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# Use Of Misoprostol in the Prevention and Treatment of Post Partum Haemorrhage Among Primary Health Care Workers in Zaria Metropolis, Kaduna State, Nigeria

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## Abstract

Postpartum haemorrhage (PPH) is the most common cause of obstetric haemorrhage and the leading cause of maternal mortality in Nigeria. Injectable uterotonics such as oxytocin, ergometrine, and syntometrine are the conventional first-line drugs for the prevention and treatment of PPH. Misoprostol, an oral uterotonic approved by the Federal Ministry of Health in Nigeria, offers a practical alternative, especially in low-resource settings. This study aimed to assess the knowledge and use of misoprostol for the prevention and treatment of PPH among primary health care workers in Zaria Metropolis. A descriptive survey design was employed, involving 156 primary health care workers. Data were collected using a validated questionnaire and analyzed using descriptive statistics and chi-square tests. Results showed that only 31.3% of respondents had a high level of knowledge of misoprostol for PPH prevention and treatment. Slightly above one-third (38.3%) reported correct use of misoprostol for PPH prevention, while only 16.3% had used it correctly for treatment. Less than a quarter (23.3%) had received formal training on misoprostol use, and only 27.3% indicated that the drug was consistently available in their health facilities. A significant relationship was found between knowledge and correct use of misoprostol for both prevention and treatment of PPH ($p < 0.0001$). However, professional cadre did not significantly influence knowledge levels ($p = 0.107$). The study concludes that improved knowledge is associated with appropriate use of misoprostol and recommends increased training, supervision, and consistent drug availability to enhance PPH prevention and management.

**Keywords**: Knowledge, Misoprostol, Postpartum Haemorrhage, Primary Healthcare Workers and Use.

## 1.0 Introduction

Maternal mortality remains a major public health challenge, particularly in developing countries. It is especially tragic as these deaths occur during the essential physiological process of childbirth, in the course of fulfilling the natural role of sustaining the human race. The World Health Organisation WHO (2021), defines maternal mortality as the death of a woman while pregnant or within 42 days of pregnancy termination from the cause related to or aggravated by pregnancy or its management excluding accidental or incidental causes irrespective of duration or site of the pregnancy. In 2023, approximately 260,000 maternal deaths occurred globally, 92% of which occurred in low- and middle-income countries, and most could have been prevented (WHO, 2023). Nigeria is currently ranked the country with the second highest number of maternal mortalities globally estimated to be 1047 deaths per 100,000 live births, after India (WHO, 2023). Postpartum haemorrhage (PPH) is the common cause of obstetric haemorrhage and it contributes a quarter of maternal mortality globally with the majority occurring in low to middle income countries like Nigeria (Ngwenya, 2016; Tajudeen et al 2024). According to the World Health Organization (WHO, 2021), PPH is defined as bleeding from the genital tract of 500 ml or more within the first 24 hours of delivery of the baby and 1000ml after cesarean section. The causes of postpartum hemorrhage can be summarized by the four "T's": tone (uterine atony), trauma (lacerations or uterine rupture) tissue (retained placenta or clots), and thrombin (clotting-factor deficiency) (Hemorrhage, 2017). The most common cause is uterine atony (accounting for approximately 70% of cases), followed by obstetrical lacerations (approximately 20%), retained placental tissue (approximately 10%), and clotting-factor deficiencies (<1%) (Hemorrhage, 2017)

The International Federation of Obstetrics and Gynecology/International Council of Midwives (FIGO/ICM, 2006) recommends Active Management of the Third Stage of Labour (AMTSL) to prevent postpartum hemorrhage (PPH). It involves uterotonics administration, controlled cord traction with a skilled attendant, uterine massage after placenta delivery. Injectable uterotonics is the first line drug for prevention and treatment of PPH, it includes ergometrine, oxytocin, and syntometrine. However, these injectable drugs are heat-sensitive, requiring refrigeration, this may be difficult in low-resource settings or rural areas where electricity supply is very erratic and may be ineffective at preventing and treating PPH sufficiently for Nigeria's quest to accelerate pace towards Sustainable goal 3- target of reducing maternal mortality to 70/100,000 live births (United Nation, 2015).

