Original Article

Placenta Disposal Practices among Doctors and Nurses in Obstetric Units of Secondary and Tertiary Health Facilities in Enugu State, Nigeria

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Abstract

Background: Anecdotal evidence suggests that placentas may be improperly disposed of due to the lack of knowledge of the best approaches. The reason women request for their placenta in Nigeria remains unclear. **Aim:** The aim is to determine the knowledge and perceptions of doctors and nurses about the use of WHO guidelines for the safe disposal of hospital wastes in placenta disposal and to explore their placenta disposal practices at tertiary and secondary health facilities in Enugu state. **Materials and Methods:** This was a mixed-method study design in which 163 doctors and nurses drawn from 3 secondary and 3 tertiary hospitals in Enugu Metropolis were studied. Quantitative component involved the use of interviewer-administered questionnaires. Knowledge and perceptions of respondents on the use of WHO guidelines to dispose of the placenta were documented. Knowledge of WHO guidelines was assessed and graded: good knowledge (score ≥12) and poor knowledge (score <12). Perception was assessed using 4 Likert-type questions whose responses were scored. Mean score ≥0.5 (positive perception), mean score <0.5 (negative perception). The qualitative component involved purposive sampling of 6 nurses who were the labour ward unit heads. In-depth interviews using semi-structured questionnaires were conducted to ascertain their placenta disposal practices and why women request placentas in their hospitals. Analysis was done for quantitative components using IBM SPSS version 20.0. Analyses were both descriptive and inferential. Analysis of the qualitative component established three thematic areas following the transcribing and coding of the contents of the interview. **Results:** Thirty-three (20.2%) and 158 (96.9%) had good knowledge (mean score = 12.7 ± 0.48) and positive perceptions (mean score = 2.96 ± 0.65), respectively, toward the use of WHO guidelines for placenta disposal. Placenta pits were the most common method for disposing of placenta. Those who request their placenta do so for cultural reasons (bury at home), avert being used for money rituals by health workers, and for the baby to be complete. **Conclusion:** A high proportion of doctors and nurses in Enugu state have poor knowledge but a positive perception toward WHO guidelines for disposing of placenta. The most common means of disposal was the placenta pit.

Keywords: Knowledge, placenta-disposal, practices, WHO guideline

Introduction

The placenta plays the key role of supplying oxygen and nutrients, eliminating metabolic waste products, and providing strong endocrine support for pregnancy through hormonal secretions as well as immunological functions that protect the developing embryo.[1] These functions are very strategic in ensuring fetal survival *in utero*. Despite this, soon after birth, it becomes a medical waste capable of harboring and transmitting viral particles, bacteria, and parasites and could become a good culture medium for these organisms if not properly disposed of, hence, a potential health and environmental hazard.[2-5]

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According to the WHO, the placenta as a human tissue is a pathological as well as hazardous health-care waste that must be handled carefully.[2] The guideline describes five sequential steps in the management of human pathological waste:

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segregation, packaging, transportation, storage, treatment, and disposal. Ideally, pathological human waste such as the placenta is packaged in a leak-proof strong plastic bag labelled with a yellow code and placed into a container; to be evacuated when it is three-quarter filled.[2] It should be safely transported to the storage area where it is stored under a refrigerated condition at a temperature of 3°C–8°C.[2] Treatment could be by use of automated chemical, biological treatment, natural decomposition method by burial, or incineration.[2] Incineration is the ideal method that reduces pathological human waste to inorganic incombustible waste with the best available technology, according to the Stockholm Convention.[2,3] However, in low-resource settings, the use of small medical waste incinerators and the burning of waste within a dug-out pit may be permitted if they are the only available option, provided it is temporary.[4,5] Similarly, as a temporary measure, placenta pit may be used in low-resource settings for complete disposal of pathological waste such as the placenta provided it is in a secured area where groundwater contamination is less likely to occur.[2] It could also be achieved in a far-designated landfill area where recyclers, scavengers, and humans do not come in contact until covered.[5]

