

# Effect of Utilization of a Nursing Assessment Sheet on Nurses' knowledge and Performance Regarding Magnesium Sulphate Administration to Eclampsia Mothers

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**Abstract:** This study aimed to evaluate the effect of utilization a nursing assessment sheet on nurses' knowledge and performance regarding magnesium sulphate administration to eclampsia mothers. **Design:** A quasi-experimental design was used. **Sample type:** Convenience sample was recruited. **Setting:** The study was conducted at the Labor and Delivery unit in Mansoura University Hospital, Egypt, from the beginning of January until the end of March 2018. **Subjects:** Forty nurses working in Labour and Delivery unit. **Tools:** A Structured Interview Schedule: Covers the data related to general characteristics of nurses and knowledge of nurses about magnesium sulphate therapy, Nursing assessment sheet and an observation checklist for administration of Magnesium Sulphate to mothers, a question to assess the problems faced in utilizing nursing assessment sheet. **Results:** There was a highly statically significant difference before and after intervention, regarding the total knowledge score, total performance score, total patient's assessment score about MgSO<sub>4</sub> administration among the studied sample with improved knowledge, performance, patient's assessment score after intervention (P=0.001). Also, there was a significant relationship between (total knowledge score and total performance score), (total patient's assessment score and total knowledge score), (total performance scores and total patient's assessment score) among the studied sample after intervention (P >0.05). There were some problems which were faced by nurses in utilizing nursing assessment sheet as staff shortages, patient overload, and less experience. **Conclusion:** Utilization a nursing assessment sheet for the magnesium sulphate administration to eclampsia mothers results in improving nurses' knowledge, performance and patient assessment. Therefore, it is recommended to implement nursing assessment sheet in all clinical settings where MgSO<sub>4</sub> therapy is administered.

**Keywords:** Eclampsia, Magnesium Sulphate, Nursing Assessment sheet, Preeclampsia.

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## 1. INTRODUCTION

In Egypt, maternal mortality was 53 deaths per 100,000 live births in 2003, but it gradually declines to be 43.5 per 100 000 live births in 2015 (UNICEF, WHO, The World Bank, and the United Nations Population Division, 2014). According to Egyptian Ministry of Health, MMR is higher in upper Egypt than lower Egypt (74–61%, respectively). The most common cause of maternal death in Egypt is post-partum hemorrhage and preeclampsia with its complications (Kassebaum *et al.*, 2014).

Preeclampsia and eclampsia are two hypertensive disorders of pregnancy, two of the leading causes of maternal perinatal death in the world. Pre-eclampsia is a multisystemic disease characterized by the development of hypertension after 20 weeks of pregnancy, proteinuria or, in its absence, of signs or symptoms indicative of target organ injury. Eclampsia is the result of brain injury caused by pre-eclampsia (Peres, *et al.*, 2018). PE is associated with an increased risk of placental

detachment, premature labor, IUGR, acute renal failure, cardiovascular and vascular complications, disseminated intravascular coagulation and generalized maternal death (Portelli & Baron, 2018).

Magnesium sulfate is indicated for the prevention and control of seizures in eclampsia, for neuroprotection of the fetus before anticipated early preterm delivery, and for the postponement of premature delivery between 24 and 34 weeks of gestational age (American Congress of Obstetricians & Gynecologists Committee of Obstetric Practice, 2016). Immediate consequences of magnesium sulphate toxicity are: Nausea, vomiting, flushing, urinary retention, hypotension, low heart rate, loss of fetal heart rate variation, depressive neuromuscular function, and central nervous system depression leading to apnea and death. (Martin et al., 2017).

Prolonged use of magnesium for more than 48 hours may have adverse effects on neonatal bone mineralization. Use outside the indicators presents all the risks of use for the patients, without any obvious advantage. Errors related to the use of magnesium include mixing errors of solutions and dosages. These errors are aggravated by poor monitoring, the inability to identify early signs of magnesium toxicity and an uncoordinated and delayed response (Kayla et al., 2018).

The nurse should focus primarily on careful assessment of the patient before and during administration of magnesium sulphate. This assessment includes, blood pressure, pulse rate, respiratory rate, input / output, deep tendon reflexes, level of consciousness, headache / visual disturbances, lung sounds, epigastric pain, temperature, edema, In addition, an evaluation of the fetal heart rate and uterine contractions should be performed (Kaur & Kaur, 2013).

