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Adherence Status and Associated Factors of Iron and Folic Acid Supplementation among Pregnant Women Attending Ante Natal Care at Jimma Town Public Health Facility, South West Ethiopia, 2017

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Keywords: *adherence, pregnant women, iron, folic-acid, antenatal care.*

GJMR-E Classification: *NLMC Code: QU 188*



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Result: 226 pregnant women was participated in the study with 100% response rate. 8 IDI respondents were included in the data analysis for triangulation. The adherence rate was 136(60%)and factors significantly associated with adherence to Iron and folic acid supplementation were, time of registration for Antenatal care, X^2 (1, N=226) = 7.3997, p= 0.006523, knowledge of anemia, X^2 (1, N=226) = 24.4671, p= 0.00001, history of anemia during current pregnancy X^2 (1, N=226) = 5.5078, p= 0.018932, and gravidity, X^2 (1, N=226) = 22.9821, p=0.00001. Forgetfulness and fear of side effects were the major reasons for missing the doses of tablets.

Conclusion: Iron and folic acid adherence rate were low in the study area. Thus, increasing knowledge of pregnant women about iron and folic acid supplementation, through adequate counseling, community education helps to increase adherence.

Keywords: adherence, pregnant women, iron, folic-acid, antenatal care.

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I. Background

Iron deficiency anemia during pregnancy is a serious public health problem due to its high prevalence and potential negative consequences. Estimates from the World Health Organization report that from 35% to 75% (56% on average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic (WHO, 1992). Studies done by (Haidar and Pobocik) also indicate that one in every three women had anemia and deficiency of folic acid, while one in every five had iron deficiency anemia, indicating that both folic acid and iron deficiencies constitute the major micronutrient deficiencies in Ethiopian women (Haidar and Pobocik, 2009). It can lead to several adverse birth outcomes including low birth weight, preterm delivery, stillbirth, and maternal and neonatal mortality (WHO, 1992). Infants are among the vulnerable groups of iron deficiency, since there is a link between maternal and neonatal iron status, interventions on infant alone will be insufficient to decrease infant iron status (Harris.ED.1992; WHO, 1992).

Oral iron and folic acid supplementation are a feasible and cost-effective strategy that exists for iron deficiency anemia prevention and control (CDC, 1998; WHO, 1989). Studies done on well-nourished Danish women, shows that: women were given either a placebo or 66 mg Fe/d as ferrous fumarate beginning week 16 of pregnancy. At term, in the placebo group, 92% of women had no bone marrow iron, 65% of women had latent iron deficiency, and 18% of women had iron deficiency anemia. Even in the group supplemented with iron, iron stores at term were exhausted in 54% of women, although only 6% of women had latent iron deficiency and no women had iron deficiency anemia (US, National Academy Press, 1993). Infants born to anemic mothers were 5.7 more likely to become anemic than women born to nonanemic mothers (Colomer J, et al. 1990).

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Several developing countries are now implementing iron/folic acid supplementation programs, but only a few countries had significant improvement in anemia control and prevention. Studies conducted in different parts of the world (Asia, Latin America and African countries) have shown low adherence of women taking daily iron/folic acid supplementations and this is among one of the main reasons why IFAS programs have been less effective (Mithra et al., 2014; Bekele et al. 2015; Wendt et al., 2015). In Ethiopia, iron/foliate supplementation is the main strategy for Anemia control and prevention. However, adherence rate remains very low. The national data suggests that from all pregnant women supplemented with IFA tablets only 0.4% consumed more than 90 tablets during their pregnancy time (Fiedler et al. 2014). Eighty-three percent of women did not take iron tablets during their last pregnancy. Fifteen percent took for less than 60 days, and less than 1 percent took for three months or more during their last pregnancy (CSA, 2011). A comparison of 2005 and 2011 EDHS data reveals that the percent of women with at least one ANC visit who took iron tablets increased by 63 percent (CSA 2005; CSA 2011). Despite this progress, Studies conducted in different parts of the country showed that the adherence rate is low (Samson et al., 2014; Bekele et al., 2015; Abel et al., 2015). Even though adherence is a major problem in IFA supplementation programs, limited researches have been done to investigate factor associated with it. Therefore, study try to determine the adherence status and associated factors of IFAS among pregnant women attending at ANC clinic in Jimma town public health facilities.