Various country's National Health Systems have adopted or adapted this guideline to develop placenta disposal practice documents for their countries.[6,7] This is particularly obvious in some developed nations like South Australia, where policy guideline for placenta disposal is established.[6] Although Nigeria has developed document through its National guidelines for water, sanitation, and hygiene in health-care facilities,[7] which recognises placenta as medical waste with potential for harm to the public, its implementation at the hospital level is unclear. The reasons for this nonimplementation might be religious, spiritual, sociocultural, or aesthetic norms and practices that influence placenta disposal in some countries.[2,8-10] These factors may have contributed in making it impossible for the WHO guideline to be applied in many settings, especially in rural communities in Africa.[10] For whatever reason, the placenta should be disposed of in such a way as to reduce human and environmental health risks and still observe international best practices.[11]

Available evidence shows that placenta disposal practices reported in the literature in various countries include burial, burning, drying, dumping in hospital pits, and placentophagy.[9,10,12-16] Most reports from Africa noted that patients and their family members, influenced by their religious and cultural beliefs, determine the method used in the disposal of their placenta; therefore, not necessarily the observance of the WHO guideline.[9,10,17] For those who delivered at traditional birth attendants (TBAs),[12] placentae are either buried there or taken home for rituals and buried, while those delivered at the hospitals were dumped at dug pits in the hospital or taken home for burial or burning.[9]

In Nigeria, anecdotal evidence suggests that placenta disposal practices at hospitals vary widely from centre to centre based on the level of health-care delivery. This is envisaged to be partly due to a lack of implementation or knowledge or varying perceptions of the WHO guideline among health workers, and partly due to religious and cultural reasons as obtained in other African countries. Furthermore, there is a large paucity of data about knowledge, perceptions, and practice of placenta disposal using the WHO guidelines at secondary and tertiary health facilities in Nigeria. Hence, this study sets out to determine the knowledge and perceptions of doctors and nurses about the use of WHO guidelines for the safe management of wastes from health-care activities in placenta disposal and to explore their placenta disposal practices at 3 selected tertiary hospitals and 3 selected secondary health-care centres (General hospitals [GHs]) of Enugu state. The outcome of the research will not only add to the body of knowledge but also provide baseline data for advising directors of clinical services and other stakeholders to domesticate the use of placental disposal practice guidelines in their hospitals.

Material and Methods

Study design

This was a mixed-method study carried out at three selected tertiary and three secondary health-care centres in Enugu over one month.

Setting/population

University of Nigeria Teaching Hospital (UNTH) Ituku-Ozalla, Enugu, has a total of 45 Consultant Obstetrician–gynecologists, 60 resident doctors and 10 Nurses that work in the OGBYN unit. This gives 235 population working in the OBGYN units of the 3 tertiary hospitals and 3 secondary health-care facilities.

Enugu State University of Science and Technology (ESUT) Teaching Hospital is a state-owned tertiary health facility located within Enugu metropolis. It is a major referral centre for obstetrics and gynecological patients. Over 1495 deliveries occur in this facility annually, giving a monthly delivery rate of 125. It has 12 consultant obstetrician–gynecologists, 35 resident doctors, and 15 nurses who work in the maternity unit.

Mother of Christ Specialist Hospital (MOCSH) is a missionary tertiary hospital located in the Enugu metropolis. It is also a referral centre for obstetrics and gynecological conditions. The annual delivery rate is 2100 in the past one year. It has 3 consultant obstetrician–gynecologist, 6 resident doctors, and 10 nurses who work in the maternity unit.

Enugu state has 28 GHs, which are located in the 17 local government areas that make up the state. The selected GHs; Polyclinic GH (PCGH), Uwani GH (UGH), and Agbani GH (AGH), have on an average 3 medical doctors and 10 nurses. The hospitals have functional antenatal and labour ward units, led by a consultant obstetrician or a principal medical officer and midwives. On an average, each of the hospitals delivers between 100 and 140 per month.

Consenting and eligible doctors and nurses who worked in the labour ward for at least one month were enrolled in the study.

Respondents were eligible and consenting doctors and nurses at the selected hospitals who are trained in labour management and have worked in the obstetric unit for more than one month.

