**Research**

**Preconception Folic Acid Intake among Women of Child Bearing Age in Ozoro, Isoko North Local Government, Delta State, Nigeria**

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Article history: Received 3 May 2023, Reviewed 31 July 2023, Accepted for publication 17 August 2023

**Abstract**

**Background:** Folic acid (FA) deficiency is a major public problem among childbearing group women.

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**Objective**: The objective of the study was to assess preconception folic acid supplementation intake among childbearing age women in Isoko North Local Government Council, Delta State, Nigeria.

**Method**: A cross-sectional design was conducted for the study. Convenience sampling was used to select two hundred and eighty (280) women. A self-administered close-ended questionnaire was used to collect data. Data was analysed using Statistical Package for Social Science (SPSS) version 21. Descriptive (frequency and percentage) and inferential (chi-square and multivariate logistic regression regression) statistics. Level of significance was at 0.05.

**Result**: Majority 192(70.3%) of respondents were aware of folic acid supplement intake before pregnancy. But majority have fair knowledge 134(49%), 35(13%) had good knowledge while 104(38%) have poor knowledge. A majority 122(45%) of respondents took folic acid, 79(29%) took folic acid and 72(26%) took folic acid. Factors associated with preconception folic acid supplementation intake are tertiary education, married women and planned pregnancy. Predictors of folic acid supplementation intake are parity and awareness.

**How to cite this article:**

Enuku CA & Akpoyovwere JO; Preconception Folic Acid Intake among Women of Child Bearing Age in Ozoro, Isoko North Local Government, Delta State, Nigeria. The Nigerian Health Journal 2023; 23(3): 741 – 749.

**Conclusion:** Respondents are aware of preconception folic acid supplementation intake but have fair knowledge. Preconception folic acid supplementation intake was fair. The fair knowledge actually translated to fair intake of folic acid supplementation.

**Keywords:** Folic acid, Awareness, Preconception, Childbearing, supplementation

**Introduction**

Preconception care is the provision of biomedical behaviour and social health interventions to women and couples before conception occurs. Preconception intake of folic acid supplementation is an important means of reducing or preventing birth defects in infants such as neural tube defect like an anencephaly and spinal bifida.1 Proper maternal nutrition is important for coping with the extra demands for normal development of a growing foetus. Folic acid (FA) deficiency is among the major public health problems, especially among childbearing age women. Iron and folic acid deficiencies are the most important public health problems causing adverse pregnancy outcomes like maternal and fetal mortality and also deficiency of folic acid during preconception care is the main risk factor for the occurrence of neutral tube defects (NTDs) like an anencephaly, encephalopathy and spinal bifida.1,2 Intake of folic acid prior to and during pregnancy is beneficial to childbearing age woman.3 Folic acid intake during the preconception period helps protect against a number of congenital malformations such as neural tube defects. The risk of neural tube defect is significantly reduced when supplemental folic acid is taken four weeks before conception and twelve weeks of conception (first trimester).4 Neural tube defect (NTDs) are congenital structural anomalies of the embryonic structure that develop in the brain , spinal cord and their surrounding structures and they are common worldwide.5

Although a pregnant woman is able to compensate for nutrient deficiencies and excess, she cannot provide the essential nutrient for her child if she herself is deficient.1 Most of the iron and folic acid deficiency that lead to the above mentioned adverse outcomes happen in childbearing age woman because of inadequate intake or low absorption of iron, loss of iron through menstruation and frequent pregnancies.6 To overcome these challenges daily iron supplementation 400mcg daily for the duration of three consecutive months was recommended as a public health intervention for reproductive age women.5 A balanced diet is the best way to receive nutrients, but vitamin Supplements can also be beneficial. Supplements do not replace a healthy diet but rather ensure that a woman is receiving enough daily nutrients,5 Folic acid is a B- Vitamin, contained in various foods but can be best obtained from multivitamin. This can also be found in leafy green vegetables, fortified cereals, citrus fruits, wheat bread and legumes. Moreso foods alone may not contain the entire recommended daily 400mcg since some of the folates can be reduced through cooking it.7

Study among Lebanese women revealed that majority of them had knowledge about FA during pregnancy, but only a small proportion knew the benefit for taking it. Also majority of the woman took FA supplement during pregnancy. Few took FA before becoming aware of their pregnancy.8 Similar study among women of childbearing age in Benue revealed that awareness and use of folic acid among the women was low and that awareness is a predictor of folic acid use.9

