

## **Knowledge Attitude and Practices of Pregnant Women Attending Comprehensive Health Centre, Isolo, Ondo State towards Hygienic Practice**

**Damilola R. Nun<sup>1\*</sup>, Emmanuel O. Adesuyi<sup>1</sup> and Samuel A. Olawoore<sup>1</sup>**

*<sup>1</sup>Institute of Nursing Research (INRFCNSWZ), Nigeria.*

### **Authors' contributions**

*All authors contributed maximally to every section of the manuscript. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/IJTDH/2018/40582

#### Editor(s):

(1) Giuseppe Murdaca, Clinical Immunology Unit, Department of Internal Medicine, University of Genoa, Italy.

#### Reviewers:

(1) Daniel Ejike, Kampala International University, Uganda.

(2) Somchai Amornyotin, Siriraj Hospital, Mahidol University, Thailand.

Complete Peer review History: <http://www.sciencedomain.org/review-history/24450>

**Original Research Article**

**Received 10<sup>th</sup> February 2018**

**Accepted 18<sup>th</sup> April 2018**

**Published 4<sup>th</sup> May 2018**

### **ABSTRACT**

The study assessed the knowledge, attitude, and practices of pregnant women attending the Comprehensive Health Centre, Isolo, Ondo state Nigeria towards hygienic practice. A descriptive research design was utilized. The study was conducted at the antenatal clinic of the Comprehensive Health Centre, Isolo, Ondo state, Nigeria. A sample size of one hundred and twenty (120) at 4 percent error (5 more respondents) to accommodate for attrition rate was gotten by using Germany's rule. Accidental, convenience sampling technique was adopted. One Hundred and twenty-five (125) questionnaires were distributed, 50 each for three consecutive weeks of antenatal appointments. The instrument for data collection adopted for this study was a self-designed questionnaire consisting of closed-ended questions. One hundred and twenty (120) questionnaires were retrieved. Data collected were analyzed using the statistical package for social sciences (SPSS 22), same were presented and summarized through the use of tables and charts. Pearson chi-square goodness of fit test was used to test the two null hypothesis, both of which were accepted. This suggested there was no significant statistical relationship between the variables tested. The implication was that parity and the knowledge of pregnant women had no significant impact or influence on their practice of hygiene. Although the result indicated a high level

\*Corresponding author: Email: [nundamilola@gmail.com](mailto:nundamilola@gmail.com);

of knowledge but a little disparity in the attitude and practice, though considerably high too. It was deduced that hygienic practices do not involve just one aspect of personal cleanliness but rather a collection of careful behaviors and practices to maintain safety and prevent the spread of disease especially in handling what stays on our body and what goes in. It was suggested that nurses, midwives, and other health care providers must ensure that pregnant women are health educated on the several ways to keep themselves free from infection during pregnancy. This will be best achieved during ante-natal clinics, children clinics as well as when they visit the hospitals.

*Keywords: Knowledge; attitude; practice; pregnant women; hygiene practices.*

## 1. INTRODUCTION

Hygiene is an old concept related to medicine, as well as to personal and professional care practices related to most aspects of living [1]. Good hygienic practices, such as hand washing and the safe disposal of faeces, are essential for maximizing the health benefits of safe water and sanitation facilities [2]. Evidence showed that when hygiene education accompanies the provision of water and sanitation, the number of deaths caused by diarrhea diseases is reduced by an average of 65 percent. Hygiene education and promotion encourage people to replace their unsafe practices with simple and safe alternatives. Maintaining oral health during pregnancy has been recognized as an important public health issue world-wide. Research continues to show an association between gum disease (gingivitis and periodontitis) and adverse pregnancy outcomes such as pre-natal loss, low birth weight, and premature births [3-4].