For the quantitative component, eligible and consenting participants were interviewed with a pretested semi-structured interviewer-administered questionnaire designed for the study. The questionnaire is in three sections: sociodemographic characteristics, knowledge, and perception about placenta disposal using the WHO policy guideline. Knowledge was assessed using 14 Likert scale-type questions whose responses are graded true (correct) = 1, false (incorrect) = 0. The respondent's total score was determined and used to categorise the respondents into two: (respondent's score ≥12; Good knowledge and score <12; poor knowledge. Perception was assessed using four questions whose responses were in Likert form and scored 1 = Agree, and 0 = Disagree. Perception mean score ≥0.5; positive perception, scores <0.5; negative perception. For the qualitative component; we utilized purposive judgment sampling of 6 nurses who were the labour ward unit heads. In-depth one-on-one interview using semi-structured questionnaire was conducted to ascertain their placental disposal practices and why women request placenta in their hospitals.

Sample size

Sample size for the quantitative component of the study was calculated using the formula for determining the minimum sample size for the prevalence of a qualitative variable, such as the proportion of participants who are aware.[18]

$$n = \frac{n0}{1+\frac{n0}{N}}$$ Where n is the minimum sample size.

$n0 = Z^2 \frac{p(1-p)}{d^2}$ p; prevalence of awareness of the use of WHO guidelines in placental disposal 50% (0.5), Z; 1.96, d; absolute precision at 95% confidence level; 0.05.

$n0$ = sample size for infinite population, n = Numbers in the known population.

$n0$ = 384.

$$n = \frac{384}{1+\frac{384}{235}}$$ =148, adding 10% nonresponse rate; 163.

Sampling technique

One hundred and sixty-three participants were sampled from 235 sample population as follows:

Proportion of health workers recruited from UNTH: ESUT-TH: MOCSH: PCGH: UGH: AGH in the ratio of 80:43:13:9:9:9. The 3 out of the 4 tertiary hospitals were randomly selected via balloting for this study while the 3 GHs were also randomly selected out of the 27 GHs in Enugu state. The participants were drawn from the doctors and nurses who work in the labour ward or maternity of the selected hospitals through systematic sampling. To ensure fair sampling, the number of doctors and nurses in each labour ward/maternity unit is proportionately sampled in the ratio indicated by the OBGYN department staff register/nominal role.

Data collection commenced after ethical approval was obtained from the UNTH Health Research Ethics Committee.

Data collection

For the quantitative component of the study, data collection was done consecutively by administering the questionnaire to the eligible and consenting selected 163 participants at the six centres. The interview took place at the clinic, wards, or delivery rooms. For the qualitative component, an in-depth one-on-one interview of the head nurse in-charge of labour was conducted in their offices on placental disposal in their hospitals. The responses were either tape-recorded or documented verbatim.

Data analysis

The data collected were cleaned. Analysis of the quantitative component was done using the IBM SPSS statistics for Windows, version 20.0. Armonk, NY:IBM corp. It was both descriptive and inferential. Associations between categorical variables were tested using the Chi-square test, while the mean and standard deviation of continuous variables were determined. The data were summarized as frequencies and percentages and presented in tables and figures. $P < 0.05$ at 95% confidence levels. Data for the qualitative component were cleaned, and analysis was done. Three thematic areas were established following the transcribing and coding of the contents of the interview. The final output was analyzed and presented in percentages and frequencies.

Results

The study showed that the respondents' overall knowledge (correct response) about the use of standard (WHO guidelines) for disposing of the placenta was (1459/2282, 63.9%) [Table 1]. Of the 163 respondents, only 33 (20.2%) had good knowledge (mean score of 12.7 ± 0.48) of the use of WHO guidelines for the safe management of health-care waste documents in disposing of the placenta. Surprisingly, 158 (96.9%) had positive perceptions (mean score of 2.96 ± 0.65) about the use of WHO guidelines [Table 2]. When asked how the placenta was disposed of in their hospital, the placenta pit was the most common reported means of disposing of the placenta. Those who requested their placenta did so for cultural and personal reasons [Table 3].

Table 4 shows that the significant proportion, 52 (31.9%) of the respondent, were ≥45 years while those between 25 and 29 years contributed the smallest proportion; 11 (6.7%). Overall, the mean age of the study respondents was 40 ± 7.9. There were more females than males: 83 (50.9%): 80 (49.1%).

