducted and results produced, doctors and other personnel are able to make the right clinical decisions that will benefit the patient's care and smooth running of the health institution.

Chapter – 2: Literature Review

Authors (Year)	Study Location	Sample Size	Sampling Techniques	Salient Features
Rao et al. (2018) “Impact of Laboratory Service Delays on Prenatal Care in Delhi.” <i>Journal of Maternal Health</i>	Delhi	300	Random sampling	Investigated the impact of laboratory service delays on prenatal care. Found significant correlations between delayed lab results and adverse outcomes.
Singh & Gupta (2019) "Communication Gaps Between Lab Staff and Healthcare Providers in Mumbai." <i>International Journal of Clinical Practice</i> , 33(7), 345-352.	Mumbai	250	Stratified random sampling	Analyzed communication gaps between lab staff and healthcare providers. Highlighted the need for standardized communication protocols.
Kumar et al. (2020) "Advanced Diagnostic Technologies and Lab Service Efficiency in Chennai." <i>Clinical Laboratory Innovations</i> , 28(2), 89-97	Chennai	500	Convenience sampling	Examined the role of advanced diagnostic technologies in improving lab service efficiency. Recommended the adoption of point-of-care testing (POCT).
Patel et al. (2021) "Patient Satisfaction with Lab Services in Bangalore." <i>Healthcare Quality Journal</i> , 15(5), 412-420	Bangalore	200	Systematic sampling	Assessed patient satisfaction with lab services. Found that timely results and professional staff behavior

				are key to high patient satisfaction.
Sharma & Mehta (2022) "Barriers to Efficient Lab Services in Kolkata." <i>Public Health Reports</i> , 137(1), 50-59.	Kolkata	400	Cluster sampling	Explored barriers to efficient lab services, including equipment shortages and inadequate staffing. Suggested increasing investment in lab infrastructure.

Chapter – 3: Methodology

This chapter include questions addressed, the study design, the context or setting of the study, the population of interest, the methods employed, the sample size, the type of sampling used or the sampling frame, the instruments of data collection, definitions of key or operational variables, analytical techniques, qualitative data collection methods, and consideration of the research's ethical implications.

3.1: Research Questions

1. What are the guidelines, and standard operating procedures of the laboratory services for pregnant women?
2. What is the current status of availing laboratory services?
3. What are the facilitating and hindering factors for availing the laboratory services by its type?

3.2: Objectives of the Study

1. To review the guidelines and standard operating procedures of the hospital laboratory services meant for pregnant women.
2. To study of the current status of laboratory services availed at the hospital or at home.
3. To study the strengths, weakness, opportunity and threats (SWOT) of the Laboratory Services at the hospital.
4. To develop strategies to enhance the laboratory services both in-house (hospital based) and home sample collection services.

3.3: Study Design

It is a Cross-Sectional Observational Study (Mixed-Methods)

3.4: Study Setting

The study was carried out in a 50 bed maternity hospital in India catering to pregnant women and has an increased need for laboratory investigations in pregnancy on account of their medical complications.

3.5: Study Respondents

The study respondents include:

- Clients, who are pregnant women going for treatment at the maternity hospital
- Employees and workers of the laboratory of the maternity hospital

3.6: Study Procedures/Approaches

1. Quantitative Assessment

Sample Size Calculation: The actual prenatal care examinee population is estimated 400 pregnant women based on the pilot study calculated using the sample size formula for a 95% confidence level with a 5% error margin.

$$n = Z^2 * p * (1-p) / E^2$$

Where:

- n = required sample size
- Z = Z-score corresponding to the desired confidence level (for 95% confidence level)
- p = estimated proportion of the population
- E = margin of error

Data collection methods and tools:

- Review of conversion data sheet
- Review of the Hospital feedback form
- In-depth interviews with the laboratory staff
- Exit interview with pregnant women who had availed the lab services

Operational Definitions

- Guidelines and SOPs: Evaluated by the existence documented of processes within the services while the awareness of service provision and compliance to those processes as documented in the laboratory services.
 - Current status of laboratory services availed at the hospital or home sample collection.
 - Facilitating Factors: Factors that increase the productivity of lab services.
 - Hindering Factors: Challenges that inhibit optimization of the utilization of the laboratory services.
2. Qualitative Methods: Thus, thematic analysis is used to analyse the qualitative data received during the interviews and consider features of the Lab services.