Pregnancy is often thought to be associated with increased susceptibility to infection. For example, during the 19th and early 20th century, pregnancy was thought to have a deleterious effect on the course of tuberculosis, so much that therapeutic abortion was recommended in pregnant women with tuberculosis [5]. This may be due to the various physiological, anatomical and biochemical changes that occur in the body of pregnant women during pregnancy especially the ones that has to do with elevation of the hormone level, suppression of the immune system and may also account for the exaggeration in the excretion of waste body products such as sweat, urine, mucus, saliva etc. during pregnancy. Pregnancy is a special state for a woman which is associated with concomitant physiological and emotional changes. For instance, some pathologies have been reported in the oral cavity among pregnant women [6].

[7] Poor hygienic practices are rampant amidst pregnant women, some of which include:

- Sharing of sanitary facilities by the pregnant women without care for the cleanliness state of the facilities.
- Not changing the pant daily and when they have discharged.
- Wearing of wet pant due to whatever reason like no sunshine to dry the pants after washing them, or to make them feel comfortable and
- Use of herbal concoction to wash their private part for easy baby delivery or as part of culture depending on which family or tribe the women married from.

Practicing personal hygiene was ranked as the first set of behaviors in maintaining the safety of food and reducing number of food borne illnesses with washing hands before handling food receiving the highest rank [8]. Large numbers of the women do not use to properly clean their hands and often contaminate them after washing. Whereas, personal hygiene as indicated in the activities of daily living such as the safe practice of washing hands before preparing food makes food poisoning less likely to occur [9]. Hands should be washed with warm water and soap for at least 20 seconds [10]. As a result of the anatomical design of the female urethral, they are more susceptible to urinary tract infection than male. Isolates from urinary tract infection are mainly of faecal origin, suggesting poor hygiene amongst pregnant women [11]. Therefore, the need for personal hygiene should be stressed as symptomatic and asymptomatic bacteriuria can lead to cystitis and pyelonephritis.

In a research survey, it was discovered that there are an average oral health knowledge and positive attitudes to oral health [12-13]. Interestingly, the good knowledge and attitudes

displayed were not fully reflected in the women's oral health practices [13]. While it was found that most women have a good understanding of hygiene, practiced good personal hygiene, went for regular antenatal services, took adequate food, fruits and vegetables, maintained one sexual partner as a preventive measure for infection during pregnancy [14-15].

Evidently, the African literature has a dearth of studies that investigate the knowledge, attitude, and practices of pregnant women towards hygienic practice. To our knowledge, no previous study in Nigeria addresses this important subject. This study was conducted to fill that gap and to add to our knowledge of how very little practices that are often overlooked can wrought havoc on the mother and unborn child during pregnancy. This is particularly important since water, sanitation, and hygiene are linked to child and maternal health. Access to improved water, personal hygiene, and sanitation which are all parameters of hygienic practice are key to Sustainable Developmental Goals (SDGs 3 & 6) targets of addressing child and maternal mortality in Nigeria. Hence we will investigate the knowledge attitude and practices of pregnant women attending the Comprehensive Health Centre, Isolo, Ondo State towards hygienic practice.

### 1.1 Statement of Problem

In the 1950s, the transplant immunologist Peter Medawar proposed that during pregnancy there is a general maternal immune suppression to assure tolerance of this allogeneic fetus [16-17]. Our understanding of the immune alterations that occur during pregnancy has evolved considerably since Medawar's time to include more complex theories of immune alteration. There is evidence that adaptive immune responses are weakened, potentially explaining reduced viral clearance [18-19]. This spells out the importance of carefulness in handling what pregnant women ingest as well as a good hygienic practice in respect to their body and the environment.

But unfortunately, the pregnant state may also predispose to unhealthy habits. These habits may include: lethargy, lowered interest in self-care such as bathing, tooth brushing, etc., likeness for particular types of food groups at the detriment of other essential food groups, frequent unhealthy snacking habits such as licking sweets

to curb nausea, and pica (craving for unhealthy substances or food) [13].