In 2006, the International Federation of Gynecology and Obstetrics (FIGO) recommended the use of misoprostol to treat PPH, especially in locations with scarce resources. In 2012, FIGO published its guidelines indicating 800µg misoprostol for the treatment of PPH. However, it was not until 2015 that the WHO included this drug on the list of essential drugs for this purpose. In Nigeria, the Federal Ministry of Health in Nigeria also approved the use of misoprostol and developed clinical guidelines for its use in the management of PPH in 2006 (FMOH, 2011). The drug was added to the country´s essential drug list in 2011, showing its significance in the prevention and control of PPH (FMOH, 2011). This is because it is relatively inexpensive, has multiple administration routes (rectal, oral, sublingual), easy storage, stability in field conditions, long shelf life (3 years), usable with or without a skilled attendant (Gbadegesin *et al.,* 2021). Despite the availability of this evidence-based drug, studies indicate that misoprostol has not been effectively utilized by midwives in managing postpartum hemorrhage (PPH).

Maternal health indicators in Nigeria remain poor, with a maternal mortality ratio (MMR) officially reported as 512 deaths per 100,000 live births (NPC, 2019). More recent WHO estimates place the figure significantly higher at 1,047 per 100,000 live births, with PPH identified as the leading cause (WHO, 2023). The 2018 National Demographic Report further revealed that maternal mortality accounts for 31% of deaths among women of reproductive age in the country (NPC, 2019). These alarming statistics underscore the urgent need for a reliable alternative to oxytocin in PPH management, particularly in a low-resource settings.

Misoprostol should be readily available in primary health care facilities which are the basic healthcare units in Nigeria, mainly located in rural communities. Women needing delivery care first present in PHCs and only

when they experience severe complications are they referred to secondary or tertiary levels of care (Duduyemi *et al.,* 2019). However, referral mechanisms are underdeveloped, making prompt treatment challenging. Nigeria's Federal Ministry of Health trained health professionals nationwide to use misoprostol to reduce maternal mortality from postpartum hemorrhage (PPH). (FMOH, 2011 ). Additionally, Ahmadu Bello University Zaria in collaboration with University of California, Berkeley, trained primary healthcare providers in Zaria on misoprostol use. (Population & Reproductive Health Initiative, based at ABUTH, Zaria 2010). The training was informed by the result of a community-based study which showed that less than 5% of primary health care workers in the country have knowledge of the drug (Okonofua, 2010). The study conducted in Lagos by Duduyemi *et al.,* (2019) indicated that the most common uteronic used in the management of PPH was misoprostol and most of the respondents reported that misoprostol can be used in the management of PPH but only 5.7% correctly stated the appropriate dose of misoprostol (800 ug sublingual). This may be because misoprostol is readily available in PHCs and they rarely give IV drugs. In PHCs nurses and midwives often take deliveries and were not trained and updated on the correct dose. Also, available records from primary health care facilities in Zaria metropolis showed that majority of the maternal deaths were as a result of PPH caused by uterine atony (Sabon-Gari Health Department, 2023). The researcher also observed that during the course of her practical experiences with students in the facilities that misoprostol was not commonly used by the health workers rather oxytocin and ergometrine were the commonly used drugs, despite the advantages of misoprostol. This significant knowledge gaps among healthcare workers regarding misoprostol's administration and dosage prompt this study to determine the knowledge and use of misoprostol among primary health care workers in Zaria metropolis to prevent maternal mortality associated with PPH.