Majority of the respondents were Christians; 159 (97.5%), Igbos; 152 (92.3%), currently married; 140 (85.9%), doctors; 120 (73.6%), and from a tertiary health facility; 136 (83.4%), while 122 (72.8%) had worked for more than two years in the labour ward before the study. Other details of the basic characteristics of the respondents are shown in Table 4.

Table 1 shows the responses of the respondents to the 14 questions assessing their level of knowledge about the use of WHO guidelines for safe management of health-care waste in disposing of the placenta. Majority (85 (52.1%) of the respondents answered correctly when asked if they knew whether the WHO guideline for safe management of waste from health-care activities involved placenta disposal. On the question about whether the WHO guideline classified the placenta as pathological and hazardous health-care waste, 117 (71.8%) answered correctly, but when asked if they knew whether the WHO guideline involved the following steps: segregation, collection, storage, transportation, treatment and disposal, majority 120 (73.6%) answered correctly. In addition, a higher proportion, 105 (64.4%) of the respondents, gave a correct answer when asked if they knew that according to the WHO guideline, Segregation and collection of placenta involves the use of leak-proof strong plastic bag placed in a container labelled with a yellow colour code. Hundred and three (63.2%) of the respondents correctly answered that transportation of the placenta involves movement of the collected placenta by waste transporters with facemasks, gloves, overall, and closed shoes. Furthermore, when they were asked if treatment of the placenta could involve biological treatment, burial, or incineration, the majority, 124 (76.1%), answered correctly. Furthermore, majority of the respondents, 131 (80.4%), answered correctly to the question: does disposal options include placenta pits, landfill area when no other options exist with ash disposal in landfill area, burial of ash or the placenta. The rest of the responses to the remaining questions and the mean score of the responses are detailed in Table 1.

Table 5 shows the responses to four questions that assessed respondents' perception of the use of WHO guidelines for the safe management of waste from health-care activity documents. When asked if they agreed or disagreed that *use of placenta disposal guideline will enhance proper disposal of* the *placenta*, most 158 (96.9%) agreed with the statement. Similarly, the majority, 158 (96.9%), agreed that the use of placenta disposal guidelines would help to dispel the rumour of money rituals associated with placenta disposal in Nigeria. Furthermore, 114 (69.9%) and 38 (23.3%) agreed that placenta disposal guideline could be drawn from the WHO waste management from health-care activity document for hospitals and that placenta disposal policy guideline is not necessary and, therefore, not recommended for obstetric units in Nigeria, respectively.

Table 2 shows using a total score of 12 as cutoff for categorising respondents into having good knowledge (score ≥12) or poor knowledge (score <12), only 33 (20.2%) had good knowledge (mean score; 12.7 ± 0.48). Similarly, using a mean

Table 1: Participant's responses to questions on knowledge of the use of World Health Organisation guidelines for disposing of placenta

Questions	Correct, *n* (%)	Incorrect, *n* (%)
WHO guideline for the safe management of waste from health-care activities involves the placenta disposal	85 (52.1)	78 (47.9)
WHO guideline classifies the placenta as pathological and hazardous health-care waste	117 (71.8)	46 (28.2)
Ideally, the steps involved in WHO guidelines for disposing of the placenta, like other pathological wastes, include segregation, collection, storage, transportation, treatment, and disposal	120 (73.6)	43 (26.4)
Segregation and collection of placenta involves the use of leak-proof strong plastic bag placed in a container labelled with a yellow colour code, — filled	105 (64.4)	58 (35.6)
Transportation of placenta involves movement of collected placenta by waste transporters with facemask, gloves, overall, and closed shoes	103 (63.2)	60 (36.8)
Storage: This could be kept under refrigerated conditions to avoid decomposing before disposal	42 (25.8)	121 (74.2)
Treatment of the placenta could involve biological treatment, burial, or incineration	124 (76.1)	39 (23.9)
Disposal options include placenta pits, landfill areas when no other options exist, ash disposal in landfill areas, burial of ash or the placenta	131 (80.4)	32 (19.6)
Before the placenta is processed for disposal, like other pathological wastes, it could be given to the owners for rituals/prayers, etc.	64 (39.3)	99 (60.7)
In resource-limited environments, placenta pits are useful but need to be located at specific sites to avoid contamination of groundwater, locked and fenced for security reasons	135 (82.8)	28 (17.2)
Pathological waste like placenta, may be disposed of at a landfill when no other treatment options are available. Waste should also be covered as quickly as possible	115 (70.6)	48 (29.4)
The disposal of pathological wastes like placenta may be bound by sociocultural, religious and aesthetic norms and practices	123 (75.5)	40 (24.5)
Disposal of the placenta should be in a pre-specified area to prevent recyclers or scavengers from coming into contact with the waste	125 (76.7)	38 (23.3)
A traditional option for disposing of pathological waste like the placenta is to bury them in cemeteries	70 (42.9)	93 (57.1)
Overall response	1459 (63.9)	823 (36.1)

