Section: Community Medicine

Original Research Article

ASSESSMENT OF MATERNAL HEALTH AND SERVICE UTILIZATION BY ANC MOTHERS ATTENDING PMSMA IN A URBAN PRIMARY CARE SETTING IN SOUTHERN ODISHA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: The Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) aims to improve the quality and coverage of antenatal care through comprehensive examinations and early identification of high-risk pregnancies. Assessing maternal health and service utilization at the primary-care level can help identify gaps in programme implementation.

Materials and Methods: A facility based cross-sectional observational study was conducted among 30 antenatal mothers in their second or third trimester attending the PMSMA clinic at the Urban Health Training Centre, Ankuli, Berhampur, Odisha, from June to November 2025. Participants were selected by convenience sampling. Data were collected through interviewer-administered questionnaires and verified using Mother and Child Protection cards and facility records. Data were analysed using Jamovi version 2.7.33 and summarized as frequencies and percentages.

Results: Of the 30 participants, 46.7% were aged 21–25 years and 53.3% were primigravida. Pallor was observed in 43.3%, while pedal oedema was present in 20.0%. Mild anaemia was reported in 60.0% and moderate anaemia in 20.0%; 20.0% had normal haemoglobin levels. Utilization was highest for iron-folic acid supplementation (76.7%), followed by calcium supplementation (70.0%) and tetanus toxoid immunization (66.7%). Albendazole utilization was 23.3%. Awareness of Janani Suraksha Yojana was reported by 73.0% of participants.

Conclusion: Utilization of several essential antenatal interventions under PMSMA was encouraging; however, anaemia and gaps in the uptake of selected services and awareness of maternal health schemes remain important concerns. Strengthened counselling, family involvement, and focused health education may further improve service utilization and maternal health.

Keywords: Antenatal care; Maternal health; PMSMA; Service utilization; Anaemia; Odisha.

INTRODUCTION

Pregnancy is a normal physiological process, yet it remains a period during which women are vulnerable to several health complications that may adversely affect both maternal and fetal outcomes if timely care is not provided. Appropriate antenatal care (ANC) enables early identification of pregnancy-related risks, facilitates preventive interventions, and improves the likelihood of a safe pregnancy and childbirth. Therefore, ensuring universal access to quality maternal healthcare continues to be a major public health priority worldwide.[1]

Maternal mortality remains an important indicator of the effectiveness of a country's healthcare system. As part of the Sustainable Development Goals (SDG-3), countries have committed to reducing the global maternal mortality ratio to fewer than 70 deaths per 100,000 live births by 2030.[1] Although remarkable progress has been achieved over the past two

decades, preventable maternal deaths continue to occur, particularly in low- and middle-income countries where access to quality maternal healthcare is often uneven.

India has witnessed a substantial decline in maternal mortality owing to improvements in institutional deliveries, emergency obstetric care, skilled birth attendance, and expansion of maternal health programmes. National estimates indicate that the maternal mortality ratio has reduced considerably during recent years, reflecting significant advancements in maternal healthcare services.[2,3] Nevertheless, thousands of women still die each year from preventable complications related to pregnancy and childbirth, highlighting the need for continuous strengthening of maternal health services across all levels of care.[3]

Among the various interventions aimed at reducing maternal and neonatal morbidity, comprehensive antenatal care occupies a central position. ANC provides an opportunity for healthcare providers to assess maternal well-being, identify high-risk pregnancies, screen for anaemia, hypertensive disorders, gestational diabetes, infections and other complications, while simultaneously offering counselling regarding nutrition, birth preparedness, institutional delivery, breastfeeding and family planning. Early recognition and appropriate management of these conditions substantially improve maternal and neonatal outcomes.[3]

Recognizing the importance of quality antenatal services, the Ministry of Health and Family Welfare, Government of India, launched the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) in June 2016.[4] The programme aims to ensure that every pregnant woman receives at least one comprehensive antenatal examination by a trained physician or obstetric specialist during the second or third trimester of pregnancy. These services are provided free of cost on the 9th day of every month through government health facilities across the country.[5]

The PMSMA initiative emphasizes standardized antenatal assessment, early detection of high-risk pregnancies, appropriate referral, counselling and regular follow-up. Women identified with obstetric or medical complications are categorized as high-risk using a colour-coded system to facilitate closer monitoring and timely management. This systematic approach is intended to reduce delays in diagnosis and treatment, thereby contributing to improved maternal and neonatal health outcomes.[5,6]

Since its implementation, PMSMA has expanded access to specialist antenatal care for millions of pregnant women across India. However, the effectiveness of the programme depends not only on service availability but also on its utilization by beneficiaries, the quality of care delivered, and the ability of healthcare facilities to provide comprehensive antenatal services. Variations in infrastructure, availability of trained personnel, laboratory support and community awareness may influence programme performance across different geographical settings.[5]

Understanding how pregnant women utilize these services and identifying existing gaps are essential for improving programme implementation. Evidence generated from local settings can help health administrators strengthen service delivery, enhance patient satisfaction and optimize maternal health outcomes through context-specific interventions.