Nurses' assessment sheets and clinical protocols are particularly useful in guiding nurses in the management of MgSO<sub>4</sub>. The Federal Ministry of Health has developed a national protocol for obstetrical care services that outlines the management of eclampsia and how to use and monitor MgSO<sub>4</sub>. It is necessary to disseminate this protocol and train the country's health workers to use it (Federal Ministry of Health Abuja, 2012).

#### **Significance of the study:**

Eclampsia is one of the leading causes of maternal mortality and is responsible for more than 60,000 deaths worldwide each year (Duhig et al., 2018). Many strategies are used to reduce maternal mortality, one of these strategies is using nursing assessment sheet which helps nurses to plan and provide care to the mothers efficiently by early recognition of problems that may arise as a side-effect of magnesium sulphate therapy.

By praising the researcher's clinical setting, it was found that nurses were not properly following the steps of MgSO<sub>4</sub> administration. So, giving information and training on administration of MgSO<sub>4</sub> by using nursing assessment sheet lead to improve nurses knowledge and skills of nurses which help him to make an accurate assessment and documentation of the mother's condition, hence reducing maternal and fetal complications and mortality rate. Also, It can prevent nurse's negligence in administering magnesium sulphate by documenting the condition of mothers and the fetus and decreases the likelihood of an overdose of drug by communicating through documentation. Hence the need was felt to undertake a study to implementing nursing assessment sheet.

#### **Aim of the study:**

The study aimed to evaluate the effect of utilization a nursing assessment sheet on nurses' knowledge and performance regarding magnesium sulphate administration to eclampsia mothers.

#### **Study hypothesis:**

Nurses' knowledge and performance of administration of magnesium sulphate is expected to be good through the utilization of the nursing assessment sheet.

## **2. SUBJECTS AND METHOD**

**Study Design:** A quasi-experimental design was used.

**Study Setting :** The study was conducted in the Labor and Delivery unit of Mansoura University Hospital, Egypt. It is an emergency unit which provides health care, three days weekly to parturient women; either at a low or high risk, and to the abortion cases.

**Sample type:** A nonprobability sampling technique was used.

**Study Subjects:** A convenience sample of forty maternity nurses who working in Labour and Delivery unit, were included in this study.

**Data collection tools:**

Four tools were used

**Tool I: A Structured Interview Schedule:** Included two parts: **Part one:** Covers the personal data of nurses as age, experience year, professional qualification. **Part II:** Includes 22 items to assess knowledge of nurses about magnesium sulphate therapy as indications of magnesium sulphate administration, route of administration Magnesium Sulphate, the total loading dose of magnesium sulphate, the maintenance dose for magnesium sulphate therapy, antidote for magnesium sulphate and so on.

**Scoring system:**

Each question had given two options (correct, incorrect), scores range from 0-1. Score one was given for the correct answer, score zero was given for the wrong answer. The total knowledge scores = 22, it was classified as the following, scores (< 50%) = Poor, scores (50 - < 75 %) = fair scores ( $\geq 75\%$ ) = Good

**Tool II: The nursing assessment sheet for the administration of MgSO<sub>4</sub> to mothers having eclampsia:** It was adopted from **Kaur & Meenakshi, (2011)** to assist nurses to observe and record the condition of the mothers during the administration of magnesium sulphate therapy. The assessment part of the sheet included 15 components that were, day, time, respiration, pulse, B.P., headache, output, temperature, knee jerk, GCS score, epigastric pain, edema, site used for injection, comments and signature.

**Scoring system:**

The total items were 15 in 8 hours = 120, scores range from 0-120. It was classified as the following, scores (< 50%) = Poor assessment, scores (50 - < 75 %) = fair assessment, scores ( $\geq 75\%$ ) = Good assessment.

**Tool III: The observation checklist for administration of Magnesium Sulphate :** It was adopted from **Kaur & Meenakshi, (2011)** to assess the performance of nurses for utilizing nursing assessment sheet. It consists of 20 items which were distributed under various headings as - on admission assessment, before and after administration of MgSO<sub>4</sub> and emergency equipment. **On admission nurse has checked** (any previous administration of MgSO<sub>4</sub>, the indication for giving MgSO<sub>4</sub>, vital signs for baseline assessment, neurological status, urine output, blood reports for MgSO<sub>4</sub> plasma level. **Before administration of MgSO<sub>4</sub> nurse has checked** (doctor's order for the prescription, explained the purpose of administering to the patient, filled the correct dose, administered injection through right route, administered drugs at the correct time, monitored vital signs as mentioned in the assessment sheet, checked knee jerk, recorded urine output). **After administering MgSO<sub>4</sub> After administering MgSO<sub>4</sub> nurse has monitored** (untoward signs like headache, edema, visual disturbances and epigastric pain, injection site for edema or infiltration, maintained the record of MgSO<sub>4</sub>, reported any untoward sign to physician emergency equipment). **Emergency equipment** (kept Calcium Gluconate ready, kept the resuscitation trolley available to use in case of MgSO<sub>4</sub> overdose).

