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Research Paper

Relationship between osteoporosis patient outcomes for women with breast cancer

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ABSTRACT

Introduction: Osteopenia, along with osteoporosis, all systemic skeletal disorders linked with different levels of bone loss, are common within postmenopausal female breast cancer survivors, despite earlier estimates indicating that up to 80% experience bone density loss. Objective: This paper aims to investigate the relationship between osteoporosis patient outcomes for women with breast cancer. Patients and methods: This paper was presented as a cross-sectional study about the evaluation relationship between osteoporosis patient outcomes for women with breast cancer. There were 150 participants in this data were almost participate within ages older than 30 and under than 65 years into Iraqi women in different hospitals in Iraq between 15th July 2021 to 27th August 2022. The analysed data included two groups, which are Group A and Group B; where group A represented patients were got breast cancer and struggle of osteoporosis, while Group B also have breast cancer and survived of osteoporosis. The data collected was analysed and designed by the SPSS program. Results and Discussion: A number of studies have shown that women about breast cancer suffer from a higher risk of fracture than women without cancer. However, the findings have proved so varied that smaller epidemiological investigations have evaluated the dangers of a condition known as well as osteoporosis in women in breast cancer compared to women without cancer in the exact same group. According to research, the first group has a higher incidence of bone density than the second since the primary reason is a lack of estrogen hormone in the first group, which promotes quicker bone loss. The researchers observed that individuals with group A breast cancer had a higher frequency of diminished bone density, including osteoporosis. They did not have a greater rate of bone loss at the start when compared to non-cancer women.

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1. INTRODUCTION

Osteopenia, along with osteoporosis, all systemic skeletal disorders linked with different levels of bone loss, are common within postmenopausal female breast cancer survivors, despite earlier estimates indicating that up to 80% experience bone density loss. Untreated bone loss can cause considerable morbidity and even mortality owing to pain and fractures. Osteopenia is defined as having lower-than-average bone density [1], [2], whereas osteoporosis is defined as having combined low bone density with architectural degeneration of bone tissue. Cancer-related risk factors of osteoporosis and osteoporosis in breast cancer survivors include both therapy and early menopause. Importantly, the higher risk of osteoporosis and osteopenia among breast tumor survivors, particularly younger survivors, compared to cancer-free peers, is unclear [3], [4], [5].

In the general population, osteopenia, as well as osteoporosis, are also common. In the USA, roughly 15.4% of women over the age of 50 have osteoporosis, while 51.4% have poor bone density [6], [7], [8]. Furthermore, one in every two women is at risk of a fracture caused by osteoporosis throughout the course of their lives. Age, menopause-induced estrogen shortage, low weight, lack of physical exercise, drinking too much alcohol, a family tradition of bone fracture, smoking cigarettes, inadequate intake of calcium, and vitamin D deficiency are all related with bone density reduction in cancer-free women. Loss of bone strength in survivors of cancer might be attributable to a combination of risk factors and treatment-related effects. These risk variables can be distinguished through contrasting cancer survivors to cancer-free persons [9], [10], [11], [12], [13].

Several epidemiologic studies have been conducted to compare osteoporosis and osteoporosis within breast cancer survivors to cancer-free women in the same cohort. One earlier research found considerably fewer measurements of mineral density in bones, the gold standard for evaluating loss of bone [14], and two other studies found a higher likelihood of osteoporosis and osteopenia in cancer-free women. These studies focused mostly on elderly and long-term breast disease survivors, with no distinction made based on tumor subtypes or detailed treatment regimens [15].

One explanation for the scarcity of research involving younger breast cancer patients is the difficulty in obtaining an equivalent cancer-free group, as young disease-free women do not commonly have their bone health assessed. Fortunately, we discovered this was not the case among women with family breast cancer risk, allowing us to assess the risk of osteoporosis and osteopenia through the familial risk cohort designated as the Breast & Ovarian Surveillance Service trial [16]. This paper aims to investigate the relationship between osteoporosis patient outcomes for women with breast cancer.

