EAS Journal of Nursing and Midwifery
Abbreviated Key Title: EAS J Nurs Midwifery
ISSN: 2663-0966 (Print) & ISSN: 2663-6735 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-7 | Issue-3 | May-Jun -2025 | DOI: https://doi.org/10.36349/easjnm.2025.v07i03.003

Original Research Article

Competency of Nurses and Midwives on the Administration of Magnesium Sulphate in the Management of Severe Pre-Eclampsia and Eclampsia at Kapiri Mposhi District Hospital, Central Province, Zambia

Juness Kachimba[1], Chisha Jones Simuyemba[2*], Febiano Phiri[3], Bwalya Munjili[4], Isabel Nyahoda[5], Kenny Kaluba[6]

[1]Department of Research, Eden University, Lusaka, Zambia
[2]Faculty of Clinical Nursing, Eden University, P.O Box, Lusaka, Zambia
[3]Facaulty of Clinical nursing, Eden University, Lusaka, Zambia
[4]National Institute of Public Administration, Health service management, Nursing, P.O Box, 31990, Lusaka, Zambia
[5]Facaulty of Clinical nursing, Eden University, Lusaka, Zambia
[6]Kapiri Mposhi District Hospital, Maternity Ward, Kapiri Mposhi, Zambia

Article History
Received: 09.04.2025
Accepted: 15.05.2025
Published: 02.06.2025

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Introduction:*** Magnesium Sulphate (MgSO4) is the first-line treatment for severe pre-eclampsia and eclampsia, conditions that contribute significantly to maternal and fetal mortality worldwide. Despite its availability in Zambia, gaps in knowledge and competency among healthcare providers may hinder its effective use. This study aimed to assess the competence of nurses and midwives at Kapiri Mposhi District Hospital in the administration of MgSO4. ***Methods:*** This was a cross-sectional study where 100 respondents participated in the study. Participants were randomly selected. A structured questionnaires and checklists were used to collect data. Statistics Package for Social Sciences computer software package version 23.0 was used to analyze data. Chi square tests was used to test the significance of the association between Knowledge on administration of MgSo4, Competence in MgSo4 administration, among nurses and midwives at Kapiri Mposhi District Hospital. A 95% confidence interval and P value of 0.05 were used to ascertain the degree of significance. Multivariate binary logistic regression model to determine predictors of practices and need for information was also used. ***Result:*** On analyzing the dependent variables, majority, 71% demonstrated competence in MgSo4 administration. More than half 69% of respondents had knowledge on MgSO4 administration and 58% were trained. However, 31% lacked knowledge, and 29% were either unskilled or had limited skills. Almost all (92%) of the respondents confirmed MgSO4 being readily available in the department while 73.9% of respondents actively used it. Associated barriers to utilization included fear of side effects and lack of mentorship. ***Conclusion:*** Lack of knowledge was the main reason associated with lack of competence in MgSo4 administration among 29% of nurses and midwives regardless of the period of being in service. Particular attention should therefore be given to ensuring that nurses and midwives undergo trainings, mentorship programs, and making available MgSo4 administration guidelines on in the labor ward for easy guidance and improvement of maternal health outcomes.

Keywords: Administration of MgSo4, Competence, Knowledge.

1. INTRODUCTION

Magnesium Sulphate (MgSO4) is the drug of choice for effective treatment/management of Eclampsia and Severe Pre-eclampsia Duley *et al*, [1]. Severe pre-eclampsia and eclampsia account for an estimation of over 70 000 maternal and 500 000 fetal deaths annually. Worldwide, the incidence of Severe pre-eclampsia is in the range of 5-7% of all pregnant women [2].

Effective Management of Severe pre-eclampsia and Eclampsia using MgSo4 is one of the signal functions of Emergency Obstetric and Newborn Care (EMONC) to prevent and promptly treat complications and consequently avert maternal and newborn deaths (Obstetric & Newborn Care in Maternal Health, MOH, [3].

***Corresponding Author:** Chisha Jones Simuyemba
Faculty of Clinical Nursing, Eden University, P.O Box, Lusaka, Zambia

With regard to the administration of MgSo4, a study conducted by Sevene *et al*. [4] reported on barriers affecting the use of MgSo4 in which a range of market and system failures that explain the reasons to low use of MgSo4 were identified, and these included the high price of generic MgSO4. Seven's study findings stated that unavailability of MgSo4 affected its use and administration. The fact that correct administration requires one to have right skill, it is deemed necessary that this study on competency is done to assess quality of patients care.

