

Awareness of Nurses/nurse Midwives Regarding Magnesium Sulfate Administration to Pre-Eclamptic /Eclamptic Mothers

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Abstract

Background: Hypertension is the most common medical problem encountered in pregnancy and remains an important cause of maternal, and fetal, morbidity and mortality. It complicates up to 15% of pregnant mothers and accounts for approximately a quarter of all antenatal admissions. The hypertensive disorders of pregnancy cover a spectrum of conditions, of which pre eclampsia poses the greatest potential risk and remains one of the most common causes of maternal death in the UK. The aim of the study is to examine the nurses/nurse midwives knowledge regarding Magnesium Sulfate administration to pre-eclamptic /eclamptic mothers. Materials and Methods, study design is a descriptive – cross sectional hospital based study, at Bhari Teaching Hospital, Saad Abualla, and Omdurman Maternity Hospital, Khartoum State, Sudan. Sample sizes 50 nurses/nurse midwives who are working in obstetrical wards are all enrolled in this study as total coverage. Data collection technique and tools: structured interview questionnaire sheet was developed to assess the nurses/nurse midwives' knowledge regarding Magnesium Sulfate administration to pre-eclamptic /eclamptic mothers and parameters of monitoring the patient. Data processing and statistical analysis: Data were analyzed by using Statistical Package for Social Sciences program (SPSS). Validity and reliability of instruments: The instruments were pre-tested in the pilot study before final data collection for reliability. Ethical consideration: from Ethical Committees, general medical directors of selected hospitals and verbal agree from the nurses who are working in obstetric words.

Keywords: Nurses, nurse midwives, Magnesium Sulfate, knowledge, parameters

1. Introduction

1.1. Background:

Pre-eclampsia (PE) is a condition that pregnant women are generally diagnosed in the second half of their pregnancies. It is marked by elevated blood pressure and a high level of protein in the urine. When left untreated, it can progress to severe pre eclampsia (SPE), with complications of the lungs, kidney and liver, or can progress to eclampsia (Duley, , Meher, , Jones, 2013) Eclampsia is defined as the development of convulsions or coma in a woman with Pre-eclampsia. Among pregnant women worldwide 7-15% develops PE and approximately 1-2% develops eclampsia (Dolea, AbouZahr, 2003) Hypertensive disorders, which include PE/E, represent a significant proportion of maternal deaths worldwide.

Such deaths account 9.1%, 9.1% and 25.7% in Sub-Saharan Africa, South Asia, and Latin America respectively (Ton, et al 2019) Casefatality rates are significantly higher in less developed countries relative to more

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developed countries, ranging from 26.3% in South Africa to 1.8% in the United Kingdom (Rabiou, et al 2018). Nepal Maternal Mortality and Morbidity Study 2008-2009 showed that PE/E has increased from 14% in 1998 to 21% in 2008.

It stated as the second most common cause of maternal mortality (Baral, et al 2010) Some studies were conducted in various hospitals of Nepal. The incidence of eclampsia was found 0.29% in Paropakar Maternity and Women's Hospital (Choudhary, 2003) while in Koshi Zonal Hospital, pre-eclampsia, severe pre-eclampsia and eclampsia were found to be 0.7%, 0.3% and 1.3% respectively (Thapa, 2008). For most cases of SPE, eclampsia can be prevented by introducing MgSO₄ an immediately initiating labor. In mother's with SPE, MgSO₄ was found to reduce the occurrence of eclampsia by more than 50% and maternal deaths by 46%. This is the national standard drug for treatment of SPE/E in Nepal (Warriner, et al 2011). and also listed to the Essential Drugs List (Poudel, et al 2009). In severe pre-eclampsia or eclampsia, the total initial dose is 10 to 14 g of MgSO₄. Intravenously, a dose of 4 to 5 g in 250 ml of 5% Dextrose Injection, 0.9% Sodium Chloride Injection may be infused. Simultaneously, intramuscular doses of up to 10 g (5 g in each buttock) are given. (Kaur, et al 2013) A potential concern for magnesium sulphate therapy is the risk of side effects which could increase with the duration of treatment especially if there are challenges in clinical monitoring of the patients. The therapeutic range of magnesium in plasma is 1.7 - 3.5 mmol/L. When there is increase in this level intoxication occurs resulting in magnesium intoxication. These include flushing, sweating, hypotension, flaccid paralysis, hypothermia, circulatory collapse, sinoatrial and atrioventricular blockade, cardiac and central nervous system depression proceeding to respiratory paralysis.