Rationale

Despite considerable investments in maternal healthcare programmes, equitable utilization of quality antenatal services continues to be a challenge in many parts of India. While PMSMA has improved access to specialist antenatal care, several studies have demonstrated that the quality and completeness of services delivered remain inconsistent across healthcare facilities.[1,5]

Research conducted in different regions of the country has shown that many pregnant women do not receive all the recommended investigations and clinical examinations during their antenatal visits. Essential components such as urine examination, abdominal assessment, laboratory investigations and counselling are often inadequately performed because of shortages of trained personnel, inadequate infrastructure, limited diagnostic facilities and operational constraints.[5]

Another important concern is the limited awareness regarding PMSMA among eligible beneficiaries. Although routine antenatal services are widely recognized, many women remain unaware of the additional benefits available during PMSMA sessions, including specialist consultation and systematic screening for high-risk pregnancy. Inadequate awareness may reduce attendance, delay identification of complications and ultimately limit the effectiveness of the programme.[5]

Utilization of maternal health services is also influenced by several socio-demographic and cultural factors. Educational status, family support, socioeconomic conditions, accessibility of healthcare facilities and prevailing community beliefs significantly affect health-seeking behaviour during pregnancy. Misconceptions regarding iron-folic acid supplementation, dietary practices and pregnancy-related investigations continue to influence compliance with recommended antenatal care practices in many communities.[4,6]

Odisha has made substantial progress in improving maternal and child health indicators through sustained public health interventions. Nevertheless, limited evidence is available regarding the utilization of PMSMA services in urban primary healthcare settings, particularly in southern Odisha. Urban Primary Health Centres cater to diverse populations, including economically weaker sections, migrant workers and underserved urban communities, whose healthcare needs and utilization patterns may differ considerably from those observed in rural populations.

Assessing maternal health status together with the utilization of services provided under PMSMA is therefore essential for understanding programme performance at the primary care level. Such information can identify existing service gaps, estimate the burden of high-risk pregnancies, evaluate beneficiary satisfaction and generate evidence for improving programme implementation. Findings from the present study are expected to support local health authorities in strengthening maternal healthcare services and enhancing the quality of antenatal care in urban primary healthcare settings of southern Odisha.

Aims and Objectives

Aim

To assess maternal health status and utilization of PMSMA services among ANC mothers attending an urban primary health centre in southern Odisha.

Objectives:

1. To determine the proportion of ANC mothers availing key PMSMA services
2. To assess the health profile of ANC mothers.
3. To identify socio-demographic and obstetric factors associated with full ANC utilization.

MATERIALS AND METHODS

A facility based cross-sectional observational study was conducted to assess maternal health status and utilization of maternal health services among antenatal care (ANC) mothers attending the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) clinic. The study was carried out at the Urban Health Training Centre (UHTC), Ankuli, Berhampur, Ganjam district, Odisha, which functions as an urban primary healthcare facility under the Department of Community Medicine, MKCG Medical College and Hospital.

The UHTC provides comprehensive primary healthcare services to the society, including routine antenatal care and implementation of the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) on the 9th of every month. The study was conducted over a period of six months from June 2025 to November 2025.

A convenience sampling technique was employed, and 30 antenatal mothers in the second and third trimesters of pregnancy who attended the PMSMA clinic during the study period and fulfilled the eligibility criteria were included in the study."

Inclusion Criteria

Pregnant women in the second or third trimester attending PMSMA clinics, Women willing to participate and providing written informed consent & Women carrying their Mother and Child Protection (MCP) card or whose antenatal records were available at the health facility.

Exclusion Criteria

Pregnant women in the first trimester, Women requiring immediate referral because of obstetric or medical emergencies, Women who were critically ill or unable to participate in the interview & Women unwilling to provide informed consent.