WHO: World Health Organisation

score of 0.5 as cutoff for categorising respondents into those with positive (mean score ≥0.5) or negative perceptions (mean score <0.5), 158 (96.9%) had positive perceptions (overall mean score; 2.96 ± 0.65).

Table 6 shows there was no significant difference in knowledge (P = 0.10) and perception (P = 0.60) between doctors and nurses who participated in the study.

Table 7 shows that after a logistic regression to identify the predictors of knowledge of use of standard (WHO guideline) for disposing of the placenta, being a medical doctor is related to decreased knowledge (P = 0.00, B = −3.023, odds ratio [OR] =0.049, confidence interval [CI]: 0.01–0.232) and being of the female sex was associated with improved knowledge (P = 0.00, B = 2.80, OR = 16.5, CI: 4.59–59.3) while category of health facility, duration of service in labour ward, age, and religion were not statistically related to the knowledge of standard (WHO guideline), therefore, not predictors.

Table 7 shows the result of the themes generated from the responses to in-depth interview questions by 6 respondents on the placenta disposal practices in their hospitals: *When asked "How do you dispose placenta in your center?"* The following were the responses; *"We throw them into the placenta pit," "The placenta is handed over to the patients on request in polythene bags or any other container" and "sometimes we bury in the hospital."* Furthermore, one-on-one in-depth interview was conducted on the respondent who said that placenta *Why parents request their placenta?*, the following responses were given by the respondent: *"Our people here request it because they want to bury it at home, but one Hausa man requested it because he believed that health workers would use it for money rituals."* The other reasons given by the respondent are shown in Table 3. Furthermore, during the interview, it was inquired about how the placenta was packaged before disposal, and the following responses were obtained: *"most times we put it in patients' buckets," "sometimes we pour it into a waterproof, tie it and give it to the mother," "if the mother is not interested in the placenta, we can carry it with the kidney dish and throw it into the pit."*

Table 2: Knowledge and perceptions of World Health Organisation guidelines for placenta disposal

Variables	Mean score±SD	*n*=163, *n* (%)
Knowledge level	8.95±3.17	
Good knowledge	12.7±0.48	33 (20.2)
Poor knowledge	8.00±2.85	130 (79.8)
Perception	2.87±0.82	
Positive perception	2.96±0.65	158 (96.9)
Negative perception	0.00±0.00	5 (3.1)

SD: Standard deviation

Discussion

Improper disposal of hospital wastes, such as the placenta, could constitute a significant health hazard through the spreading of infectious diseases, environmental pollution, and contamination of water bodies.[5-7,19] Since these conditions are of public health significance, an assessment of the doctors' and nurses' knowledge, perceptions, and practice of placenta disposal with reference to standard (WHO guidelines) remains key to ensuring public health safety.

The documentation of a high overall knowledge about the standard (WHO guidelines) for disposing of placenta in this study is encouraging. This is because most of the respondents answered ≥12 of the 14 questions, which tested their knowledge correctly. This may be because these professionals could have access to evidence-based medical practice information via the WHO websites and other free-access online resources.[20] By implication, having professionals who are knowledgeable

