

# Antenatal Magnesium Sulfate and Adverse Gastrointestinal Outcomes in Preterm Infants - A Systematic Review and Meta-Analysis

Arun PRASATH<sup>1</sup>, Nell ARONOFF<sup>2</sup>, Praveen CHANDRASEKHARAN<sup>1</sup>, and Shivashankar DIGGIKAR<sup>3</sup>

<sup>1</sup>University at Buffalo Jacobs School of Medicine and Biomedical Sciences

<sup>2</sup>University at Buffalo Libraries

<sup>3</sup>Oyster Woman and Child Hospital

February 22, 2023

## Abstract

**Background** Magnesium sulphate is widely used in antenatal mothers for various indications such as neuroprotection, tocolysis and preeclampsia. Some studies suggest that there is alteration in intestinal motility and blood flow in preterm neonates as a result of exposure to Magnesium sulphate. **Objective** To evaluate the effect of antenatal magnesium Sulphate (MgSO<sub>4</sub>) on mortality and morbidity outcomes related to the gastrointestinal system (GI) in preterm infants. **Search strategy** PubMed, CINAHL, Embase, and CENTRAL were searched through up to November 2022. **Data collection and Analysis** Two authors independently conducted data extraction. A random-effects model meta-analysis was performed. All included studies were assessed for methodological quality using appropriate quality assessment tool. The GRADE approach was used to assess the overall certainty of evidence. **Main Results** A total of thirty-eight observational and six RCTs involving 51,466 preterm infants were included. There were no increased odds of stage [?]2 NEC, (n= 50,727, OR:1.0; 95% CI: 0.89-1.12, I<sup>2</sup>- 7%), SIP (n= 34,186, OR: 1.22, 95% CI: 0.94-1.58, I<sup>2</sup>-30%), feed intolerance (n= 414, OR: 1.06, 95% CI: 0.64-1.76, I<sup>2</sup>-12%) in infants exposed to antenatal MgSO<sub>4</sub>. On the contrary, the incidence of surgical NEC was significantly lower in MgSO<sub>4</sub> exposure infants (n= 29,506 OR:0.74; 95% CI: 0.62-0.90, ARR: 0.47%). Studies assessing the effect on GI-related mortality were sparse to make any conceivable conclusion. GRADE certainty of findings were 'very low'. **Conclusion** Antenatal MgSO<sub>4</sub> did not increase the incidence of gastrointestinal-related morbidities or mortality in preterm infants.

## Hosted file

BJOG manuscript SD.docx available at <https://authorea.com/users/588891/articles/625946-antenatal-magnesium-sulfate-and-adverse-gastrointestinal-outcomes-in-preterm-infants-a-systematic-review-and-meta-analysis>