The study collected information on:

- Socio-demographic characteristics (age, education, occupation, religion, socioeconomic status, family type).
- Obstetric characteristics (gravidity, parity, gestational age, previous obstetric history).
- Maternal health profile (anaemia, hypertension, diabetes mellitus, body mass index, high-risk pregnancy status and other co-morbidities).
- Utilization of PMSMA services (clinical examination, laboratory investigations, ultrasonography, iron-folic acid supplementation, calcium supplementation, tetanus-diphtheria vaccination, counselling, and referral services).
- Awareness regarding PMSMA.
- Beneficiary satisfaction with services received.

Data were collected using a pre-tested, semi-structured interviewer-administered questionnaire developed after reviewing the PMSMA Operational Guidelines and relevant literature. Information obtained during the interview was cross-verified with the Mother and Child Protection (MCP) card and antenatal records available at the health facility to minimize recall bias.

The questionnaire consisted of four sections: Socio-demographic and obstetric profile, Maternal health assessment and high-risk pregnancy screening, Utilization of maternal health services under PMSMA & Knowledge regarding PMSMA and beneficiary satisfaction.

Operational Definitions: High-risk pregnancy: Any pregnancy identified as high-risk according to the PMSMA Operational Guidelines and marked with a red sticker due to the presence of obstetric or medical risk factors requiring closer monitoring.

Full ANC service utilization: A pregnant woman was considered to have received complete ANC services during the PMSMA visit if she underwent measurement of weight and blood pressure, abdominal examination, recommended laboratory investigations, received iron-folic acid and calcium supplementation, appropriate counselling, and was referred for ultrasonography or higher care whenever indicated.

Data collection was carried out on designated PMSMA days after obtaining written informed consent. Face-to-face exit interviews were conducted in a private setting to ensure confidentiality. Information obtained from participants was verified using the MCP card and facility records. Completeness of the questionnaire was checked on the same day to minimize missing information.

Collected data were entered into Microsoft Excel, cleaned for completeness and consistency, and analysed using Jamovi software version 2.7.33. Continuous variables were expressed as mean ± standard deviation or median with interquartile range depending on data distribution. Categorical variables were summarized using frequencies and percentages.

The study protocol was approved by the Institutional Ethics Committee of MKCG Medical College and Hospital, Berhampur, Odisha (IEC Approval No. 317). Written informed consent was obtained from all study participants before enrolment. Participation was entirely voluntary, and confidentiality of participant information was maintained throughout the study. Data were anonymized and used exclusively for research purposes.

RESULTS

Among the 30 antenatal mothers enrolled in the study, the largest proportion (46.7%) belonged to the 21–25 years age group, followed by 26–30 years (23.3%), ≤20 years (16.7%), and ≥30 years (13.3%). All the participants were Hindus. Regarding educational status, 43.3% of mothers had completed higher secondary education, followed by secondary education (23.3%), graduation (16.7%), primary education (13.3%), and postgraduate education (3.3%). Among fathers, 36.7% were graduates, 26.7% had higher secondary education, 16.6% had primary education, while 10% each had secondary and postgraduate education. Based on the Modified Kuppuswamy socioeconomic classification, the majority of participants belonged to the lower middle (36.6%) and upper lower (33.3%) socioeconomic classes, followed by the upper middle class (26.7%), whereas only 3.3% belonged to the upper socioeconomic class.

Table 1: socio demographic profile of ANC women (N=30)

Socio-demographic characterstics	Categories	Counts	Percentage
Age groups (in yrs)	<=20	5	16.7%
	21-25	14	46.7%
	26-30	7	23.3%
	>=30	4	13.3%
Religion	Hindu	30	100
ANC women's education	Primary	4	13.3%
	Secondary	7	23.3%
	Higher secondary	13	43.3%
	Graduate	5	16.7%
	Post graduate	1	3.3%
Spouse education	Primary	5	16.6%
	Secondary	3	10%
	Higher secondary	8	26.7%
	Graduate	11	36.7%
	Post graduate	3	10%
Socio economic status classification	Upper lower	10	33.3%
	Lower middle	11	36.6%
	Upper middle	8	26.7%
	Upper	1	3.3%

Table 2: Obstetric Profile of the Study Participants (N = 30)

Variable	Category	n (%)
Gravida	Primigravida (G1)	16(53.3%)
	Multigravida (≥G2)	14(46.7%
Parity	Nulliparous	22(73.3%)
	Primipara (P1)	5(16.7%)
	Multipara (≥P2)	3(10%)
Previous abortion	Yes	8(26.8%)
	No	22(73.2%)
Previous mode of delivery (for multiparous women)	Normal vaginal delivery	6(20.3%)
	Caesarean section	1(3.3%)

[Table 2] presents the obstetric profile of the study participants. More than half of the antenatal mothers were primigravida (53.3%), while 46.7% were multigravida. The majority (73.3%) were nulliparous, whereas 16.7% were primipara and 10.0% were multipara. Previous abortion was reported by 26.8% of the participants, while 73.2% had no history of abortion. Among women with a previous delivery, normal vaginal delivery was the predominant mode of delivery (20.3%), whereas only 3.3% had a previous caesarean section.