II. Objectives

a) General Objective

To assess adherence status and associated factors of Iron and folic acid supplementations among pregnant women attending Ante natal care clinic at Jimma town public health facilities, south west of Ethiopia, 2017.

b) Specific Objectives

To determine adherence level of Iron and folic acid supplementations among pregnant women attending, Ante natal care clinic at Jimma town public health facilities, south west of Ethiopia, 2017.

To identify factors associated with adherence to Iron and folic acid supplementation among pregnant women attending Ante natal care clinic at Jimma town public health facilities, south west of Ethiopia, 2017.

III. Methods

a) Study design, period and area

Institutional based cross-sectional study design was employed from April 10 - May 10, 2017 at public health facilities of Jimma town, south west Ethiopia.

b) Source population

All pregnant women who took IFAS and visited the ANC clinic at Jimma town public health facilities during the study period

c) Study Population

All selected pregnant women who took IFAS at least for a month and visited the ANC clinic during the study period.

d) Dependent Variables

Iron and folic acid supplementations adherence whereas, Independent variables are, Age, religion, residence, marital status, mother education level, partner education level, support from family, family size, income, number of visits, time of registration, gravidity, parity, trimester, history of previous anemia, history of current anemia, Adequate explanation about the tablets by providers, distance from the health facility, Knowledge on Anemia and knowledge on IFAS.

e) Sample size determination

The sample size was determined by a single population proportion formula by considering the following assumptions:

$$\boldsymbol{n = \frac{(Z_\alpha/2)^2 * P\,(1-P)}{d^2}}$$

Where:

f) Sample size

From the previous study the proportion of adherence level of IFAS among ANC followers was 37.2%. By taking 95% CI, a margin of error 5%, the sample size comes= 359. Since the source population is <10,000, by taking population correction formula and Considering 10% non-response rate, the total study subjects were 226- pregnant women. For qualitative data collection, eight IDI was done from six mothers and two midwives who have long time working experience on ANC clinic.

g) Sampling techniques

Initially, out of four health centers and two hospitals in the town one hospital and two health centers were selected by using simple random sampling techniques. Then the final sample size was allocated proportionally for each health facilities based on their number of ANC followers. By using the list of ANC registration book as sampling frame, simple random sampling technique were applied. For qualitative study participant were selected purposively from mothers ANC followers and midwifes work on ANC clinic.

h) Data collection tool and procedure

Data collection tool was prepared by reviewing different literature and first prepared in English then translated to Oromic language. Interviews were done to collect data from participants. Data was collected by four data collectors and one supervisor who had BSC and MSC respectively.

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i) Data Quality Assurances

The data collectors and supervisors were trained for two days before pre-test on the objective, how to use the questionnaires to ensure consistency. Pre-test was conducted on 5% of sample size in jimma zone health facility out of town.

j) Data analysis

Data was analyzed using Pearson chi-square test. Variables found significant when its (p–value ≤ 0.05). Descriptive statistic including frequency, percentage was used to describe the data. Finally, the results were presented in the form of texts and tables. For qualitative study thematic analysis was done and triangulated with quantitative data.

IV. Result

a) Socio-demographic Characteristics of study participant

A total of 226 pregnant women were participated in the study, making a response rate of 100%. Majority of 124 (54.0%) were≥25 years. One hundred ninety (84.1%) of study participants resided in urban. The vast majority, 112(49.5%) were Muslim followers, and 214 (94.7%) of the participants were married. According to mother's response about 26 (11.5%) and 27 (11.9%) respondents and respondents' husband were cannot read and write respectively. About 97 (42.9%) of the study participants were house wife followed by daily laborer 12(5.3%), and 187(80.97%) of the study participants had family size of at most three. About 51(22.5%) of the participants had monthly income of 1000-3000 birr. Table (1)

Table 1: Socio-demographic characteristic of anc followers among jimma town public health facilities south west Ethiopia, 2017