Similarly in another study conducted by Anna and Ridge *et al* [5], on Identifying Health System Barriers and Enablers to availability and use of MgSo4 Injection in poor resource countries: findings were that there was a "fear" of using MgSO4 among the health professionals; as such, staff in many of secondary care hospitals and basic health units referred convulsing patients without any emergency management because they felt inadequate to manage them. These findings do not assess the competence of the mentioned health professionals to correctly administer MgSo4. Furthermore, fear was mostly a sign of lacking adequate knowledge and skill to correctly administer MgSo4. Therefore, it is necessary that this study is done to find the right cause to low utilization of MgSo4 in order to avoid fear and manage patients accordingly.

Locally, Kapiri Mposhi District hospital has been recording high numbers of maternal mortalities attributed to Severe Pre-eclampsia and Eclampsia besides having enough qualified nurses and midwives and MgSo4 mostly readily available [6]. This research is therefore critical to ascertain gaps on knowledge and competencies of nurses and midwives at the mentioned hospital on correct MgSo4 administration.

2. MATERIALS AND METHODS

2.1. Study Design, Setting, and Participants

An analytical cross-section design was used to investigate an association between MgSo4 administration and knowledge/ competence in the administration of MgSo4 among nurses and midwives at Kapiri Mposhi district hospital.

The study was conducted at Kapiri Mposhi district hospital of Central Province. Kapiri Mposhi District Hospital is located in deeper parts of Central province of Zambia, in Kapiri Mposhi District. It is the biggest health facility and the only referral Centre among 40 other health facilities in the district. It provides EmONC (Emergency Obstetric Nursing Care), BEmOC (Basic Emergency Obstetric Care) and CEmOC (Comprehensive Emergency Obstetric Care) interventions. This facility was picked for this study due to the nature of its functionality and also the fact that most of the maternal deaths that happens in the district takes place at this institution.

The study population for this research comprised of nurses and midwives who have been in service for at least 2 years and above and are involved in management of obstetric cases such as Eclampsia and Pre-eclampsia. All nurses and midwives were considered eligible if they were working at Kapiri District Hospital, have been in service for 2 years and above and are involved in the management of clients with obstetric conditions such as severe Pre-eclampsia and Eclampsia. The study was conducted from April 2024 to April 2025.

2.2. Data Collection Procedure

Ethical clearance and approval was also done by Eden University Research Ethics Committee (EREC) and data was collected over a period of 10 weeks. Participants were assured of anonymity and confidentiality by interviewing them in privacy individually after consenting to participate with their signature. The researcher administered a questionnaire in face-to-face interviews that lasted about 30 minutes.

2.3. Instruments

Data was collected using a structured questionnaire alongside Dakshata checklist. A structured questionnaire and Dakshata checklist were used to collect data on administration of MgSo4. A structured questionnaire and Dakshata checklist were developed basing on the administration of MgSo4. The structured questionnaire was developed basing on the pilot testing to ensure feasibility and content validity. The instrument comprised of a series of questions that were closed-ended. The interview schedule contained questions under five sections; Section A: Demographic Characteristics (age, marital status, employment status, education level and income of the people within the population), Section B: Knowledge of Nurses and Midwives on administration of MgSo4, C: Competence of nurses and midwives on MgSo4 administration, D: administration of MgSo4 among nurses and midwives.

Administration of MgSo4 among nurses and midwives was graded as correct if respondents scored above 4 questions on section D and was graded as low if respondents scored 4 and below on questions in section D. Section B: Knowledge on administration of MgSo4 by nurses and midwives was graded as high if respondents scored above 3 questions on section B and was graded as low if respondents scored 3 and below on questions in section B. Section C: Competence of nurses and midwives. Competence of nurses and midwives in the administration of MgSo4 was graded as competent if respondents scored above 3 questions on section C and was graded as not competent if respondents scored 3 and below on questions in section C.

2.4. Data Analysis

Data were analyzed using the IBM® Statistical Package for Social Sciences (SPSS®) for Windows version 23.0. The Chi-square test was used to determine an association between predictor variables (demographic

factors, knowledge of nurses and midwives on MgSo4 administration, competence of nurses and midwives on the administration of MgSo4) and the outcome variable (administration of MgSo4 by nurses and midwives at Kapiri Mposhi district hospital). For those variables in categories, a Fisher's exact test was used. The Confidence Interval (CI) of (95%) was set and set level of significance at 5%.