## 2.0 Objectives

1.Determine the level of knowledge of misoprostol as a drug used in the prevention
and treatment of PPH among primary health care workers in Zaria metropolis.
2. Determine the correct use misoprostol in the prevention and treatment of post-partum haemorrhage
3. Identify factors influencing use of misoprostol for the prevention and treatment of postpartum haemorrhage.
4. Determine the relationship between knowledge of Misoprostol and the use of misoprostol among the primary health care workers.
5. Determine the relationship between some demographic characteristics such as age of respondents, qualification, and years of experience and the knowledge of misoprostol.

## 3.0 Materials and Methods

### 3.1 Research Design

A cross-sectional descriptive design was used for the study. This is because it allows for collection of data from a group of people at the same time, for the purpose of describing the phenomena under study as it exists at the time of study (Cvetkovic *et al.,* 2021).

### 3.2 Study Setting

The study was carried out in health facilities within Zaria metropolis which comprised of two LGA (Zaria and Sabon-Gari LGAs). There are nine (9) primary health care facilities in Sabon-Gari local government and a total of fifteen (15) primary health care facilities in Zaria local government providing maternal health services (Sabon-Gari and Zaria Local Government Health Department Record, 2023). Zaria metropolis has a population total of 698,348 according to the 2006 census (with Sabon Gari having 291,358 and Zaria 406,990), and projected to be 1,011,088 in 2019 using a 3.05% growth rate per annum (National Population Commission, (2006) National Bureau of Statistics, (2012)).

### 3.3 Study Population

All the nurses, midwives and community health workers working in the primary health care facilities that provide maternal health services in Zaria metropolis. As at the time of the study, there were one hundred and fifty-six workers distributed across the twenty-four primary health care facilities in the Zaria and Sabon-Gari LGA and they form the population of the study

### 3.4 Sample Size Determination

The subjects of the study consisted of all the one hundred and fifty –six primary health care providers providing delivery care services in the twenty-four facilities in the two local government area. Due to the small population size, the entire health workers were used for the study. This is in line with Fisher (1983) and Shelly (1984), in their studies involving small population that all elements can and should be included in the study, hence no sampling is needed.

### 3.5 Instruments for Data Collection

The instrument used for data collection was a questionnaire designed by the researcher based on guidelines on the use of misoprostol for the prevention and treatment of post-partum haemorrhage according to the FMoHSW 2024. The questionnaire was made up of thirty-two items based on the objectives of the study. It consisted of four sections: Section A, consisted of four questions to describe the socio-demographic characteristics of the respondents. Section B, was made up of thirteen questions to measure the respondent's knowledge of misoprostol in the prevention and treatment of PPH. Section C consisted of nine questions to measure the use of misoprostol among the primary health care workers. Section D consisted of eight questions to elicit factors influencing use of misoprostol for the prevention and treatment of post-partum haemorrhage.

### 3.6 Validity of the Research Instrument

Face and content validity was ensured by the judgment of four experts in the field of investigation.

### 3.7 Reliability of the Research Instrument

In order to establish the reliability of the instrument, It was pretested at one of the PHCs to identify problems that might be encountered during data collection. The instrument was administered to 16 healthcare workers representing approximately 10% of the sample size. Data generated were computed, Cronbach's alpha was used to determine the internal consistency of 0.89.

### 3.8 Method of Data Collection and Analysis

The researcher and 4 employed research assistants visited the head of each facility for self-introduction before the collection of data. The respondents were approached; the aim of the study was explained to the respondents and informed consent obtained. The questionnaires were administered each day between 2nd December 2024 to 31st January 2025 and data collection ended 6th February 2025.