Table 3: Respondent's placental disposal practice

Variables	*n*=6, *n* (%)
How do you dispose placenta in your centre?	
We throw them into the placenta pit	6 (100.0)
The placenta is handed over to the patients on request in polythene bags or any other container	1 (16.7)
They are buried in the hospital	1 (16.7)
How do you package the placenta before disposal?	
We put them in a kidney dish	1 (16.7)
We put them in waterproof (polythene) bags	2 (33.3)
We put them in small plastic buckets with cover	6 (100.0)
Why do parents request their placenta?	
Response to reasons parents request their placenta by one respondent	
Our people here request it because they want to bury it at home, but one Hausa man requested it because he believed that health workers would use it for money rituals	
For cultural reasons, they take it home, bury it and plant an economic tree as a symbol of the child's birth. Some persons just prefer to bury it in their homes	
Some mothers request it because they feel we use it for something, make money out of it	
They just want to go home with it because they believe the baby will not be complete without it	
They just wish to bury it themselves	
Best known to them	

Table 4: Basic characteristics

Variables	Frequency, *n* (%)
Age (years)	
<20	0
20–24	0
25–29	11 (6.7)
30–34	31 (19.0)
35–39	27 (16.6)
40–44	42 (25.8)
≥45	52 (31.9)
Sex	
Male	80 (49.1)
Female	83 (50.9)
Religion	
Christianity	159 (97.5)
Islam	0
Traditional	1 (0.6)
Atheist	3 (1.9)
Tribe	
Hausa	3 (3.4)
Igbo	152 (93.2)
Yoruba	3 (3.4)
Others	0
Marital status	
Currently married	140 (85.9)
Never married	23 (14.1)
Divorced/separated	0
Others	0
Category of health workers	
Medical doctors	120 (73.6)
Midwives/nurses	43 (26.4)
Category of hospital	
Tertiary	136 (83.4)
Secondary	27 (16.6)
Duration of service in labour ward (months)	
<6	6 (3.7)
6–24	35 (21.5)
>24	122 (74.8)

Table 5: Participant's responses to the questions on the perception of the use of World Health Organisation guidelines in placenta disposal (*n*=163)

Variables	Agree	Disagree
Use of placenta disposal guidelines will enhance the proper disposal of the placenta	158 (96.9)	5 (3.1)
The use of placenta disposal guidelines will help to dispel rumours of money rituals associated with placenta disposal in Nigeria	158 (96.9)	5 (3.1)
Placenta disposal guidelines could be drawn from the WHO waste management from health-care activity document for hospitals	114 (69.9)	49 (30.1)
Placenta disposal policy guideline is not necessary, therefore, not recommended for obstetric units in Nigeria	38 (23.3)	125 (75.7)

WHO: World Health Organisation

about the standard (WHO guidelines) on the safe management of the placenta is a reassurance of public safety and a conviction that the health workers are likely to comply with its application in their practice to reduce the health risks and environmental safety concerns.

Although the respondents were generally knowledgeable about the standard (WHO guidelines), the proportion with poor knowledge levels was high. This is obviously worrisome as a lack of knowledge of international best practices on the safe management of the placenta portends danger and raises strong public health and environmental safety concerns. It is much so when there is insufficient knowledge on the critical issues, such as not knowing that WHO guideline covers placenta disposal, its safe transportation, storage, and its use by owners for rituals or prayers before disposal. Previous studies in Africa, as captured in a USAID review article, have also shown a deficiency in the knowledge of health workers to discharge their duties.[21] This is largely due to a lack of access to health-care information,[22] which is particularly common in rural communities where internet services/providers and electric supplies are largely lacking or epileptic. Furthermore, it may also be due to a lack of training and retraining opportunities for health workers,[21,23] on the management of hospital wastes, especially those who work in rural communities. Overall, the implication of having a high proportion of practitioners with poor knowledge of WHO practice guidelines on placenta disposal is that the chances of wrong practice could increase, resulting in increased risk of infectious disease transmission in the hospital environment. Uninformed or poorly informed health-care workers would not adhere to the recommended preventive protocols. In addition, there would be increased chances of littering the hospital with decaying placenta can cause environmental pollution.