Food-borne diseases have been increasing in recent years, with a greater impact on the health and economy of developing countries than developed countries [20]. According to the World Health Organization, in 2005 alone, 1.8 million people died from diarrheal diseases, and most of these cases were attributed to the ingestion of contaminated food and drinking water. According to the Centers for Disease Control and Prevention, an estimated one in six Americans (or 48 million people) become sick, 128,000 are hospitalized, and 3000 die of foodborne diseases every year [21]. Of all the ten common disease that causes mortality in pregnancy as reviewed by Sappenfield and his team only a few doesn't have its mode of transmission directly associated with the poor hygienic practice, however, in all cases, the hygienic practice has a vital role to play[5]. This research, therefore, intends to assess the knowledge attitude and practices of pregnant women attending the comprehensive health centre, solo, Ondo state towards hygienic practice.

### 1.2 Operational Definition of Terms

**Pregnant Women:** a female whose offspring presently develops inside her also called gravidity or gestation.

**Hygiene:** Condition of practices conducive to maintaining health and preventing disease especially through cleanliness.

**Hygienic Practice:** a set of practices performed for the preservation of health and to prevent disease.

### 1.3 Research Hypothesis

- There is no significant relationship between parity and practices of hygiene among pregnant women.
- There's no significant relationship between the knowledge and practices of hygiene among pregnant women.

## 2. METHODOLOGY

Descriptive study design was adopted since the focus is to assess the knowledge, attitude, and practice of pregnant women attending a comprehensive health center towards hygiene practices. This research was conducted in Isolo

Comprehensive Health Centre located in Akure South of Ondo State. The target population was pregnant women attending the antenatal clinics of the above-named health center. An estimate of one hundred and fifty (150) pregnant women registered with the antenatal clinic each month. The sample size was one hundred and twenty (120) gotten by using Yermane's rule. The instrument used for this study was a well-structured self-designed questionnaire consisting of structured closed-ended questions (yes/no questions), based on published facts, which comprise of sections to assess the knowledge of pregnant women, their attitudes and their practices towards hygienic practices during pregnancy. The instrument used (questionnaire) was subjected to scrutiny to make sure it was reliable for carrying out the research. The content of the instrument was compared with the objectives of the study and the literature to ensure content validity. The instrument was pre-tested by carrying out a pilot study to check the reliability of this instrument. Ten percent of the sample size was used, twelve (12) questionnaires were distributed at the Ugele comprehensive health center, Akure and analyzed using Cronbach alpha coefficient. Ambiguous questions and the ones who reduced the Cronbach alpha coefficient were removed. The research hypothesis was analyzed using Pearson chi-square goodness of fit test.

One hundred and twenty-five (125) questionnaires were distributed to accommodate for attrition, but one hundred and twenty (120) were properly filled and retrieved. Accidental convenience sampling technique was adopted; the questionnaires were distributed on three different occasions with an average of fifty questionnaires distributed each week of antenatal appointments.

$$\text{Yemane's Formula } n = \frac{N}{1 + Ne^2}$$

$$N=150, e=0.04$$

$$n = \frac{150}{1 + 150(0.04^2)}$$

$$n=120.96$$

## 2.1 Data Analysis

Data collected were analyzed using the statistical package for social sciences (SPSS 22). Analyzed data were summarized and presented in a simplified form using tables and charts.

This was followed by interpretation of the data presented in the tables.

## 2.2 Ethical Consideration

Approval and ethical clearance were obtained from the primary health care (PHC) coordinator and the matron of the health center to collect data. Both written and oral permissions were obtained from each respondent that participated in the study after succinctly explaining to them the importance and objectives of the study. The researcher also explained to all respondents that they are free to participate or opt out of the study as their answers would be confidential and will only be used for scientific research purposes.

The written consent has been collected for this manuscript from the patient.

## 3. RESULTS

**Inference:** 98.3% of the respondents knew that regular antenatal visit was essential during pregnancy. 91.7% of the respondent agreed that there is adequate and effective teaching on personal hygiene on every antenatal visit. 73.3% of the respondents agreed that lack of oral hygiene such as regular brushing could result in infection during pregnancy while 26.7 disagreed. 84.2% of the respondents knew that lack of adequate perineal care during pregnancy can negatively affect the mother and the unborn baby while 15.5% has poor knowledge about the above. 88.3% respondents had good knowledge that ensuring a good and clean environment will promote healthy living during pregnancy while 11.7% had poor knowledge. 92.5% respondents knew that eating of a balanced diet and properly handled foods/fruits promotes the development of the unborn baby.