2. METHODOLOGY

This paper was presented as a cross-sectional study about the evaluation relationship between osteoporosis patient outcomes for women with breast cancer. There were 150 participants in this data

were almost participate within ages older than 30 and under than 65 years into Iraqi women in different hospitals in Iraq between 15th July 2021 to 27th August 2022. The analysed data included two groups, which are Group A and Group B; where group A represented patients were got breast cancer and struggle of osteoporosis, while Group B also have breast cancer and survived of osteoporosis. The data collected was analysed and designed by the SPSS program.

Data was interested into Distributions of breast cancer patients based on age, symptoms which are Irritation of breast skin, new lump in the breast, Redness nipple area, and swelling of part of the breast, and causes also include a family history of breast cancer, increasing age, inherited genes that increase cancer risk, and obesity, smoking, alcohol, BMI were divided into 26.60, 28.80, 30.55, and 34.63 as well as chronic diseases which have on Cholesterol, Heart disease, Hypertension, and Others where all these characteristic of demographic data were presented in Table 1, Table 2, Table 3, Table 4, Table 5, Table 6, and Table 7. Our data also address the measurement of changes in estrogenic receptor status and BRCA1/2 status in comparison between Groups A and B, where the outcomes can be seen in Figure 1 and Figure 2.

Data also revealed a significant role of breast cancer effect on the bone density patients, where it extended into Bones examination density of breast cancer into group A and group B, where can be clear from Table 8 and Table 9 as well as the examination was getting on comparison with in comparison between group A and group B were pointed within low bones density and high bones density which Highline into Figure 3. The data are presented in Table 10 and Table 11, evaluations of Current vitamins supplement uses of osteoporosis into group A ad group B of breast cancer patients where pointing with Current calcium supplement use and Current vitamin D supplement use. Furthermore, the data reveal significant differences in Changes of breast cancer treatment in between both groups. A and B were determined with three treatments used, which are surgery, chemotherapy, and hormone therapy as well. As this paper was got the using of hormone therapy in breast cancer in-between group A and Group B into Tamoxifen and Aromatase inhibitors where these outcomes are found in Figure 4 and Figure 5. To further of results, this paper presents an assessment of the risk of osteopenia and osteoporosis among breast cancer group A and breast cancer group B where these parameters include Age at diagnosis, with ≤ 40 years and > 40 years, ER status was having on ER-negative and ER-positive as well as Supplement use where get on Current calcium supplement use and Current vitamin D supplement used to evaluate the risk factors based on Hazard ratio where determine into Age-adjusted HR (95% CI) and MV-adjusted HR (95% CI) which the outcomes can progressed into Table 12. According to Table 13, this paper was also presenting an assessment of the quality of life for breast cancer patients into a comparison between Group A and Group B which all parameters have Aged, Oestrogen levels, Bones density, Breast cancer treatment, and Heart rate where that outcomes can determined in Table 13.

3. RESULTS AND DISCUSSION

Table 1. Distributions of Breast Cancer Patients Based on Ages

N	**Va**	**75**
	Mis	**0**
M		44.8933
Me		47.0000
Mo		30.00
SD		10.01833
Var		100.367
Ske		-.033
SES		.277
Kur		-1.315
SEK		.548
R		30.00

Min	30.00
Max	60.00
S	3367.00

Table 2. Distributions of Breast Cancer Patients Based on Symptoms

		F	P	VP (%)	CP (%)
Va	Irritation of breast skin	15	20.0	20.0	20.0
	New lump in the breast	21	28.0	28.0	48.0
	Redness nipple area	21	28.0	28.0	76.0
	Swelling of part of the breast	18	24.0	24.0	100.0
	T	75	100.0	100.0	

Table 3. Distributions of Breast Cancer Patients Based on Causes

		F	P	VP (%)	CP (%)
Valid	A family history of breast cancer	9	12.0	12.0	12.0
	Increasing age	18	24.0	24.0	36.0
	Inherited genes that increase cancer risk	13	17.3	17.3	53.3
	Obesity	35	46.7	46.7	100.0
	Total	75	100.0	100.0	

Table 4. Examination of Breast Cancer Patients Based on Smoking

		F	P	VP (%)	CP (%)
Valid	No smoking	57	76.0	76.0	76.0
	Smoking	18	24.0	24.0	100.0
	Total	75	100.0	100.0	