Variable	Category	Frequency	Percent
Age	<25 yrs	102	45.1
	>25 yrs	124	54.9
Religion	Orthodox	92	40.7
	Muslim	112	49.5
	Protestant	21	9.3
	Others*	1	0.4
Residence	Urban	190	84.1
	Rural	36	15.9
Educational status	Cannot read and write	26	11.5
	Can read and write	60	26.5
Occupational status	Primary education	97	42.9
	Secondary and above	43	19.1
	Government employee	51	22.6
	Daily laborer	12	5.3
	Merchant	66	29.2
	House wife	97	42.9
	Others**	0	0
Marital Status	Married	214	94.7
	Unmarried	12	5.3
Husband Educational status	Cannot read and write	27	11.9
	Can read and write	48	21.2
	Primary education	50	22.2
	Secondary and above	101	44.7
Family size	1-3	43	19.0
	4-6	121	53.5
Family income	>6	62	27.5

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Variable	<500 birr	76	33.6
	500-1000birr	99	43.8
	1000-200birr	36	15.9
	<3000birr	15	6.7

b) Obstetric and Health Facility related characteristics of the respondents

One hundred thirty-one (58.0%) of the respondents were in their second trimester. About 30(13.3%) of the participants were primigravida, and only 196 (86.7%) were Multiparous. More than two-third 201(88.9%) of the respondents visited the ANC clinic within their 16weeks of gestation. More than ninety percent (226) of the respondents, had at most four ANC visits. About 125 (55.3%) of the respondents spent more than 30 minutes (by foot) to reach the health facility, and 180 (79.6%) of the respondents got medical advice about IFAS) (Table 2).

Table 2: Obstetric and health facility related characteristics of pregnant women attending anc, at jimma town public health facility, south west Ethiopia, May 2017, (n=226)

Variable	Category	Frequency	Percent
Gravidity	Primigravida	30	13.3
	Multigravida	196	86.7
Parity	Nulliparous	0	0
	Primiparous	30	13.3
	Multiparous	196	86.7
Trimester	First	43	19.0
	Second	131	58.0
	Third	52	23.0
Time of registration	<16 weeks (Early)	201	88.9
	≥16 weeks (Late)	25	11.1
Number of Visits	≤4	144	63.7
	>4	82	36.3
Distance from health facility	≤30 minutes	101	44.7
	>30 minutes	125	55.3
Get Medical advice about IFAS	Yes	180	79.6
	No	46	20.4

c) Self-reported rate of Adherence to IFAS and Reasons

One hundred thirty-six (60%) of pregnant women adhered to IFAS (took ≥4 tablets per week in the previous one month preceding the survey) (Figure 1). The leading reason for adherence was getting medical advice (79.6%) followed by fear of illness if not taking the supplement (20.4%). Findings from the qualitative part of the study also revealed that most pregnant mothers' main reason for consuming the tablets was getting medical advice from health care providers.