**Inference:** Table 2 shows that 42.5% disagreed while 52.5% strongly disagreed to the statement "health education on hygiene practices is not important and needful during antenatal visits" 25.8% of the respondents agreed that brushing of teeth twice daily is stressful and unnecessary, 1.7% strongly agreed 0.8% strongly agreed, 49.2% disagreed while 24.2% strongly disagreed. 2.5% of the respondents agreed that changing of under wears soiled with urine and discharges once or twice daily is a waste of effort, 0.8% strongly agreed, 50.8% disagreed while 45.8% strongly disagreed. 2.5% of the respondents agreed that regular hand washing after handling dirty substance like using the toilet is more of a waste of water, soap and time, 46.7% disagreed while 50.8% strongly disagreed. 0.8% respondents agreed that tight

clothes do not affect the unborn baby, 0.8% strongly agreed, 42.5% disagreed while 55.8% strongly disagreed. 2.5% respondents agreed that it is not necessary to wash fruits before eating since they are natural and fresh foods, 1.7% strongly agreed, 55.0% disagreed while 40.8% strongly disagreed.

**Inference:** Table 3 shows the practices of hygiene by pregnant women. 96.7% of the respondents often attend their antenatal clinics, 0.8% attend sometimes. 40.8% respondents often brush their teeth twice daily, 36.7% sometimes brush twice daily while 22.5% never brush the teeth twice daily. 82.5% of the respondent practice washing of hand after using the toilet often, 15.8% practice this sometimes while 1.7% respondents never practiced it. 79.2% of the respondents often discard stagnant water around their houses, 15.8% practice it sometimes, 0.8% rarely practice while 4.2% never discard stagnant water around their houses. 60.8% respondents often sleep for at least 8/9 hours daily, 31.7% do sometimes while 7.5% never sleep 8/9 hours daily. 85.8% of the respondents often change soiled under wears at least twice daily, 10.0% change soiled under wears at least twice daily sometimes while

4.2% never change soiled under wears at twice daily.