[Figure 1] depicts the clinical profile of the study participants with respect to pallor and pedal edema. Pallor was present in 43.3% of antenatal mothers, while 56.7% had no pallor. Pedal edema was observed in 20.0% of the participants, whereas the majority (80.0%) had no edema, indicating that most mothers were clinically free from these examination findings.



Figure 1: Clinical Profile

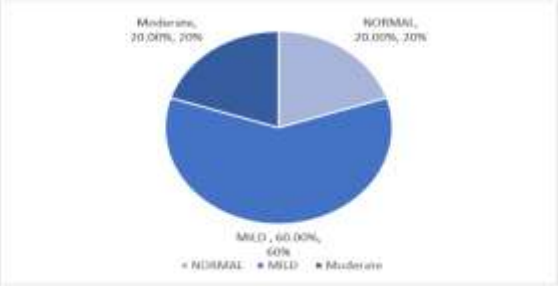

Figure 2: Distribution of study participants according to severity of anemia

[Figure 2] illustrates the distribution of antenatal mothers according to the severity of anaemia. Mild anaemia was the most common category, accounting for 60.0% of the participants, followed by moderate anaemia (20.0%). Only 20.0% of the mothers had normal haemoglobin levels, while no participant was found to have severe anaemia.

The mean systolic and diastolic blood pressures of the study participants were 106 mmHg and 66 mmHg, respectively. The mean body temperature was 37°C, the mean pulse rate was 86 beats per minute, and the mean random blood glucose level was 125 mg/dL.

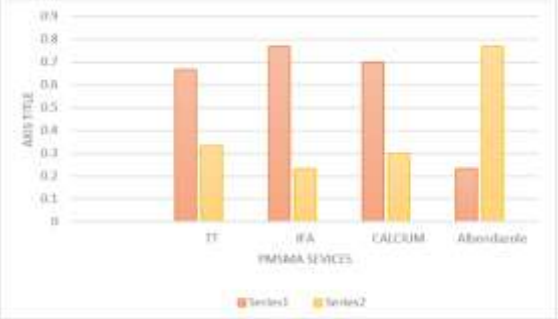

Figure 3: PMSMA Service Utilization

[Figure 3] depicts the utilization of selected PMSMA services among the study participants. Iron and folic acid (IFA) supplementation showed the highest utilization (76.7%), followed by calcium supplementation (70.0%) and tetanus toxoid (TT) immunization (66.7%). In contrast, albendazole administration was received by only 23.3% of the participants, while 76.7% had not received the drug.

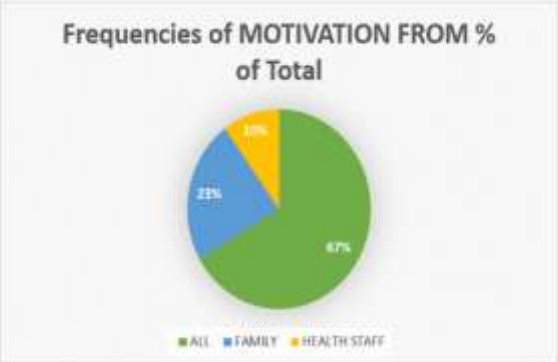

Figure 4: Source of motivation for utilization of PMSMA services

[Figure 4] illustrates the sources of motivation for availing PMSMA services among the study participants. The majority of antenatal mothers (67.0%) reported being motivated by both family members and healthcare staff, while 23.0% were motivated solely by family members. Only 10.0% of the participants reported that healthcare staff alone motivated them to utilize PMSMA services.

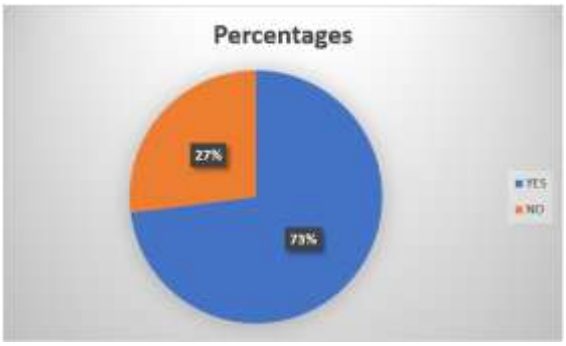

Figure 5: Awareness of Janani Suraksha Yojana (JSY) among antenatal mothers (N = 30)

Awareness regarding the Janani Suraksha Yojana (JSY) was reported by 73.0% of the antenatal mothers, while 27.0% were unaware of the scheme. These findings suggest that although awareness of JSY was satisfactory among most participants, nearly one-fourth of the mothers still lacked knowledge about this important maternal health programme.