Hypocalcaemia with signs of tetany secondary to Magnesium Sulfate therapy for eclampsia has been reported. (Kaur, & Gainer, 2013) During the administration of magnesium sulphate the main nursing consideration is monitored hourly blood pressure, pulse, and respiratory rate. Magnesium sulfate affects the central nervous system of the mother. So as a part of normal care includes checking the mother's reflexes. If too much magnesium sulfate is given, the women reflexes will be slowed. Patellar reflexes are usually checked about every 1 to 4 hours. One hourly urine measures, four hourly testing of urinary protein. (Khan, Wojdyla, Say, Gülmezoglu., & Van Look, 2006) Maternal mortality in the developing world is receiving increasing attention in recent years and significantly it is a key emphasis of the Millennium Development Goals (MDGs) (Nyamtema, Urassa, & van Roosmalen, 2011). The World Health Organization (WHO) reports that hemorrhage/bleeding, infections, unsafe abortions and eclampsia are common causes of maternal mortality especially in developing countries. (Langer, Villar, Tell, Kim, & Kennedy 2008). Severe pre-eclampsia and eclampsia-related deaths are common causes of preventable maternal deaths by 99% of these deaths occurring in low and middle income countries. (Hogan, Foreman, Naghavi, Ahn, Wang, Makela, & Murray 2010) Eclampsia is a major cause of maternal morbidity and mortality in Nigeria. It was reported to have contributed to 46.3% of maternal deaths in Kano State (Onah, Ikeako, & Iloabachie, 2006). And 43% of maternal deaths in Jigawa State. (Okereke, Ahonsi, Tukur, , Ishaku, & (Oginni, 2012). These figures indicate remarkably high rates of maternal mortality with high contributions from eclampsia-related maternal deaths in northern Nigeria.

WHO has recommended the use of magnesium sulphate (MgSO₄) as a safe and low-cost drug to manage severe pre-eclampsia and eclampsia cases. (Urassa, 2004). Studies have shown that the drug significantly lowers the possibility of seizures in women with severe pre-eclampsia or eclampsia, prevents progression from severe preeclampsia to eclampsia and generally lowers maternal mortality. (Langer, Villar, Tell, Kim, & Kennedy 2008).

2. Materials and Methods

2.1. Study design: a descriptive – cross sectional hospital based study was used.

2.2. Setting: Bhari Teaching Hospital, Saad Abualla, and Omdurman Maternity Hospital, Khartoum State - Sudan.

2.3. Sample: Are 50 nurses/nurse midwives, who are working in obstetrical wards all are enrolled in this study as total coverage.

2.4. Data collection technique and tools: structured interview questionnaire sheet was developed to assess the nurses/nurse midwives' knowledge regarding Magnesium Sulfate administration to pre-eclamptic /eclamptic mother and parameters of monitoring the patient.

2.5. Data processing and statistical analysis: Data were analyzed by using Statistical Package for Social Sciences program (SPSS) and Microsoft office excel 2007 was used for data processing and statistical analysis.

2.6. Validity and Reliability of instruments: The instruments were pre-tested in the pilot study before final data collection for reliability.

2.7. Ethical consideration: Written approval from Research, Ethical Committees, general medical directors of selected hospitals and verbal agree from the nurses are working in obstetric word.