According to another study carried out in Canada on the relationship between awareness and intake of folic acid supplementation, it was revealed that although most women understood the benefits of folic acid supplementation, a little over a third of them do not take folic acid supplements prior to becoming pregnancy and less than half supplemented according to national guidelines.10 Data from three birth centres in Italy, on women‘s knowledge and peri-conceptional use of folic acid: revealed that women had better knowledge with increasing use of folic acid because they had information on correct period of assumption of folic acid . And also stated that investing on provision of information instead of the directive approach represented by the compulsory fortification of food, appears to be an appropriate action.11 Similarly in a study on awareness, knowledge and use of folic acid carried out in Korean revealed that women with knowledge of folic acid are likely to take folic acid supplement.12 In the same vein, another study conducted in Benghazi Libya noted that overall knowledge regarding the preconception use of folic acid was relatively low when compared to other studies worldwide.13

Furthermore, another study on the use of folic acid among pregnant women attending antenatal care clinic at Al-hejrah primary health care center, Makkah Al Mokarramah, Saudi Arabia revealed that two-third (69.7%) of the women had their information from physicians followed by internet (33.4%) and TV (19.7%). Almost two-thirds (65.2%) of participant of pregnant women had sufficient knowledge about the importance of folic acid supplementation during pregnancy.14 However, pregnant women who read about folic acid and those having more sources of information about the importance of folic acid intake during pregnancy had sufficient knowledge about it. Also a majority had taken folic acid during pregnancy.14 Similarly, another study on folic acid and knowledge about women in reproductive age found that a majority of the women of reproductive age did not use folic acid and lack adequate levels of information.15 The study on prevalence and determinants of perception of folic acid use: an Italian multicentre study revealed that preconception folic acid supplement use in many Italian women is low, women who do not plan their pregnancy or do not request a preconception health visit to their doctor have among the lowest prevalence of preconception folic acid use. The findings also revealed that preconception folic acid use was also associated with higher maternal age, higher education, marriage/cohabitation, lower parity, infertility treatment and chronic disease.16 Folic acid usage among pregnant women in Ethiopia have noted to be very low in a study carried out in Ethiopia.17 Moreso as regard intake of folic acid by Polish women with higher education in Polish revealed that better education programs may improve knowledge about prophylaxis. Also that compliance with recommendations of Primary prevention program of Neural tube defect is unsatisfactory.18 Furthermore, World Health Organisation (WHO) recommends preconception FA supplementation, that is, and all women should take a daily supplement of 400mcg FA four weeks before conception until 12 weeks of gestation.19

Despite, the recommendation and the benefits of the folic acid in the prevention of NTDs, preconception intake of this micronutrient remain low in several countries as many women are unaware of its recommendation.20, 21 However to the knowledge of the researchers, no studies have been conducted on preconception folic acid supplementation intake among childbearing age women in Isoko North Local Government of Delta State, Nigeria. Therefore, the aim of the study was to assess the preconception folic acid intake among women of childbearing age in Ozoro Isoko North Local Government, Delta State specifically to assess the level knowledge of Preconception folic acid supplementation intake among of women of childbearing age and to ascertain factors associated with Preconception folic acid supplementation intake in Isoko North Local Government, Delta State.

**Method**

This is a cross-sectional descriptive survey. Isoko North Local Government was created on August 27th 1991 from the defunct Isoko local government. The administrative headquarter is Ozoro, a developing town strategically located on the Warri-Asaba expressway. It is bounded in the North by Ndokwa West, in the East by Ndokwa East, in the South by Isoko South and in the West by Ughelli North local government. It occupies a space of land measuring approximately 477km square. According to March 2006, National Population Census, the numerical strength of Isoko North Local Government Area is over 144,960 and the population was approximately 165,000. The people speak basically Isoko language. The most dominant religion of the people is Christianity. However, agriculture is the most dominant economic activity in the area. Fishing, farming and trading accounts for a huge percent of agricultural activities. Simply put, farming, trading and fishing are the major and occupations of the people. The local government council has twenty-one (21) primary health care centre.

***Population:*** The target population for the study is two hundred and eighty (280) childbearing age women between ages 19-49 year.