3.7: Ethical Considerations

1. Informed Written Consent: All participants give and document their written informed consent before the study. They understand the objective of the study, the activities to be carried out in the study and their liberty to opt out of the study at any given time without any explanation required.
2. Voluntary Participation: There is no force in encouraging the participants to participate in the study nor are there any offers of any incentives given, which maintains ethical soundness.
3. Data Security and Confidentiality: To ensure that the privacy of the participant data is protected measures are put in place. The names of participants are not included and data is kept very secured in password protected files and only the research team can access them thus avoiding compromised data.

3.8: Lab Tests frequently prescribed to pregnant women

1. Preconception Counselling

- TSH, HbA1C, Vit. D

2. After Pregnancy confirmation

- Category 1: Beta HCG
- Category 2: Beta HCG, TSH, HbA1C

- Category 3: Beta HCG, TSH, HbA1C, Coagulation Profile (Bleeding Time, Clotting Time, PT/PTT/INR)

3. Trimester Wise Test

- 1st Trimester: CBC, TSH, HbA1C, Urine Culture, Clotting Time, Serology, Thalassemia.
- 2nd Trimester: Double Marker/Triple Marker, Oa77
- 3rd Trimester: CBC, TSH, Urine Analysis, +/- Serology

Chapter 4: Results

The results of the study for increasing the availing laboratory services for pregnant women in a maternity hospital are outlined in this chapter. Hence, this section is presented the framework (organization guidelines and standard operating procedures), current status of the laboratory services, strengths, weakness, opportunity an threat, and the alternative strategies accordingly.

Guidelines and standard operating procedures of the hospital laboratory services meant for pregnant women

Figure 1: Two types of lab services

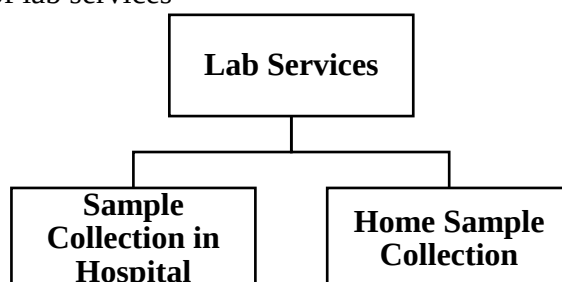


Figure 2: Organization follows the sample collection process within the Hospital in the following manner:

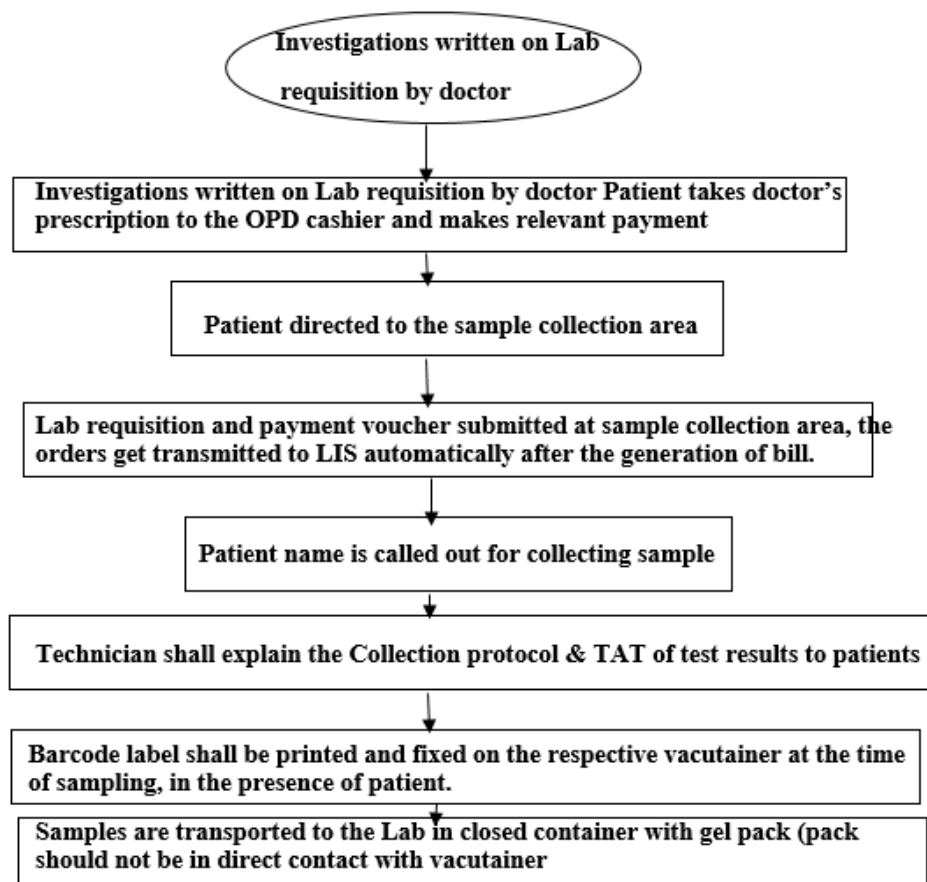
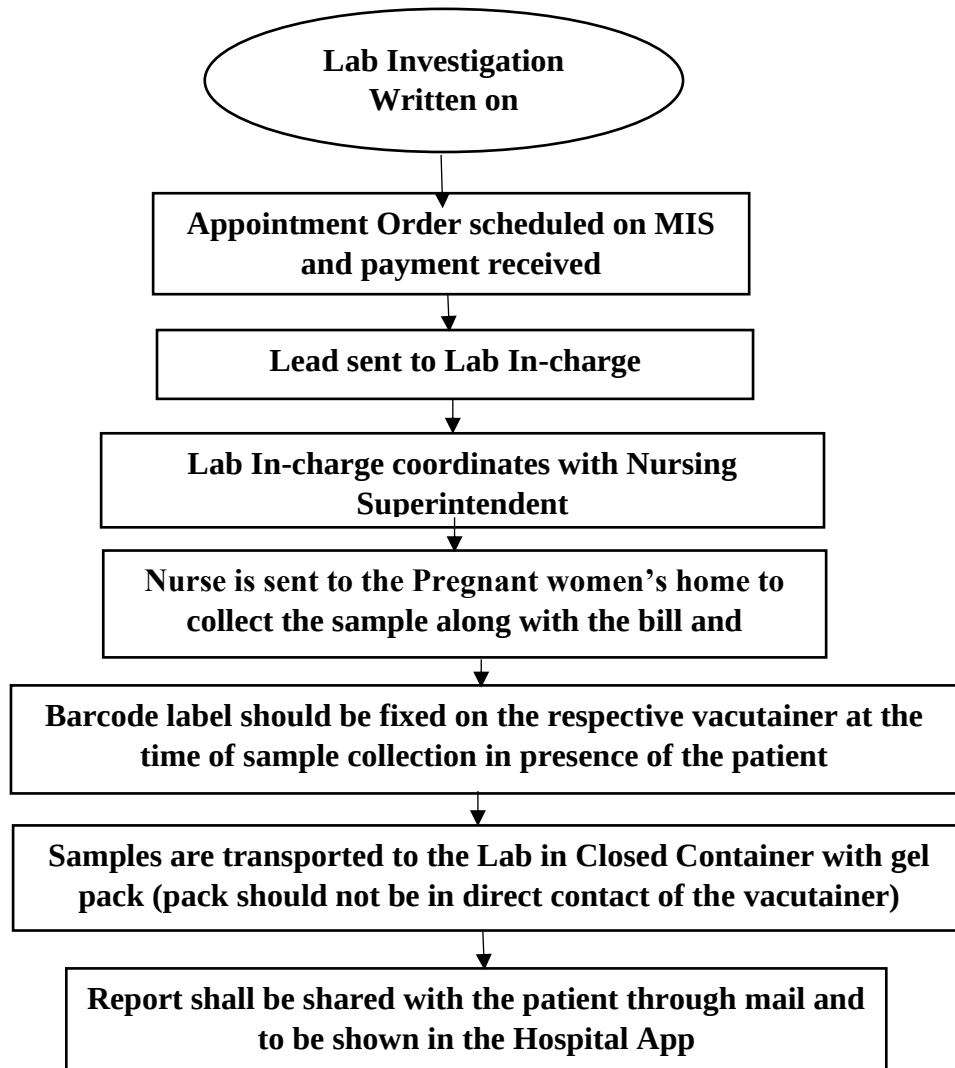


Figure 3: the organization follows the **home sample collection** process in the following manner.



