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ORIGINAL ARTICLE

Assessment of Utilization Pattern of Ante Natal Maternal & Child Health Kits Provided by the Government Among Post Natal Mothers in Tamil Nadu

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Abstract

Background: Maternal nutrition and antenatal care are critical determinants of maternal and neonatal outcomes. Tamil Nadu implements maternity benefit schemes providing cash assistance and antenatal maternal and child health (MCH) kits; however, evidence on their utilisation remains limited. **Methods:** A community-based cross-sectional study was conducted among 180 postnatal mothers who delivered within the preceding six months in a selected block of Tamil Nadu. Participants were selected by simple random sampling from Primary Health Centre records. Data were collected using a pretested interviewer-administered questionnaire assessing socio-demographic characteristics, antenatal care, utilisation of MCH kits and maternal–neonatal outcomes. **Results:** The mean age of participants was 23.75 ± 4.23 years. Early antenatal registration was reported by 87.8%. Anaemia (28.3%) and previous caesarean section (17.1%) were common high-risk conditions. Among eligible mothers, 48.9% spent 50–75% of cash assistance on nutrition. Although 78.0% received nutrition kits, only 30.3% reported complete consumption, while 51.9% consumed them partially. Institutional delivery was universal, 78.1% of newborns had normal birth weight, and 4.8% required resuscitation. **Conclusion:** Despite good antenatal coverage and scheme reach, utilisation of nutritional components of MCH kits remains suboptimal. Strengthening nutrition counselling and behaviour change communication is essential to improve maternal nutrition and neonatal outcomes.

Keywords: Antenatal care, Maternal nutrition, MRMBS, Nutrition kits, Tamil Nadu

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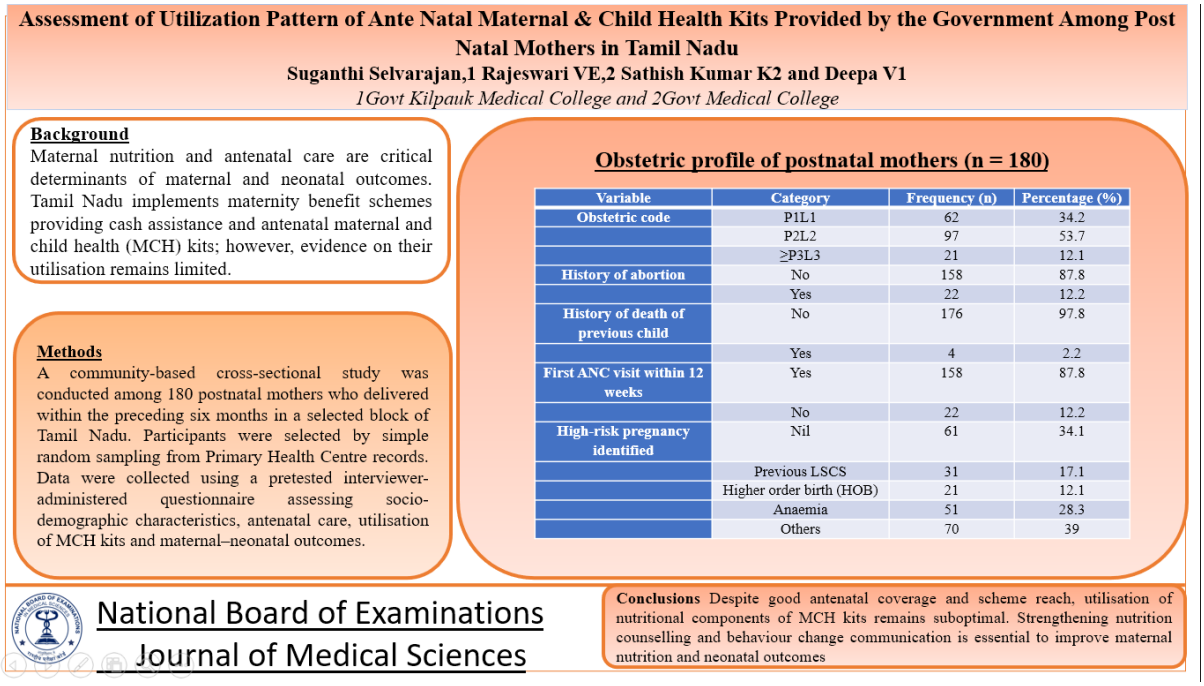
Graphical Abstract