3. Results

3.1. Demographic Characteristics of the Study Sample:

The study participants were 50 nurses/nurse midwives who are working in obstetrical wards in Bhari Teaching Hospital, Saad Abualla, and the Omdurman Maternity Hospital.

3.1.1. Figure (1): Showed that, the frequency of socio-demographic characteristics of participants, years of experience of nurses/nurse midwives. Less than 5 years were (71.43%), from 5-10 years equal (16.33%), and more than 10 years had (12.24%).

3.1.2. Figure (2): showed levels of qualification of nurses/nurse midwives. (30.00%) are diploma nurses, while (50.00%) BSc nurses and (12.00%) are M.Sc nurses.

3.1.3. Figure (3): showed knowledge regarding the pharmacological group related to magnesium sulphate, Anticonvulsant (66%), Anticoagulant (2%), both of them (4%), don't know (16%) and all of them (12%).

3.2. Knowledge and awareness of participants' about magnesium sulphate:

3.2.1. Figure (4): illustrated the presence of participants' knowledge regarding indication of magnesium sulfate. Preeclampsia (6%), eclampsia result (46%), both of them (20%), don't know (24%), all of them (4%). This was statistically insignificant with experience (years) ($P > 0.05$) Table (1) and professional qualification Table (2)

3.2.2. Figure (5): illustrated the percentage of participants' knowledge regarding the route of administration of MgSO₄. Intramuscular (6%), intravenous (84%), subcutaneous (4%), don't know (2%), all of them (4%). This was statistically insignificant with experience (years) ($P > 0.05$) Table (1) and professional qualification Table (2).

3.2.3. Figure (6): showed knowledge regarding the side effect of magnesium sulfate participants' response was Headache (20%), edema (14%), visual disturbances (14%), epigastria pain (10%), don't know (16%), all of them (26%). This was statistically insignificant with a professional qualification ($P > 0.05$) Table (2).

3.2.4. Figure (7): showed knowledge regarding the signs and symptom of toxicity participants' response were Sweating (14%), depressed reflexes (14%), circulatory collapse (22%), don't know (6%), all of them (24%). This was statistically insignificant with experience (years) ($P > 0.05$) Table (1) and professional qualification Table (2).

3.2.5. Figure (8): showed knowledge of Participants regarding the antidote of MgSO₄. Calcium gluconate (50%), potassium chloride (16%), don't know (30%), all of them (4%). This was statistically significant with experience (years) ($P < 0.05$) Table (1) and insignificant with professional qualification Table (2).

3.2.6. Figure (9): illustrated the percent of participants' knowledge regarding the main nursing considerations for monitoring. Monitoring hourly blood pressure, pulse and respiratory rate (52%). One hourly urine measures (6%). Four hourly testing of urinary protein (2%). Don't know (12%). All of the above (28%). This was statistically insignificant with experience (years) ($P > 0.05$) Table (1) and professional qualification Table (2).

3.3. Table (1): Showed the relationship between the knowledge of nurses/nurse midwives' and their experience.

Table (1): Showed the relationship between the knowledge of nurses/nurse midwives' and their experience=50

	Option		Experience (years)			Total	Knowledge	P-value
			<5 years	5-10 years	>10			
pharmacological group related to magnesium sulphate	Anticonvulsant	Count	21	7	4	32	Fair	.908
		%Total	43.8%	14.6%	8.3%	66.7%		
indications of magnesium sulphate	Both of them	Count	17	6	3	26	Fair	0.189
		%Total	34.7%	12.2%	6.1%	53.1%		
maintenance dose of magnesium sulphate?	24 Mg	Count	18	4	1	23	Poor	.310
		%Total	37.5%	8.3%	2.1%	47.9%		
Routes of administration of MgSo4	All of them	Count	33	7	6	46	Good	.359
		%Total	69.9%	14.6%	12.5%	97.9%		
The side effects of magnesium sulphate?	All of them	Count	31	7	5	41	Good	.450
		%Total	66.6%	14.6%	6.2%	85.4%		
Signs and symptom of toxicity?	All of them	Count	32	7	6	45	Good	.357
		%Total	66.6%	14.6%	12.5%	93.8%		
The antidote of magnesium sulphate	Calcium gluconate	Count	21	4	0	25	Fair	.008
		%Total	43.8%	8.3%	.0%	52.1%		
Main nursing consideration for monitoring	All of them	Count	30	7	5	42	Good	.145
		%Total	73.8%	14.9%	11.6%	88.4%		