Delivery of Lab Investigations Reports for both Hospital collection and Home Sample Collection

- For Sample Received before 1: 00 pm, the report is issued before 5:00 pm
- For Sample received after 1:00 pm, the report is issued next day by 12:00 pm

Current status of laboratory services availed at the hospital or at home.

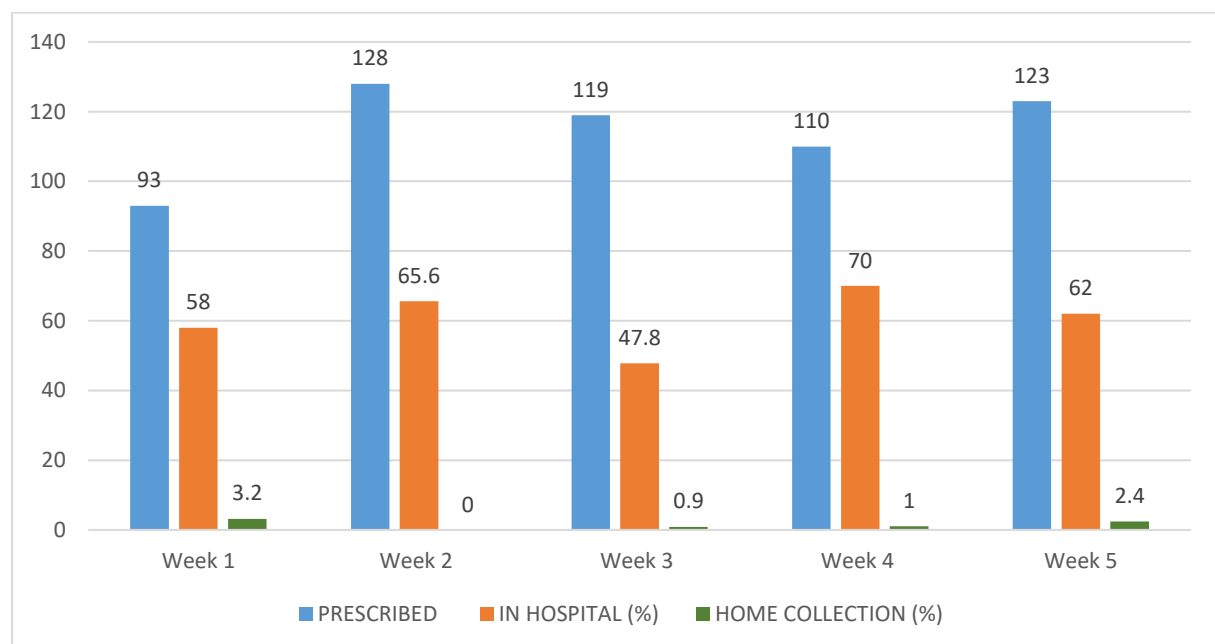
According to the secondary data, the lab services were not efficient and therefore, one on one interaction with the pregnant women was done in person as well as over calls to follow up with the pregnant women who were prescribed Lab tests. This was started from mid-April to mid-May 2024. Before this the conversion rate was just 29% for the month of mid-April to mid-May 2024.

There are two types of laboratory services in the hospital as mentioned above. For the period of mid-May to mid-June 2024, week wise analysis was done to understand the trends during

for the current period. Because during this period, phone calls and/ or personal communication during their hospital visit were made to follow up the pregnant women registered with the hospital.

The results show that during the week 1, a total of 93 expected women were prescribed laboratory investigations. Of these, 58% women opted for the investigations done at the hospital itself on the same day of visit while three percent women availed home based services. Similarly, 128, 119, 110, and 123 women were prescribed laboratory investigations in the following weeks 2, 3, 4, and 5 respectively. There is variation in the availing hospital based and home-based services. However, it is also important to understand that after calls or personal communication made, the women might have visited and availed hospital based services which are not reflected here (Fig 4).

Figure 4: Week-wise Distribution of Laboratory services to the Pregnant women by its types (hospital or homebased)



In the month of May a15- June 14, 2024, a total of 551 expectant women were prescribed the laboratory investigations. Of these, 61% women availed the services on the same day of visit there only. Twelve such women preferred home based services. Slightly more than one-third omen did not avail the services neither from hospital or home based. Therefore, conversion rate could be considered 63 per cent only. This analysis dons not include those women who might have availed the laboratory services after the follow from the hospital (Table 1).

