ISSN Online: 3007-1941 ISSN Print: 3007-1933 https://msra.online/index.php/Journal/about

Multidisciplinary Surgical Research Annals
https://msra.online/index.php/Journal/about
Volume 4, Issue 1 (2026)

Comparison Of Magnesium Sulphate Verses Nifedipine In Preterm Labor

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Article Details

Keywords: Magnesium Sulfate, Nifedipine, Preterm Labor

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ABSTRACT

Objectives: To comparatively evaluate the effectiveness of magnesium sulfate and nifedipine in the management of preterm labour.

Materials and Methods: After ethical approval, 120 eligible patients were enrolled and divided into two groups, receiving either oral nifedipine or intravenous magnesium sulfate. Maternal and fetal parameters were monitored, treatment efficacy was assessed at 48 hours, and data were collected via a predesigned questionnaire and analyzed using SPSS Version 26.

Results: The study participants had a mean age of 33.54 ± 6.78 years, with 49 (40.8%) aged 18–30 years, 44 (36.7%) aged 31–40 years, and 27 (22.5%) older than 40 years. Treatment efficacy was higher in Group A (46 patients, 76.7%) than in Group B (34 patients, 56.7%), while lack of efficacy was 23.3% and 43.3%, respectively. The mean gestational age was 31.62 ± 2.85 weeks in Group A and 31.31±3.24 weeks in Group B. Mean parity was 2.23±1.14 in Group A versus 1.80 ± 0.93 in Group B, and mean gravida was 2.68 ± 1.32 compared with 2.26 ± 1.16. In Group A, no significant association was found between efficacy and age, parity, gestational age, or gravida. In Group B, while age and gestational age were not significantly associated with efficacy, parity ($p = 0.01$) and gravida ($p = 0.02$) showed significant correlations, with higher treatment success observed in patients with parity 3–4 and gravida greater than three.

Conclusion: Nifedipine proved more effective than magnesium sulfate in delaying preterm labor, with higher efficacy and fewer maternal side effects, while magnesium sulfate's effectiveness was influenced by maternal parity and gravida, emphasizing the need for individualized therapy.

INTRODUCTION:

Preterm labor, defined as the onset of regular uterine contractions with cervical changes before 37 completed weeks of gestation, remains a significant challenge in obstetrics worldwide.(1) It is a leading cause of neonatal morbidity and mortality, contributing to complications such as respiratory distress syndrome, intraventricular hemorrhage, and long-term neurodevelopmental delays.(2) The global incidence of preterm birth has been increasing, especially in developed countries, despite significant advancements in obstetric care.(3) Preterm birth (PTB) remains a significant challenge in modern obstetrics, with its prevalence continuing to rise in many developed countries.(4) Each year, an estimated 15 million infants are born preterm worldwide.(5) Approximately half of women diagnosed with threatened preterm labor eventually progress to active preterm labor.(6) Although the precise mechanism of preterm labor is not fully understood, (7) it is thought to result from factors such as placental abruption, mechanical stress from uterine overdistension (e.g., multiple pregnancies or polyhydramnios), cervical insufficiency, infections, uterine anomalies, and compromised fetal blood flow.

Among the commonly used tocolytics, magnesium sulfate and nifedipine are widely employed. agnesium sulfate, administered intravenously, has proven efficacy in inhibiting uterine contractions but carries the risk of maternal adverse effects such as hypotension, flushing, and respiratory depression, necessitating close monitoring. On the other hand, nifedipine, an oral calcium channel blocker, offers comparable efficacy with fewer side effects, easier administration, and better maternal tolerability. Several studies have suggested that nifedipine may be as effective or even superiorto magnesium sulfate in delaying preterm labor.

Despite the widespread use of these agents, comparative data on their efficacy and safety remain limited, especially in local populations. Understanding the relative benefits and risks of these tocolytics is essential for guiding individualized treatment decisions, improving maternal safety, and optimizing neonatal outcomes.

This study was designed to compare the effectiveness of magnesium sulfate and nifedipine in the management of preterm labor among pregnant women presenting to a tertiary care hospital.

Objective:

To comparatively evaluate the effectiveness of magnesium sulfate and nifedipine in the management of preterm labour.

MATERIALS AND METHODS:

Study Design: Randomized controlled trial
Study setting: Department of obstetrics and gynecology Surgery, DHQ Teaching Hospital Rawalpindi.
Duration of the study: Duration of the study was 6 month.
Sampling Technique: Non-probability Consecutive sampling

Selection criteria:

Inclusion criteria:

Pregnant women with preterm labour between 28 and 36+6 weeks of gestation.
Singleton pregnancy confirmed on clinical examination and/or ultrasound.
Presence of regular uterine contractions (≥4 contractions in 20 minutes or ≥8 contractions in 60 minutes) associated with cervical changes (cervical dilatation ≤4 cm and/or cervical effacement).
Live fetus with reassuring fetal heart rate pattern.
Women aged 18–45 years.

