

## **QUALITY OF LIFE, CARDIOVASCULAR INDICES AND STRESS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN FMC OWO, ONDO STATE**

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### ABSTRACT

**Background:** The period of pregnancy is a critical period in a woman's life that involves not only biological/physiological but psychological and social changes. These changes can affect quality of life of a pregnant woman, maternal and infant health hence the need to be monitored and kept under control.

**Aim:** To determine the correlation between Quality of life, selected Cardiovascular indices and Stress among pregnant women attending antenatal clinic in Federal Medical Centre, Owo.

**Methods:** This cross-sectional study recruited 95 pregnant women attending antenatal clinic. Data was obtained using the Perceived Stress Scale and World Health Organization Quality of Life-Bref. Participants' blood pressure and pulse rate were measured using appropriate instrument. Data were analyzed using descriptive statistic and Inferential statistics of spearman rho correlation of coefficient and Kruskal Wallis analysis of variance with mean rank. Alpha level was set at  $p=0.05$

**Results:** A significant negative correlation was observed between pulse rate and perceived stress level ( $r = -0.195$ ,  $p = <0.05$ ); between physical domain of the WHOQoL-Bref and perceived stress level ( $r = -0.207$ ,  $p = <0.05$ ). No significant difference was found for perceived stress among the different categories of gestational age of respondents. Also there was no significant difference in all the domains of quality of life and overall quality of life among the different categories of gestational age of respondents ( $p>0.05$ ).

**Conclusion:** Stress is negatively correlated with pulse rate of pregnant women while Physical health negatively correlated with perceived stress. Stress and quality of life were not significantly different throughout the different stages of pregnancy.

**Keywords:** *Quality of life, Cardiovascular indices, Stress, Pregnant women*

### INTRODUCTION

In the life of a woman, pregnancy is taken to be a unique and exceptional moment.<sup>1</sup> It is a very specific and complex stage in a woman's life, that involves not only biological/physiological but also psychological and social changes.<sup>2</sup> These changes can affect quality of life of a pregnant woman even in uncomplicated pregnancies, affecting both maternal and infant health.<sup>3</sup> Integrated health is a notion that aims at giving exhaustive care related to promotion of individuals' physical, social, mental wellbeing. Close health care promotion during pregnancy is needed in order to identify women at risk of unfavourable outcomes<sup>4</sup>.

In 1994, the World Health Organization (WHO) defined quality of life (QoL) as "the individuals" perception of their position in life in the context of culture and value systems in which they live in relation to their goals, expectations, standards and concerns.<sup>1,5</sup> Health related quality of life is a concept that defines an individual's own perception of their subjective state of health, functioning and well-being in the physical, psychological and social domains and their role performance.<sup>1,6</sup> Health related quality of life decreases during pregnancy.<sup>7</sup> The major factors that contributed to reduced or poor quality of life were medically associated with reproduction, complication before or during pregnancy, obesity, nausea and vomiting, stress, anxiety,

depression during pregnancy etc. This supports the notion of psychological state being one of the aspects of health of a pregnant mother that is of a big concern to both the pregnant mother and the care giver<sup>3</sup>.

Stress is a complex sequence of events or reactions of the human body to demanding circumstances.<sup>8</sup> Pregnancy even though an exciting experience, involves a lot of emotional adjustments and as a result poses a lot of stress to woman's life.<sup>9</sup> It has been established in a study that the higher the number of stressful events, the higher the level of postpartum depression and mental disorders<sup>10</sup>. A study found that 20% of preterm births were estimated to be caused by maternal stress during pregnancy, hence the need to identify and reduce the exposure to stress during pregnancy<sup>11</sup>. Psychiatric counselling that focuses identification of risk behaviours, promotion of sound mental health among pregnant women and prevention of adverse effects for the foetus has been advocated, hence the need to evaluate pregnant women periodically for risk of unfavourable outcomes<sup>12</sup>.