Table 1: Current status of the laboratory services prescribed and availed by its types

Total Prescribed (n=551)			
Lab investigation prescribed and done within the hospital	Lab investigation prescribed and done through home sample collection	Did not turn up to the hospital services	Proportion of Total Conversion
336 (61%)	12 (2%)	203 (37%)	348 (63%)

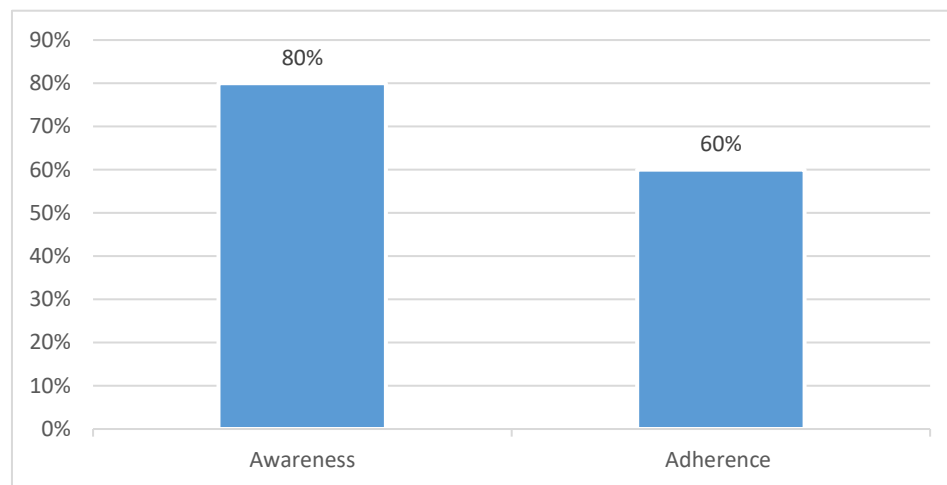
To summarise, results revealed a difference of 345 between two months due to extensive follow up was made.

Table 2: Difference in results between 2 months before and after

Date	Conversion
14.04.2024 to 13.04.2024	29%
15.05.2024 to 14.06.2024	63%

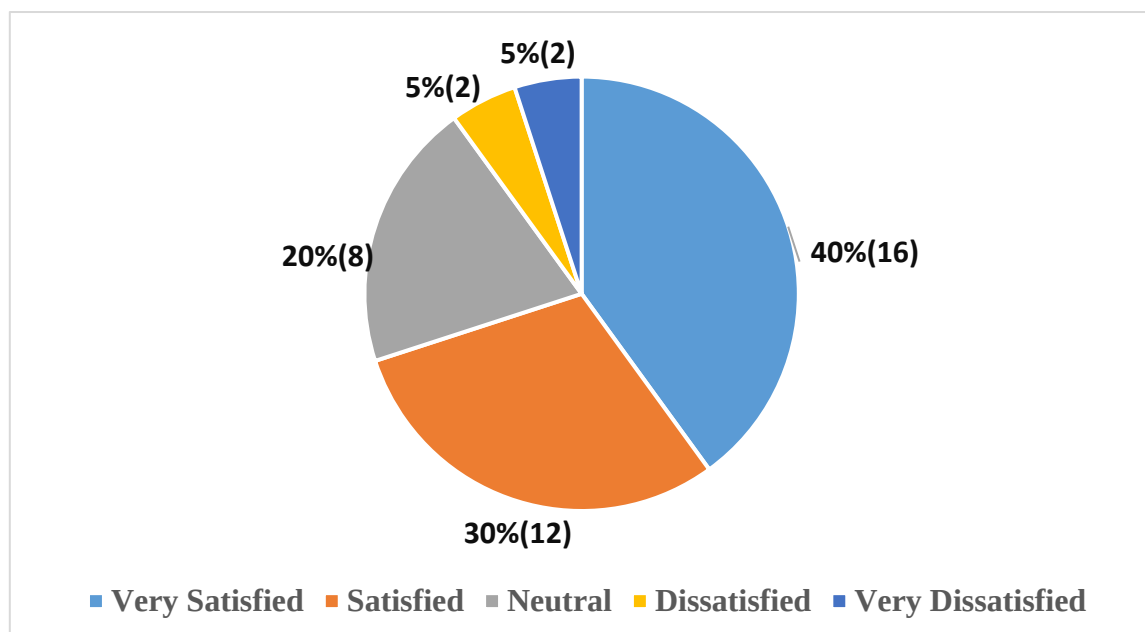
In addition, the laboratory staff (four staff members- one man, three women) were also interacted through an in depth interview guide to know their awareness of the guidelines available for them. The results show that the staff was aware of majority of the SOPs (80%) prescribed by the hospital but adherence was just 60% of the procedures.