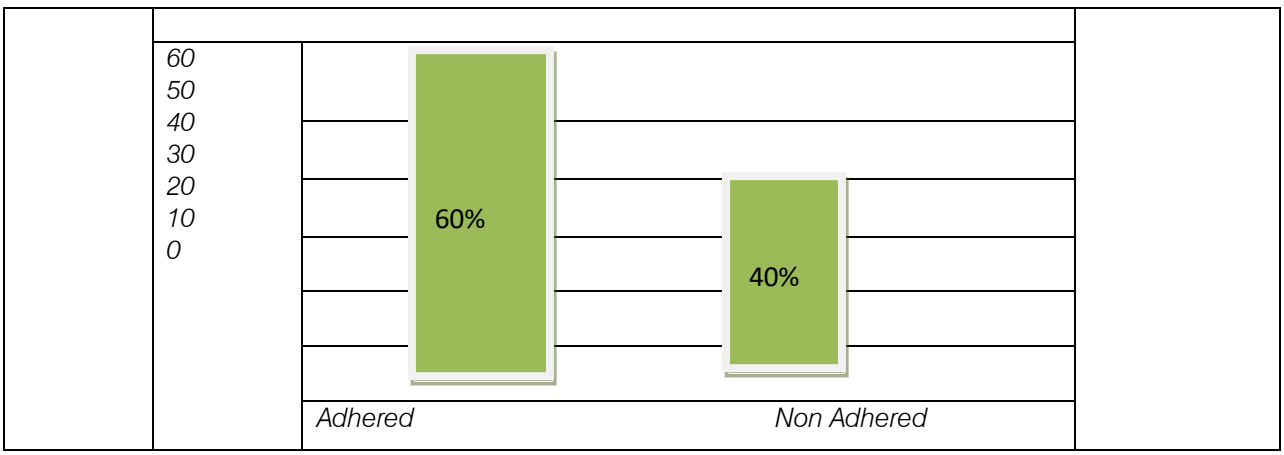


Figure 1: Self-reported rate of Adherence among Pregnant women attending ANC, in Jimma town south west Ethiopia, May 2017, (N=226).

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Twenty-eight years old, pregnant women said that, "I took IFAS*'s because the health care providers (both at a health facility and home visit) told me it prevents you from anemia and your fetus from diseases."*

The other qualitative finding showed that, fear of illness, if tablets are missed was the second main reason to adhere IFAS.

Thirty-two years old, pregnant women said that … "I am forced to take the IFAS, because I fear the illness that would happen to me and my fetus, if I missed the doses of IFAS."

Another reason for taking IFAS raised by in-depth interview participants was getting family support.

Thirty years old, pregnant women said that …" I never missed the tablet, because my husband reminds me to take it."

From women who missed the doses of IFAS, the leading reason was forgetfulness (88, 38.9%) followed by fear of side effect (72, 31.9%). Other reasons for missing the doses of IFAS were the belief that taking IFAS leads a too big baby (56, 24.8%) and taking too many IFAS tablets, would harm the mother and infant (24, 10.6%).

Findings from the qualitative component also revealed that most pregnant mothers' main reason for missing the doses of tablets was forgetfulness.

Twenty-six years old, pregnant women said that …" Since I forgot, I missed more than half of the tablets. Pills are taken at night time; I spent all day with work, when I returned to home, I will be so exhausted then I will forget them. "

A thirty-five years Midwife *said that…."* the main reason for missing the doses of tablets was forgetfulness, not side effect since we gave them counseling about side effects."

d) Knowledge of Anemia and IFAS

Accordingly, the median was 47.4%. About 78 (61.9%) of the respondents had good knowledge of anemia (scored median and above), and 48 (38.0%) of the respondents had poor knowledge of anemia (scored below the median. The median was 71.4%. One hundred five (46.5%) of the respondents had good knowledge of IFAS (scored median and above), and about 61(26.9%) of the respondents had poor knowledge of IFAS (scored below the median).

e) Factors Associated with Adherence to IFAS

To know the association of predictor variables with IFAS, Pearson chi-square test was used. Four variables: -Gravidity, time of ANC registration, history of anemia during the current pregnancy and having knowledge about anemia were showed an association with p-value ($P<0.05$).

A chi-square test was performed to examine the relation between gravidity and adherent to iron and folic supplementations of pregnant women. The relation between these variables was significant, X^2 (1, N=226) = 22.9821, p=0.00001.Multiparity were more likely than primiparity to be able to adherent to iron and folic supplementations.

There is a significant association between registration time and iron adherent and folic supplementations. The relation between these variables was significant, X^2 (1, N=226) = 7.3997, p= 0.006523. Mothers who registered early gestational age (<16 weeks) were more likely to adherent iron and folic supplementations than who were registered lately (>16 weeks).

Qualitative finding also supports this finding:

Thirty years old, female midwife said that … "If they come to health facility at early gestational age, we get more time for counseling and knowing each other, that helps them to adhere for IFAS."

There is a significant association between history of anemia during current pregnancy and adherent to iron and folic supplementations. The relation between these variables was significant, X^2 (1, N=226) = 5.5078, p= 0.018932. Women who had history of anemia during current pregnancy were more likely to be adhered to Iron and folic acid supplementations than those who hadn't.

This is supported by qualitative finding:

Twenty -eight years old, pregnant women said that … "I am forced to take IFAS because of I have anemia."

There is a significant relationship between knowledge of anemia and adherent to iron and folic supplementations. The relation between these variables was significant, X^2 (1, N=226) = 24.4671, p= 0.00001.Mothers who had good knowledge about anemia had more likely to adhere iron and foliate supplementations.