The analysis was done using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics including frequencies (f), percentages were used to present the data while inferential statistic of Pearson Chi square test was used to test the relationship between level of Knowledge and use of misoprostol for prevention and treatment of PPH, as well as relationship between knowledge and some socio-demographic variables such as professional cadre and years of experience. The level for statistical significance was set at $p < 0.05$. For the purpose of this study, knowledge of the respondents was categorized into three levels. To achieve this, a scoring system was developed. There was a total of 13 questions on knowledge of which five were rated 10marks and the remaining eight where rated 6.25 marks each making a total of 100%. Respondents scoring 80-100% was graded as having high level of knowledge, 50-79% as moderate level of Knowledge and 49% and below was regarded as having low level of knowledge of misoprostol for the prevention and treatment of postpartum haemorrhage. The potential limitations in this method include recall bias, self-reporting bias.

### 3.9 Ethical consideration

Ethical approval was obtained from the health research ethical committee of Ahmadu Bello University Teaching Hospital Zaria. All respondents were fully informed of the objective and design of the study and written consents were obtained from each of the respondents

### 4.0 Results

A total of 156 questionnaires were administered to the respondents and 150 were completely filled and retrieved giving a response rate of 96.2%.

**Table 1: Socio-Demographic characteristics of Respondents (n= 150)**

| Variables | Frequency | Percentage (%) |
|---|---|---|
| **Age** | | |
| 20-30 | 61 | 40.7 |
| 31-40 | 56 | 37.3 |
| 41-50 | 30 | 20.0 |
| 51 and Above | 3 | 2.0 |
| Total | 150 | 100.0 |
| **Sex** | | |
| Male | 29 | 19.3 |
| Female | 121 | 80.7 |
| Total | 150 | 100.0 |
| **Prof. cadre** | | |
| Nurse | 26 | 17.3 |
| Nurse/midwife | 44 | 29.3 |
| SCHEW | 47 | 31.3 |
| JCHEW | 20 | 13.3 |
| CHO | 13 | 8.7 |
| Total | 150 | 100.0 |
| **Years of work experience** | | |
| 0-5yrs | 51 | 34.0 |
| 6-10yrs | 50 | 33.3 |
| 11-15yrs | 26 | 17.3 |
| 16-20yrs | 13 | 8.7 |
| Above 20yrs | 10 | 6.7 |
| Total | 150 | 100.0 |

Table above reveals that 40.7% of the respondents are between 20-30 years of age, (80.7%) are females, 29 (19.3%) are males, with regards to the professional cadre of the staff, 44(29.3%) were Nurse midwives, while 13(8.7%) were community health officers, and that 34.0% of the respondents have had between 0-5 years' work experience.

**Table 2: Level of knowledge of misoprostol for the prevention and treatment of PPH (n= 150)**

| Level of knowledge | Frequency(percentage) |
|---|---|
| High | 47(31.3) |
| Moderate | 27(18.0) |
| Low | 76(50.6) |
| Total | 150 |

The table above shows that only 31.3% of the respondents had high level of knowledge of misoprostol for the prevention and treatment of postpartum haemorrhage.

**Table 3: Use of Misoprostol in the prevention and treatment of PPH**

| Variables | Response | F | (%) |
|---|---|---|---|
| Have you ever used misoprostol for the prevention of PPH | Yes | 101 | 67.3 |
| | No | 49 | 32.7 |
| | Total | 150 | 100 |
| If yes what dose did you administer? | correct | 55 | 54.5 |
| | incorrect | 46 | 45.5 |
| | Total | 101 | 100 |
| What was the route of administration? | correct | 66 | 65.3 |
| | incorrect | 35 | 34.7 |
| | Total | 101 | 100 |
| When did you administered the drug? | correct | 56 | 55.4 |
| | incorrect | 45 | 44.6 |
| | Total | 101 | 100 |
| Have you used Misoprostol in the treatment of PPH. | Yes | 99 | 66 |
| | No | 51 | 34 |
| | Total | 150 | 100 |
| If yes, what dosage did you administered? | correct | 28 | 28.3 |
| | incorrect | 71 | 71.7 |
| | Total | 99 | 100 |
| What is your most frequent route of administration? | Correct | 28 | 28.3 |
| | incorrect | 71 | 71.7 |
| | Total | 99 | 100 |
| Have you witnessed any of your patients with any side effect of misoprostol? | Yes | 61 | 61.8 |
| | No | 38 | 38.4 |
| | Total | 99 | 100 |
| If yes what are the side effect? | Hyperpyrexia | 30 | 49.2 |
| | rigors and | 20 | 32.8 |
| | chill | 11 | 18.0 |
| | headache | 61 | 100 |
| | Total | | |