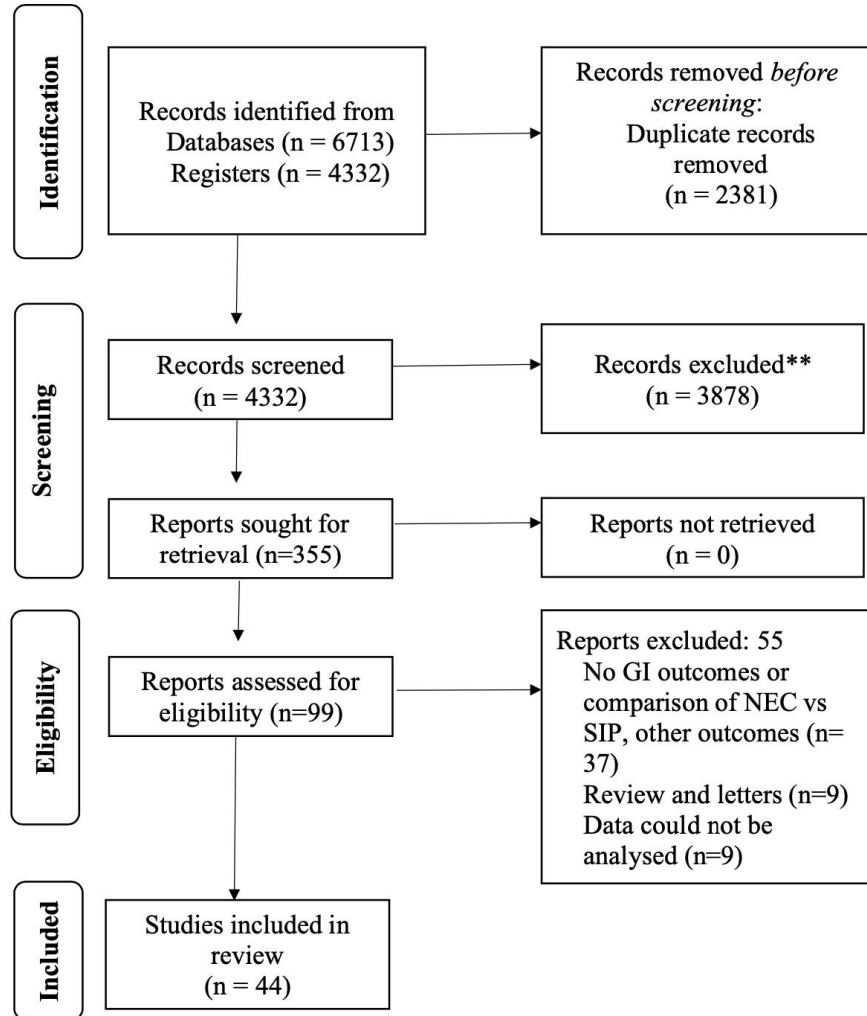


Figure 2A. Gastrointestinal associated Mortality

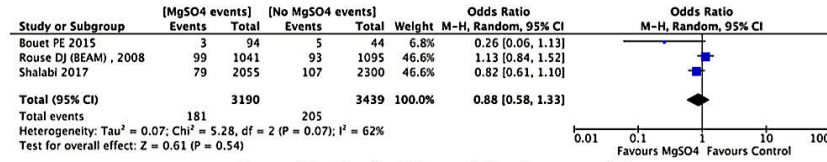


Figure 2B. Medical Necrotizing Enterocolitis

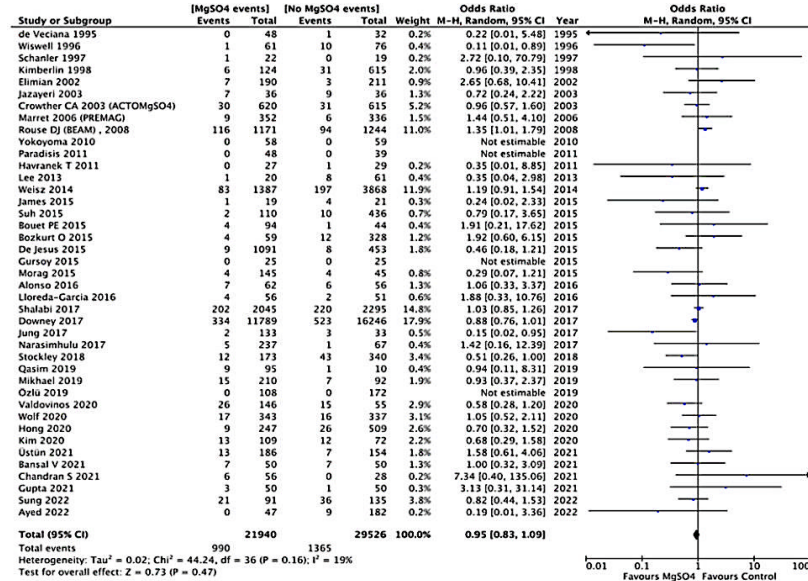


Figure 2C. Surgical Necrotizing Enterocolitis

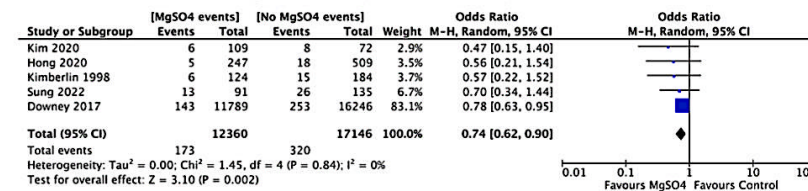


Figure 2D. Spontaneous intestinal perforation

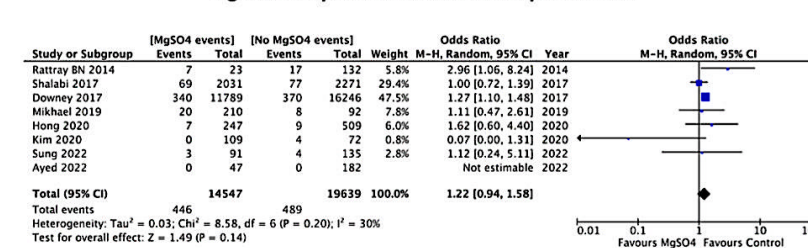


Figure 2E. Feeding intolerance

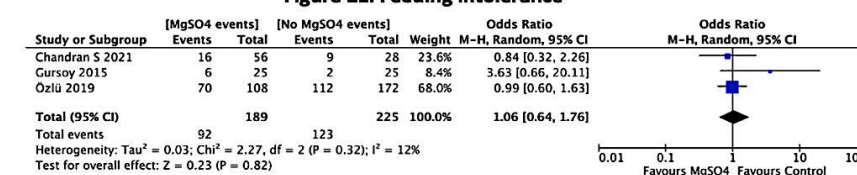
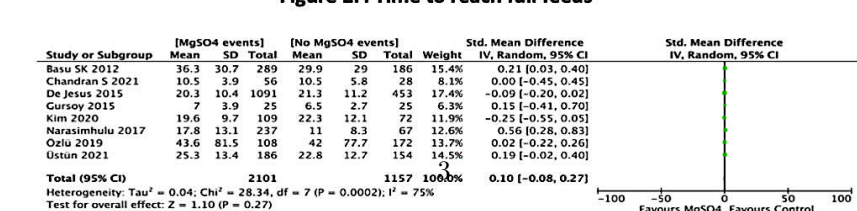