Introduction & Background

The government of India and Tamil Nadu has implemented programs that distribute ante-natal and post-natal health kits to support mothers in managing their health during pregnancy and after childbirth. One of the main schemes among these is MRMBS. Dr Muthulakshmi Reddy Scheme (MRMBS) is a maternity benefit scheme was launched by Government of Tamil Nadu in 1987 with the aim of help in getting nutritious food to avoid low birth weight babies [1]. It was integrated with PMMVY – Pradhan Mantri Mathru Vandhana Yojana of GoI in 2017 with shared funding of the programme [2]. It is initiated for additional income for nutrition during pregnancy and for partial wage compensation for three months after childbirth. Apart from financial assistance, the program will also ensure better health and nutrition of the pregnant mother and unborn child. Every eligible beneficiary will get a nutritional kit. This kit will contain health mix, dry dates, iron tonic, protein biscuits, ghee, disinfectants, towel and albendazole tablets. Previous study reports that most of the benefitted mothers delivered normal weight babies and the results confirm 99% significance between the beneficiaries and the weight at birth of the child [3].

Despite this sustained public health initiative and the awareness efforts, the prevalence of low birth weight in Tamil Nadu remains a public health concern, indicating the need for the continued emphasis on the maternal nutrition and health education among the expectant mothers [4]. Antenatal MCH kits are designed in such a way to provide essential support throughout their pregnancy; however, variations in the utilization of these servies may occur due to multiple factors such as differences in the awareness levels, accessibility of the kits, and also the prevailing socio-cultural practices [5]. Evaluating how these kits are being utilized by the beneficiaries can also help in identifying the opportunities to strengthen

its implementation strategies and to optimize service delivery. Furthermore, insights into the utilization patterns can also support the evidence-based refinement of these existing programmes, thereby enhancing their responsiveness to the maternal and child health needs and also contributes to improved health outcomes in Tamil Nadu.

Previous studies from Tamil Nadu have reported varying levels of awareness and utilisation of maternity benefit schemes and nutrition kits. Lakshmi and Rajkumar observed suboptimal awareness regarding maternity benefit schemes among antenatal women in rural Tamil Nadu, while Swamynathan et al. reported that although most beneficiaries received nutrition kits, utilisation and awareness regarding components varied considerably [5,6]. Praveena also highlighted gaps between scheme coverage and effective nutritional utilisation, emphasizing the need for program strengthening [7].

Accordingly, this study was undertaken to primarily assess the pattern of utilization of the antenatal MCH kits provided free of cost by the Government of India and Government of Tamil Nadu among tribal post-natal mothers, and to examine the association between kit utilization and maternal and child health outcomes. This study also aimed to document current utilization practices and identify potential gaps, with the objective of promoting optimal use of government-provided antenatal supplements and supporting favorable maternal and child health outcomes.

Methodology

A community-based observational cross-sectional study was conducted over a period of six months among postnatal mothers residing in a selected block of a selected district in Tamil Nadu. Multi-stage random sampling was used to identify the block for the study. One block was selected by simple random sampling from the district, and eligible postnatal mothers were selected by simple random sampling from PHC beneficiary lists. As this was a single-block study, findings are representative only of the study area and not generalisable to the entire state.

The study population comprised postnatal women who had delivered within the preceding six months and were eligible for benefits under the Dr. Muthulakshmi Reddy Maternity Benefit Scheme (MRMBS).