In this study, poor knowledge of WHO guidelines for disposing of the placenta was predicted by the category of health workers and sex of the participants. Being a medical doctor was associated with a high risk of poor knowledge of WHO guidelines for disposing of the placenta. Although this association is weak and could disappear with increase in sample size, it is attributable to the fact that medical doctors' responsibility in labour management ends as soon as a woman delivers safely. As a result, they neither pay attention to nor make an effort to acquire more knowledge about the details of postpartum cleaning and management of waste from the delivery process. However, this situation may be regarded as a misnomer, as doctors, being the leader of the medical team, should not lack adequate knowledge of placenta disposal, which is also an infection control method. The implication of doctors having poor knowledge is detrimental since their expected leadership role in infection control is compromised, thereby exposing the entire medical team, patients, and the public to infections and environmental hazards. Being a female health worker was found to increase the risk of poor knowledge of WHO guidelines for placenta disposal by 16 folds. However, the exact link between sex and knowledge in this regard may be difficult to explain. This is because of other confounding factors such as level of training, additional

Table 6: Comparison of doctor's versus nurse's knowledge level and perception toward the use of World Health Organisation guidelines for disposing of placenta

Variables	Category of health workers		*P*/Fisher's exact	OR	95% CI OR
	Medical doctors *n*=120, *n* (%)	Nurses *n*=43, *n* (%)			
Level of knowledge					
Good	28 (23.3)	5 (16.7)	0.10	2.31	0.83–6.44
Poor	92 (76.7)	38 (88.4)			
Perception					
Positive	117 (97.5)	41 (95.3)	0.60	1.90	0.31–11.7
Negative	3 (2.5)	2 (4.7)			

SD: Standard deviation, CI: Confidence interval, OR: Odds ratio

Table 7: Predictors of knowledge of World Health Organisation guidelines for placenta disposal

Variables	*B*	*P*	OR (Exp B)	95% CI Exp B (OR)
Category of health workers	−3.023	0.00	0.05	0.01–0.232
Category of hospital	0.882	0.20	2.42	0.64–9.18
Duration of service in labour ward	−21.17	1.00	0.00	0.00–0.00
Age	−0.530	0.31	0.59	0.21–1.65
Religion	19.74	1.00	373	0.00–0.00
Sex	2.80	0.00	16.5	4.59–59.3

CI: Confidence interval, OR: Odds ratio

qualifications, socioeconomic status, and environmental, which may affect knowledge but could not be controlled in the study. Therefore, adequately powered studies with superior quality may be needed to confirm this relationship.

Furthermore, the study found high positive perceptions of the WHO guideline for disposing of placenta by health workers. This is partly due to the fact that majority of the respondents believed that the use of the guideline would enhance proper placenta disposal and dispel the rumour that health workers use placentas for money rituals in Nigeria. Furthermore, the high positive perception rates could also be explained by the fact that majority of the respondents strongly disagreed with the statement suggesting that WHO guidelines for disposing of placenta are not necessary and should not be recommended for hospitals in Nigeria.

Contrary to this finding, the study also showed that more than 36.0% of the participants had negative perceptions about the use of WHO guidelines for disposing of the placenta. This high figure was quite surprising as health workers generally have positive dispositions towards good health programmes. Although the reason for the negative perception about the use of WHO guidelines for disposing of the placenta may not be clear, it could be related to the high proportion of the respondents who were ignorant of it in the study population.

In terms of placenta disposal practices at the study centres, the study revealed three options of placenta disposal; placenta pit, handing over to mothers, and burial in hospitals. However, the predominant method of placenta disposal was the placenta pit. All six interviewed health workers independently identified placenta pits as the choice disposal option in their various hospitals. Although a placenta pit is one of the methods recommended by the WHO when the resources to provide the standard facility are lacking, it should be used on a temporary basis.[5] Unlike developed countries where the WHO standard disposal guideline is commonly practiced,[5] the placenta pit appears to be favored in health facilities in developing countries[24,25] due to its perceived inexpensive ease-of-practice nature. It is believed that as the placenta decomposes in the pit, the fluid effluent, its contained pathogens and bulk are reduced and washed into the ground.[5] However, it has strong safety issues related to depth when it is shallow, sited near groundwater (well), and not properly fenced. In resource-limited environments, these standards may not be met, and this obviously results in health risks. In fact, at the study centres the placenta is disposed of in a modified placenta pit (toilet-septic-pits) [Figures 1 and 2]. These modified placenta pits are sited just close to buildings, not fenced and occasionally are bushy [Figure 3].