Table 3 above shows that only two-third (67.3%) of the respondents had ever used misoprostol, out of which (54.5%) had administered the correct dose and only 65.3% had administered through the correct route for the prevention of PPH. The table also shows that slightly above half (55.4%) had administered the drug at the correct time. However, two-third (66%) of the respondents had used the drug for the treatment of PPH, out of which

only 28.3% used the correct dosage and through the correct route. Finally, only 61.6% of the respondents had witnessed the side effect of the drug. In summary, only 38.6% of the respondents had used misoprostol correctly for the prevention of PPH while only 16.2% had used the drug correctly for the treatment of PPH.

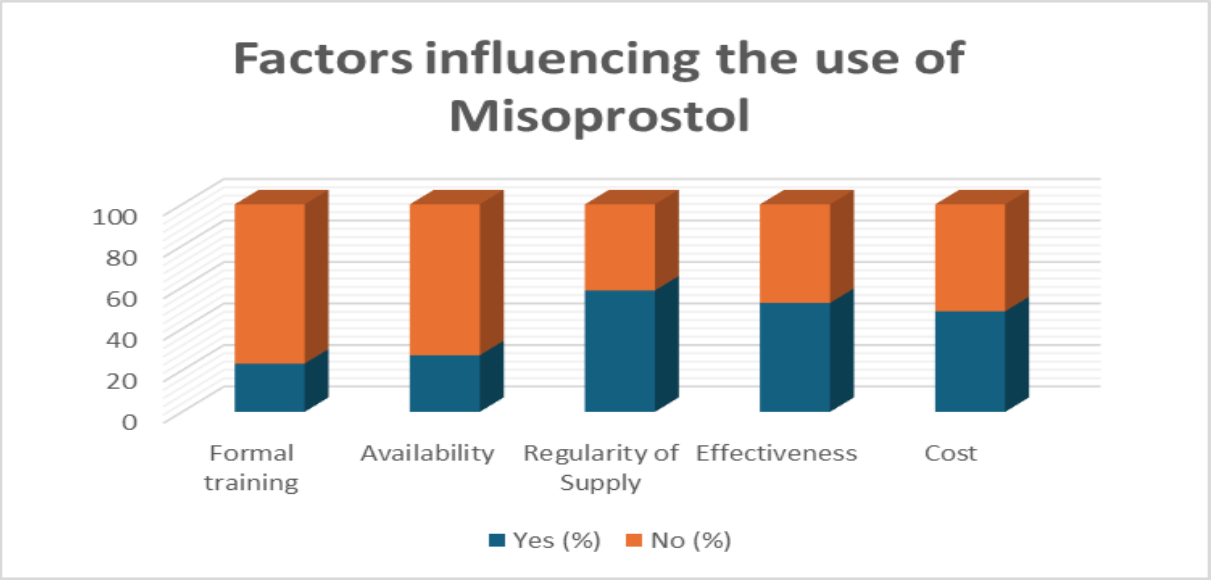


Figure 1: Factors influencing use of Misoprostol for the prevention and treatment of PPH

Figure 1 reveals that only 35(23.3%) of the respondents indicated the provision of formal training as a factor influencing the use of misoprostol while 41(27.3%) indicated the availability of the drug in their facility as a factor. However, 58.5%, 52.5% and 48.5% of the respondents respectively indicated regularity of supply, effectiveness of the drug and cost as factors influencing the use of misoprostol.