Postnatal mothers who were eligible for MRMBS and who were willing to participate in the study were included. Mothers who did not provide consent and those with psychiatric illnesses that impaired comprehension or ability to respond to the questionnaire were excluded from the study. The sample size was calculated to be 180 participants based on a previous study by Swamynathan et al., which reported that 82% of mothers had received nutrition kits under the maternity benefit scheme [6]. A simple random sampling technique was employed to select participants from the list of MRMBS beneficiaries obtained from the respective Primary Health Centres (PHCs) in the study area.

Data was collected using a pretested and pre-validated interviewer-administered questionnaire in the local vernacular language. Information was obtained on socio-demographic characteristics, obstetric history, antenatal care utilization, receipt and utilisation of cash assistance and nutritional kits, and maternal and neonatal outcomes. Following data

collection, participants were provided health education focusing on postnatal care, personal hygiene, and appropriate maternal and infant nutrition.

The study variables included age, education, occupation, socio-economic status, religion, type of family, number of cash instalments received and proportion utilized for nutrition, utilisation details of individual nutritional items in the kit, maternal weight gain during pregnancy, pregnancy outcome, gestational age at delivery, birth weight of the newborn, and requirement of resuscitation or neonatal intensive care.

The primary outcome variable was utilisation of antenatal MCH kit components (categorised as complete, partial or non-utilisation). Secondary outcomes included maternal weight gain, gestational age at delivery, birth weight and neonatal resuscitation requirement. Data were analysed using SPSS version XX. Descriptive statistics were used to summarise socio-demographic and obstetric variables. Associations between utilisation of kit items and selected maternal and neonatal outcomes were assessed using Chi-square test. Logistic regression analysis was performed to explore predictors of utilisation. A p value <0.05 was considered statistically significant.

Results

A total of 180 women were included in this study. The mean age of the participants was 23.75 years (SD = 4.23). Majority of the women had completed high school education (63.4%), followed by graduates (22%). Most participants were homemakers (78%), while 12.2% were engaged in agriculture.

The mean age of husbands of these women was 26.8 years (SD = 4.43). Nearly half of the husbands had completed higher secondary education or diploma (46.3%), while 17.1% were graduates or above. All participants were married and living with their husbands. 46.3% belonged to nuclear families, while remaining participants lived in joint or other types of families. According to BG Prasad socio-economic classification, majority belonged to the middle (51.2%) and lower middle (41.5%) socio-economic classes (Table 1).

Table 1. Socio-demographic characteristics of the participants (n = 180)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean (SD) = 23.75 (4.23)		
Education	Middle school	13	7.3
	High school	114	63.4
	Higher secondary / Diploma	13	7.3
	Graduate and above	40	22.0
Occupation	Homemaker	140	77.8
	Agriculture / farming	26	14.4
	Clerical / Shop owner	9	5

	Teacher/ Semi-professional	5	2.8
Husband's age (years)	Mean (SD) = 26.8 (4.43)		
Husband's education	Primary school	4	2.4
	Middle school	4	2.4
	High school	57	31.7
	Higher secondary / Diploma	83	46.3
	Graduate and above	31	17.1
Type of family	Nuclear	83	46.3
	Joint	35	19.5
	Three-generation / others	62	34.2
Socio-economic status	Upper middle	13	7.3
	Middle	92	51.2
	Lower	75	41.5

In terms of obstetric profile, 53.7% of women were P2L2 i.e. two deliveries with two live children currently, followed by 34.2% P1L1. A history of abortion was reported by 12.2%, and 2.4% had a history of death of a previous child. The first antenatal visit within 12 weeks of gestation was reported by 87.8% of participants. High-risk pregnancy conditions were identified in several participants, with anemia (28.3%) and previous LSCS (17.1%) being the most common; multiple risk factors were noted in some women (Table 2).