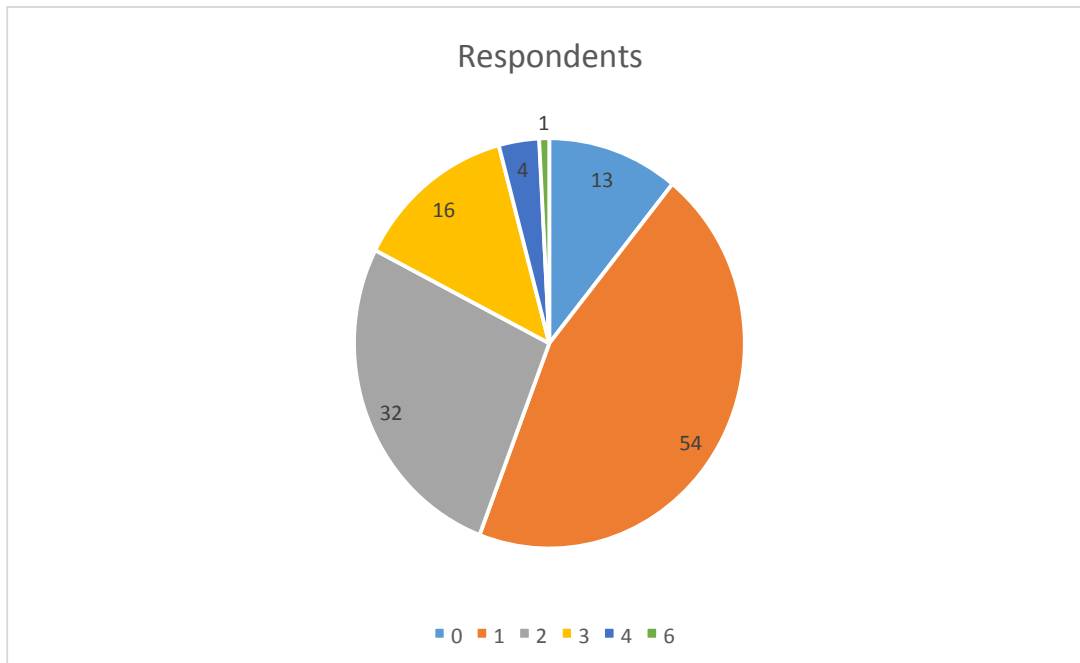
### 3.1 Hypothesis Testing

**Hypothesis 1:** There is no significant relationship between parity and practices of hygiene among pregnant women

**Inference:** The data analyzed using chi-square goodness of fit test. The null hypothesis was accepted at  $X^2(10) = 4.0$ ,  $p = 0.05$ . Hence, there is no significant relationship between the parity and practices of hygiene among pregnant women.

**Hypothesis 2:** There is no significant difference between the knowledge and practices of hygiene among pregnant women.

**Inference:** The data was analyzed using a Chi-square goodness of fit test. The null hypothesis was accepted at  $X^2(2) = 3.180$ ,  $p \geq 0.05$ . Hence, there is no significant difference between the knowledge and practices of hygiene among pregnant women.



10.8 % had 0 number of children, 45% had 1 child, 26.7% had 2 children, 13.3% had 3 children, 3.3% had four children while 0.8% had six children.

**Chart 1. Demograph showing the parity of the respondents**

**Table 1. Knowledge of pregnant women on hygiene practices**

S/N			Frequency N = 120	Percentage (%)
1.	Regular Antenatal Visit is essential during pregnancy	Yes	118	98.3
		no	2	1.7
2.	There is adequate and effective teaching on personal hygiene on every antenatal visit	Yes	110	91.7
		no	10	8.3
3.	Lack of oral hygiene such as regular brushing can result in infection during pregnancy	Yes	88	73.3
		no	32	26.7
4	Lack of adequate perineal care during pregnancy can negatively affect the mother and the unborn baby	Yes	101	84.2
		no	19	15.5
5	Ensuring a good and clean environment will promote healthy living during pregnancy	Yes	106	88.3
		no	14	11.7
6	Eating of a balanced diet and properly handled foods/fruits promotes the development of the unborn baby	Yes	111	92.5
		no	9	7.5

**Table 2. Attitude of pregnant women towards hygiene practices**

			Frequency n=120	Percentage (%)
1	Health education on hygiene practices is not important and needful during antenatal visits	Agree	4	3.3
		Strongly agree	2	1.7
		Disagree	51	42.5
		Strongly disagree	63	52.5
2	Brushing of teeth twice daily is stressful and unnecessary	Agree	31	25.8
		Strongly agree	1	0.8
		Disagree	59	49.2
		Strongly disagree	29	24.2
3	Changing of under wears soiled with urine and discharges once or twice daily is a waste of effort	Agree	3	2.5
		Strongly agree	1	0.8
		Disagree	61	50.8
		Strongly disagree	55	45.8
4	Regular hand washing after handling dirty substance, such as using the toilet is more of a waste of water, soap and time.	Agree	3	2.5
		Disagree	56	46.7
		Strongly disagree	61	50.8
5	Tight clothes does not affect the unborn baby	Agree	1	0.8
		Strongly agree	1	0.8
		Disagree	51	42.5
		Strongly disagree	67	55.8
6	It is not necessary to wash fruits before eating since they are natural and fresh foods	Agree	3	2.5
		Strongly agree	2	1.7
		Disagree	66	55.0
		Strongly disagree	49	40.8