Figure 6: Source of motivation for utilization of PMSMA services among antenatal mothers (N = 30)

[Figure 6] illustrates the primary sources of motivation for availing PMSMA services among the study participants. The highest proportion of mothers (23.3%) reported receiving motivation from both their in-laws and husband, followed by motivation from the husband alone (16.7%) and husband along with in-laws (13.3%). Smaller proportions of participants reported motivation from ASHA workers alone (10.0%), ASHA with in-laws (10.0%), or ASHA in combination with other family members, indicating that family support, particularly from husbands and in-laws, played a predominant role in encouraging utilization of PMSMA services.

DISCUSSION

The present study assessed the socio-demographic characteristics, obstetric and clinical profile,

awareness, and utilization of PMSMA services among antenatal mothers. More than half of the participants were primigravida, while the majority were nulliparous, indicating that a substantial proportion of women were experiencing their first pregnancy. Most participants had no history of previous abortion, and among women with a previous delivery, normal vaginal delivery was the predominant mode of delivery. These findings reflect a relatively low obstetric risk profile among the study population.

The clinical assessment revealed that pallor was more common than pedal oedema, suggesting that anaemia remains an important health concern during pregnancy. Although the majority of participants had mild anaemia, only a smaller proportion had moderate anaemia, and one-fifth had normal haemoglobin levels. The mean systolic and diastolic blood pressures were 106 mmHg and 66 mmHg, respectively, while the mean body temperature was 37°C, the mean pulse rate was 86 beats/min, and the mean random blood glucose level was 125 mg/dL.

These mean clinical parameters were within the expected physiological range for most antenatal mothers, suggesting that, despite the high prevalence of mild anaemia, the overall clinical condition of the participants was stable at the time of assessment. This finding emphasizes the continued need for routine haemoglobin screening, iron supplementation, and nutritional counselling during antenatal care to prevent adverse maternal and fetal outcomes.[6-8]

Utilization of essential PMSMA services was generally satisfactory. A high proportion of mothers reported receiving tetanus toxoid immunization, iron and folic acid tablets, and calcium supplementation, indicating good implementation of key antenatal interventions. However, comparatively lower utilization of Albendazole suggests that deworming services may require greater emphasis during antenatal counselling and service delivery.[9]

Awareness regarding Janani Suraksha Yojana (JSY) was encouraging, with nearly three-fourths of mothers reporting awareness of the scheme. Nevertheless, more than one-fourth remained unaware, highlighting the need for intensified Information, Education, and Communication (IEC) activities to improve awareness and promote optimal utilization of maternal health schemes.[10]

The study also demonstrated that family members played a pivotal role in motivating mothers to utilize PMSMA services. In-laws emerged as the most common source of motivation, followed by husbands and ASHA workers. These findings underline the importance of involving family members, particularly husbands and elder women in the household, during antenatal counselling sessions to improve maternal healthcare-seeking behaviour.

Overall, the findings indicate satisfactory utilization of antenatal services under PMSMA; however, gaps persist in clinical conditions such as anaemia, awareness regarding government schemes, and utilization of certain services. Strengthening counselling, family involvement, early identification of maternal health problems, and continued community-based health education through ASHA workers may further enhance the effectiveness of PMSMA and contribute to improved maternal and neonatal health outcomes.

CONCLUSION

The present study demonstrated that the utilization of PMSMA services among antenatal mothers was generally satisfactory, with high coverage of essential antenatal interventions such as tetanus toxoid immunization, iron and folic acid supplementation, calcium supplementation, and routine antenatal check-ups.

Although the majority of mothers were aware of maternal health services, gaps persisted in awareness of government schemes and clinical conditions such as anaemia, with most participants exhibiting mild anaemia.

Family members, particularly in-laws and husbands, played a significant role in motivating mothers to utilize antenatal services.

These findings highlight the need to strengthen health education, improve awareness regarding maternal welfare schemes, promote family-centred counselling, and ensure early identification and management of maternal health problems to further enhance the effectiveness of PMSMA and improve maternal and neonatal health outcomes.

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