Table 5. Examination of Breast Cancer Patients Based on Alcohol

		F	P	VP (%)	CP (%)
Valid	Alcohol	17	22.7	22.7	22.7
	No-Alcohol	58	77.3	77.3	100.0
	Total	75	100.0	100.0	

Table 6. Examination of Breast Cancer Patients Based on BMI

		F	P	VP (%)	CP (%)
Valid	26.60	16	21.3	21.3	21.3
	28.80	19	25.3	25.3	46.7
	30.55	16	21.3	21.3	68.0
	34.63	24	32.0	32.0	100.0
	Total	75	100.0	100.0	

Table 7. Presenting of Breast Cancer Patients Based on Chronic Diseases

		F	P	VP (%)	CP (%)
Valid	Cholesterol	15	20.0	20.0	20.0
	Heart disease	11	14.7	14.7	34.7
	Hypertension	38	50.7	50.7	85.3
	Others	11	14.7	14.7	100.0
	Total	75	100.0	100.0	

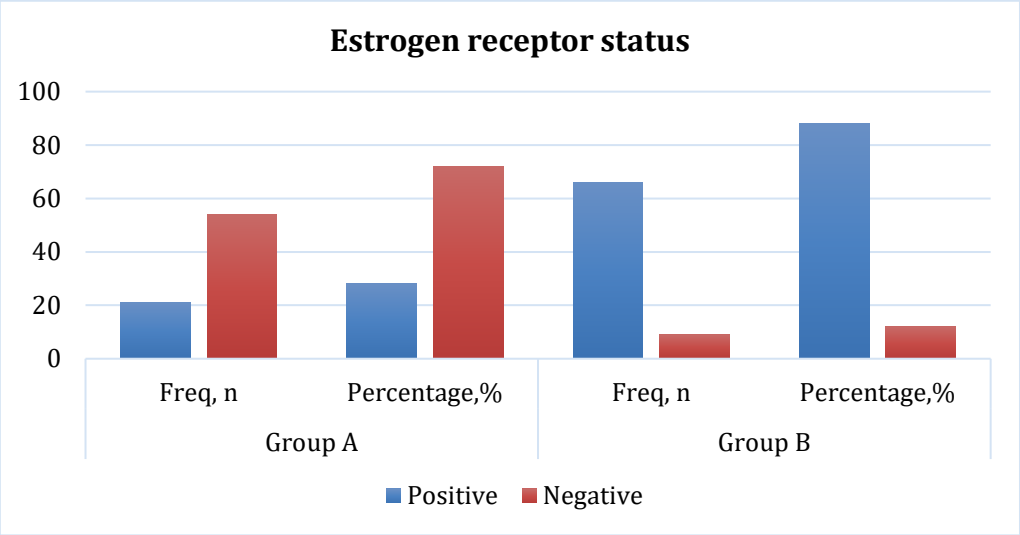

Figure 1. Measurement of Changes in Estrogenic Receptor Status in Comparison between Group A and Group B