Figure 5: Lab staff awareness of the SOPs and its' adherence



Feedback forms were provided to the pregnant women at the time of their exit. However, this process is voluntary. Forms are kept at the reception desk, with some general instructions (Name, MPI, Feedback department, Feedback). However, it was not mandatory for the beneficiaries to fill the feedback form and was a voluntary process.

Figure 6: Patient Satisfaction with Laboratory Services (n=40)



Exit interviews were conducted with the pregnant women who have availed the lab services from the hospital. Nearly 70% were either highly satisfied or satisfied. Those who did not

respond or expressed “can’t say or don’t know” were considered as neither satisfied nor dissatisfied. However, for the improvement purpose, they are also grouped with not satisfied, and therefore, 30% were considered not satisfied.

SWOT of the Laboratory Services at the hospital

A McKinsey 7S analysis was conducted to quantify and examine the enablers and barriers affecting the operations’ efficiency and efficacy of laboratory services. SWOT analysis presents for the hospital based and the home based services.

SWOT Analysis for Hospital Lab Services

STRENGTHS • State of the art equipment • Accreditation and compliance (NABL)	WEAKNESS • Shortage of trained personnel • Charges are high (compared with 1 mg) • Frequent errors (3 errors in past one month)
OPPORTUNITIES • Super specialised hospital for maternity care	THREATS • Competition from 1mg (located in the same vicinity)

SWOT Analysis for Home Lab Sample Collection

STRENGTHS • State of the art equipment • Accreditation and compliance (NABL) • No additional charges for Home Sample collection	WEAKNESS • Shortage of trained personnel • Charges are high (compared with 1 mg) • Delay in providing the service due to various unforeseen reasons.
OPPORTUNITIES • Proactively approach the neighbourhood as maternity care is very frequent event in general	THREATS • Competition from 1mg and other independent labs who have also started Home Lab Sample Collection

The findings identify both the ‘best practices’ and ‘opportunities for improvement,’ providing a starting point for designing strategies to build on this information to strengthen the delivery of laboratory services to meet the maternal and foetal health of clients.

This study also revealed several issues in laboratory services in the studied maternity hospital. Table 1 details the findings made with regard to change and advancement in the practices in laboratories in the recent past.

Alternative strategies to enhance the laboratory services for home sample collection services.

- Customized Training and dedicated Guidelines for home based services
- Advocacy for Patient-Centred Care during home visit: networking and advocacy for more contacts can be approached during home visits.

Alternative strategies to enhance the laboratory services for hospital services

- Optimization of Service Efficiency: Measures that can be taken to eliminate the causes of prolonged waiting for test results and guarantee the effectiveness of necessary tests at the right time of pregnancy.

The strategies may be further studied in terms of feasibility. The organization may implement and find it out its applicability as well.

Chapter 5: Discussion

Current Trends in Laboratory Services: In this regard, some of the trends the study unveiled include point-of care testing, EHR, fully-automatic analysers, and tele-laboratory services. These advancement areas in line with what Chawla et al., 2019 noted regarding integration of technology in laboratory services as one of the factors that has brought improvement in health outcome. the level of tele-laboratory services' utilization is lower, which may point to opportunities for further expansion.

Facilitating and Hindering Factors: Promoting factors the following were identified: staff number sufficient ; enhancing equipment; training exercise constant; flow of information proper. These are key determinants in running an effective laboratory and correlate with the research conducted by Singh et al. (2018) in stressing on these factors to improve service delivery. Socio-cultural factors stated as barriers included lack of personnel, equipment, and result delay, which also tally with the barriers stated by Sharma and Gupta (2017). Such challenges have to be addressed through deliberate measures such as with special attention to resources and flow of work.