**Table 3. Practices of hygiene by pregnant women**

S/N			Frequency N = 120	Percentage (%)
1	Do you attend your antenatal clinics?	Often	116	96.7
		Sometimes	1	0.8
		Rarely	3	2.5
2	Do you brush your teeth at least twice daily?	Often	49	40.8
		Sometimes never	44	36.7
			27	22.5
3	Do you wash your hand before and after using the toilet?	Often	99	82.5
		Sometimes	19	15.8
		Rarely	2	1.7
4	Do you discard stagnant water around your house?	Often	95	79.2
		Sometimes	19	15.8
		Rarely	1	0.8
		Never	5	4.2
5	Do you sleep at least 8/9 hours daily?	Often	73	60.8
		Sometimes never	38	31.7
			9	7.5
6	Do you change soiled under wears at least twice daily?	Often	103	85.8
		Sometimes never	12	10.0
			5	4.2

**Table 4. Relationship between parity and practice of hygiene among pregnant women**

	Do you change soiled under wears at least twice daily?			Total
	Often	Sometimes	Never	
PARITY .00	11	1	1	13
1.00	45	7	2	54
2.00	27	4	1	32
3.00	15	0	1	16
4.00	4	0	0	4
6.00	1	0	0	1
Total	103	12	5	120

**Chi-square tests**

	Value	df	Asymp. Sig. (2sided)
Pearson Chi-Square	4.000 <sup>a</sup>	10	.947
Likelihood Ratio	6.159	10	.802
Linear-by-Linear Association	.705	1	.401
N of Valid Cases	120		

a.  $X^2 = 4.0, df = 10, p = 0.947$

**Table 5. Relationship between the knowledge and practice of hygiene among pregnant women**

	Do you brush your teeth at least twice daily?			Total	
	Often	Sometimes	Never		
Lack of oral hygiene such as regular brushing can result in infection during pregnancy	Yes	36	29	23	88
	No	13	15	4	32
Total	49	44	27	120	

**Chi-square tests**

	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2sided)</b>
Pearson Chi-Square	3.180 <sup>a</sup>	2	.204
Likelihood Ratio	3.367	2	.186
Linear-by-Linear Association	1.297	1	.255
N of Valid Cases	120		

$$X^2 = 3.180, df = 2, p = 0.204$$

**4. DISCUSSION**

This study showed that majority of the pregnant women had a high level of knowledge about hygiene practices irrespective of their educational background. This agrees with the findings that most women have a good understanding of hygiene [14-15]. Overall, the respondents in the present survey displayed average oral health knowledge and positive attitudes to oral health as observed in similar studies [12-13]. Some respondents, however, incorrectly agreed that lack of oral hygiene does not lead to infection or cause any harm during pregnancy. This misconception needs to be addressed particularly because a good number of the respondents believe that the mouth should be cleaned twice daily to prevent dental diseases yet less than a third of the respondents actually clean their mouths twice daily. This may be due to certain hidden socioeconomic factors.

Also, more than 50% of the respondents maintained good personal hygiene, went for regular antenatal services, took adequate food, fruits, and vegetables, changed soiled underwear, brushed their teeth at least twice daily, do not keep the stagnant water as a preventive measure for infection during pregnancy in consonance with other studies [14-15]. The result of the attitude of pregnant women towards hygienic practices showed a satisfactory attitude towards the practice of hygiene during pregnancy, and this could be the reason for the enhanced practice of these hygiene techniques. However, this contrast the study that discovered that good knowledge and attitudes displayed were not fully reflected in the women's oral health practices [13].

Also, a research carried out in India showed that pregnant women's knowledge and awareness regarding oral health was poor as displayed from their result [22]. However, our result shows a good knowledge of oral care although about 22% of the respondents do not practice this despite knowledge gained.

**4.1 Hypothesis I**

The null hypothesis was accepted at  $X^2(10) = 4.0, p \geq 0.05$ . Hence, there is no significant relationship between the parity and practices of hygiene among pregnant women. The implication is that according to the findings of this study, we can state that parity of pregnant women had no significant statistical relationship with their practice of hygiene. This then means there could be other factors that influence their practice other than parity.