3.4. Table (2): Showed the relationship between the knowledge of nurses/nurse midwives' and their professional qualification

Table (2): Showed the relationship between the knowledge of nurses/nurse midwives' and their professional qualification: N=50.

Item	Option	Professional Qualification			Total	Knowledge	P-value	
		Diploma nurse	B.Sc(N)	M.Sc(N)				
pharmacological group related to magnesium sulphate	Both of them	Count	1	1	0	2	Poor	.166
		%Total	2.0%	2.0%	.0%			
Indications of magnesium sulphate	Both of them	Count	8	17	2	27	Fair	.218
		%Total	16.0%	34.0%	4.0%			
the maintenance dose of magnesium sulphate	24 Mg	Count	4	14	5	23	Poor	.038
		%Total	8.2%	28.6%	10.2%			
The routes of administration of MgSo4	All of them	Count	18	24	6	48	Good	.384
		%Total	37.8%	49.0%	12.2%			
The side effects of magnesimsulphate	All of them	Count	14	23	4	41	Good	.656
		%Total	28.5%	46.9%	8.1%			
Signs and symptom of toxicity	All of them	Count	17	24	5	46	Good	.077
		%Total	34.7%	49.0%	10.2%			
Tha antidote of magnesium sulphate	calcium gluconate	Count	8	13	4	25		.780
		%Total	16.3%	26.5%	8.2%			
Main nursing consideration for monitoring	All of them	Count	16	21	6	43	Good	.490
		%Total	33.4%	43.7%	12.5%			

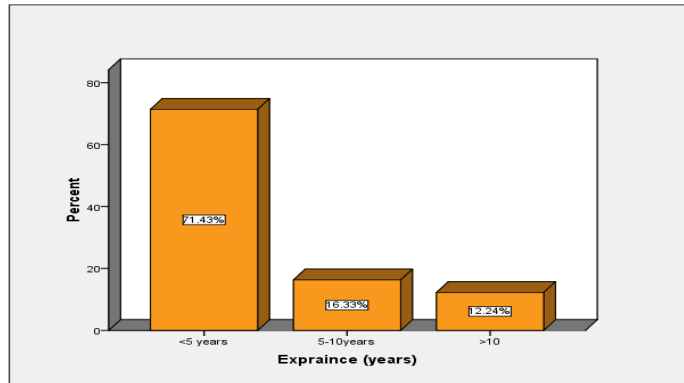


Figure (1): Showed years of experience of nurses/nurse midwives.

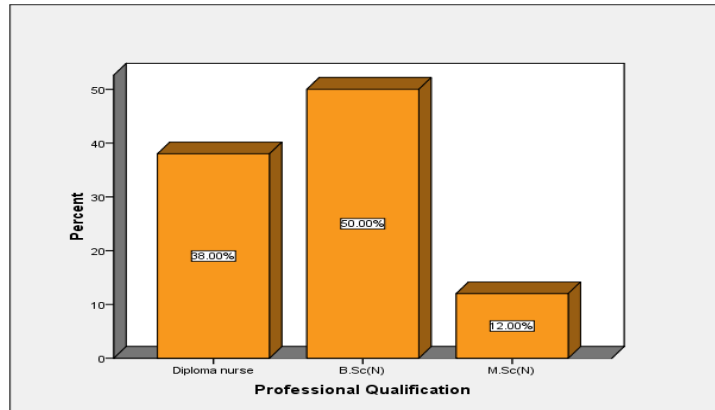


Figure (2): Showed level of qualification of nurses/nurse midwives.

