

Physical Responses Following Post-Partum Administration of Rectal Misoprostol

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Abstract

Background Postpartum haemorrhage is identified as one of main causes of maternal mortality especially in low income countries including Indonesia. The use of rectal misoprostol is a considerable intervention to prevent postpartum haemorrhage. However, administering misoprostol would cause various considerable responses that need intensive observation to prevent high risk condition of post-partum women. Limited studies in Indonesia assessed responses of post-partum women's after misoprostol administration. This study aimed to identify physical responses of post-partum women after misoprostol administration. **Methods**, This descriptive quantitative study involved 30 post-partum women. They were chosen using consecutive sampling technique. The data collection instruments were an observation form and a semi-structured interview form. Using those instruments women's physical responses observed on the minute of 15, 30, 45, 60, 90 and the hour of 2, 3, and 4 after post- partum. The data were analysed using frequency distribution. **Results** The study found that there were different physical responses of women after rectal misoprostol administration including nausea, vomiting, diarrhoea, headache and fever, especially in the minute of 15 and the hour of 2. The most prominent physical responses were nausea, and followed by headache and fever. **Conclusion** This study finding is a significant information for health professionals especially nurses. Nurses could develop an anticipatory guide in anticipating any effects that may risk to postpartum patients.

Keywords: Misoprostol, Physical Responses, Post-partum.

Introduction

Maternal Mortality Rate (MMR) is one of the indicators of the women's health status in a country including Indonesia (Ministry of Health RI, 2014). Based on the Indonesia Demographic and Health Survey conducted in 2015, MMR of Indonesia was 305 per 100,000 live births (Ministry of Health RI 2016). It indicated an increase from the previous survey conducted in 2008 which reached 226 per 100,000 live births (Ministry of Health RI 2016). The causes of maternal mortality in Indonesia are based on the highest percentage is obstetric haemorrhage (Ministry of Health, 2014). The obstetric haemorrhage is one of the risks commonly encountered during the post-partum period. Prevention should be initiated since the active management of the third stage to prevent the occurrence of post-partum haemorrhage.

One of the haemorrhage prevention actions for post-partum haemorrhages which are commonly taken in developing countries is Misoprostol therapy in the labour stages (Hofmeyr, 2008). Prata (2005) found that administering misoprostol 1000 µg per rectal can prevent the post-partum haemorrhage. In addition to preventing postpartum haemorrhage, misoprostol treatment might also cause various effects or responses that could threaten the safety of postpartum mothers if the intervention is not given appropriately. Hofmeyr et al. (2008) conducted a literature review of 46 articles on the use of Misoprostol to prevent and treat the post-partum haemorrhage. The literature reviews found that there was no prior study specifically examining the effects of Misoprostol on maternal mortality. However, the reviews informed that the maternal mortality was also due to Misoprostol therapy. Hofmeyr (2008) also concluded the need for further research to review the effectiveness of misoprostol in preventing post-partum haemorrhage and the effect that might harm after the Misoprostol therapy.

Few studies assess the physical responses after Misoprostol therapy. Bellad & Goudar in B-Lynch et al. (2006) found responses arising after giving 1000 µg doses of misoprostol per

rectal such as nausea, vomiting, diarrhoea, headache, and shivering. RSKIA Bandung, as one of a referral hospital in Bandung for mother and child cases including risky delivery, also provides Misoprostol therapy for post-partum haemorrhage, at doses of 800 µg. However, there is no continuous study on the maternal physical responses during post-partum after Misoprostol management. The objective of this study is to identify the maternal physical during post-partum after giving 800 µg Misoprostol. Understanding patient's responses to the therapy are useful for determining intervention to prevent conditions that can threaten the safety of the mother.

Research method

This study was a descriptive quantitative research. In this study, a consecutive sampling technique conducted to 30 post-partum mothers in RSKIA Bandung. Data collections were conducted through the observation of physical conditions and interview about post-partum women symptoms after being given misoprostol per rectal. Interviews and observations were conducted at the minute of 15, 30, 45, 60, 90 and the hour of 2, 3, and 4 after giving misoprostol per rectal. Data analysis steps were editing, coding and tabulating. Afterwards, each response was calculated to obtain its percentage.