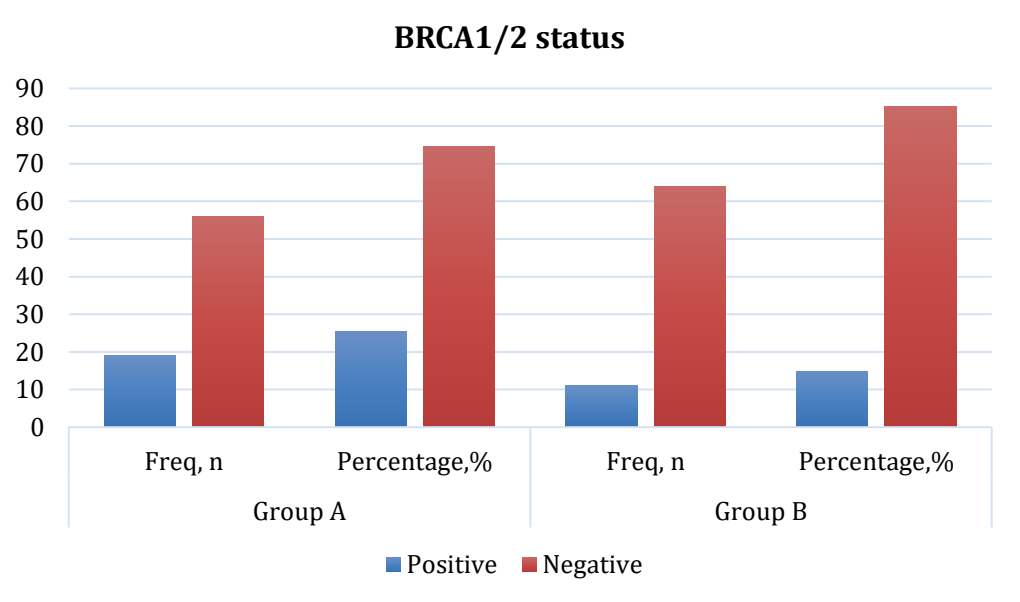

Figure 2. Measurement of Changes in BRCA1/2 Status in Comparison between Group A and Group B

Table 8. Bones Examination Density of Breast Cancer into Group A

		F	P	VP (%)	CP (%)
Valid	Bone density examination	22	29.3	29.3	29.3
	Not exist	53	70.7	70.7	100.0
	Total	75	100.0	100.0	

Table 9. Bones Examination Density of Breast Cancer into Group B

		F	P	VP (%)	CP (%)
Valid	Bone density examination	49	65.3	65.3	65.3
	Not exist	26	34.7	34.7	100.0
	Total	75	100.0	100.0	

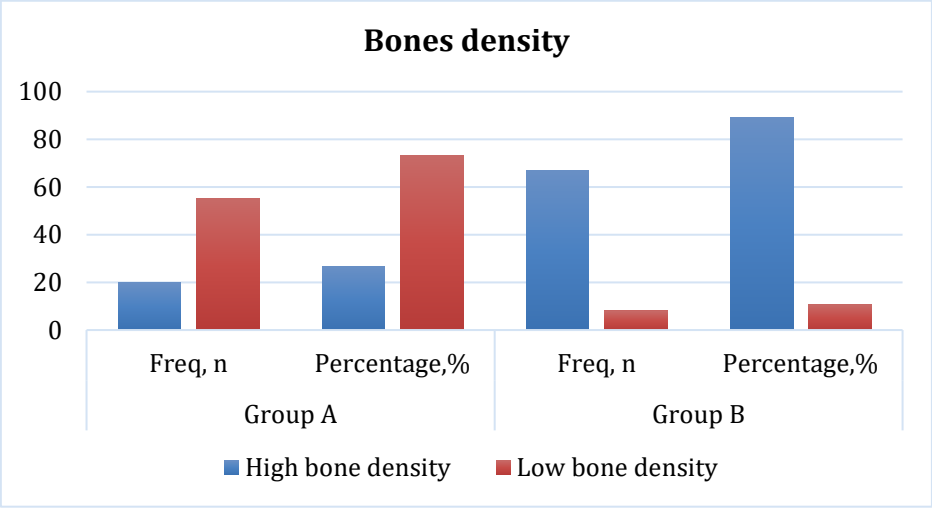

Figure 3. Assessment of Bone Density within Breast Cancer in Comparison between Group A and Group B

Table 10. Evaluations of Current Vitamins Supplement Uses of Osteoporosis into Group A of Breast Cancer Patients

		F	P	VP (%)	CP (%)
Valid	Current Calcium Supplement Use	23	30.7	30.7	30.7
	Current Vitamin D Supplement Use	10	13.3	13.3	44.0
	Not Done	42	56.0	56.0	100.0
	Total	75	100.0	100.0	

Table 11. Evaluations of Current Vitamins Supplement Uses of Osteoporosis into Group B of Breast Cancer Patients

		F	P	VP (%)	CP (%)
Valid	Current Calcium Supplement Use	25	33.3	33.3	33.3
	Current Vitamin D Supplement Use	24	32.0	32.0	65.3
	Not Done	26	34.7	34.7	100.0
	Total	75	100.0	100.0	