**4.2 Hypothesis II**

The null hypothesis was rejected at  $X^2(2) = 3.180, p \geq 0.05$ . Hence, there is no significant difference between the knowledge and practices of hygiene among pregnant women. This suggested that the knowledge of pregnant women about hygienic practices had no significant statistical relationship with their practice of personal hygiene. This is evidenced by the disparity certain levels of knowledge, and their practice as it revealed a lobe sided knowledge and practice as also seen in other studies [12-13].

**5. CONCLUSION**

The result of this study showed that hygienic practices do not involve just one aspect of personal cleanliness but rather a collection of careful behaviors and practices to maintain safety and prevent the spread of disease especially in handling what stays on our body and what goes in. Personal hygiene is not achieved by being careful in just one aspect of personal cleanliness as seen in our result of findings but in all because if a pregnant woman washes her tooth twice daily but does not change her soiled under-wears as at when due, though pathogens may not invade the body through the oral route but they could do so through the genito-urinal and anal route. This may be part of the reason for the present maternal mortality ratio in Nigeria at 578 death of women per 100,000. It is therefore important that nurses,



midwives, and other health care providers ensure that pregnant women are health educated on the several ways to keep themselves free from infection during pregnancy. This will be best achieved during ante-natal clinics, children clinics as well as when they visit the hospitals.

## 6. RECOMMENDATIONS

- Health professionals should ensure hygiene practices are reinforced during antenatal clinics
- Families should be educated on personal hygiene anytime they are opportune to have contact with the different stage of our health care system (primary, secondary or tertiary)
- Governments should create awareness on media and enforce policies that will create enabling environment for both health workers and the populace to ensure personal and environmental cleanliness.

## 7. LIMITATIONS

- Sample size/population used may not be large enough and thus weak in determining the association
- Health workers not cooperative enough, translation of questionnaires to local language was tedious and many respondents needed to be assisted to fill the questionnaire
- Lack of fund as the work was purely financed by the researchers

## CONSENT

A written informed consent was obtained from the pregnant women and other approved parties in the process of data collection.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the author.

## ACKNOWLEDGEMENT

The authors gratefully acknowledge all the pregnant women who volunteered for this study. Also, we are grateful to the administrative and nursing staff of the health center selected for this research work.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Mazharul H. A study on knowledge, attitude and practice about personal hygiene and disease awareness of East-West university students in Dhaka City; 2012;13.  
[Cited 2018 Apr 11]  
Available:<http://dSPACE.ewubd.edu/bitstream/handle/123456789/22/Md.%20Mazharul%20Hossain.pdf?sequence=1&isAllowed=y>
2. Water Aid America; 2011.  
Available: <http://www.wateraidamerica.org/>
3. George A, Shamin S, Johnson M. Periodontal treatment during pregnancy and birth outcomes: A meta-analysis of rando-mised trials. *Int J Evid Based Healthc.* 2011;9:122-147.
4. Shub A, Wong C, Jennings B, Swain JR, Newnham. Maternal periodontal disease and perinatal mortality. *Aust N Z J Obstet Gynaecol.* 2009;49:130–136.
5. Sappenfield E, Jamieson DJ, Kourtis AP. *Journal of Infectious Diseases in Obstetrics and Gynecology* Hindawi Publishing Corporation; 2013.  
Available:<http://dx.doi.org/10.1155/2013/752852>
6. Annan BD, Nuamah K. Oral pathologies seen in pregnant and non-pregnant women. *Ghana Med. J.* 2005;39(1):24-27.  
[cited on 2017 Feb 7]  
Available:<http://www.oalib.com/paper/1335734#.WJmboX0o9dg>
7. Sowole RO, Adegbite AA, Okemakin FY, Sowemimo RO. Correlation analysis of bacteria vaginosis and hygiene practices among pregnant women attending antenatal clinic at Geeral Hospital ijobu ode Ogun Statewestern Nigeria. *International Journal of Medical and Health Research.* 2015;1(2)67-74.
8. Medeiros LC, Kendall P, Hillers VN, Schroeder M. Identification and classification of consumers food handling behaviors for food safety education. *J Am Diet Assoc.* 2001; 101(11):1326-39.  
[Cited on 2017 Feb 4]  
Available:[http://www.andjrn.org/article/S0002-8223\(01\)00318-2/abstract](http://www.andjrn.org/article/S0002-8223(01)00318-2/abstract)