Research Results

This section present the results of observations and interviews with 30 post-partum women having misoprostol 800 µ per rectal . The observations were conducted at the minute of 15, 30, 45, 60, and 90 as well as the hour of 2, 3, and 4 using a check list form. The short interviews were related to some symptoms: nausea, diarrhoea, and headaches. The results of the frequency distribution of physical responses during post-partum after Misoprostol management presented in Table 1

Table 1 Physical Responses after Administered Misoprostol (n = 30)

Responses	Observation times							
	15	30	45	60	90	2 hours	3 hours	4 hours
Nausea	23,33%	20%	20%	16,66%	16,66%	10%	0%	3,33%
Vomit	3,33%	0%	0%	0%	0%	3,33%	3,33%	0%
Diarrhea	3,33%	0%	0%	0%	0%	0%	0%	3,33%
Headaches	6,66%	3,33%	3,33%	3,33%	3,33%	0%	13,33%	10%
Fever	10%	6,66%	13,33%	6,66%	3,33%	3,33%	6,66%	3,33%
No symptoms	53,35%	70%	63,34%	73,35%	76,68%	83,34%	76,68%	80%
Total	100%	100%	100%	100%	100%	100%	100%	100%

The table showed that the majority of respondents were no significant responses after administered Misoprostol. However, this study identified differences respondents' physical responses from time to time based on observations and interviews form. In the first 15 minutes after giving Misoprostol, 46.65% of respondents felt inconvenience. The most common symptoms were nausea and then followed by fever, headache, diarrhoea, and vomiting. From 30 to 90 minutes, there were no more respondents who got vomiting and diarrhoea. However, the respondents showed vomiting after 2 hours and diarrhoea after 4 hours. The highest percentage of fever was at 45 minutes and headache at 3 hours. Nausea, headache, and fever were the responses constantly appeared during observations and interviews. Table 1 also showed fluctuating women's physical symptoms from the minute of 15 to the hour of 4.

Discussion

The research results show that the responses of patients who received 800 µg misoprostol per rectal during the post-partum period are fever, nausea, headache, vomiting, and diarrhoea. These responses are in line with the study conducted by Bellad and Goudar (2006) although with the different dose given (1000 µ misoprostol). The research instrument also asked whether there are complaints other than nausea, vomiting, headache, shivering, and diarrhoea; however, there was no respondent complained about anything else. The high percentage of respondents who

had complaints after 15 minutes of giving Misoprostol was different from Tang et al. (2007) stating that the onset of action of misoprostol given per rectal was ± 100 min and on the sublingual route of onset of action from misoprostol was ± 11 min. It should be further studied whether the respondent's response at the minute of 15 is an effect of Misoprostol or caused by anything else.

The response of nausea is a response of misoprostol per rectal management which is the highest presentation among other responses. However, at the observation after 3 hours, the nausea response did not arise, and after 4 hours observation, the nausea response did not occupy the highest presentation. The nausea response in a post-partum mother with misoprostol management is in accordance with the research conducted by Bellad and Goudar (2006) and Tang et al. (2007). Misoprostol is an analogue prostaglandin E1; Prostaglandin is a fatty acid which is naturally produced by various body tissues. Tang et al. (2007) state that misoprostol pharmacokinetically dissolves in water, rapidly absorbed and undergoes a change in its acid form which has a clinical activity. There was no misoprostol acid accumulation in the study with multiple doses; meanwhile, stable plasma levels were achieved within two days. The maximum plasma concentration of misoprostol was reduced after its use with the food and the total availability of misoprostol acid was reduced with the use of antacid. The acid form of misoprostol changing causes gastric mucosal irritation. The gastric mucosal irritation will cause anxiety sensation and discomfort in

the abdomen which leads to vomiting called nausea. In this study, nausea began to arise after observing 15 minutes to two hours. This is related to the rapid process of absorption made by the body against misoprostol.