**Table 4: Relationship between knowledge and the use of misoprostol for Prevention of PPH**

| | Use of misoprostol for prevention of PPH | | |
|---|---|---|---|
| Level of Knowledge misoprostol | Correct use | Incorrect use | Total |
| High | 24 | 12 | 36 |
| Moderate | 5 | 14 | 19 |
| Low | 10 | 36 | 65 |
| Total | 39 | 62 | 101 |

$\chi 2 = 18.572$ df=2 p-value < 0.0001

Table 4 shows a significant relationship between knowledge and the use of misoprostol for the prevention of post-partum haemorrhage

**Table 5: Relationship between the level of knowledge and use of misoprostol for treatment of PPH**

| | Use of misoprostol for treatment of PPH | | |
|---|---|---|---|
| Level of Knowledge misoprostol | Correct use | Incorrect use | Total |
| High | 15 | 16 | 31 |
| Moderate | 0 | 13 | 13 |
| Low | 1 | 54 | 68 |
| Total | 16 | 83 | 99 |

$\chi 2 = 34.591$ df=2 p-value < 0.0001

Tables 5 shows a significant relationship between knowledge and the use of misoprostol for the treatment of PPH. Respondents with high level of knowledge use the drug correctly.

Table 6: The relationship between professional cadre and knowledge of misoprostol for prevention and treatment of PPH

| | Knowledge of misoprostol | | | |
|---|---|---|---|---|
| Professional Cadre | High | Moderate | Low | Total |
| Nurse | 3 | 5 | 15 | 23 |
| Nurse-midwife | 11 | 4 | 9 | 24 |
| SCHEW | 22 | 11 | 34 | 67 |
| JCHEW | 5 | 4 | 13 | 22 |
| CHO | 6 | 3 | 5 | 14 |
| Total | 47 | 27 | 76 | 150 |

$\chi 2 = 7.613$ df=4 p-value = 0.107

Table 6 shows no significant relationship between professional cadre and knowledge of misoprostol. The professional cadre of the respondents does not influence level of knowledge of misoprostol.

Table 7: The relationship between years of experience and knowledge of misoprostol

| | Knowledge of misoprostol | | | |
|---|---|---|---|---|
| Years of working experience | High | Moderate | Low | Total |
| 0-5yrs | 6 | 14 | 26 | 46 |
| 6-10yrs | 15 | 6 | 17 | 38 |
| 11-15yrs | 17 | 4 | 21 | 42 |
| 16-20yrs | 5 | 2 | 8 | 15 |
| above | 4 | 1 | 4 | 9 |
| Total | 47 | 27 | 76 | 150 |

$\chi 2 = 10.701$ df=4 p-value = 0.030

Table 7 revealed a significant relationship between the years of working experience and knowledge of misoprostol.

**4.1 Discussion**

Level of knowledge of misoprostol for the prevention and treatment of post-partum haemorrhage revealed that only about one third had high level of knowledge. This is surprising as training on the use of the drug among primary health care workers were organized following the approval of the drug by the Federal Ministry of Health (Population & Reproductive Health Initiative, based at ABUTH, Zaria 2010). This low knowledge may be due to ineffective training methods leading to poor retention of the knowledge, poor learning capacity of the participants or inconsistent follow-up which may make the participants to forget what they learned over time. This finding is higher than that of Mibi *et al.,* (2023) where only 10% of the respondents had knowledge of misoprostol for the prevention and treatment of post-partum haemorrhage. In a related study conducted in Northern Nigeria among women in semi-urban communities, Adiri and Ejembi (2017) reported that knowledge regarding the use of misoprostol for managing postpartum hemorrhage (PPH) was low. This may be attributed to the fact that if midwives who are expected to educate these women lack adequate knowledge themselves, it is unsurprising that the women receiving care also demonstrate similar gaps in understanding (Iwoala *et al.,* 2021).