3. RESULTS

The interview was conducted with 100 participants of whom more than half 59%, were females. In relation to duration in service, 40% represents number of respondents who served between 2-6 years, 35% served between 7-10yrs and 25% had served beyond 10yrs as presented in **Table 1**. **Table 2** shows that more than half 69%, had high knowledge levels on MgSo4 administration. Furthermore, it was learnt that 84% respondents said they knew how to administer MgSo4 and were trained while 15.9% knew how to administer the drug but were not trained. In relation to competence in MgSo4 administration, 71% of respondents revealed to be competent while 31% had limited skills. Active use of MgSo4 guidelines was demonstrated among 51% of respondents while 49% did not.

Table 1: Demographic characteristics of the participants (n = 100)

Characteristics	Frequency	Percent
Gender		
Male	41	41%
Female	59	59%
Duration in service		
2 to 6 years	40	40%
7 to 10 years	35	35%
Above 10 years	25	25%

Table 2: Independent variables (n=100)

Characteristics	Frequency	Percent
Overall knowledge levels on MgSo4		
High knowledge levels	69	69%
Low knowledge levels	41	41%
Administration of MgSo4/ training		
Knew how to administer/ trained	84	84%
Did not know how to administer/ not trained	16	16%
Competency in MgSO4 Administration		
Competent	71	71%
Limited skills	31	31%
Use of Guidelines		
Actively used the guidelines	51	51%
Did not use the guidelines	49	49%

Table 3 shows that there was a statistically significant association between knowledge level and administration of MgSo4 among nurses and midwives, as well as being trained on MgSo4 and administration of the drug. However, there was no statistically significant association between availability of guidelines and administration of MgSo4 among nurses/ midwives and between competency and administration of MgSo4.

Table 4 shows the binary logistic regression model was tested for multicollinearity, Hosmer and Lemeshow test of fitness for data, and omnibus test of model coefficients and classification accuracy. The dependent variable was administration of MgSo4: Good (1) and Poor (0). The results of the binary logistic regression analysis showed that holding other variables constant, participants who had low knowledge levels were 0.923 times less likely to correctly administer MgSo4 compared to those who had high knowledge levels, and this effect was significant (OR: 0.923, CI: 1.034 - 0.425, P: < 0.049). Further analysis showed that respondents who were not trained in MgSo4 were 1.351 less likely to achieve correct administration of MgSo4 compared to those who were trained and this effect was significant (OR: 1.351, CI: 1.403 – 0.252, P: < 0.041).

4. DISCUSSION OF FINDINGS

Results revealed that majority of respondents were females at 59% while men at were at 41%. Female representation was slightly higher than that of males because the study sample (n=100) targeted nurses and midwives a profession that mostly has a 2:1 Female to Male Ratio.

With regard to knowledge levels, more than half of respondents (69%) revealed knowledge on MgSo4. Furthermore, it was learnt that 84% respondents said they knew how to administer MgSo4 and were trained, while 15.9% knew how to administer the drug but were not trained. Knowledge depreciation on MgSO4

administration from the point of student training to being in service could be the possible effect to having the 31% of respondents who didn't know how to administer MgSo4 yet in service. These findings agree to the study done by Abubakari *et al.* [7], whose results showed that more than half of the respondents (53.5%) had good knowledge of respondents on MgSO4 administration and 46.5% of the respondents had poor knowledge of MgSO4 administration. Similarly, Smith *et al.* [8], conducted a study on "Knowledge of health care workers on Magnesium Sulphate, Eclampsia and Pre-eclampsia" and his findings showed that Students were more Knowledgeable (at student level) because global principles regarding use of MgSo4 for management of severe pre-eclampsia and Eclampsia were included in the pre- service health related trainings and so students were exposed to information. There was however knowledge decline later on due to lack of follow ups once students graduate and start practicing as health care workers.

On the other hand, some of the attributes such as; Experience could be the reason why the 15.9% who were not trained were able to administer MgSo4 (learning through observations). The 84.1% of those who were able to administer MgSo4 because they were trained could possibly depict the fact that trainings were available for nurses and midwives on MgSO4 administration. This is also confirmed by data [6], on trained nurses/ midwives which showed 72% respondents confirmed having attended a training out of which, 8% trained at university, 46% trained from college, 21% were trained through workshops while 25% were oriented within the hospital.