Table 2. Obstetric profile of postnatal mothers (n = 180)

Variable	**Category**	**Frequency (n)**	**Percentage (%)**
Obstetric code	P1L1	62	34.2
	P2L2	97	53.7
	≥P3L3	21	12.1
History of abortion	No	158	87.8
	Yes	22	12.2
History of death of previous child	No	176	97.8
	Yes	4	2.2

First ANC visit within 12 weeks	Yes	158	87.8
	No	22	12.2
High-risk pregnancy identified*	Nil	61	34.1
	Previous LSCS	31	17.1
	Higher order birth (HOB)	21	12.1
	Anaemia	51	28.3
	Others	70	39

*Multiple responses possible

Majority (78.0%) were eligible for benefits under the MRMBS scheme. Among those who received cash assistance, 48.9% reported spending 50–75% of the amount on nutrition. Nutrition kits were received by 78.0% of participants; among them, 77.14% received two kits, while the rest received only one kit. More than half of the mothers (56.1%) were able to recall three or more items included in the MRMBS nutrition kit, while 43.9% recalled fewer than three items. Varied awareness regarding the benefits of individual items in the kit was present among the participants: 60.1% knew the nutritional benefits of dates, 58.5% were aware of the role of health mix in improving nutrition, whereas knowledge regarding albendazole for deworming was comparatively lower (43.0%). With respect to utilisation, only 30.3% of mothers reported complete consumption of all nutrition kit items. Almost half of the mothers (51.9%) consumed the items partially, while 17.8% reported non-utilisation. The most common reason for incomplete utilisation was dislike of taste or smell (31.0%), followed by fear of gastrointestinal side effects (13.8%) and discouragement from family members (6.9%). In contrast, compliance with tablet albendazole was high, 90.3% reporting consumption. (Table 3)

Table 3. Nutritional kit and cash assistance details among postnatal mothers (n=180)

Variable	Category	Frequency (n)	Percentage (%)
MRMBS eligibility	Yes	140	78.0
	No	40	22.0
Proportion of cash assistance spent on nutrition	>75%	31	17.2
	50–75%	88	48.9
	<50%	61	33.9
Nutrition kits received	Yes	140	78.0
	No	40	22.0
Number of nutrition kits received (n=140)	1 kit	32	22.86
	2 kits	108	77.14
Number of items in the kit recalled by the mother			
< 3 items		79	43.9
≥ 3 items		101	56.1
Knowledge regarding benefits of kit components			
Health mix – improves nutrition		105	58.5
Dates – improves haemoglobin / nutrition		108	60.1
Tablet Albendazole – deworming		77	43.0
Utilisation of kit items (excluding Albendazole)			
Fully consumed		55	30.3
Partially consumed		93	51.9
Never consumed		32	17.8
Reasons for non-/partial utilisation*			
Disliked taste or smell		56	31.0
Fear of side effects (e.g. gastritis)		25	13.8
Advised by family members not to consume		12	6.9
Tablet Albendazole consumption			
Yes		163	90.3
No		17	9.7

* Multiple responses.

Institutional delivery was universal among the study participants. Majority of the deliveries occurred in the public health sector (78.1%), with 31.7% conducted at tertiary care hospitals, followed by 29.3% at secondary care facilities and 17.1% at primary care hospitals. Private sector deliveries accounted for 21.9%. The mean pre-pregnancy weight of mothers was 46.75 ± 6.7 kg, which increased to 55.35 ± 7.9 kg in the third trimester, with an average gestational weight gain of 8.6 ± 2.7 kg. Most deliveries were full-term (95.1%), and normal vaginal delivery was the predominant mode (61.0%), while 39.0% underwent caesarean section. All pregnancies resulted in live births. 78.1% of newborns had a normal birth weight (≥2.5 kg), while 21.9% had low birth weight of < 2.5 kg. Only 4.8% of newborns required resuscitation at birth, indicating overall favorable perinatal outcomes (Table 4).