However, about two-third of the respondents had used misoprostol for the prevention of PPH and only about half of them reported to have administered the correct dose; this practice may be attributed to their low level of

knowledge. By implication wrong dosage of the drug may lead poor management of third stage of labour with consequent PPH and mortality. This finding is contrary to the findings of Mibi *et al.,* (2023) where only slightly above one-third of the health care workers had used correct dosage for the prevention and almost half of them for the treatment of PPH. Differences in the permeating effect of ABU - university of California project on community use of misoprostol as mentioned above may accounts for the differences in the level of knowledge in this study.

Findings from this study showed that about two-third of the respondents administered the drug through the correct route; about half of them reported to have administered the drug at the right time (immediately after childbirth before separation of placenta). This does not support the findings of FMOHE (2008) where majority of the HCW stated that they administered the drug at the right time and through the correct route. The reason may be due the variation in time duration from the training and the surveys.

The finding also revealed that only few of the respondents had received formal training on use of misoprostol. This implies that a greater proportion of the participants were not part of the organized training; another reason for their poor knowledge. Only few respondents reported the availability of misoprostol at their facility. This may also influence the use of the drug. This is contrary to the finding of a study in Lagos by Duduyemi *et al.,* (2019) where 73.7% of the respondents stated that the drug was always available in their facility; this great availability may be associated to the fact that the settings for the study were intervention centers from an organization where the drug was supplied to crash maternal mortality due to PPH. However, the non-availability of the drug in the current setting may not be unconnected to the fact that in Nigeria only one pharmaceutical company (Emzor) is into production of this drug. More than half of the respondents of the respondents admitted that from their experience, misoprostol effectively prevented and treated PPH. This may be connected to the fact that only few of the respondents had used the drug correctly for the prevention and treatment of post-partum haemorrhage. This is incongruous to the finding FMOHE (2007) where 97% of the respondents stated that from their experience, misoprostol effectively prevented and treated PPH.

Findings from the study revealed that there was a significant association between knowledge and correct use of misoprostol. Respondents with higher level of knowledge of misoprostol tend to use the drug correctly. This finding supports the study of Duduyemi *et al.,* (2019) where there was a relationship between knowledge of misoprostol and use of misoprostol for the prevention and treatment of post-partum haemorrhage. Findings also showed that professional cadre of the respondents does not influence their level of knowledge of misoprostol, by implication improve knowledge is only acquired through appropriate training. Likewise years of experience of the respondents were associated with knowledge of misoprostol. Majority of respondents with years of experience between 6-15 years had high level of knowledge of misoprostol. This may not be unconnected to the fact that these groups of respondents are very enthusiastic and are more likely to explore training opportunities.

## 5.0 Conclusion

Based on the findings of the study, it can be concluded that primary health care workers in Zaria metropolis have low knowledge of misoprostol for the prevention and treatment, only few of the primary health care workers had been trained on the knowledge and correct use of misoprostol for the prevention and treatment of PPH. A significant association exists between knowledge and use of misoprostol for the prevention and treatment of PPH. Policy makers should make explicit policies on the need for regular and continuous training of Primary Healthcare Workers

## 6.0 Recommendations

1. Investment by State Ministry of health, National primary health care development Agency and Nursing and Midwifery council of Nigeria in training and retraining of primary health care workers on the use of misoprostol for the prevention and management PPH
2. Monitoring and supervision by Federal Ministry of Health and Nursing and midwifery on the correct use of the drug for the prevention and treatment of PPH.

3. Frequent supply and sustainable commodity management by the state and local government and also establishment of misoprostol revolving fund in the health facilities will be a good mechanism to improve the availability of misoprostol and thereby promoting its use among the primary health care workers.
4. Need for further studies especially the intervention studies to evaluate the impact of training on knowledge and utilization as well as qualitative studies to explore barriers to utilization
5. The study has some limitations. The results are based on self-report data that are prone self-report bias, recall bias.

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