The cardiovascular system undergoes profound change during pregnancy. This includes increase cardiac output and decreased vascular resistance especially at the initial stage following increased oestrogen and vasodilatory prostaglandin (PGI<sub>2</sub>), which regulates nitric oxide synthesis causing peripheral vasodilatation. There is also increase in blood volume and stroke volume<sup>13</sup>. Pregnancy is a critical time to address the cardiovascular function of a woman throughout life, and acts as a cardio-metabolic stressor<sup>14</sup>. Normal pregnancy requires significant maternal cardio-metabolic adaptation, with a 30% to 50% increase in cardiac output, alterations in lipid profile including an approximately 50% increases in

total cholesterol, and a significant increase during the second half of gestation to facilitate transfer of glucose to foetus. There is compelling evidence that adverse pregnancy outcomes present as warning signs for future cardiovascular risk and can be useful in identifying high-risk women<sup>15</sup>. According to Elkayam et al.,<sup>16</sup>, 1-4% of pregnancies are complicated by cardiovascular disease. The pre-existing conditions that can make pregnant women susceptible to cardiovascular disease include hypertension, diabetes mellitus and congenital heart disease<sup>17</sup>. Proper assessment and enhancement of cardiovascular health early in pregnancy reduces the risk of cardiovascular diseases. This is especially important in women with hypertensive disorders due to the fact that they have a higher tendency to develop atherosclerosis and other cardiovascular diseases<sup>18</sup>. Management of cardiovascular disease in pregnancy can be complicated, because of the unique physiological changes taking place in the body and the presence of the foetus<sup>19</sup>.

In a study conducted on pregnant women in south eastern part of Ethiopia, it was discovered that the prevalence of perceived stress was 11.6% and factors like marital status, age, occupation, living arrangement, number of pregnancies, gestational age, status of pregnancy and history of neonatal death contributed to its occurrence<sup>20</sup>. Here in Nigeria, a study on stress and resilience was conducted in Ile-Ife among pregnant teenagers. It was found that majority of women were categorized as having moderate level of perceived pregnancy related stress and low resilience. Feeling of shame, male partner rejection of pregnancy and lack of parental involvement emerged as the independent predictors of higher level of pregnancy related stress<sup>21</sup>.

Given the prevalent changes that are experienced in pregnancy, knowing the correlation between Quality of life, selected Cardiovascular indices and Stress among pregnant women in Federal Medical Centre Owo metropolis may help in preventing and managing the risks involved. Few related studies have been done in the western part of Nigeria and few in Nigeria at large, hence the need of this study.

## **METHODS**

### **Study design**

The design for this study was a cross-sectional survey.

### **Research Population**

The study population for this study were apparently healthy pregnant women between ages 15 and 50 years attending ante-natal clinic. They were recruited from the ante-natal clinic of obstetrics and gynecology department of Federal Medical Center, Owo Ondo State, using a consecutive sampling technique.

### **Instrument for data Collection**

Data was obtained using the following instruments:

**Perceived Stress Scale:** Perceived stress scale (PSS) is a 10-item questionnaire developed to assess stress levels in young people and adults aged 12 years and above. It is a self-report measure that evaluates the degree to which an individual has perceived life as unpredictable, uncontrollable and overloading over the past month. Six items of PSS-10 measure stress and four items measure coping strategy to stress. Each item is scored from 0 (never) to 5 (very often) with a total range of 0 to 40. Scores ranging from 0 -13 was considered low stress, 14 – 26 considered moderate stress, while scores

ranging from 27 – 40 was considered high perceived stress. The test-retest reliability for PSS subscales was significant ( $r = .66$  and  $r = .50$ )<sup>26</sup>

**The World Health Organization Quality of Life-Bref (WHOQOL-Bref):** The WHOQOL-BREF is a self-administered questionnaire, comprising of 26 items that captures 4 domain structures, physical health, psychological, social relationship and environment. The four domain scores give an individual's perception of life in each domain. Each question is scored 1-5, the higher the scores in each domain, the greater the quality of life the individual in that aspect of their life. The domain score is gotten by calculating the mean score of items within each domain. This is multiplied by 4 to get a domain score comparable with scores used in WHOQOL-100. Raw scores are then converted to transformed scores. The Cronbach's alpha coefficient for the whole WHOQOL-BREF scale was 0.896, internal reliability for all domains was above 0.70. The test-retest reliability for all domains was significant at  $p < 0.01$  level, showing good stability of the scale<sup>27</sup>.

**Sphygmomanometer:** Blood pressure was measured using the Dekamet MK3 Accoson Mercury Sphygmomanometer. The device works by tightening a strap or cuff around a wearers forearm and slowly increasing pressure. It effectively measures systolic and diastolic pressure when used with a stethoscope.