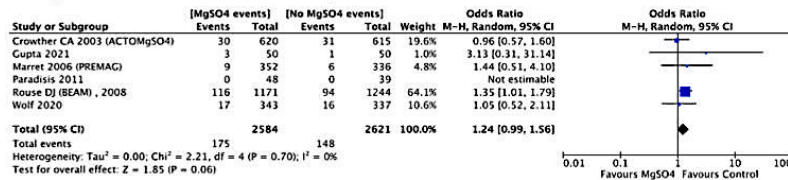


Figure 2F. Time to reach full feeds

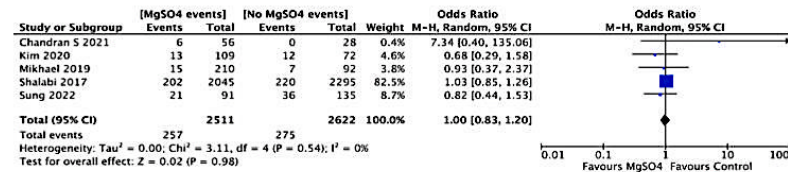




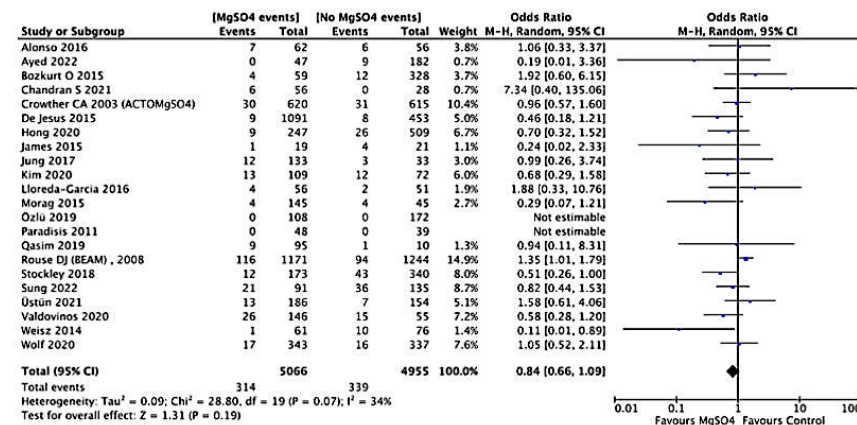
**Figure 3A. Medical Necrotizing enterocolitis in Randomized controlled trials**



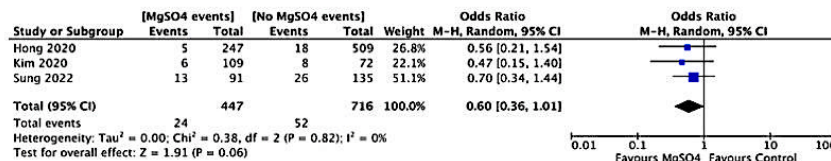
**Figure 3B. Medical Necrotizing enterocolitis in infants ≤ 28 weeks**



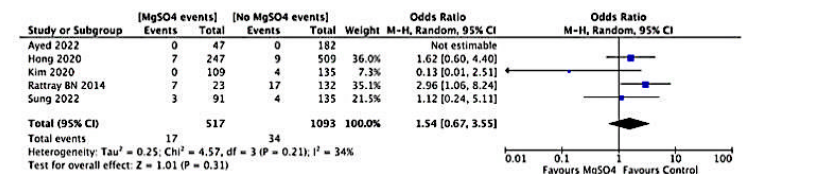
**Figure 3C. Medical Necrotizing enterocolitis in infants ≤ 32 weeks**