Exclusion criteria:

Preterm labour associated with preterm premature rupture of membranes (PPROM).
Contraindicated to nifedifine and magnesium sulfate.

Patients with known known allergy or hypersensitivity to magnesium sulfate or nifedifine.
Maternal medical conditions that contraindicated the use of tocolytic therapy included severe pre-eclampsia or eclampsia, significant underlying cardiac disease, uncontrolled diabetes mellitus, and severe anemia.

Methods:
Following approval from the Ethical Committee of DHQ Teaching Hospital Rawalpindi, eligible patients fulfilling the inclusion criteria were recruited after obtaining written informed consent from the patients or their guardians. A total of 120 participants were enrolled and allocated into two equal groups. Participants in Group A were administered oral nifedipine, starting with a 30 mg loading dose followed by 20–30 mg every 4–6 hours until uterine contractions ceased. Group B received intravenous magnesium sulfate, given as a 4 g loading dose over 15 minutes, followed by a maintenance infusion of 1 g per hour, continued until delivery, completion of 24 hours, or the development of unacceptable side effects. Maternal and fetal parameters were monitored at four-hour intervals. Treatment effectiveness was evaluated by the researcher 48 hours after initiation and classified as either effective or non-effective. Data were collected using a predesigned questionnaire. The collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) software, Version 26.

RESULTS: The mean age of the study participants was 33.54 ± 6.78 years. Regarding age distribution, 49 (40.8%) participants were aged 18–30 years, 44 (36.7%) were between 31–40 years, and 27 (22.5%) were older than 40 years (Table 1). Treatment efficacy was observed in 46 patients (76.7%) in Group A, compared with 34 patients (56.7%) in Group B. Conversely, lack of efficacy was noted in 14 patients (23.3%) in Group A and 26 patients (43.3%) in Group B (Table 2). The mean gestational age was 31.616 ± 2.85 weeks in Group A and 31.31 ± 3.24 weeks in Group B. The mean parity was 2.23 ± 1.14 in Group A compared with 1.80 ± 0.93 in Group B. Similarly, the mean gravida was 2.68 ± 1.32 in Group A, whereas it was 2.26 ± 1.16 in Group B (Table 3). In Group A, no statistically significant association was observed between treatment efficacy and age groups (p = 0.12), parity (p = 0.13), gestational age (p = 0.69), or gravida (p = 0.38). Among patients aged 18–30 years, efficacy was noted in 43.5%, while lower efficacy was observed in older age groups. Similarly, patients with parity 1–2 and gestational age greater than 30 weeks showed higher efficacy rates, though these differences were not statistically significant. In Group B, age groups (p = 0.57) and gestational age (p = 0.98) also did not show a significant association with efficacy. However, parity demonstrated a statistically significant association with treatment outcome (p = 0.01), with higher efficacy seen among patients with parity 3–4. Gravida was also significantly associated with efficacy in Group B (p = 0.02), where patients with gravida greater than three showed better treatment response compared to those with lower gravida (Table 4).

Table 1: Patient characteristics of enrolled patients (n=120)

Variables	
Age (Years)	33.54±6.78
Age Groups	
18-30 years	49(40.8%)
31-40 years	44(36.7%)
>40 years	27(22.5%)

Table 2: Frequency of efficacy of both groups (n=120)

Efficacy	Group A	Group B
Yes	46(76.7%)	34(56.7%)
No	14(23.3%)	26(43.3%)

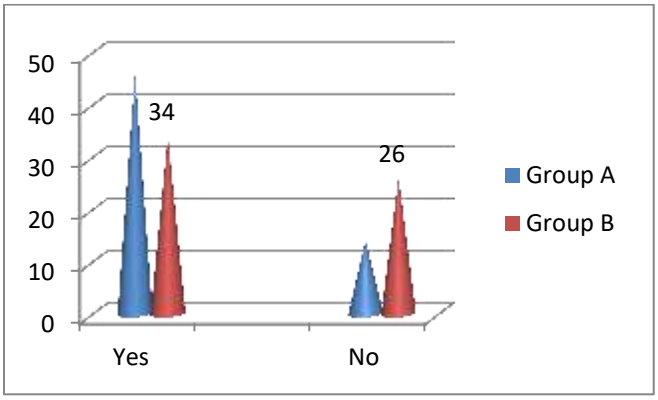

Fig 1: Frequency of patients on the basis of efficacy.