**Scoring system:**

Each item had given two options (done, not done), scores range from 0-20. Score one was given for the done item, score zero was given for not done item.

**Tool VI:** A question to assess the problems faced in utilization nursing assessment sheet as stated by nurses as staff shortages, patient overload, lack of in-service education, less experience.

**The validity of the Tool:**

The tools were reviewed by three panels of women's health experts to test the validity of the content. In accordance with the suggestions of the experts, the comments were considered.

**Reliability of the tools:**

The reliability of the tools was adopted from **Kaur & Meenakshi, (2011)** it was 0.747 for tool II (nursing assessment sheet) and it was 0.747 for tool III (the observation checklist).

**Ethical Considerations:**

Before conducting the study, an approval letter was obtained from the head of Women's Health and Midwives Nursing Department, Faculty of Nursing, Mansoura University, followed by approval letter from the Faculty Ethical Research Committee, then an approval letter from the director of Mansoura University Hospital (MUH) to carry out the study. Informed consent was obtained from each nurse prior to the procedure. All nurses had the right to refuse to participate in the study or to be withdrawal at any time. Study maneuvers don't cause harm to the nurses.

**A Pilot study:**

A pilot study was conducted on 10% of nurses (4 nurses) to test the applicability and importance of the study instrument and to verify the clarity of the questionnaire as well as to estimate the time required to respond. No modification was done, these nurses were excluded from the study sample.

**Data collection procedure:**

- Prior to data collection, approval of the study was obtained from the head of the department of obstetrics and gynecology at Mansoura University Hospital..

- Data was collected three days a week. The field work was carried out from the beginning of January to the end of March 2018

- The study was conducted in four phases: Assessment, planning, implementation, and evaluation.

- **Assessment phase:** An official permission was obtained for the study. Before proceeding with data collection, the purpose of the study was explained to the nurses. Nurses were told that the interview was voluntary and anonymous.

- **Planning phase:** Lecture about magnesium sulphate therapy, procedure of administration of magnesium sulphate and nursing assessment sheet were prepared.

- **Implementation phase:**

▪ At first a pretest was conducted as a first level of intervention by distributing the structured questionnaire which included general characteristics, nurses' knowledge about magnesium sulphate, then the nurses were given the nursing assessment sheet to fill when mothers with preeclampsia/ eclampsia were admitted and prescribed magnesium sulphate therapy. After that the researcher observed the performance of the nurses for 8 hrs shift while they were administering and caring for the patient receiving magnesium sulphate therapy by using checklist.

▪ Second, All nurses participated in three sessions.

▪ **First session:** Include an interactive lecture was conducted for all nurses to educate them about magnesium sulphate therapy by using a Power Point presentation. At the end of the first session, 40 nurses were divided into eight groups, 5 nurses in each group.

▪ **Second session:** In this session each group were educated how to fill assessment sheet for the administration Mgso4 to mothers having pre-eclampsia/ eclampsia.

▪ **Third session:** Designed to improve the performance of nurses in the administration of Magnesium Sulphate to mothers having pre-eclampsia/ eclampsia. Each group was educating the steps of the administration of the Magnesium Sulphate procedure followed by a demonstration. Repeat demonstrations occurred 2-3 times to be competence.

▪ Each session lasted about 30 to 45 minutes, in simple language, adapted to the level of understanding of the nursing staff. At the end of each session, comments were invited and nurses' questions were discussed to explain any misunderstandings. Various teaching methods were used, such as lectures, group discussions and demonstrations.

- **Evaluation phase:** During this phase, the effect of utilization of nursing assessment sheet as

knowledge, assessment and performance was evaluated by using the same tools. The immediate evaluation was conducted as a posttest.

- At the end the nurses were also asked about problems faced while conducting the nursing assessment sheet

**Statistical Analysis:**

The statistical analysis was performed using Statistical Packages for Social Science (SPSS) version 20.0. The data were presented using descriptive statistics in the form of frequencies and percentages of qualitative variables, means and standard deviations of quantitative variables. The quantitative variable was compared using the t paired t Test. Statistical significance was calculated at  $p < 0.05$ .