***Sampling:*** All childbearing age women in the local government area were used in the study. Convenience sampling technique was used for those who are willing to participate. All the childbearing age women were used because the population of the age 19-49 years were not many.

***Instrument for Data Collection:*** The research instrument for the study was a self-developed questionnaire with closed ended questions. It is divided into four sections. Section A: Elicit information on respondent’s biographic data; Section B: Awareness of preconception folic acid intake amongst respondents; Section C: Knowledge of preconception folic acid intake amongst respondents; Section D: Factors associated with preconception intake of folic acid.

***Validity of Instrument:*** The draft questionnaire, objective and hypotheses of the study were submitted to experts (Maternal and Child Health Nurse and Nutritionist Specialists) in the field for face and content validity and then by the statistician. The items were scrutinised and modifications were made where necessary. All the input were used to effect corrections in the final copy.

***Reliability of Instrument:*** A reliability test was done by conducting a pilot study on twenty-eight (280) respondents (childbearing age women) in Isoko South Local Government Council using split half method. The reliability of the instrument was established using Cronbach’s alpha test to obtain coefficient of 0.89. Level of significance was at 0.05

***Method of Data Collection:*** One research assistant was trained on the purpose and objective of the study. The researcher and research assistant collected the data. The copies of questionnaire were administered to the child bearing age women in the council after the document for informed consent has been duly completed after which they were retrieved. Data collection took two weeks (2wks) 13th-23rd September 2017 with 97.5% response rate.

***Data Analysis:*** All data were entered and analysed using Statistical Package for Social Sciences (SPSS) version 21.0 for window. Data obtained were analysed using descriptive statistics such as frequency, and percentages and inferential statistics such as Chi-Square(x2) and regression was used to test for association between variables. Level of significance was set at 0.05.

**Results**

**Table 1:** Demographic characteristics of respondents

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency n=273** | **Percentage** |
| **Age** |  |  |
| 16 - 19yrs | 57 | 20.9 |
| 20 - 25yrs | 26 | 9.5 |
| 26 - 30yrs | 78 | 28.6 |
| 31 - 35yrs | 33 | 12.1 |
| 36 - 40yrs and above | 79 | 28.9 |
| **Educational status** |  |  |
| Primary | 35 | 12.8 |
| Secondary | 67 | 24.5 |
| Tertiary | 171 | 62.6 |
| **Marital Status** |  |  |
| Married | 204 | 74.7 |
| Single | 69 | 25.3 |
| **Parity** |  |  |
| None | 87 | 31.9 |
| 1 – 2 | 105 | 38.5 |
| 3 – 4 | 63 | 23.1 |
| 5 and above | 18 | 6.6 |
| **Pregnancy** |  |  |
| Planned | 177 | 64.8 |
| Unplanned | 96 | 35.2 |

Table 1 shows that on the basis of age a majority 79(28.9%) of the respondents are within the age range of 36-40 years and above, 78(28.6%) of the respondents are within the age range of 26-30 years, 57(20.9%) of the respondents are within the age range of 16-19 years, 33(12.1%) are within the age range of 31-35 years, while the remaining 26(9.5%) are within the age range of 20-25 years. The educational status of respondents showed that a majority 171(62.6%) of them respondents have tertiary education, followed by 67(24.5%) of the respondents who have secondary education while the remaining 35(12.8%) have primary education. The marital status of the respondents shows that a majority 204(74.7%) are married while the remaining 69(25.3%) are single. On parity of respondents; a majority 105(38.5%) got pregnant within the parity range of 1-2, followed by 87(31.9%) who have never been pregnant, 63(23.1%) got pregnant within the parity range of 3-4 while the remaining 18(6.6%) of the respondents got pregnant within the parity range of 5 and above. On the basis of respondents pregnancy, a majority 177(64.8%) said their pregnancy was planned while the remaining 96(35.2%) said their pregnancy was unplanned.