### **Procedure for Data Collection**

Ethical approval for this study was obtained from ethical review committee of the Federal Medical Centre Owo (FMC/OW/380/VOL.CC11/191) prior to the commencement of the study. Participants' informed consent were also sought and obtained.

Consented participants who are apparently healthy were consecutively recruited into the study. The selected cardiovascular indices were taken as indicated below:

**Blood pressure (mmHg):** On arrival at study venue, the participants took some rest for five minutes, after which they were placed in a relaxed sitting with arm supported on the table at the heart level. The cuff of the Accoson Mercury Sphygmomanometer was wrapped round the left upper arm just above the cubital fossa and the stethoscope bell was lightly placed over the brachial artery just below the cuff's edge. The cuff was then inflated to 180mm/Hg and gradually air was released from the cuff at a moderate rate(3mm/sec). the difference in sound was done by listening with the stethoscope and proper observation of the dial or mercury gauge was carefully done. The first knocking sound (Korotkoff Sounds) was recorded as the systolic pressure. When the knocking sound disappears, that was recorded as the diastolic pressure (such as 120/80).

**Pulse rate (beats per minute):** To measure for pulse, the index and middle finger of the hand was placed on the inner wrist of the arm, just below the base of the thumb. The tapping or pulsing was felt against the fingers. A count of the beat was taken for 60seconds and recorded.

The self-administered questionnaires were given to the participants to fill and collected by the researcher immediately they were filled by the respondents.

#### **Data Analysis**

The data from this study was summarized using descriptive statistic of mean, standard deviation, proportion as well as frequencies, and analyzed using inferential statistics of Pearson product moment correlation, Kruskal Wallis analysis of variance with mean rank was used for significant

difference among the QoL, Stress, gestational age and number of pregnancies. The alpha level will be set at  $p=0.05$

#### **RESULTS**

The socio-demographic characteristics of respondents are presented in Table 1. The sample comprised of 95 pregnant women with age 26-30years being the modal frequency of respondents 39 (40.6%). 94 (99.0%) of the respondents were married while 21 (21.9%) of the respondents are Trader; 46 (48.5%) of the respondents were in third trimester, majority of the respondents 36 (37.5%) are having their first pregnancy. Table 3 shows the descriptive statistics of pulse rate, quality of life, blood pressure of respondents. The minimum and maximum pulse rate ranged from 18 to 47, with a mean of  $89.42(\pm 11.76)$ . The systolic blood pressure ranged from 70 to 140, with a mean of  $109.66(\pm 13.29)$ . The diastolic blood pressure ranged from 50 to 90, with a mean value of  $64.56(\pm 10.83)$ . Physical domain ranged from 13 to 100, with a mean value of  $61.50(\pm 15.17)$ . Psychological domain ranged from 19 to 94, with a mean value of  $67.25(\pm 15.03)$ . Social relationship ranged from 6 to 100, with a mean value of  $73.09(\pm 21.86)$ . Environment ranged from 13 to 100, with a mean value of  $67.47(\pm 18.01)$ . Overall quality of life ranged from 25 to 93 with a mean value of  $66.69(\pm 14.16)$ . Table 2 shows the perceived stress level of respondents. The result shows 12(12.6%) of the participants reported low perceived stress level, 78(82.1%) moderate perceived stress and 5(5.3%) high perceived stress level. Table 4 shows the correlation of quality of life, pulse rate, blood pressure and stress level among respondents. There is a significant correlation between systolic blood

pressure and pulse rate ( $r = 0.221$ ,  $p = < 0.05$ ). There is a significant negative correlation between pulse rate and perceived stress level ( $r = -0.195$ ,  $p = < 0.05$ ). There is a significant correlation between systolic blood pressure and diastolic blood pressure ( $r = 0.573$ ,  $p = < 0.05$ ). There is also a significant negative correlation between physical domain and perceived stress level ( $r = -0.207$ ,  $p = < 0.05$ ) and there is also a significant correlation between physical domain and psychological domain ( $r = 0.361$ ,  $p = < 0.05$ ). There is a significant correlation between physical domain and social relationship ( $r = 0.396$ ,  $p = < 0.05$ ) and there is also a significant correlation between physical domain and environment ( $r = 0.358$ ,  $p = < 0.05$ ). There is a significant correlation between psychological domain and environment ( $r = 0.570$ ,  $p = < 0.05$ ). Presented in table 5 is the result of Kruskal-Wallis Analysis of variance by ranks between quality of life and perceived stress among gestational age. The result shows no significant difference for perceived stress between