**3. RESULTS**

**Table (1): Distribution of the studied sample according to their general characteristics**

| Characters                  | Items                          | No (40) | %    |
|-----------------------------|--------------------------------|---------|------|
| Age (years)                 | 21 -                           | 23      | 57.5 |
|                             | 25 -                           | 7       | 17.5 |
|                             | 30 -                           | 6       | 15.0 |
|                             | 35 +                           | 4       | 10.0 |
| Experience years            | 1-                             | 19      | 47.5 |
|                             | 5-                             | 8       | 20.0 |
|                             | 10-                            | 9       | 22.5 |
|                             | 15+                            | 4       | 10.0 |
| Professional qualifications | Diploma of nursing             | 21      | 52.5 |
|                             | Technical institute of nursing | 19      | 47.5 |

Out of 40 nurses working in delivery room dealing with cases of pre-eclampsia and eclampsia; 23 (57.5%) has aged less than 25 years, 7 (17.5) aged 25 to less than 30 years, 6 (15.0%) aged 30 to less than 35 years and only 4 (10.0%) age 35 years and above. The experience of the studied nurses facing these cases ranged from one year to more than 15 years. Nearly half (47.5%) of them had experienced 1-< 5 years, while those of long experience (15+ years) represent only (10%). Nearly half (47.5%) had nursing diploma and (52.5%) had technical institute of nursing (**table one**).

**Table (2): Total mean scores, standard deviation, significance test of knowledge, performance and patient's assessment about MgSO<sub>4</sub> administration among the studied sample before and after intervention**

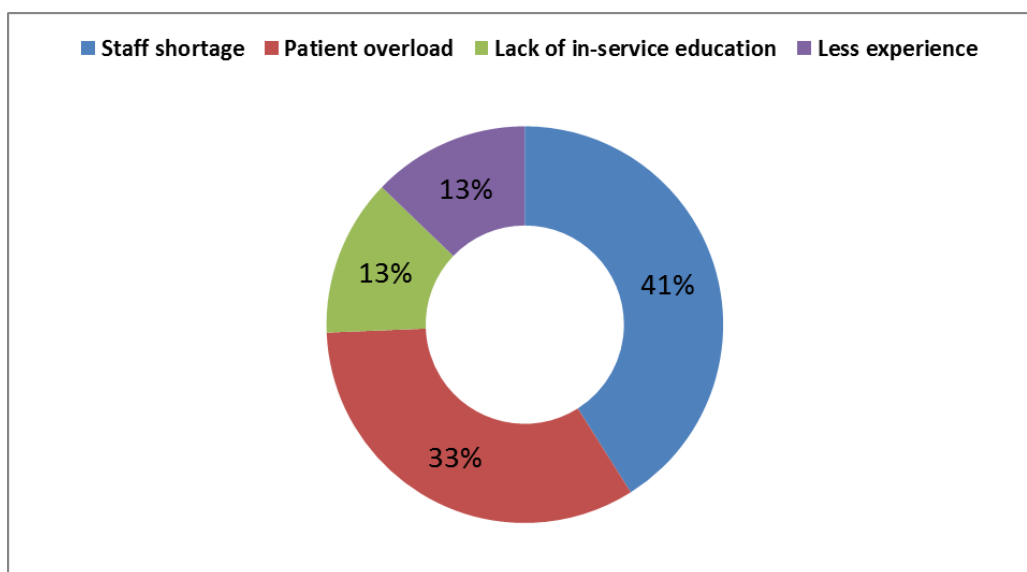
| Items                | Total score before intervention |       | Total score after intervention |        | Significance test    |
|----------------------|---------------------------------|-------|--------------------------------|--------|----------------------|
|                      | Mean                            | ± SD  | Mean                           | ± SD   |                      |
| Knowledge            | 8.77                            | ±3.48 | 15.60                          | ±4.348 | t=1 6.47 P = 0.0001  |
| Performance          | 12.02                           | ±1.95 | 17.07                          | ±1.45  | t=15.03 P = 0.0001   |
| Patient's assessment | 1.35                            | ±.483 | 2.60                           | ±.496  | t = 16.01 P = 0.0001 |

**Table (two):** Shows that there was a highly statically significant difference before and after intervention, regarding total knowledge score about MgSO<sub>4</sub> administration, with improvement total knowledge score after intervention (P=0.001). Also, there was a highly statically significant difference before and after intervention, regarding total performance score about MgSO<sub>4</sub> administration, with improvement in total performance score after intervention (P=0.001). Else, there was a highly statically significant difference before and after intervention, regarding total patient's assessment score about MgSO<sub>4</sub> administration,with improvement in total patient's assessment score after intervention (P=0.001).