Patient Satisfaction with Laboratory Services: Patient Satisfaction with Laboratory Services: The satisfaction scores among the pregnant women are moderate and it indicates that there are concerns regarding delays and communication to be addressed. Similar challenges were viewed in a study by Patel and colleagues (2021) in which timeliness of service provision and good communication were also among the factors that affect patients' satisfaction. Concentrating on decreasing the patients' waiting time and increasing positive communication with staff increases satisfaction levels.

Comparison with Other Studies The implication of the results of this study lies in the general harmony of its finding with other studies of the sector. For instance: Mukherjee et al. (2020): They said their cross-sectional assessment of knowledge and practices among healthcare professionals in India discovered that there was, a high level of knowledge of clinical practice guidelines; however, a low level of compliance due to practicality issues.

Chawla et al. (2019): Zeroed in on in this study were the technological innovations in laboratory services and similar observations of the adoption of POCT and EHR.

Singh et al. (2018): Stressed on the need for proper staffing and constant training as basic factors of improving and sustaining proper organization of laboratories.

Sharma and Gupta (2017): They noted usual constraints in laboratory services including equipment which is in tandem with the findings of this study.

Patel et al. (2021): Pregnant woman's expectation of prompt service and communication as determined by their studies on patient satisfaction is similar to the findings of the present study.

Chapter 6: Conclusion

Awareness and Adherence to Guidelines and SOPs: Almost all the laboratory staff had moderate knowledge on guidelines and SOPs; however, compliance rate was comparatively low considering that there should be strong enforcement and continuing education programs.

1. Facilitating Factors: Voluntary health system was established to have adequate staff, available advanced equipment, continuous training to ensure that laboratory services produce results that are efficient and effective, while communication regarding laboratory services had effective protocols.
2. Hindering Factors: The identified challenges include lack of equipment, lack of staff, slow turnaround time in getting the results, and failure to follow set standard operating procedures which are factors that must be addressed to improve the efficiency of the services.
3. Patient Satisfaction: The survey for the study revealed that satisfaction of the patients with laboratory services was generally fair and there was indication that there were areas of concern that needed to be addressed such as delays in laboratory services and perceived communication with patient.

In this section the results of the study on building a continuum of laboratory services of pregnant women in a maternity hospital are presented and the consequences described. The chapter starts with the understanding of guidelines and Standard Operation Procedures (SOP) that has to do with laboratory services for pregnant individuals. It examines the trends evident in the hospital's laboratory services meaning trend analysis and SWOT which show the areas of efficiency and the areas that needs improvement.

Implications of the Findings:

These results increase the need to incorporate high quality service into the structure of maternity care facilities. In this way, due to better access and compliance with the established protocols regarding the provision of these services, there is an improvement in patient satisfaction and increased compliance with protocols concerning prenatal testing. The paper uncovers that integrated or well-coordinated work flows and stringent measures on the quality assurance play a crucial role on the effective administration of maternal health.

Chapter-7 References:

- Routine Tests During Pregnancy [Internet]. www.acog.org. Available from: <https://www.acog.org/womens-health/faqs/routine-tests-during-pregnancy#:~:text=Yes%2C%20during%20the%20first%20trimester>
- World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience [Internet]. Geneva: World Health Organization; 2016. Available from: <https://iris.who.int/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1>
- International Online Medical Council (IOMC) [Internet]. International Online Medical Council. [cited 2024 Jul 5]. Available from: <https://www.iomcworld.org/open-access/quality-of-laboratory-service-for-focused-antenatal-care-services-on-the-era-of-covid-19-at-public-health-facilities-of-jimma-town-94248.html>
- Hsai NM, Matsui M, Ng CFS, Khaing CT, Imoto A, Sayed AM, et al. Satisfaction of Pregnant Women with Antenatal Care Services at Women and Children Hospital in South Okkalapa, Myanmar: [A Facility-Based Cross-Sectional Study Triangulated with Qualitative Study. Patient Preference and Adherence. 2020 Dec;Volume 14:2489–99](#)
- Gronowski, Ann M. *Handbook of Clinical Laboratory Testing during Pregnancy*. 1 Jan. 2004. Accessed 6 Aug. 2023.
- James D, Steer P, Weiner C, Gonik B, Crowther C, Robson S, et al. Pregnancy and Laboratory Studies: *A Reference Table for Clinicians. Obstetrics & Gynecology*. 2010 Apr;115(4):868.