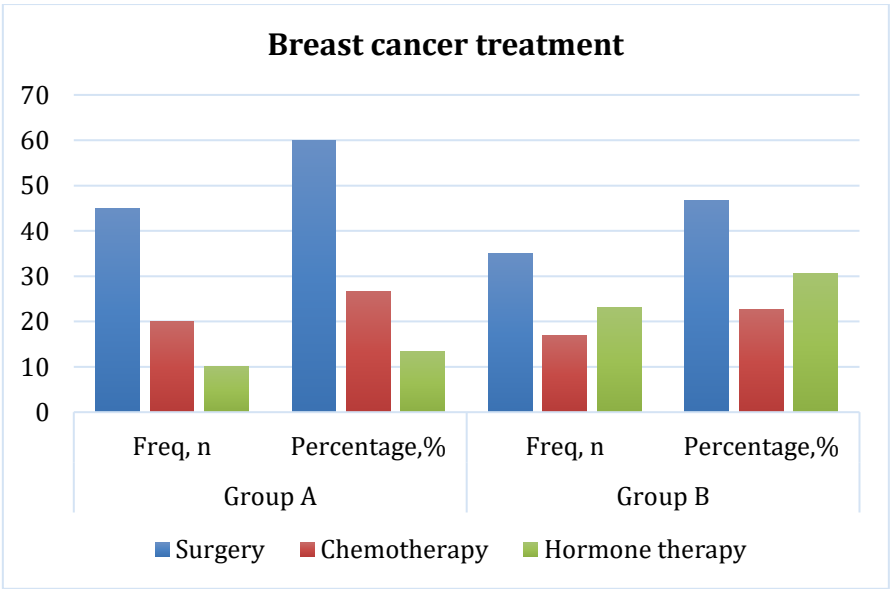

Figure 4. Changes of Breast Cancer Treatment in Between Both Groups A, B

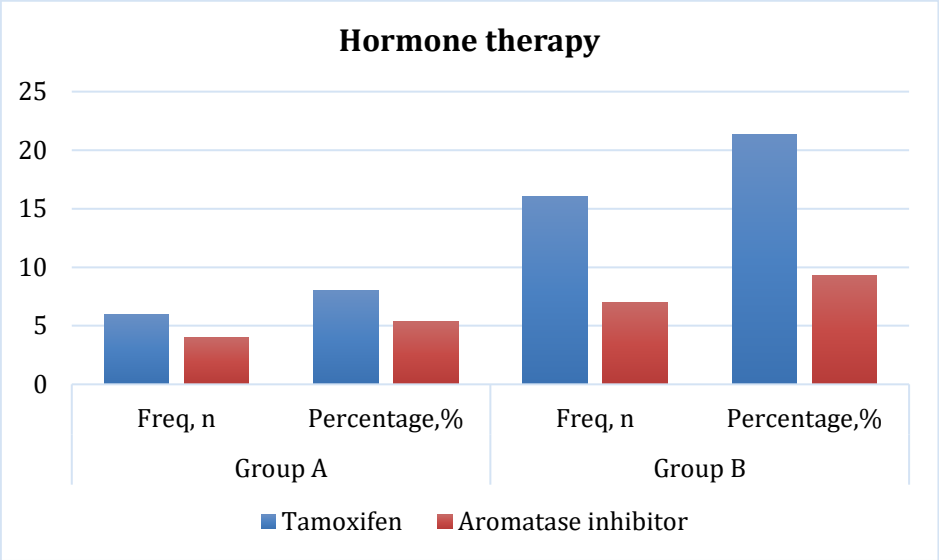

Figure 5. The Using of Hormone Therapy in Breast Cancer in-Between Group A and Group B

Table 12. Assessment of Risk of Osteopenia and Osteoporosis among Breast Cancer Group A and Breast Cancer Group B

Risk factors	Age-adjusted HR (95% CI)	MV-adjusted HR (95% CI)
Age at diagnosis		
≤ 40 years	2.24 (1.57–3.66)	1.45 (1.17–3.34)
> 40 years	1.52 (0.88–2.74)	1.20 (0.78–2.54)
ER status		
ER-negative	1.45 (0.60–3.64)	1.17 (0.75–2.75)
ER-positive	2.53 (1.44–3.49)	2.11 (1.31–3.43)
Supplement use		
Current calcium supplement use	1.24 (0.76–3.56)	1.48 (0.55–2.82)
Current vitamin D supplement use	1.15 (0.68–2.82)	1.24 (0.77–3.44)