**Table 2:** Awareness of preconception folic acid intake amongst respondents

|  |  |  |
| --- | --- | --- |
| **Variable** | **Freq** | **Percent** |
| **Have you heard of folic acid use before pregnancy?** |  |  |
| Yes | 192 | 70.3 |
| No | 81 | 29.7 |
| **Source of Information (n=192)** |  |  |
| Internet | 138 | 71.9 |
| Health facility | 156 | 81.3 |
| Friends | 165 | 85.9 |
| Newspaper | 125 | 65.1 |
| Television/Radio | 133 | 69.3 |
| Relations | 138 | 71.9 |
| Others | 122 | 63.5 |

Table 2 shows awareness of folic acid amongst respondents. Majority 192(70.3%) had heard of folic acid use before pregnancy, 165(85.9%) heard from friends, 156(81.3%) heard from health centre, 138(71.9%) from the internet and relations, 133(69.3%) from television/radio, 125(65.1%) newspaper, lastly 122(63.5%) other sources of information not stated on the questionnaire.

Table 3 shows knowledge of Preconception folic acid amongst respondents. It was reported by majority 150(54.9%) that folic acid benefits both mother and infant, 78(28.6%) reported it benefited the mother, 32(11.7%) reported it benefitted the infant. Majority 112(41%) reported folic acid prevents anaemia, 48(17.5%) reported it was just routine, 42(15.4%) reported it was preventive of neural tube defect, 20(7.3%) gave other functions of folic acid not listed in the questionnaire. It was reported by majority 167(61.2%) that fresh green vegetables leafy vegetable was a source of folic acid, 164(60.1%) reported synthetic folic acid (drugs), 129(47.3%) reported citrus fruit, 111(40.7%) reported it was beans. It was reported by majority 152(55.7%) that best time to take folic acid was throughout pregnancy, 66(24.2%) reported before pregnancy, 36(13.2%) reported first three months of pregnancy, 37(13.6%) reported before and during the first three month of pregnancy. Majority 110(53%) reported one tablet of 5mg was the dose of folic acid, 48(15.8%) reported it was one tablet of 0.4mg, 25(25.7%) reported it was one tablet of 10mg, 16(5.4%) reported it was half of 2.5mg.

**Table 3.** Knowledge of pre-conception folic acid intake among respondents

|  |  |  |
| --- | --- | --- |
| **Variable** | **Freq** | **%** |
| **Who does folic acid benefit** |  |  |
| Mother | 78 | 28.6 |
| Infant | 32 | 11.7 |
| Both | 150 | 54.9 |
| No information | 13 | 4.8 |
| **Function of Folic Acid** |  |  |
| Routine | 48 | 17.5 |
| Prevention of Anaemia | 112 | 41 |
| Preventive of Neural tube defect | 42 | 15.4 |
| Others | 20 | 7.3 |
| Don’t Know | 51 | 18.7 |
| **Source of Folic Acid** |  |  |
| Fresh green vegetables leafy vegetable (e.g. pumpkin spinach) | 167 | 61.2 |
| Legume (Beans) | 111 | 40.7 |
| Citrus fruit (oranges, grapes) | 129 | 47.3 |
| Synthetic folic acid (drugs) | 164 | 60.1 |
| **Best time to take Folic Acid** |  |  |
| Before pregnancy | 66 | 24.2 |
| First three months of pregnancy | 36 | 13.2 |
| Throughout pregnancy | 152 | 55.7 |
| Before and during the first three month of pregnancy | 37 | 13.6 |
| **The dose of folic acid** |  |  |
| One tablet of 0.4mg | 48 | 15.8 |
| Half of 2.5mg | 16 | 5.4 |
| One tablet of 5mg | 110 | 53 |
| One tablet of 10mg | 25 | 25.7 |
| None | 64 | 23.4 |

**Figure 1:** Level of Knowledge of Preconception Folic acid intake

Figure 4.1 gives a summary of respondent’s level of knowledge of folic acid, majority 49% had a fair level of knowledge, 38% poor level of knowledge while the remaining 13% had a good level of knowledge respectively.

**Table 4:** Preconception Folic acid intake by respondents

| **Variable** | **Freq** | **%** |
| --- | --- | --- |
| **Do you take Folic acid** |  |  |
| Yes | 209 | 76.6 |
| No | 64 | 23.4 |
| **The dose of folic acid (n=209)** |  |  |
| One tablet of 0.4mg | 39 | 18.7 |
| Half of 2.5mg | 12 | 5.7 |
| One tablet of 5mg | 88 | 42.1 |
| One tablet of 10mg | 21 | 10.0 |
| None | 49 | 23.4 |
| **Reason not taking Folic Acid (n=64)** |  |  |
| Not recommended | 15 | 23.4 |
| No information | 13 | 20.3 |
| Never heard of it | 6 | 9.4 |
| Bad taste | 11 | 17.2 |
| Allergic reactions | 8 | 12.5 |
| No reason | 11 | 17.2 |
| **When did you take Folic Acid (n=209)** |  |  |
| Before pregnancy | 15 | 23.4 |
| two months before pregnancy | 6 | 9.4 |
| Throughout pregnancy | 36 | 56.3 |
| Two months before pregnancy and three months during pregnancy | 7 | 10.9 |