After 4 hours, there was a complaint of nausea unlike at hour of 3; this could be caused by another thing, in this case, the post-partum mothers have been given foods at the hour of 3. The food intakes will decrease the acid concentration as well as avoid the stomach irritation. The onset of the nausea response after 4-hour observation may be due to the food entering the stomach has been digested and moved into the small intestine whereas the acidic content of misoprostol still exists; this situation led to a nausea response even with fewer presentations than in the early minutes of observation.

The response shown by respondents on each observation is shivering; it is an involuntary response to temperature differences in the body. Striated muscle movement during shivering requires considerable energy. Shivering produces heat production at 4 to 5 times compared to the normal condition (Potter & Perry, 2009). Temperature control mechanisms in human beings keep the core temperature (internal tissue temperature) constant in the conditions of extreme environmental and physical activity. The surface temperature changes accordingly to the blood flow to the skin and the amount of heat lost to the outside environment. In post-partum mothers with misoprostol management, the body attempts to maintain uterine contractions by increasing blood flow to the uterus and reducing blood flow to the skin (peripheral vasoconstriction). Peripheral vasoconstriction is the body's attempt to minimize heat loss. When the blood flow to the skin is reduced, the body temperature in the periphery will decrease resulting in a considerable difference between the core and peripheral temperatures. With these differences, the body compensates by increasing heat production by shivering. It needs to conduct a further study about other causes of shivering experienced by the patients.

Tangetal. (2007) found a response that arose after giving 600 µg and 800 µg misoprostol per oral was hyperpyrexia (temperature > 40°C).

Seen from pharmacodynamic misoprostol drugs, the intake route of misoprostol per oral is the intake route with the fastest onset of action, i.e. ± 8 minutes with a duration of action is ± 2 hours. Meanwhile, the onset of action of misoprostol per rectal is 100 minutes, and the duration of action of the route per rectal is 4 hours. This study focuses on the complaints; therefore, it does not study more deeply especially on the changes in the patient's vital signs such as body temperature. Further research is needed on the change of vital signs after Misoprostol or other causes because the temperature increases in the first 24-hour on the post-partum mother is normal as a body adaptation due to substantial fluid loss after delivery.

Based on the pharmacokinetics of misoprostol, per oral intake will lead to faster absorption, i.e. ± 12 minutes with a half-time of 20-30 minutes. Dukes & Aronson (2000) state that excessive pharmacological effects can be due to the relatively too large dose for the patient. With the rapid onset of action that Misoprostol achieves at per oral route, there will be excessive pharmacological effects and opposite effects. Besides, this effect can also occur due to pharmacokinetic interactions as well as pharmacodynamics between drugs given simultaneously, so the effect of the drug becomes larger. This is considered to cause hyperpyrexia.

A headache is one of the most frequent responses appearing at misoprostol management. Potter & Perry (2009) state that one of the headache causes is a chronic contraction of the head and neck muscles. This may occur in post-partum mothers with misoprostol management. Meanwhile, the response of misoprostol is stimulation of the sympathetic nerves that causes myometrial contractions. This sympathetic nerve stimulation can cause other muscle contractions, such as head and neck muscles. This contraction of head and neck muscles causes central sensitization in the meningeal nociceptor and trigeminal ganglion neurons which lead to the perception of a headache.

In this study, headache response arose almost at all observation minutes, except at the 2nd hour of observation where headache response did not show any symptom. Even at the 3rd and 4th hour of observations, headache

response occupies the highest presentation amongst other responses. This is related to the duration of action of misoprostol per rectal, i.e. 4 hours (Tang et al., 2007). The high presentation of headache responses at the 3rd and 4th hour of observations compared with other responses was due to chronic contractions of the head and neck muscles. Because of this chronic contraction, headache response arose with fewer presentations in the early minutes and increased in the 3rd and 4th hour of observations. It might also be associated with elevated levels of endorphins in the first 2 hours in response to the presence of pain stimuli; however, in the next hour, endorphin levels declined, but the acid levels of misoprostol were still present. Therefore, the pain response was relatively low at the minute 15 to 90, did not arise at the hour 2, but increased at the 3rd and 4th hour of observation.