This finding supported by qualitative data.

Thirty-two years old pregnant women said that … "I am forced to take the tablets because I know about anemia that may cause serious complication if I bleed during delivery."

Table 3.

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Table 3: Chi- square test that shows may factors associated with Adherence to IFAS among pregnant women attending ANC, in Jimma town public health facility, southwest of Ethiopia, 2017

Variables	Adhered No. (%)	None adhered No. (%)	Chi-square	p-value
Educational status				
Cannot read and write	36	40	8.3811	0.38758
Can read and write	42	18		
Primary education	38	20		
Secondary and above	20	12		
total	136	90		
Monthly family income				
< 500	36	24	0.6008	0.896258
500 – 1000	28	22		
> 1000	31	20		
1000-3000	41	24		
Total	136	90		
Gravidity				
Primigravida	91	31	22.9821	0.00001
Multigravida	45	59		
Total	136	90		
Trimester				
First	40	31	2.6369	0.267558
Second	44	34		
Third	52	25		
Total	136	90		
Time of regiratation				
Early (≤16 weeks)	102	52	7.3997	0.006523
Late (>16 weeks)	34	38		
Total	136	90		
History of anemia current pregnancy				
Yes	99	52	5.5078	0.018932
No	37	38		
Total	136	90		
Knowledge of anemia				
Poor	48	62	24.4671	0.00001
Good	88	28		
Total	136	90		
Knowledge of IFAS				
Poor	31	28	1.942	0.163449
Good	105	62		

V. Discussion

The result revealed that 60% of pregnant women were adhered to Iron and folic acid supplementation (took ≥4 IFAS tablets per week in the previous one month preceding the survey) which is consistence with the study done in Indonesia (53.7%) (Wulandari et al. 2013). However; it is higher than the study done in Mecha district, Northwest Ethiopia (20.4%) (Bekele et al. 2015), Tigray, Ethiopia (37.2%) (Abel et al., 2015), Misha district, South Ethiopia (39.2%) (Abient et al., 2015), Kenya (24.5%) (Dinga et al., 2013).This difference might be due to difference in study setting, time variation related with currently accelerated maternal and child health promotions, and majority of the respondents being urban residents' this helps to get information from media. It is lower than the study done in South India (64.7%) (Mithra et al., 2014). The variation may be due difference in geographic locations, socio cultural, healthy life style, inaccessibility of health services and lack of awareness.

The study revealed that, women who had history of anemia during current pregnancy had more likely to adhere with Iron and folic acid supplementations. The finding is consistent with other studies conducted in Mecha district, Northwest Ethiopia (Bekele et al. 2015), Tigray, Ethiopia (Abel et al., 2015), Kenya (Dinga et al., 2013) and Tanzania (Ogundipe et al., 2012). This might be due to health care providers given more attention for anemic women during counseling which increases client's awareness and knowledge of Iron and folic acid supplementations. The other reason might be due to women's fear of anemia complications for both them self's and their infants, they try to take more pills to be cured from the anemia.

Mothers who were registered early for ANC services had more likely adhere to IFAS than those who were late registered. The result of this study is supported by other studies done in Tigray, Ethiopia (Abel et al., 2015), Ethiopia (Fiedler et al., 2014), India (Wendt et al., 2015) and Indonesia (Titaley and Dibley, 2015). The reason may be pregnant women who had early registration for ANC services probably had better concern for their pregnancy and had more ANC visits which in turn leads to getting better medical advice and

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ultimately improved their knowledge about anemia and Iron and folic acid supplementations.

The other important factors that had a significant association with Iron and folic acid supplementation adherence was, knowledge of Anemia. A mother who has good knowledge of anemia more likely adherent to IFAS than who had poor knowledge. The finding is supported by other studies done in Eight rural districts of Ethiopia (Samson et al., 2014, and India (Mithra et al., 2014).The possible reason is that those pregnant women who had good knowledge of anemia, were aware of the effect of anemia on pregnancy this may cause fear of anemia complications, this helps them to know the importance of IFAS to alleviate anemia and the problem if missed the tablets. Similarly, the result also indicates that, multipara mothers have, more likely to had adherence of IFAS. The reason may be multipara mothers may have more contact with health care providers during previous pregnancy, so this may improve time to time their knowledge and experience about IFAS, anemia and its complications, finally they can easily adhere to IFAS.