Table 4 shows folic acid intake by respondents. It was reported by majority 209(76.6%) that they take folic acid, 88(42.1%) reported their dose of folic acid was one tablet of 5mg, 39(18.7%) reported theirs was one tablet of 0.4mg, 21(10%) reported theirs was one tablet of 10mg, the remaining 12(5.7%) reported theirs was half of 2.5mg. it was reported by 15(23.4%) that their reason for not taking folic acid was because it wasn’t recommended for them, 13(20.3%) reported they had no information about it, 6(9.4%) reported they never heard of it, 11(7.2%) reported because of bad taste, 8(12.5%) reported allergic reactions, 11(17.2%) reported no reason. It was reported by majority 36(56.3%) that they took folic acid throughout pregnancy, 15(23.4%) reported it was before pregnancy, 7(10.9%) reported it was two months before pregnancy and three months during pregnancy, while the remaining 6(9.4%) reported it was two months before pregnancy.

**Figure 2:** Level of intake of Preconception Folic acid

Figure 2 gives a summary of respondent’s level of folic acid intake; majority 45% had fair level of intake, 29% had poor level of intake while the remaining 26% had good level of intake respectively.

**Table 5:** Factors associated with Preconception folic acid intake

| **Variable** | **Do you take Folic acid** | |  |
| --- | --- | --- | --- |
|  | **Yes** | **No** | **P** |
| **Age** |  |  |  |
| 16 - 19yrs | 22(38.6) | 35(61.4) | 0.000 |
| 20 - 25yrs | 17(65.4) | 9(34.6) |  |
| 26 - 30yrs | 70(89.7) | 8(10.3) |  |
| 31 - 35yrs | 28(84.8) | 5(15.2) |  |
| 36 - 40yrs and above | 72(91.1) | 7(8.9) |  |
| **Educational Status** |  |  |  |
| Primary | 16(45.7) | 19(54.3) | 0.000 |
| Secondary | 43(64.2) | 24(35.8) |  |
| Tertiary | 150(87.7) | 21(12.3) |  |
| **Marital Status** |  |  |  |
| Married | 171(83.8) | 33(16.2) | 0.000 |
| Single | 33(55.1) | 31(41.9) |  |
| **Parity** |  |  |  |
| None | 53(60.9) | 34(39.1) | 0.000 |
| 1-2 | 85(81.0) | 20(19.0) |  |
| 3-4 | 53(84.1) | 10(15.9) |  |
| 5 and above | 18(100.0) | 0(0.0) |  |
| **Pregnancy** |  |  |  |
| Planned | 152(85.9) | 25(14.1) | 0.000 |
| Unplanned | 57(59.4) | 39(40.6) |  |
| **Have you heard of folic acid use before pregnancy?** |  |  |  |
| Yes | 167(87.0) | 25(13.0) | 0.000 |
| No | 42(51.9) | 39(48.1) |  |

Table 5 Factors associated with intake of folic acid by respondents. The age factor shows that 70(89.7%) of those within the age range of 26-30 years took folic acid. 72(91.1%) of those within the age range of 36-40 years took folic acid. The age factor was significantly associated (p<0.001) with intake of folic acid. The educational factor shows that among those who have tertiary education, a majority of them 150(87.7%) took folic acid while 43(64.2%) of those that have secondary education take folic acid. The educational factor was significantly associated (p<0.001) with intake of folic acid. On the marital factor, a majority 171(83.8%) of those who are married took folic acid. The marital factor was significantly associated (p<0.001) with uptake of folic acid. The parity factor shows that 85(81.0%) of the respondents who have given birth 1-2 take folic. While 53(84.1%) of the respondents that fell within the parity range of 3-4 took folic acid. The parity factor was significantly associated (p<0.001) with intake of folic acid. The pregnancy factor shows that, a majority 152(85.9%) of the respondents whose pregnancy was planned took folic while 57(59.4%) of the respondents whose pregnancies were not planned took folic acid. The pregnancy factor was significantly associated (p<0.001) with intake of folic acid.