gestational age of respondents ( $H = 0.775$ ,  $p = 0.646$ ). The result also showed no significant difference in all the domains of quality of life and overall QoL between gestational age of the respondents (Physical domain  $p = 0.251$ ; Psychological  $p = 0.801$ ; Social relationship  $p = 0.642$ ; Environment  $p = 0.705$ ; Overall QoL  $p = 0.646$ ).

Presented in table 6 is the result of Kruskal-Wallis Analysis of variance by ranks between quality of life and perceived stress. The result shows no significant difference between perceived stress and number of pregnancy of respondents ( $H = 1.661$ ,  $p = 0.766$ ). The result also showed no significant difference between all the domains of quality of life, overall QoL and number of pregnancies of the respondents (Physical domain  $p = 0.526$ ; Psychological  $p = 0.978$ ; Social relationship  $p = 0.761$ ; Environment  $p = 0.936$ ; Overall QoL  $p = 0.798$ ).

**Table 1: Socio-demographic characteristics of respondents** **N = 95**

Variables	Attributes	Frequency	Percentage
Age	15-20years	4	4.2
	20-25years	16	16.7
	26-30years	39	40.6
	31-35years	19	19.8
	36-40years	13	13.5
	41-45years	3	3.1
	46-50years	2	2.1
Occupation	Student	5	5.2
	Civil servant	17	18.2
	Teacher	6	6.3
	Self employed	14	15.0
	Trader	21	21.9
	Business woman	16	16.7
	Fashion designer	16	16.7
Gestational age	First trimester	14	14.7
	Second trimester	35	36.8
	Third trimester	46	48.5
No of pregnancies	First pregnancy	36	37.5
	Second pregnancy	29	30.2
	Third pregnancy	19	19.8
	Fourth pregnancy	8	8.3
	Fifth pregnancy	3	4.2
Marital status	Single	1	1.0
	Married	94	99.0

**Table 2: Perceived stress level of respondents** **N=95**

Variables	Frequency	Percentage
Low	12	12.6
Moderate	78	82.1
High	5	5.3



**Table 3: Descriptive statistics of Pulse rate, Quality of life, Blood pressure (N=95)**

	Variables	Minimum	Maximum	Mean± Standard deviation
<b>Cardiovascular Parameters</b>	Pulse rate	57	120	89.42 ± 11.76
	Systolic blood pressure	70	140	109.66 ± 13.29
	Diastolic blood pressure	50	90	64.56 ± 10.83
<b>Quality of life</b>	Physical domain	13	100	61.50 ± 15.17
	Psychological domain	19	94	67.25 ± 15.03
	Social relationship	6	100	73.09 ± 21.86
	Environment	13	100	67.47 ± 18.01
	Overall quality of life	25	93	66.69 ± 14.16

**Table 4: Spearman's rho correlation statistics of Quality of life, Pulse rate, Blood pressure and Stress level among Respondents**