**Table (3): Mean, standard deviation, significance test of the relationship between total knowledge scores, total performance scores, total patient's assessment score among the studied sample after intervention**

| Total knowledge scores after intervention           |        | Total performance scores after intervention         |        | Significance test     |
|---|--------|---|--------|-----------------------|
| Mean  | ± SD   | Mean  | ± SD   |                       |
| 15.60   | ± 4.34 | 17.07   | ±1.45  | t = 2.16<br>P = 0.036 |
| Total patient's assessment score after intervention |        | Total knowledge scores after intervention           |        | Significance test     |
| Mean  | ± SD   | Mean  | ± SD   |                       |
| 2.60  | ±.496  | 15.60   | ± 4.34 | t =19.29<br>P =0.0001 |
| Total performance scores after intervention         |        | Total patient's assessment score after intervention |        | Significance test     |
| Mean  | ± SD   | Mean  | ± SD   |                       |
| 17.07   | ±1.45  | 2.60  | ±.496  | t =61.65<br>P =0.0001 |

**Table (5)** reveals that there was a significant relationship between total knowledge score and total performance score among the studied sample after intervention (P =0.036). Also, there was a highly significant relationship between total patient's assessment score and total knowledge score among the studied sample after intervention (P =0.0001), else, that there was a highly significant relation between total performance scores and total patient's assessment score among the studied sample after intervention (P =0.0001)



**Figure (2): Problems faced in using nursing assessment sheet as stated by nurses**

This figure clarifies the problems which were faced by nursing staff in conducting nursing assessment sheet. 41% of the studied sample complained of staff shortage, whereas 33% them stated patient overload as a problem. While only 13% were having the problem of lack of in-service education

#### 4. DISCUSSION

Magnesium sulfate has been used in obstetrics with good results in the treatment of seizures associated with pre-eclampsia. The risk of adverse effects that may increase with the duration of treatment is a potential concern for treatment with magnesium sulphate, particularly in cases of difficulties in clinical monitoring of patients

Healthcare facilities need a sufficient number of qualified personnel to effectively monitor the patient and manage drug toxicity or complications from the present regime. Good educational programs include activities for all learning styles and use a variety of educational tools, such as visual aids, illustrations, and active participation to improve critical concepts.



The study aimed to evaluate the effect of utilization a nursing assessment sheet on nurses' knowledge and performance regarding magnesium sulphate administration to eclampsia mothers was attained within the framework of the present study hypothesis (Nurses knowledge and performance of administration of magnesium sulphate is expected to be good through the utilization of the nursing assessment sheet).

Regarding knowledge about MgSO<sub>4</sub> administration among the studied sample. The study results revealed that there was a highly statically significant difference before and after intervention, regarding total knowledge score about MgSO<sub>4</sub> administration among the studied sample, with improvement total knowledge score after intervention. These results were similar with **El Rheem & Mousa (2018)** who study the effect of nursing program on improving nurses' knowledge and skills regarding the care of eclamptic women they showed that at baseline (30.0%) of nurses had poor knowledge, but post program (75.0%) of nurses had good knowledge. Similarly, **Ahmed et al., (2017)** who study the impact of a tailored intensive educational program upon preeclampsia on nurses' knowledge at Beni-Suef City showed that the program made a success in improving the knowledge of nurses regarding the nature of preeclampsia. In addition, the results of the study were supported by **EL-Bahy et al. (2013)**, who examine the effect of nursing educational program about pregnancy induced hypertension on nurses' knowledge, they found that, the nurses didn't have knowledge pre the program related to doses, signs of MgSo4 toxicity, treatment of MgSo4 toxicity and nursing role during administration of MgSo4 while post program the majority of nurses showed satisfactory knowledge related to the previous items.