Table 4: Comparison between groups according to demographic data (n=120)

	Group A (Mean ±SD)	Group B (Mean ±SD)
Gestational age (Weeks)	31.616±2.85	31.31±3.24
Parity	2.23±1.14	1.80±0.93
Gravida	2.68± 1.32	2.26± 1.16

Table 4: Stratification of patients on the basis of efficacy with respect to age Groups, parity, Gestational age and Gravida.

Groups	variables	Efficacy		p-value
		Yes	No	
	Age Groups			
Group A	18-30 years	20(43.5%)	2(14.3%)	0.12
	31-40 years	17(37.0%)	7(50.0%)	
	>40 years	9(19.6%)	5(35.7%)	
Group B	18-30 years	14(41.2%)	13(50.0%)	0.57

	31-40 years	11(32.4%)	9(34.6%)	
	>40 years	9(26.5%)	4(15.4%)	
	Parity			
Group A	1-2	30(65.2%)	6 (42.9%)	0.13
	3-4	16(34.8%)	8(57.1%)	
Group B	1-2	19(55.9%)	22(84.6 %)	0.01
	3-4	15(44.1%)	4(15.4%)	
	Gestational age			
Group A	25-30	17(37.0%)	6(42.9%)	0.69
	>30	29(63.0%)	8 (57.1%)	
Group B	25-30	13(38.2%)	10(38.5 %)	0.98
	>30	21(61.8%)	16(61.5 %)	
	Gravida			
Group A	1-3	32(80.0%)	8(20.0%)	0.38
	>3	14(70.0%)	6(30.0%)	
Group B	1-3	28(51.9%)	26(48.1 %)	0.02
	>3	6(100.0%)	0(0.0%)	

Discussion: Preterm labor remains a major cause of perinatal morbidity and mortality worldwide, making effective tocolytic therapy crucial for prolonging pregnancy and improving neonatal outcomes. This study compared the efficacy of oral nifedipine and intravenous magnesium sulfate in the management of preterm labor, evaluating both maternal and neonatal outcomes as well as factors influencing treatment response. Preterm labor is a major concern in obstetric care due to its association with neonatal morbidity and mortality.(8, 9) Preterm birth continues to be a major challenge in modern obstetrics, with its prevalence rising steadily, especially in developed countries, posing significant risks for neonatal morbidity and long-term health complications.(10) Management of preterm labor commonly relies on tocolytic therapy, which helps delay uterine contractions and prolong pregnancy, allowing the fetus crucial additional time for growth and maturation.(11) Magnesium sulfate and nifedipine are widely used tocolytic agents, yet their relative effectiveness and safety in the management of preterm labor continue to be important areas of clinical research and discussion.(12) Treatment efficacy was higher in the nifedipine group (76.7%) compared to the magnesium sulfate group (56.7%). This finding is consistent with several clinical trials and meta-analyses, which have reported that nifedipine is an effective and well-tolerated tocolytic agent, often

providing comparable or superior uterine relaxation compared to magnesium sulfate, with fewer maternal side effects. (13-15) Magnesium sulfate, although historically the standard for tocolysis, is associated with adverse effects such as flushing, hypotension, and neuromuscular symptoms, which may limit its tolerability and continuation in some patients. A study conducted by Mahham Janjua et al.(14) stated that the efficacy of nifedifine was 47.83%. The present study support oral nifedipine as a preferred first-line tocolytic agent in the management of preterm labor due to its higher efficacy and favorable side effect profile. Magnesium sulfate remains a useful alternative, particularly in specific clinical scenarios or when nifedipine is contraindicated, but careful monitoring is required due to its potential maternal adverse effects.

As preterm birth continues to be a leading cause of neonatal morbidity and mortality worldwide, the development and implementation of effective interventions are critically needed to improve both short- and long-term outcomes for affected infants.(16) Magnesium sulfate and nifedipine act as tocolytics by inhibiting uterine contractions, with nifedipine functioning as a calcium channel blocker and magnesium sulfate modulating calcium influx and myometrial excitability.(17) Nifedipine, with fewer side effects and easy oral administration, is considered a safer alternative. Another study (18) stated that oral nifedipine is as effective as magnesium sulfate. In a study by Srisuda Songthamwat et al. stated that Nifedipine had a higher success rate for inhibiting threatened preterm contractions. The primary benefit of tocolytic therapy is to prolong pregnancy for at least 48 hours, providing sufficient time for corticosteroids to enhance fetal lung maturity and reduce neonatal respiratory complications.(19, 20) In this study, nifedipine successfully inhibited uterine contractions in approximately 76.7% of cases of threatened preterm labor, a result consistent with findings from previous research, demonstrating its effectiveness as a first-line tocolytic agent.(21, 22)

CONCLUSION: It was concluded that Nifedipine was more effective than magnesium sulfate in delaying preterm labor, with higher overall efficacy and fewer maternal side effects. Maternal parity and gravida influenced magnesium sulfate efficacy but not nifedipine, highlighting the importance of individualized treatment decisions based on patient characteristics.