Table 13. Assessment of Quality-Life for Breast Cancer Patients into a Comparison between Group A and Group B

Quality-life factors	Group A	Group B	P-value
Age	38±12.4	67±8.5	0.0327
Oestrogen levels	42.65±4.2	55.84±13.83	0.0422
Bones density	30±5.67	70.46±12.4	0.0255
Breast cancer treatment	57.44±8.66	77.36±8.5	0.0433
Heart rate	60.57±5.8	78.52±7.46	0.0426

Discussion

According to studies, the first group has a greater incidence of bone density than the second since the most prevalent reason is an inadequate amount of estrogen hormone in the initial group, which promotes faster bone loss. The researchers discovered that group a breast cancer patients had a greater frequency of reduced bone density, including osteoporosis. They did not have a higher rate of bone loss at the start compared to women who did not have cancer. A number of studies have shown that women about breast cancer suffer from a higher risk of fracture than women without cancer. However, the findings have proved so varied that smaller epidemiological investigations have evaluated the dangers of a condition known as well as osteoporosis in women in breast cancer compared to women without cancer in the exact same group. According to research, the first group has a higher incidence of bone density than the second since the primary reason is a lack of estrogen hormone in the first group, which promotes

quicker bone loss. The researchers observed that individuals with group A breast cancer had a higher frequency of diminished bone density, including osteoporosis. They did not have a greater rate of bone loss at the start when compared to non-cancer women. According to studies, the first group has a higher prevalence rate of bone density than the second since the most prevalent reason is a low level of estrogen hormone in the first group, which promotes faster bone loss. Numerous studies have found that women with a high density of bones are more likely to develop breast cancer. A meta-analysis of ten studies discovered that women had a high density of bones had a 60%-80% greater chance of getting breast cancer than those with low bone density. Low bone density. Instead, increased bone density is an indicator of elevated levels of estrogen in the body. The greater a woman's lifetime estrogen production. [17], [18], [19] Higher estrogen levels have been linked to an increased likelihood of breast cancer. Women with a greater density of bones are more likely than other women to acquire breast cancer, but they have a lower risk likely to get osteoporosis. Osteoporosis is defined as a decrease in bone mass and density. It contributes to osteoporosis. [20] The previous studies related to French outcomes were shown that the genes most commonly affected in hereditary breast and ovarian cancer are the breast cancer 1 (BRCA1) and breast cancer 2 (BRCA2) genes. About 3% of breast cancers (about 7,500 women per year) and 10% of ovarian cancers (about 2,000 women per year) result from inherited mutations in the BRCA1 and BRCA2 genes. Previous research on French outcomes has shown that the breast cancer-associated gene 1 (BRCA1), as well as breast cancer 2 (BRCA2) genes, are the most typically impacted with hereditary cancers of the breast and ovary. Inherited mutations in the genes BRCA1 and BRCA2 cause roughly 3% of breast cancers (7,500 women per year) and 10% of cancers of the ovary (2,000 women per year). In comparing to our study, our results noticed that changes in BRCA1/2 in group A are higher compared with group B.

4. CONCLUSION

In our conclusion, this study investigates that the patients with breast cancer are more injured to osteoporosis and bones loss as more than the group B patients due to the group A patients have a high density that led to have bones loss as well impact on the treatment use while the second group patients have low bones density where that did not get bones lose. Furthermore, both groups found negative estrogen, but group B patients were better than the first. The risk factors result, found all the age, obesity, and bones density, have a big impact on the patient's heart rate that causes a loss in the heart rate.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Dr. Khamis Y. C. Al-Qubaeissy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dr. Talib Mohammed Hasan Al-Musaedi	✓			✓	✓	✓			✓		✓		✓	
Dr. Muna Sami Jassim		✓	✓		✓		✓			✓		✓		✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration

Va : **Va**lidation
Fo : **Fo**rmal analysis
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and approved by the relevant institutional authorities.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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