In addition to the above-mentioned association the study participant raised different reasons for adherence and non-adherence to iron and folic acid supplementations. Among the reasons that make the pregnant women to be adhered to iron and folic acid supplementations, getting medical advice, partner support and fear of illness if missed the tablets, were the major ones. The finding was supported by the study conducted in Kenya (Dinga et al., 2013) and qualitative finding in this study. This can be related with knowledge of both anemia and its complications that results women's fear of the quensquence of anemia, finally this causes adherence to IFAS. The other important reason is knowledge of the benefit of iron and folic acid supplementations that resulted from proper counseling through medical advice from health care providers. Partner support also related with, opportunity not to forget the tablets and giving more concern for the health of the baby and the mother.

The other reason of pregnant women for adherence was getting family support. The justification behind is that when pregnant women get family support, they will have an opportunity not to forget the tablets and great concern for adherence. The study was supported by the study conducted in Pakistan (Nisar et al., 2014).

Forgetfulness, misconception and fear of side effect was the most mentioned reason mentioned qualitatively for pregnant women for non-adherence to iron and folic acid supplementations. A possible explanation for forgetfulness as a major reason is that the timing that the tablet is taken. Findings from the qualitative study revealed that since most of health professional advise them to taken at night, pregnant women were forced to forget the tablet because they spent the day time with different activities and they tired and sleep early by forgetting the tablets to take. The finding also supported by other studies done in Misha district, South Ethiopia (Abient et al., 2015), Ethiopia (Fiedler et al., 2014), and South India (Mithra et al., 2014). Misconceptions and fear of side effect like taking the tablets will lead to, too big baby and harm the mother and the infant, were the other reasons of pregnant women mentioned fornot continuously using the tablets. This is probably resulted from getting inadequate counseling during medical advice from health care providers results women's poor knowledge of anemia and IFAS. The finding is supported by other studies done in eight rural districts of Ethiopia (Samson et al., 2014), Misha district, South Ethiopia (Abient et al., 2015), Kenya (Dinga et al., 2013), South India (Mithra et al., 2014), Pakistan (Nisar et al., 2014). (Bekele et al. 2015), Ethiopia (Fiedler et al., 2014), and Pakistan (Nisar et al., 2014).

VI. Conclusions

This study revealed that adhered to Iron and folic acid supplementation of the respondent was low. Early time of registration, history of anemia during current pregnancy, knowledge of anemia significantly and gravidity are associated with pregnant women adherence to iron and folic acid supplementations. Getting medical advice and partner support followed by fear of illness if missed were the major reasons that enforce pregnant women to take the tablets. On the other hand, the perceived cause of missing tablet is forgetfulness misconception and fear of side effects.

List of Abbreviations

ANC…. Antenatal Care, CSA…. Central statistical Agency, EDHS…. Ethiopian Demographic and Health Survey, FMOH… Federal Ministry of Health, IFA…. Iron Folic Acid, IFAS…. Iron Folic Acid Supplementation, IHRERC… Institutional Health Research Ethics Review Committee, NGO…….Non-Governmental Organization, WHO….World Health Organization.

Ethics approval and consent to participate

Ethical clearance was obtained from Jimma University ethical revive board. Official permission was obtained to conduct the study from Jimma town public health facilities. The respondents were informed about the objective and the purpose of the study. There was no coercion to participate in the study and participations were free to decline, giving information at any time without any justification and prejudice. Verbal consents were obtained from each mother. Confidentiality of the information was ensured by not asking the name of the client or other identifiers.

Consent for publication

Not applicable in this study.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request. But all data generated or analyzed during this study are included in this published article [and its supplementary information files].

Competing Interests

The authors declare that they have no competing interests.

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Author contributions

MT: conceptualized, designed the study, collect, analyzed interpretation the data, advising the whole research paper and also drafting of the manuscript. *AF:* conceptualized, designed the study, collect, analyzed and interpretation of the data and also drafting manuscript.

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