Table 3: The relationship between administration of MgSo4 and knowledge and training (n = 100) using a Crosstabulation analysis

Characteristics		**Administration of MgSo4**		**P value**
		Yes	**No**	
Knowledge	High knowledge levels	69 (69%)	7 (7%)	**0.049**
	Low knowledge levels	15 (15%)	9 (9%)	
Training	Trained	72 (72%)	6 (6%)	**0.041**
	Not trained	10 (10%)	12 (12%)	

Table 4: Binary logistic regression analysis of administration of MgSo4 by knowledge and training

Variables	**Indicators**	**Odds ratio**	**Adjusted estimates 95% CI**		**P value**
			Lower	**Upper**	
Knowledge	High knowledge levels	Ref			0.049
	Low knowledge levels	0.923	1.034	0.425	
Training	Trained	Ref			0.041
	Not trained	1.351	1.403	0.252	

According to the study results, there was an association between knowledge level and administration of MaSo4 among nurses/ midwives. With regard to knowledge level, consistence was found with results from a study conducted by Abubakari *et al.* [7], which highlighted a strong statistical correlation between the administration of MgSo4 and age, years of experience, and workplace. Most of the responders had understanding of magnesium sulfate dosage. Additionally, some midwives reported to have administered MgSO4 to their patients in the past. The research found a substantial statistical correlation between the administration of MgSo4 and factors such as age, years of experience, and workplace.

Results also revealed that there was an association between nurses and midwives being trained on MgSo4 and administration of the drug. Similar to the current study, Seif, and Rashi [8], conducted a study which reviewed that Knowledge is predicted by attending on-the-job training and working in higher healthcare facility level, while skills is predicted by attending on job training, more years of working experience in antenatal care units and being a medical doctor or assistant medical doctor. These findings show that on-the-job training is very effective in influencing the use of MgSo4 among nurses and midwives. Therefore, it is significant for health care facilities to adopt a trend of training nurses and midwives on MgSo4 and its use. This will enhance a comprehensive management of pre-eclampsia and eclampsia among pregnant women.

No association was found between availability of guidelines and administration of MgSo4 among nurses/ midwives. Contrary to the current results, in a study conducted by Eddy *et al.* [9], it was found out that MgSO4 was often unavailable in some facilities, particularly rural or lower level facilities, and stock-outs are an obstacle to its use. MgSO4 was also not consistently available in many low- and middle-income countries (LMICs) at country, regional and district levels, suggesting that facility-level stock-outs may reflect system-level unavailability.

With regard to the dependent variable (administration of MgSo4), a statistical significant association was found with knowledge and training. However, the sole respondent with high knowledge also demonstrated correct administration of MgSo4.

Therefore, in this study, the minority of respondents with low knowledge did not administer MgSo4 in pre-eclampsia and eclampsia patients. Regarding nurses and midwives being trained, there was an association with correct administration of MgSo4. Therefore, in this study, nurses and midwives found to have been trained in MgSo4, demonstrated correct administration of the drug while those not trained, did not administer MgSo4 eclampsia and pre-eclampsia.

Participants who had low knowledge levels were 0.923 times less likely to correctly administer MgSo4 compared to those who had high knowledge levels, and this effect was significant (OR: 0.923, CI: 1.034 - 0.425, P: < 0.049). Further analysis showed that respondents who were not trained in MgSo4 were 1.351 less likely to achieve correct administration of MgSo4 compared to those who were trained and this effect was significant (OR: 1.351, CI: 1.403 – 0.252, P: < 0.041).

On multivariable logistic analysis respondents who had low knowledge levels were 0.923 times less likely to achieve correct administration of MgSo4, compared to those who had high knowledge levels and this effect was significant (OR: 0.923, CI: 1.034 - 0.425, P: < 0.049) and were not trained in MgSo4 were 1.351 less likely to achieve correct administration of MgSo4 compared to those who were trained and this effect was significant (OR: 1.351, CI: 1.403 – 0.252, P: < 0.041).

5. CONCLUSION

The study identified two factors (knowledge level) and (training in MgSo4) as being significant in influencing correct administration of MgSo4 to patients with pre-eclampsia and eclampsia. This implies that, in order to improve correct administration, there is need for equipping nurses and midwives with knowledge on MgSo4 and ensuring trainings in MgSo4 among nurses and midwives regardless of the period of being in service. In-service trainings, workshops and “on going” mentorships may also be helpful in widening the base of knowledge and enable patients with pre/eclampsia get the best needed care and treatment.