Table 4. Delivery details and maternal & child health outcomes among study participants (n = 180)

Variable	Frequency (n)	Percentage (%)
Place of delivery		
Public sector – Primary care hospital	31	17.1
Public sector – Secondary care hospital	53	29.3
Public sector – Tertiary care hospital	57	31.7
Private sector	39	21.9
Details of weight gain during pregnancy		
Pre-pregnancy weight (kg), Mean (SD)	46.75 (6.7)	—
Last measured weight in III trimester (kg), Mean (SD)	55.35 (7.9)	—
Average weight gain during pregnancy (kg), Mean (SD)	8.6 (2.7)	—
Full-term delivery		
Yes	171	95.1
No (Preterm)	9	4.9
Mode of delivery		
Normal vaginal delivery	110	61.0
Caesarean section	70	39.0
Birth weight		
≥ 2.5 kg	141	78.1
< 2.5 kg	39	21.9
Resuscitation required at birth		
Yes	9	4.8
No	171	95.2

Inferential analysis showed no statistically significant association between utilisation of nutrition kit components and selected socio-demographic or maternal outcome variables. Although this limits causal interpretation, it suggests relatively uniform program reach across population subgroups. The primary objective of this study was descriptive—to document utilisation patterns and identify implementation gaps—which was achieved through detailed assessment of coverage, awareness and consumption practices.

Discussion

The present study assessed the utilisation pattern of antenatal maternal and child health (MCH) kits provided under the Dr. Muthulakshmi Reddy Maternity Benefit Scheme (MRMBS) and examined associated maternal and neonatal outcomes among postnatal mothers in Tamil Nadu. The findings are discussed mainly in comparison to state and national standards like NFHS-5 and in the context of programmes like RMNCAH+N and objectives of MRMBS.

The mean age of the study participants was 23.75 ± 4.23 years, with the majority in the early twenties, reflecting the typical reproductive age pattern observed in India. NFHS-5 [7] reports that nearly half of Indian women give birth before 25 years of age, particularly in rural and semi-urban settings. Early childbearing, although socially normative, continues to pose increased health and nutritional risks, highlighting the importance of timely antenatal care and nutrition support emphasized under the RMNCAH+N framework [9].

The mean age of husbands was higher than that of the women, with most having completed higher secondary education or above. Spousal education and age maturity may have positively influenced maternal healthcare utilization by facilitating informed decision-making and financial support. This may partly explain the high proportion of early ANC registration observed in this study.

Family structure showed a predominance of joint and three-generation families (53.7%). While joint families can provide social support during pregnancy, they may also influence intra-household allocation of food and healthcare decisions. RMNCAH+N emphasizes family-centric approaches and community engagement to address such socio-cultural determinants of maternal health.

Socio-economic assessment revealed that most participants belonged to the middle and lower-middle classes. Although extreme poverty was not observed, these groups remain nutritionally vulnerable. NFHS-5 [8] reports persistent maternal undernutrition and anaemia even among non-poor households, indicating that economic status alone does not ensure adequate maternal nutrition, highlighting the relevance of targeted nutrition interventions such as nutrition kits and cash assistance under MRMBS.

Among those eligible for MRMBS, over one-third spent less than 50% on nutrition reflects competing household priorities and highlights the limitations of cash-based interventions alone. Receipt of nutrition kits by most eligible women further strengthens the programmatic impact, particularly as in-kind support ensures direct nutritional benefit. Nevertheless, variation in the number of kits received suggests gaps in continuity, possibly due to late registration, supply-side constraints, or high-risk obstetric conditions requiring differential follow-up.