Variables	PR	SBP	DBP	PSS	Phy domai n	Psy domain	Soc Relation	Environm ent	Overall Qol
<b>Pulse rate</b>	1.00	0.221, <0.05	0.161, >0.05	-0.195, <0.05	0.91, >0.05	-0.077, >0.05	-0.046, >0.05	0.001, >0.05	0.04 >0.05
<b>Systolic blood pressure</b>	0.221, <0.05	1.00	0.573, <0.05	-0.111, >0.05	-0.024, >0.05	-0.054, >0.05	0.074, >0.05	0.040, >0.05	0.026, >0.05
<b>Diastolic blood pressure</b>	0.16, >0.05	0.573, < 0.05	1.00	-0.31, > 0.05	-0.001, >0.05	0.099, >0.05	0.048, >0.05	0.053, >0.05	0.067, >0.05
<b>PSS</b>	-0.195, <0.05	-0.111, >0.05	-0.31, >0.05	1.00	-0.207, <0.05	-0.076, >0.05	-0.033, >0.05	-0.110, >0.05	-0.031, >0.05
<b>Physical domain</b>	0.091, >0.05	-0.024, >0.05	-0.001, >0.05	-0.207, <0.05	1.00	0.361, <0.05	0.396, <0.05	0.358, <0.05	0.66, <0.05
<b>Psychological domain</b>	-0.077 >0.05	-0.054, >0.05	0.099, >0.05	-0.076, >0.05	0.361, <0.05	1.00	0.394, <0.05	0.570, <0.05	0.710, <0.05
<b>Social Relationship</b>	-0.046, >0.05	0.074, >0.05	0.048, >0.05	-0.033, >0.05	0.396, <0.05	0.394, <0.05	1.00	0.428, <0.05	0.725, <0.05
<b>Environment</b>	0.001, >0.05	0.040, >0.05	0.053, >0.05	-0.110, >0.05	0.358, <0.05	0.57, <0.05	0.428, <0.05	1.00	0.738, <0.05
<b>Overall quality of life</b>	0.04, >0.05	0.026, > 0.05	0.067, >0.05	-0.031, >0.05	0.660, <0.05	0.710, <0.05	0.725, <0.05	0.738, <0.05	1.00



**Table 5: Kruskal-Wallis Analysis of Variance by ranks between quality of life and perceived stress among gestational age of respondents**

<b>Variables</b>	<b>First Trimester (Mean Rank)</b>	<b>Second Trimester (Mean Rank)</b>	<b>Third Trimester (Mean Rank)</b>	<b>Kruskal-Wallis H</b>	<b>P-value</b>
<b>PSS</b>	49.50	44.72	42.98	0.775	0.646
<b>QOL</b>					
<b>Physical Domain</b>	36.30	41.33	49.50	2.761	0.251
<b>Psychological Domain</b>	51.10	44.97	43.50	0.443	0.801
<b>Social Relationship</b>	55.50	43.96	45.61	0.886	0.642
<b>Environment</b>	52.70	42.99	45.65	0.700	0.705
<b>Overall QOL</b>	50.90	42.53	47.13	0.872	0.646

**Table 6: Kruskal-Wallis Analysis of Variance by ranks between quality of life, perceived stress and no of pregnancy**

<b>Variables</b>	<b>First Pregnancy (Mean Rank)</b>	<b>Second Pregnancy (Mean Rank)</b>	<b>Third Pregnancy (Mean Rank)</b>	<b>Fourth Pregnancy (Mean Rank)</b>	<b>Fifth Pregnancy (Mean Rank)</b>	<b>Kruskal-Wallis H</b>	<b>P-value</b>
<b>PSS</b>	46.91	46.06	41.63	45.44	51.00	1.661	0.766
<b>QOL</b>							
<b>Physical Domain</b>	42.61	46.73	51.50	58.69	40.25	3.193	0.526
<b>Psychological Domain</b>	45.04	47.06	47.58	45.56	36.25	0.455	0.978
<b>Social Relationship</b>	46.92	42.21	52.24	50.44	52.00	1.861	0.761
<b>Environment</b>	46.68	44.24	46.03	53.31	51.00	0.793	0.936
<b>Overall QOL</b>	45.31	44.04	51.39	55.56	43.00	1.836	0.798

## DISCUSSION

The primary aim of this study was to determine the correlation between quality of life, selected cardiovascular indices and stress among pregnant women attending antenatal clinic in Federal Medical Centre, Owo.

The result showed two-third (77.1%) of the respondents are within age 20-35years which is in line with the study by Wegbom et al<sup>24</sup> on determinant of depression, anxiety and stress among pregnant women where 65.7% were aged 25-34 years. This could be because women likely give birth more within this age group. 99.0% of the respondents were married in this present study which is supported by Wegbom et al<sup>24</sup> in which 89% of participants were married but in contrary with the study done by Velez<sup>25</sup> on pregnancy and health related quality of life where 60% of the participants were married and this variation could be due to cultural difference. 48.5% of the respondents are in third trimester and majority of the respondents (37.5%) are primigravida pregnancy which is supported by Wegbom et al<sup>24</sup>. This could be due to the fact that most women do not present to the hospital at the first or second trimester and also the primigravida tends to present to the hospital more than the multigravida.