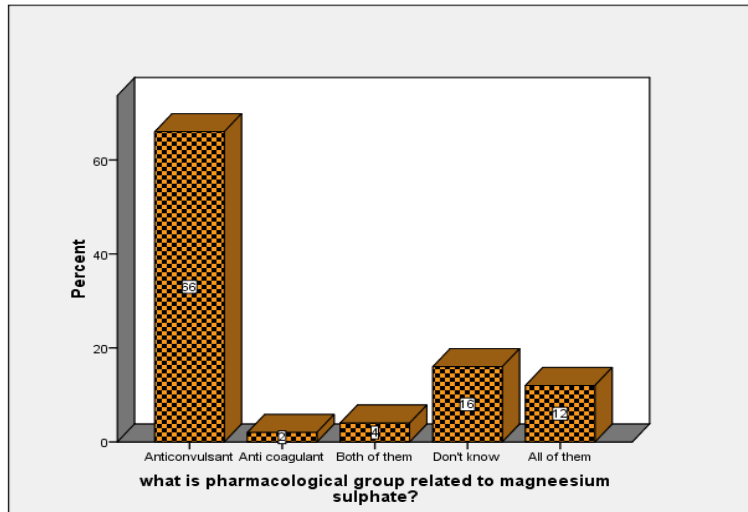


Figure (3): Showed knowledge regarding the pharmacological group related to magnesium sulphate