6. LIMITATIONS OF THE STUDY

One of the main challenges was limited data collection time. As a result, the study did not use other data collection methods such as interviews to supplement on the data collected using questionnaire and checklist. Another limitation was financial constraints to support transportation. As a result of transport challenges, it took more than the planned period to complete data collection because most of the money was used to organize stationary (printing of consent forms, questionnaires and checklists). Furthermore, with the increase of transport fares due to increased threshold of fuel prices, the money earlier budgeted for transport became lesser than what was needed.

Acknowledgements

I would like to acknowledge and appreciate my fellow investigators; Juness Ng’ambi, Fabiano Phiri, Isabel Nyahoda, Andrew Mungili and Kenny Kaluba for their tireless input from the time of development of research proposal through to report writing. I also appreciate the Research Ethics Committee at Eden University and ERES Converge Institute for their tremendous support in this research project. Lastly, I would love to thank all the authors for their work which was used as point of reference especially on Literature review in this Research project.

Conflicts of Interest: The authors declare no conflict of interest regarding the publication of this article.

REFERENCES

1. Duley. L *et al* (2020), Magnesium Sulphate and Other Anticonvulsants for women with Pre-eclampsia (review), Cochrane Database of systems review 11: CD000025. pub2.
2. WHO (2019), Make Every Mother and Child Count, Geneva. World Health Organization.
3. Adogu, P.O.U., Uwakwe, K.A., Egenti, N.B., *et al*., (2015), Assessment of Waste Management Practices among Residents of Owerri Munipal Imo State Nigeria. Journal of Environmental Protection, 6, 446, [Online] Available from,https://www.scirp.org/html/4-6702622_56212.htm, on 02/10/2022 at 06:30 hours
4. Seven E. *et al* (2020) System and Market Failures: The unavailability of Magnesium Sulphate for the treatment of Eclampsia and Pre-Eclampsia in Mozambique and Zimbabwe. BMJ 331:765-9.
5. Anna .L. Ridge *et al* (2018), Identifying barriers to availability and use of Magnesium Sulphate, Biomedical Central Articles, Lusaka , Zambia.
6. Kapiri Mposhi MPDSR Multi-disciplinary team (2022), Report on Post MPDSR Health facility survey: determinants of maternal and perinatal mortalities in the district, Central Province, Zambia.
7. Abubakari A, Seidu B, Osman A, *et al*. (2024), Knowledge and practices of midwives on the administration of magnesium sulfate to pre-eclamptic or eclamptic women in a district level hospital in northern region of Ghana. 2(3):1-1. DOI:10.61505/evidence.2024.2.3.100. Accessed [Online] from, https://the.evidencejournals.com/index.php/j/article/download/100/137?inline=1, on 17/04/2025 at 12:30 hours
8. Smith, J.M., Lowe, R.F., Fullerton, J. *et al*. (2013), An integrative review of the side effects related to the use of magnesium sulfate for pre-eclampsia and eclampsia management. BMC Pregnancy Childbirth 13, 34. Accessed [Online] from, https://doi.org/10.1186/1471-2393-13-34, on 20/04/2025 at 10:15 hours
9. Seif, S.A., Rashid, S.A. (2022), Knowledge and skills of pre-eclampsia management among

healthcare providers working in antenatal clinics in Zanzibar. BMC Health Serv Res 22, 1512 (2022). Accessed [Online] from, https://doi.org/10.1186/s12913-022-08892-5, on 17/04/2025 at 14:25 hours

10. Eddy KE, Vogel JP, Zahroh RI, *et al*. (2022), Factors affecting use of magnesium sulphate for pre-eclampsia or eclampsia: a qualitative evidence synthesis. BJOG. 2022 Feb; 129 (3):379-391. doi: 10.1111/1471-0528.16913. Epub 2021 Oct 4. PMID: 34520111; PMCID: PMC9291451. Accessed [Online] from, https://pmc.ncbi.nlm.nih.gov/articles/PMC9291451/, on 17/04/2025 at 15:45 hours

Cite This Article: Juness Kachimba, Chisha Jones Simuyemba, Febiano Phiri, Bwalya Munjili, Isabel Nyahoda, Kenny Kaluba (2025). Competency of Nurses and Midwives on the Administration of Magnesium Sulphate in the Management of Severe Pre-Eclampsia and Eclampsia at Kapiri Mposhi District Hospital, Central Province, Zambia. *EAS J Nurs Midwifery*, *7*(3), 65-70.