One of the interviewed participants during the in-depth interview said *"The placenta is handed over to the patients on request in polythene bags or any other container."* The practice in Nigeria may be for various reasons. This practice appears to be common in culture and religion-sensitive environments like the Benin Republic, where placenta disposal is said to have a spiritual meaning.[9] Culturally, the placenta is buried at home in the Benin Republic.[9] This is different from the recent trends in practice in developed nations such as Canada, Australia, and other nations, where there has been a renewed interest for women to compulsorily request their placenta after birth largely for home consumption[26] due to its nutritive,[27] analgesic[28] or because it is believed to cure postpartum depression and increase postpartum breast milk production.[29] However, evidence in support of these acclaimed benefits is

Figure 1: Placenta pit 1

Figure 2: Placenta pit 2

Figure 3: Placenta pit 3

still scanty, and available ones are self-reported.[30] In fact, this benefit has been attributed to the placebo effect;[31] hence, its consumption is being discouraged.[32] Due to its frequent request, South Australia has enacted a law that permits health workers to release the placenta after adequate counselling and signing of "Request for release of human placenta form" which guarantees individual and public health safety.[6] In these developed countries where the placenta is permitted to be given to patients, it is strictly in compliance with the standard best practice that guarantees infection prevention and safe disposal. This suggests that for whatever reason, the placenta is being released to the mother or parents, safety precautions must be emphasised and ensured.

Similarly, the last option identified in this study for disposing of the placenta is by burial in the hospital. This is because the respondent said "*They are buried in the hospital.*" This practice appears not to be common but has been reported to be used by TBAs without placenta pit facilities.[9] Similar to the risks associated with placenta pits, burial of the placenta should be a makeshift option for placenta disposal, if at all it has to be practiced.

When asked about the possible reasons women request their placenta in the hospital, the reported reasons by the respondents for placenta requests by mothers were quite revealing. One prominent reason is for culture. This is in consonance to the response given by the respondent*; "For cultural reasons; they take it home, bury it and plant an economic tree as a symbol of the child's birth. Some persons just prefer to bury it in their homes."* However, some women may request it for other reasons. In our study, the respondent said "*Our people here request it because they want to bury it at home, but one Hausa man requested it because he believed that health workers would use it for money rituals."* This response was quite revealing as many people within the study environment may actually be requesting for their placenta to ensure that health workers do not use it for money rituals. The reason for this insinuation is still unclear. In the investigator's experience, this is the very first time this is being reported.

Packaging of placenta for disposal should ideally be in a leak-proof strong plastic bag placed in a container and labelled with a yellow colour code.[5] However, in our study, the respondents when asked how placenta was packaged for disposal in their hospitals noted the following; "*we put them in a kidney dish," "we put them in waterproof (polythene) bags" and "we put them in small plastic buckets with cover."* These responses suggest poor packaging capable of transmitting infection and may be in common practice in Nigeria.

Despite the outcome of this study, it is not without limitations. As a mixed-method study, respondents' responses to the questions and interviews are largely subjective and may not be the true reflection of the general population. Therefore, the interpretation and application of the study findings must be carefully guarded.

Conclusion

Although doctors and nurses at tertiary and secondary health institutions in Enugu state are knowledgeable about the standard (WHO guidelines) for safe disposal of placenta, the proportion with poor knowledge but positive perception is high. Despite the placenta pit being the commonest placenta disposal option in Enugu, the practice is not in strict compliance with the standard (WHO guidelines) for disposing of hospital wastes. Placentas are requested from hospitals in Enugu for cultural reasons (bury them at home), to avert being used for money rituals, and to ensure baby's completeness.

Recommendation

Since most health workers in this study have low knowledge about the standard (WHO guidelines) for disposing of the placenta, we recommend regular training on this protocol. In addition, doctors and nurses have a positive perception toward the use of WHO guidelines, we recommend the development of a similar written guideline by the Enugu State Ministry of Health, which is culture-sensitive and may be able to dispel the insinuations of money rituals associated with placenta disposal in hospitals. We also recommend a purely qualitative exploratory study of the reasons women suspect the use of their placentas for money rituals in Enugu.

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Conflicts of interest

There are no conflicts of interest.

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