Another response of misoprostol is vomiting; it is by theory by Bellad & Goudar (2006). Vomiting is a complex reflex affected by the vomiting centre in the medulla oblongata of the brain. Vomiting is exclusively excreting gastric contents through the mouth with the help of the abdominal muscle contractions (Potter & Perry, 2009). The acid form of the misoprostol changes will stimulate the chemoreceptors located in the upper intestinal mucosa and is sensitive to chemicals and the vagus nerve (which will carry signals from the gastrointestinal tract). The signals captured by the chemoreceptors and carried by the vagus nerve will stimulate the vomiting centre in the medulla oblongata which mediates the reflex of vomiting.

In this study, vomiting response arose at the 15th minute and the 3rd hour of observation. At the 15th minute of observation, vomiting was associated with increased acid levels due to rapid absorption performed by the body against misoprostol. This is in accordance with the study conducted Tang et al. (2007) stating that the concentration of misoprostol acid in plasma reaches its peak at ± 30 minutes and will decrease rapidly. Meanwhile, vomiting response at the 3rd hour of observation might be caused by other factors, i.e. post-partum mother has been usually given food. Food intake which enters the stomach will reduce the onset of

symptoms of nausea, but in some cases, there will also be an increasing symptom of nausea which will lead to vomiting.

Diarrhea is also one of the responses that emerge from the management of misoprostol in postpartum mothers; this is by the theory by Bellad & Goudar (2006). Based on its pharmacokinetic, misoprostol is excreted in the faeces for about 15%. The form change into acid from misoprostol can increase intestinal motility. The increase of intestinal motility will cause diarrhoea. Diarrhea in this study is the lowest because the excretion of misoprostol mostly through the kidney is about 80% and only 15% through the faeces.

Conclusion

Various patient responses after being given Misoprostol therapy describe the physical and mental risks of the post-partum mother that can occur if the complaints are not observed and addressed. Unstable post-partum conditions may decrease mother's general condition and may endanger her safety. Psychologically, it can lead a mother to distress, affect the breastfeeding process, and involution of the uterus. Many roles that maternity nurses can do to help mothers adapt to complaints that may arise from Misoprostol therapy.

To suppress or reduce the response of nausea, shivering, headache, vomiting, and diarrhoea caused by misoprostol management, nurses can provide intervention to overcome it. Interventions that can be provided by the nurse include regularly reviewing and gaining complaints, providing nursing actions to deal with emerging complaints, providing possible information of the complaints and how to address them for the patients that will be moved from the maternity room into the post-partum room. The nurse may also advise other health teams about the complaints found in the patient. Therefore, if it is possible, other alternative therapies can be considered to prevent haemorrhage without any side effects to the patient.

Nursing actions that can be done include giving warm water, collaborating with medical personnel for antiemetics if the nausea response is not reduced or increased,

providing blankets to reduce heat loss through evaporation, providing a warm blanket to increase body temperature, as well as providing floodlight interventions to provide a warm environment in shivering patients (Potter & Perry, 2009). To reduce the headache response, the nurses can teach distraction and relaxation techniques, head and neck massage to improve circulation to the head area, as well as collaborate with medical personnel in the analgesic intake. To the vomiting patients, the nurses can tilt the patient's head at the time of vomiting to avoid aspiration and collaborate with medical personnel in antiemetics intake.

Misoprostol per rectal management at doses of 800 µg in post-partum mothers can lead to a variety of responses that could compromise the patient's condition if the patients are untreated properly. Appropriate nursing interventions and by the symptoms appearing can be reduced or prevented as minimum as possible.

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