Concerning, performance about MgSO<sub>4</sub> administration among the studied sample. The current study shows that there is a statistically significant difference before and after intervention, regarding total performance score about MgSO<sub>4</sub> administration among the studied sample, with improvement in total performance score after intervention. The results of this study were consistent with **Kaur et al., (2014)** about skill development of nurses in managing the fourth stage of labour using nursing assessment sheet and guideline, they found that all nurses in staff had poor skills related to the management of the fourth stage of labour before demonstration and guidelines. After repeated training, nurses were able to implement all steps of management of the fourth stage of labor

In relation to assessment of mothers suffering from preeclampsia and eclampsia by nurses. It has been found that there was a highly statically significant difference before and after intervention, regarding total patient's assessment score about MgSO<sub>4</sub> administration among the studied sample, with improvement in total patient's assessment score after intervention. Finding of the current study was in agreement with **Kaur & Kaur (2013)** who operationalize nursing assessment sheet forgiving of MgSo4 to mothers having preeclampsia/ eclampsia showed that after educate nurses to fill the nursing assessment sheet the subjects were able to fill the nursing assessment sheet with mean percentage performance of the subjects as 83.9±6.4 with the maximum performance level of 95%. In addition, current results have been confirmed by **Kaur et al. (2014)**, who show that all nurses had a poor assessment of fourth-stage management of labour pre-demonstration and guidelines, while post training, nurses were able to fill the nursing assessment sheet.

The agreement with the results indicates that the nurse understands very well the importance of monitoring, which is an important part of the critical care provided to the patient, and that the main objectives of monitoring are to detect the dysfunction of an organ and guide the reintroduction of oxygen into the tissues. The weakness of the organs can be monitored by several methods, depending on the organ, for example urine output for renal function. The toxic effect of Mgso4 can cause muscle paralysis. So evaluation of patellar reflex and respiratory rate is therefore very important in reducing progression to respiratory distress or arrest.

In relation to the relationship between the total knowledge score and the performance score between the studied sample after the intervention. The result of this study shows that there was a significant relationship between the total knowledge score and total performance score. This result corresponds to that of **Muhammad et al. (2018)**, who investigated the enhancing creativity and change of nursing management staff and its influencing on their performance at Benha University Hospital revealed that there was a statistical significant relation between total knowledge scores with total performance scores toward creativity of the studied nursing management staff at and follow up phase of the study. This finding also, was supported by **Khosa, et al., (2015)** and **Rogers, (2014)**.

Similarly a study done by **Mohamed et al., (2016)** assess nursing performance regarding hospital acquired Infection, It was observed that there was a relationship between total knowledge of the studied nurses and their total performance regarding hospital acquired infection, Moreover, **Soliman et al., (2013)** study nurses' perception and developing an improvement plan regarding child safety in Benha Hospitals, reveals that there is a relationship between total knowledge,

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perception and performance score of the studied staff nurses. Furthermore, the present study result was in accordance with **Abd al Rahman (2004)**, who found that, there was a statically significant relation between total knowledge, and performance.

The agreement of the study's results can be explained by the formal training courses plays an important role in enhancing and updating nurses' this knowledge, performance beside improving the quality of care given to the child.

While the current study result was not supported by the study of **El-Sayed et al (2015)** who carried a study entitled "Nurses knowledge and practice for the prevention of infection in the Burn Unit at a University Hospital " and reported that the relation between total nurses' knowledge and practice regarding application of infection control measures was not significant.

The current study clarifies the problems which were faced by nurses in conducting nursing assessment sheet. These problems as staff shortage, patient overload, lack of in-service education and less experience. Similarly a study conducted by **Kaur et al., (2013)** showed that all the subjects complained of staff shortage, whereas 74% subjects stated patient overload as a problem. However, 37% said lack of in-service education. While, the present study result was disagreement with a study done by **Mundle et al., (2010) & Jaruf (2013)** showed that indicated a shortage of drugs, and equipment were the barriers in managing eclampsia . This difference in results may be due to differences in economic status of countries

### Conclusion:

Utilization of a nursing assessment sheet for the magnesium sulphate administration to eclampsia mothers results in improving nurses' knowledge , performance and patient assessment.

### Recommendations

- Implementing nursing assessment sheet in all clinical settings where MgSO<sub>4</sub> therapy is administered to improve nurses' knowledge, performance and patient assessment.
- Teaching nursing assessment sheet in nursing curriculum which guides the student nurses for assessing the condition of the mothers receiving magnesium sulphate therapy and providing comprehensive care to the mothers.
- Efforts should be made by hospital administrators to ensure that there are adequate staff nurse and increase training of nurses

**Further study:** Implementing nursing assessment sheet in different area as postpartum, high risk.

### Limitation of the study:

Limited references due to limited studies on this topic

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