9. Fawzi M, Shama ME. Food safety knowledge and practices among women working in Alexandria University, Egypt. J Egypt Public Health Assoc. 2009;84:(1-2).
10. Badrie N, Gobin A, Dookeran S, Duncan R. Consumer awareness and perception to food safety hazards in Trinidad, West Indies. Food Control. 2006;17(1):370–377.
11. Raphael MM, Moghene EB, Emm EO, Stephen AE, Onyinye JU. Revalence of urinary infection among pregnant women in university of Benin teaching hospital Benin City, Nigeria. Journal of Asian Scientific Research. 2015;5(4):198-204.
12. Thomas NJ, Middleton PF, Crowther CA. Oral and dental health care practices in pregnant women in Australia: A postnatal survey. BMC Pregnancy and Childbirth. 2008;8(13):1-6.  
[Cited 2017 feb 7]  
Available:[www.researchgate.net/publication/305801290](http://www.researchgate.net/publication/305801290)  
[link.springer.com/content/pdf/10.1186/1471-2393-8-1-2393-8-](http://link.springer.com/content/pdf/10.1186/1471-2393-8-1-2393-8)
13. Shabbir S, Masooma Z, Qazi A, Younus SM. Oral hygiene among pregnant women; practices and knowledge. Professional Med J. 2015;22(1):106-111.
14. Natalie JT, Philippa FM, Caroline AC. Oral and dental health care practices in pregnant women in Australia; A postnatal survey. BMC Pregnancy and Childbirth 2008;8:13.  
Available:<https://doi.org/10.1186/1471-2393-8-13>
15. Nwambo JC, Nwankwo CU, Ilo CI, Ezenduka PO, Makachi MC. Preventive health behaviours for infection among pregnant mothers attending antenatal clinics in Nnamdi Azikwe University Teaching hospital, Nnewi, Anambra state, Nigeria. Journal of Research in Nursing and Midwifery. 2016;5(2)045-054.  
Available:<http://dx.doi.org/10.14303/JRNM.2016.012>
16. Medawar P. Some immunological and endocrinological problems raised by the evolution of viviparity invertebrates, Symposia of the Society for Experimental Biology. 1952;7:320–338.
17. Pazos M, Sperling RS, Moran TM, Kraus TA, The influence of pregnancy on systemic immunity. Immunologic Research. 2012;54(1–3):254–261.
18. Kraus TA, Engel SM, Sperling RS. Characterizing the pregnancy immune phenotype: Results of the viral immunity and pregnancy (VIP) study. Journal of Clinical Immunology. 2012;32(2):300–311.
19. Forbes RL, Gibson PG, Murphy VE, and Wark PAB. Impaired type I and III interferon response to rhinovirus infection during pregnancy and asthma. The Professional Medical Journal. 2012;67(3): 209–214.
20. World Health Organization. Food safety and food-borne illness; 2017.  
Available:<http://www.who.int/mediacentre/factsheets/fs237/en/>
21. Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson MA, Roy SL, et al. Foodborne illness acquired in the United States—major pathogens. Emerging Infectious Diseases. 2011;17:7–15.  
[Cited 2017 Feb 4]  
Available:[https://wwwnc.cdc.gov/eid/article/17/1/P1-1101\\_article](https://wwwnc.cdc.gov/eid/article/17/1/P1-1101_article)
22. Gambhir RS, Nirola A, Gupta T, Sekhon TS, Anand S. Oral health knowledge and awareness among pregnant women in India: A systemic review. J Indian Soc Periodontol. 2015;19:612-7.  
[Cited 2018 Apr 11]  
Available:<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4753703/#!po=57.6087>

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