On the awareness factor of folic acid use before pregnancy, a majority 167(87.0%) have heard about folic acid use before pregnancy, while 42(51.9%) who have not heard use folic acid before pregnancy.

**Table 6:** Multivariate logistic regression of predictors of Preconception folic acid intake

|  |  |  |  |
| --- | --- | --- | --- |
|  | **P** | **OR** | **95% C.I. of OR** |
| Age | 0.003 | 1.644 | 1.19-2.27 |
| Educational Status | 0.596 | 1.173 | 0.65-2.12 |
| Marital Status | 0.457 | 0.736 | 0.33-1.65 |
| Parity | 0.953 | 1.027 | 0.42-2.52 |
| Pregnancy | 0.354 | 0.671 | 0.29-1.56 |
| Awareness before pregnancy | 0.000 | 0.286 | 0.15-0.57 |

Table 6 logistic regression shows that the significant predictors of folic acid intake are parity and awareness before pregnancy.

**Discussion**

Preconception intake folic acid supplementation is an important means of reducing or preventing birth defects in infants such as neural tube defects. Findings in this study showed that a majority of the women of child bearing age were aware of folic acid use before pregnancy. This is in line with the study conducted in Canada10 and Ebonyi.21 This result is at variance with study conducted in Benue.9 Their source of knowledge was majorly from friends. This at variance with study conducted in Ebonyi21 and Saudi Arabia.14 This result possibly revealed that majority did not undergo preconception counselling.

Findings also revealed that respondents have fair knowledge of preconception folic acid supplementation intake. This is at variance with other studies conducted in Italy,11 Libya13 and Ebonyi.21 The possible explanation could be related to their source of information and content of the information. It was noted that investment in the provision of correct information is vital folic acid supplementation intake.

However, study revealed fair intake of preconception folic acid supplementation among women of child bearing age. This is at variance with the studies conducted in Canada,10 Turkey,15 Italy16 and Ethiopia17 respectively. The fair knowledge translated to fair intake of preconception folic acid supplementation among women of child bearing age. It was noted that majority took Folic acid throughout pregnancy rather than four weeks before and twelve weeks during pregnancy. This is contrary to the recommended guideline. This shows that there is a gap in knowledge.

In this study, factors that are associated with the folic acid intake are maternal age, awareness, married women, planned pregnancy and tertiary education. This is supported by an Italian multicentre study,16 which reported that pre-conception use of folic acid was associated with higher education higher, maternal age, marriage/cohabitation, lower parity and infertility treatment. Regression analysis reveals that parity and awareness are significant predictors of folic acid supplement intake. This is possibly because of the number of times their women attended antenatal clinic where they were health of the importance of preconception folic acid intake. This is contrary to a study in Hail region of Saudi Arabia which reveals that university education is a predictor of folic acid supplementation use.

***Limitations of Study:*** The limitations stem from the fact that, data was collected from self-reports which were not independently verified. The possibility of recall bias may have existed.

**Conclusion**

From findings of the study, respondents are aware of preconception folic acid supplementation intake but have fair knowledge. They also have fair intake of preconception folic acid supplementation. The fair knowledge actually translated to fair intake of folic acid supplementation.

***Ethical Consideration***

Ethical approval was obtained from Delta State Ministry of Health Ethical Committee. Approval Number is HC218/Vol11/95. Before data collection commenced, a careful explanation of the objective and implication of the study was made known to participants who gave their consent and were given assurance of confidentiality and anonymity.

***Authors’ Contribution:*** CAE conceived the idea of the study and wrote the first draft of the paper. CAE participated in data collection, data analysis. CAE was also involved in interpretation of data, as well as critical revision of the drafts of the paper. JOA read, corrected and approved the final manuscripts.

***Conflict of interest:*** The authors declared that they have no competing interests.

***Funding:*** No funding

***Acknowledgements:*** We are very grateful to the Ministry of Health and Management of the Local Government Council for providing the enabling environment to conduct the study. Appreciation also goes to a staff that assisted in administration of the research instrument. Finally, we thank the respondents for taking part in the study.

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