Utilisation pattern of MRMBS nutrition kits revealed a gap between scheme coverage and effective consumption. Although most women received nutrition kits, only 30.3% reported complete consumption of all dietary components, while over half of the participants consumed them partially. Awareness regarding the benefits of kit components ranged from 43 % to 60.1%. This might be due to disinterest from the mothers' side to know the details or inadequate counselling during handing over the kits. These findings also suggest that provision of supplements alone is insufficient without sustained and intense behaviour change communication [7].

In contrast, compliance with tablet albendazole was high (90.3%), reflecting better acceptance of medical interventions compared to food-based nutritional supplements. This highlights the need to improve taste, smell or local acceptability and family-level behaviour change for nutritional components of the kit.

Institutional delivery was universal in the study population, with 78.1% of deliveries occurring in public sector facilities, predominantly at secondary and tertiary care hospitals. This is again similar to the NFHS-5 [8] findings for Tamil Nadu, which reports near-universal institutional delivery coverage.

Maternal weight gain during pregnancy was moderate, with a mean gestational weight gain of 8.6 ± 2.7 kg, which is lower than recommended standards. Despite this, 95.1% of deliveries were full-term and 78.1% of newborns had normal birth weight (≥2.5 kg). These relatively favourable outcomes may be attributed to timely antenatal care, institutional delivery and utilisation of nutritional interventions. However, low birth weight in 21.9% of newborns indicates that maternal undernutrition remains a concern, consistent with NFHS-5 observations.

The caesarean section rate was 39.0%, which is considerably higher suggesting an increasing LSCS trend as reported in NFHS-5 data for Tamil Nadu. While access to emergency obstetric care is essential, this finding highlights the need for rationalisation of caesarean deliveries through strengthened supervision.

Further inferential tests and regression analysis on the data showed that there is no significant association between the utilisation of the items in the kit and any other socio-demographic or other study variables. This suggests equitable program reach [6], non-discriminatory service delivery and minimal differential access or utilisation based on individual maternal characteristics. It also implies that programmatic factors such as universal design, standardized kit composition and consistent service delivery through the public health system may have played a more decisive role in determining utilization.

Despite equitable access achieved by RMNCAH+N and MRMBS, the observed suboptimal full consumption of nutrition kit components and persistence of low birth weight in a subset of newborns suggest that behavioural, counselling-related, and acceptability factors, rather than access alone may be limiting the impact of the intervention. Strengthening interpersonal communication by frontline workers [10] and improving palatability and acceptability of kit components may therefore be critical to translating coverage into improved nutritional outcomes. Convergence between ICDS, health services, and maternal benefit schemes

remains crucial to achieve the RMNCAH+N vision of comprehensive, equitable and life-cycle–based maternal care.

The study has some limitations such as its cross-sectional study design could not establish temporal or causal relationships between nutrition interventions and MCH outcomes. Information on expenditure of cash assistance on nutrition was self-reported, making it susceptible to recall bias and social desirability bias. Also, anemia and nutritional status were primarily based on recorded or reported information, without any laboratory confirmation.

Future studies on this area can adopt longitudinal / cohort designs to assess the impact of MRMBS and nutrition interventions on birth outcomes and maternal nutritional status. Qualitative exploration of household decision-making regarding cash utilization can provide deeper insights into barriers to optimal nutrition spending. Detailed exploration of taste preferences and perceived side effects was beyond the scope of this quantitative study; qualitative methods such as focused group discussions or in-depth interviews may provide deeper insights.

Conclusion

The study demonstrates high coverage of antenatal care services, institutional delivery, and maternity benefit schemes among postnatal mothers in Tamil Nadu, reflecting effective implementation of the MCH programmes and MRMBS. However, utilisation of nutritional components of the MCH kits remains suboptimal despite good scheme coverage. Partial consumption, limited awareness of benefits and socio-cultural barriers continue to affect maternal nutrition and may contribute to residual low birth weight. Strengthening nutrition counselling, improving acceptability of supplements and ensuring behavioural change in the community are essential to enhance the impact of maternal nutrition interventions and improve maternal and neonatal outcomes.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

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