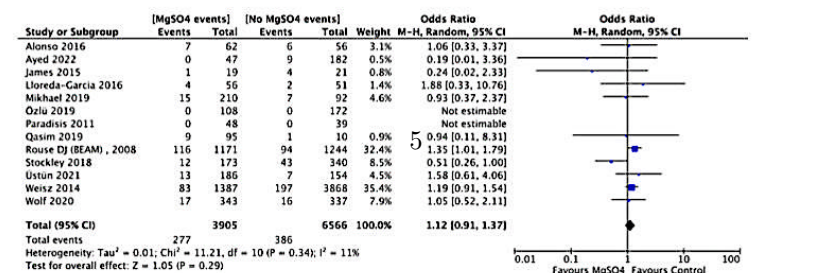
**Figure 3D. Surgical Necrotizing enterocolitis in infants ≤ 32 weeks**



**Figure 3E. Spontaneous intestinal perforation (SIP) in infants ≤ 32 weeks**

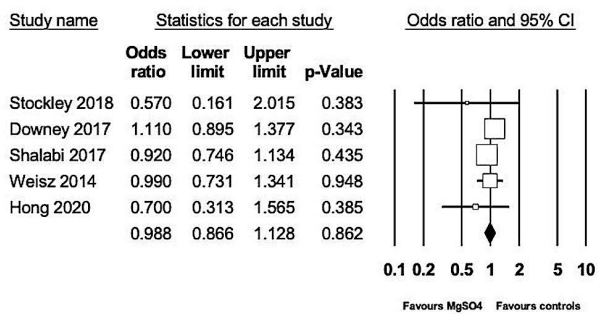


**Figure 3F. Medical Necrotizing enterocolitis when Magnesium sulfate was indicated for neuroprotection in infants ≤ 32 weeks**

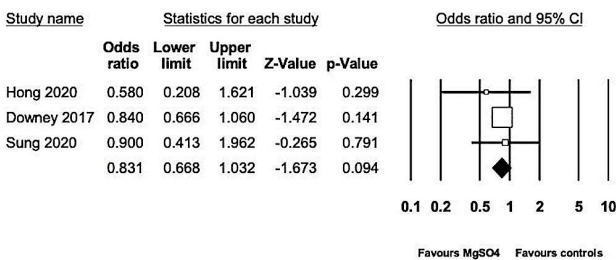


**Figure 3G. Medical Necrotizing enterocolitis when**

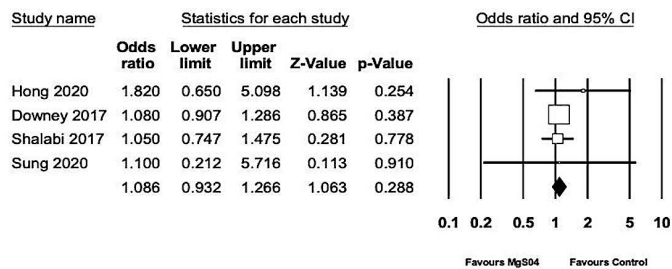
**Figure 4A. Adjusted Odds ratio analysis for Medical Necrotizing enterocolitis(Stage >=2 NEC)**



**Figure 4B. Adjusted Odds ratio analysis for Surgical Necrotizing enterocolitis**



**Figure 4C. Adjusted Odds ratio analysis for Spontaneous intestinal perforation**



**Figure 5. Risk of Bias assessment for Randomized Controlled Trials**

Study	Risk of bias domains					Overall
	D1	D2	D3	D4	D5	
Crowther CA 2003 (ACTOMgSO4)	+	+	+	+	+	+
Marret 2006 (PREMAG)	+	+	X	+	+	X
Rouse DJ, 2008 (BEAM)	+	+	+	+	+	+
Paradis 2011	+	-	+	+	+	-
Wolf 2020	+	+	+	+	+	+
Gupta 2021	X	-	+	X	-	X

Domains:  
D1: Bias arising from the randomization process.  
D2: Bias due to deviations from intended intervention.  
D3: Bias due to missing outcome data.  
D4: Bias in measurement of the outcome.  
D5: Bias in selection of the reported result.

Judgement  
X High  
- Some concerns  
+ Low

**Figure 6. Funnel plot to assess for publication or selection bias for Medical Necrotizing enterocolitis**