References:

Khandre V, Potdar J, Keerti A, Khandre Jr V. Preterm birth: an overview. Cureus. 2022;14(12).

Glover AV, Manuck TA, editors. Screening for spontaneous preterm birth and resultant therapies to reduce neonatal morbidity and mortality: A review. Seminars in Fetal and Neonatal Medicine; 2018: Elsevier.

Walani SR. Global burden of preterm birth. International Journal of Gynecology & Obstetrics. 2020;150(1):31-3.

Hoh J-K, Lappas M, Liu C, Qiao C, Pallavi K, Takeda J, et al. Preterm birth rate and dilemma of preterm labor treatment in Asia. Placenta. 2019;79:68-71.

Onishi J. Epidemiology and Incidence of Preterm Delivery. Preterm Labor and Delivery. 2020:17-25.

Haghighi L, Rashidi M, Najmi Z, Homam H, Hashemi N, Mobasseri A, et al. Comparison of intramuscular progesterone with oral nifedipine for treating threatened preterm labor: A randomized controlled trial. Medical Journal of the Islamic Republic of Iran. 2017;31:56.

Xu L, Yang T, Wen M, Wen D, Jin C, An M, et al. Frontiers in the etiology and treatment of preterm premature rupture of membrane: from molecular mechanisms to innovative therapeutic strategies. Reproductive Sciences. 2024;31(4):917-31.

Ohuma EO, Moller A-B, Bradley E, Chakwera S, Hussain-Alkhateeb L, Lewin A, et al. National, regional, and global estimates of preterm birth in 2020, with trends from 2010: a systematic analysis. The Lancet. 2023;402(10409):1261-71.

Ayele TB, Moyehodie YA. Prevalence of preterm birth and associated factors among mothers who gave birth in public hospitals of east Gojjam zone, Ethiopia. BMC pregnancy and childbirth. 2023;23(1):204.

Flenady V, Reinebrant HE, Liley HG, Tambimuttu EG, Papatsonis DN. Oxytocin receptor antagonists for inhibiting preterm labour. Cochrane Database of Systematic Reviews. 2014(6).

Yamaji N, Suzuki H, Saito K, Swa T, Namba F, Vogel JP, et al. Tocolytic therapy inhibiting preterm birth in high-risk populations: a systematic review and meta-analysis. Children. 2023;10(3):443.

Gopy M. Efficacy and safety of tocolytic therapy with oral nifedipine for the management of preterm labor: Prospective observational study.

Naz S, Majid E, Soomro S, Perveen R, Baloch R. Efficacy of nifedipine in suppression of preterm labour. Pak J Surg. 2011;27(4):299-303.

Roos C, Spaanderman ME, Schuit E, Bloemenkamp KW, Bolte AC, Cornette J, et al. Effect of maintenance tocolysis with nifedipine in threatened preterm labor on perinatal outcomes: a randomized controlled trial. Jama. 2013;309(1):41-7.

JANJUA M, WAJID R, FATIMA T. Comparison of Efficacy of Nifedipine Alone and with Progesterone Depot for Tocolysis in Preterm Labour.

Cao G, Liu J, Liu M. Global, regional, and national incidence and mortality of neonatal preterm birth, 1990-2019. JAMA pediatrics. 2022;176(8):787-96.

Shao Y, Gu S, Zhang X. [Retracted] Effects of Nifedipine and Labetalol Combined with Magnesium Sulfate on Blood Pressure Control, Blood Coagulation Function, and Maternal and Infant Outcome in Patients with Pregnancy-Induced Hypertension. Computational and Mathematical Methods in Medicine. 2022;2022(1):9317114.

Glock JL, Morales WJ. Efficacy and safety of nifedipine versus magnesium sulfate in the management of preterm labor: a randomized study. American journal of obstetrics and gynecology. 1993;169(4):960-4.

Monteiro VP, Cima LC, Tauile MT. Antenatal Corticosteroid. Perinatology: Evidence-Based Best Practices in Perinatal Medicine: Springer; 2021. p. 627-30.

Roberts D. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database Syst Rev. 2007;4.

Chawanpaiboon S, Pimol K, Sirisomboon R. Comparison of success rate of nifedipine, progesterone, and bed rest for inhibiting uterine contraction in threatened preterm labor. Journal of Obstetrics and Gynaecology Research. 2011;37(7):787-91.

Songthamwat S, Na Nan C, Songthamwat M. Effectiveness of nifedipine in threatened preterm labor: a randomized trial. International journal of women's health. 2018:317-23.