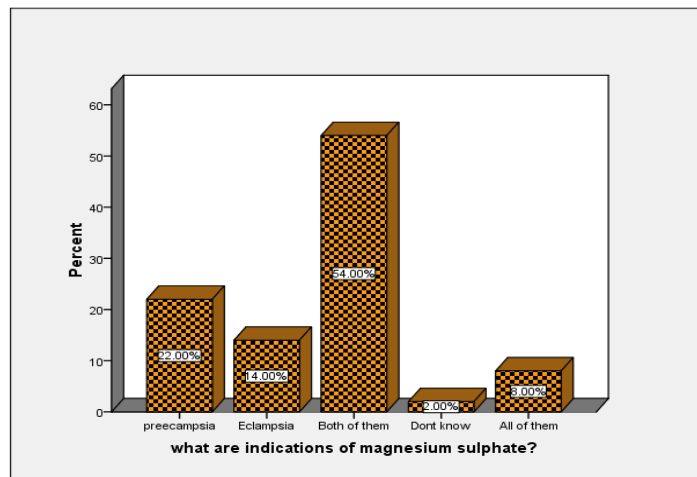


Figure (4): Showed knowledge regarding indication of magnesium sulphate

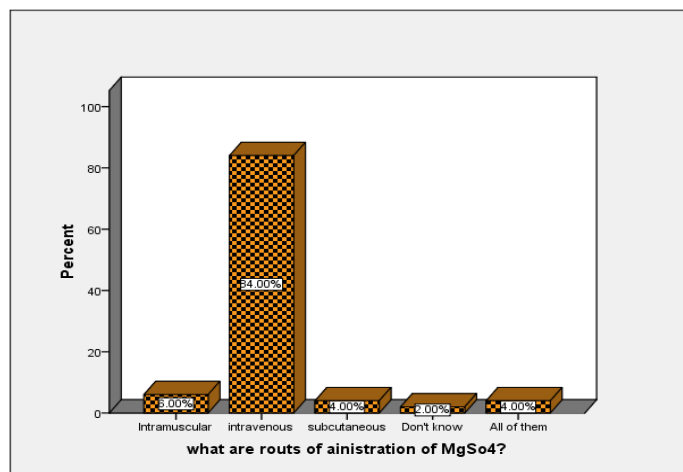


Figure (5): Showed knowledge regarding the route of administration of MgSO4

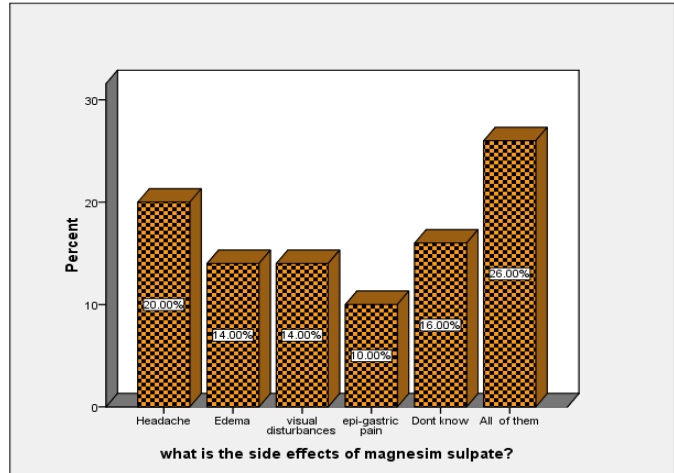


Figure (6): Showed knowledge regarding the side effect of magnesium sulphate

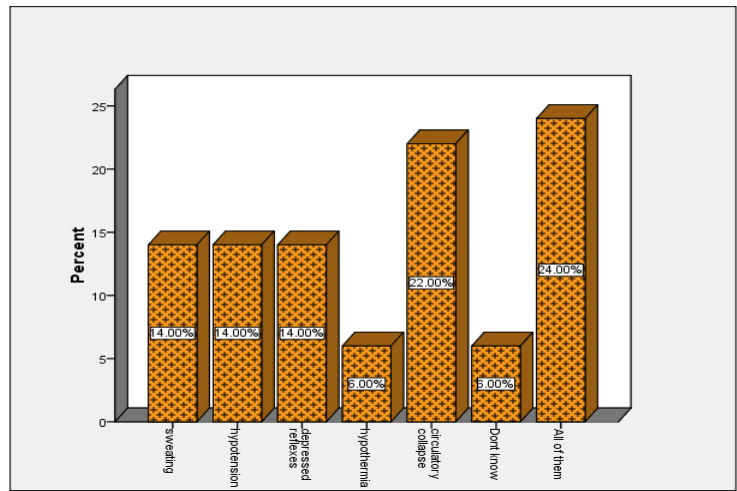


Figure (7): Showed knowledge regarding the signs and symptom of toxicity

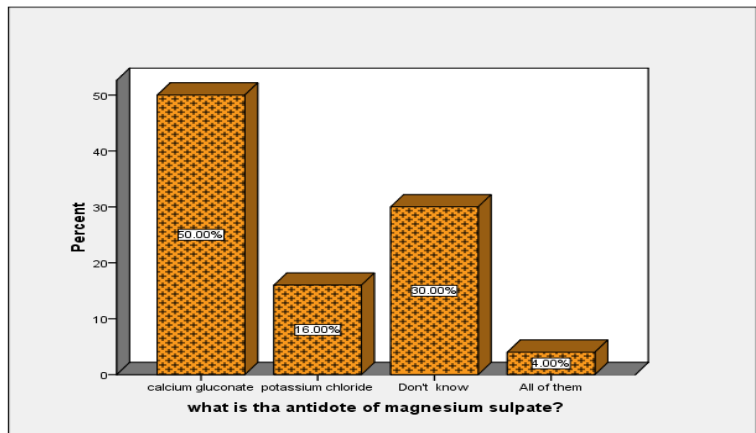


Figure (8): Showed knowledge regarding the antidote of MgSO4

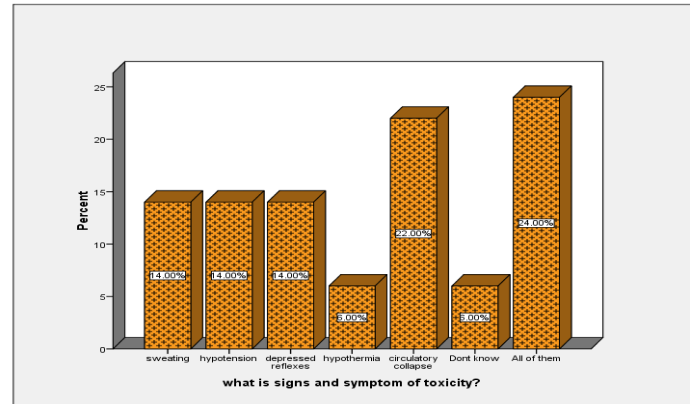


Figure (9): Showed knowledge regarding the main nursing considerations for monitoring