The result of this study revealed that perceived stress has a negative correlation with pulse rate which is in line with a study done by Jarvelin-Pasanen, Sinikallio and Tarveaine<sup>26</sup>. Increased occupational stress was found associated with lower HRV, especially with reduced parasympathetic activation. On the contrary, a study done by Kim et al 2018<sup>27</sup> confirmed that stress had an impact on heart rate variability (HRV). This represents the ability of the heart to

respond to a variety of physiological and environmental stimuli. The result showed that in most studies, HRV changed in response to stress stimulated by several factors. In pregnant women, Odendaal<sup>28</sup> reported a series of fluctuations in heart rate, especially a deceleration. This was attributed to uterine activity. The variation in results may be due to other factors considered to have an effect to the heart rate and by extension, pulse rate.

There was no significant correlation between perceived stress, systolic blood pressure and diastolic blood pressure. Hassoun et al<sup>29</sup> reported that both variables were independently associated, after age, sex lifestyle, physical activity, social status and socioeconomic status were considered. Another study reported that there was a significant correlation between systolic blood pressure, diastolic pressure and perceived stress level<sup>30,31</sup>. This variation in systolic blood pressure and diastolic blood pressure measurement can be as a result of difference in population in this present study.

The result of this study showed that quality of life had no significant correlation with systolic blood pressure and pulse rate in pregnant women within the area of study. However, there was a significant negative correlation between physical domain of quality of life and perceived stress which is in line with a study by Periera and Canavarro<sup>32</sup> where quality of life was found to improve in younger patients especially in physical domain WHOQoL-Bref. Lagadec et al<sup>3</sup> reported that the major factors associated with improved quality of life include: maternal age, primiparity, absence of social and economic problems, exercise, etc. and the factors associated with poor quality of life were stress, sleep

difficulties, complications before or during pregnancy and some other unhealthy lifestyles. Psychopathological symptoms such as anxiety, irritability and depression contributed significantly to variance in quality of life. However, Estebarsari et al<sup>33</sup> reported that physical and psychological dimension of quality of life was significantly correlated with maternal age. The stage of pregnancy was also considered a factor the affected quality of life according to Jakubauskiene et al<sup>34</sup>.

Alzboon and Vural<sup>35</sup> showed that apart from stress, perceived social support and some patient characteristics, only parity had a significant effect on quality of life<sup>36</sup>, while reporting that 94% of respondents with history of cardiovascular disease (CVD) had a good quality of life, with 85% having an adequate environmental aspect, 60.7% having active social relationships, 54.7% having good physical health, and 44.8% having a stable psychological condition. The psychological aspect of quality of life was affected the most, which supports the view that mental health is majorly associated with quality of life as was found in this study. The variation in these studies can be attributed to the presence of a disease and quality of treatment received, different population, different lifestyles of participants and also stage of pregnancy as different stages of pregnancy possess a level of effect on quality of life<sup>3</sup>.

The observation from this study shows no significant difference in stress among the different categories of gestational age of respondents which is supported by Gokoel et al<sup>37</sup>. The result also showed no significant difference in all the domains of quality of life, overall QoL among the different categories of gestational age of the respondents which contradicts the findings of Wojcik, Anisko and Siatkowski<sup>38</sup> that showed

a significant difference in the quality of life between the first and third trimester of the participants. This variation in result could be due to the fact that gestational age of the respondent is not evenly distributed across the three trimesters in the present study.

Furthermore, the observation from this present study showed no significant difference in perceived stress and the number of pregnancies of respondents which is in agreement with the findings of Gokoel et al<sup>37</sup>. The result also showed no significant association between the domains of quality of life and number of pregnancies of the respondents. This could be as a result of an uneven distribution among the groups of women with number of pregnancies.

### **CONCLUSION**

The findings from this study have shown that stress is negatively correlated with pulse rate of pregnant women. Stress has also been found to have a negative impact on physical domain of quality of life among pregnant women. Increase stress reduces the quality of life in pregnant women.

### **Recommendation**

More should be carried out examining the impact of stress on different domains of quality of life. Further studies are recommended on this topic among pregnant women in other geographical zones with a higher sample size. Further studies can also explore the impact of work stress in pregnancy among pregnant women of similar occupation.

### **CONFLICT OF INTREST:**

The authors declare no conflict of Interest in this study.

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The study was self-sponsored.

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