4. Discussion

This study identified gaps in the knowledge of nurses/nurse midwives about Magnesium Sulphate, including administration and parameters of monitoring the patient. Magnesium sulphate has been used in obstetrics with good results, inhibiting premature labor and in the treatment of eclampsia-associated seizures.

A potential concern for magnesium sulphate therapy is the risk of side effects which could increase with the duration of treatment, especially if there are challenges in clinical monitoring of the patients (Okereke, Ahonsi, Ishaku, & Oginni, 2012). The majority of deaths due to preeclampsia and eclampsia can be avoidable through the management of complications by effective and timely care to the women. (Urassa, 2004). With nurse's help, we can drive awareness, advance our scientific understanding and medical practices, and help create a world where preeclampsia and hypertensive disorders of pregnancy no longer threaten the lives of mothers and babies. (Langer, Villar, Tell, Kim, & Kennedy 2008). The general objective of this study was to assess the current knowledge regarding the Magnesium Sulphate administration to pre-eclamptic /eclamptic mothers among nurses/nurse midwives working at Bhari Teaching Hospital, Saad Abualla, and Omdurman Maternity Hospital Khartoum State, Sudan.

More than seventy percent of the participants (71.43%) their experience is less than 5 years, this is not similar to study done in Ribat University Hospital, where 60% of the participants had more than 5 years in the obstetrics and gynecology department. (20) More than half of participants were aware about recommended drug for controlling convulsion (66%), this finding was consistent with study conducted in Laquintinie hospital (2014) where nurses saw that magnesium sulphate is the best drug used to control fits or convulsion. (Ramsey, Carline, Inui, Larson, LoGerfo, Norcini, & Wenrich, 1991). Also more than half of participants in this study were knowledgeable about the indication of magnesium sulphate (54%), but in a study done by Baljit Kaur all the subjects were knowledgeable about the indication of magnesium sulfate. (Kaur, Rana, & Gainder, 2013). There are only two percent of the participants did not have knowledge about the route of administration of magnesium sulphate this is contrast to finding of

A study done by Ramadurgin India society (2016). Where few of staff nurses had personal experience to administering magnesium sulfate, and they were unaware of appropriate routes and dosages (Ramadurg, Vidler, Charanthimath, Katageri, Bellad, Mallapur, & Qureshi, 2016). When twenty four percent of the respondents knew the signs and symptom of magnesium sulphate toxicity. Our finding is lower than the finding of another study done by Bangladesh society (2016) which indicated (61.9%). (Tukur, Ishaku, Ahonsi, Oginni, & Adoyi, 2016). On the basis of the findings of the present study the knowledge of participants regarding the antidote of MgSO₄ (Calcium gluconate) (50%), is higher than result of study done by Jamilu in Nigeria where finding is (16.8). (25) This study reveals that most participants were not knowledgeable on prevention of toxicity (Monitoring hourly blood pressure, pulse and respiratory rate, One hourly urine measures. four hourly testing of urinary protein) of magnesium sulphate, this is comparable to study done by Rahma Jaruf (2013) at Mnazi Mmoja Hospital, Zanzibar, which indicated (93%) of nurse-midwives were not knowledgeable on monitoring of toxicity of magnesium sulfate. (Affar, R. J. (2013)

Acknowledgements

The authors would like to extend their thanks and appreciations to all participants who voluntarily participated in the study.

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