Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v6i5.1752
*Biol. Clin. Sci. Res. J., Volume 6(5), **2025**: 1752*
Original Research Article

Effectiveness of Structural Teaching Program on Knowledge, Attitude and Practice (KAP) Regarding Breast Cancer and Breast Self-Examination (BSE) Among Undergraduate Nursing Students

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(Received, 24th March 2025, Accepted 22nd May 2025, Published 31st May 2025)

Abstract: *Globally, breast cancer is primary cause of morbidity and mortality, reducing life by over 18.5 years. Annually, 1,384,155 cases were diagnosed globally. Therefore, Breast Self-Examination (BSE) is cost-free & non-invasive, and private method for women to identify potential breast health issues.* ***Objective:*** *To assess and evaluate the Knowledge, Attitude and Practices (KAP) amongst undergraduate nursing student's about Breast Self-Examination.* ***Methods:*** *A Quasi Experimental Study was conducted in two public and one Private Nursing Colleges which were residing in Karachi, Pakistan, where data collected amongst 383 female undergraduate Nursing students, from June, 2024 to January, 2025 to assess the KAP amongst them.* ***Results:*** *The majority of participants were aged 18–20 years (54.6%), single (88.8%), and lived in urban areas (64%). Most were first-year students (55.6%) and Mothers' education levels varied, with (36%) having no formal education. Only (10.2%) reported a family history of breast cancer. Awareness and knowledge of BSE improved significantly after the intervention. Awareness rose from (60.8% to 91.6%) ($p = 0.001$). Correct knowledge about starting BSE at age 20 increased from (17% to 82.2%), and monthly practice rose from (29.5% to 81.7%) (Both $p < 0.001$). More participants correctly identified the ideal time for BSE as a week after menstruation (19.3% to 85.6%, $p < 0.001$), though the intervention significantly improved attitudes toward BSE rose from (30% to 77.5%) ($p = 0.001$), fear of seeing a doctor decreased ($p = 0.016$), family and community support for BSE increased from (7.8% to 54.8%) ($p = 0.011$). Similarly, the intervention significantly improved participants' practice of BSE rose from (23% to 73.1%) ($p = 0.011$), while ignorance as a reason for not practicing dropped from (81.8% to 11.7%) ($p = 0.021$), Fear of finding a lump increased post-intervention (2.6% to 75.7%), showing heightened awareness, and Knowledge of correct techniques improved notably: inspecting in front of a mirror (26.1% to 93.2%), using middle three fingers (30.8% to 77.5%), and the opposite hand (83.8%). Understanding of examining the armpit and identifying nipple discharge errors also improved, and correct rejection of the triangular method increased from (23.2% to 87.7%) ($p = 0.011$) respectively.* ***Conclusion:*** *The intervention significantly enhanced Positive attitudes towards BSE increased with a higher percentage of participants recognized its importance, Fear of discovering a lump decreased, although perceptions regarding discomfort also showed minimal change.*

Keywords: Undergraduate Nursing Students, Knowledge, Attitude, Practice, Breast Self-Examination, Breast Cancer

[***How to Cite:*** Pardhan S, Mendhrani S, Mohmand Z, Bibi A, Afzal L, Fatima S, Solangi T, Michae A, Khan K. Effectiveness of structural teaching program on knowledge, attitude and practice (kap) regarding breast cancer and breast self-examination (bse) among undergraduate nursing students. *Biol. Clin. Sci. Res. J.*, **2025;** 6(5): 91-96. doi: https://doi.org/10.54112/bcsrj.v6i5.1752

Introduction

Globally, breast cancer poses a significant public health threat as it is the primary cause leading to morbidity and mortality, which severely impacts life expectancy, reducing it by over 18.5 years from there expected life, and deteriorating quality of life for over a decade necessitating urgent public health attention as compare to cardiovascular disease and diabetes mellitus and others health related diseases (1,2).

Moreover, according to the American Cancer Society [ACS] in (2017), cases reported as 627,000 women were died due to breast cancer. Similarly, related to the World Health Organization [WHO] in (2022), and International Agency for Research on Cancer [IARC] in (2018) (3). Pakistan also reported has the highest incidence of breast cancer in Asia and ranked 8th globally in deaths caused by breast cancer unfortunately because of Several barriers which impede breast cancer screening adoption in less developed populations, attributed to a range of factors, encompassing cultural and religious beliefs, deeply ingrained myths, psychological factors, knowledge gaps, socioeconomic status, and inadequate access to healthcare services and insurance, perpetuating health disparities were the crucial factors for provoking towards the breast cancer amongst female (4,5,6).

Furthermore, Breast screening tests are proactive measures aim to detect asymptomatic individuals at risk of developing disease though, positive results prompt additional testing to confirm diagnosis and guide treatment, ultimately preventing complications, and improving health outcomes, as well as Breast cancer screening uptake is positively influenced by those women who were highly educated, high socioeconomic status, health insurance coverage, and exposure to social media were more aware about the breast cancer (5- 9).

In addition, mammography screening in developing countries is hindered by its substantial financial and human resource demands, which rendering it economically and logistically challenging issues, therefore women should have knowledge about BSE which is a cost-free, non-invasive, and private method to identify potential breast health issues, including unusual discharge, lumps, or thickening, and also assist in diagnosing in early stage to prevent from breast cancer (10-12).

Likewise, in developing countries like Turkey, Malaysia India,and Tanzania, BSE addressed through social media channels for accurate information, enabling decision-making and timely action help women for diagnosis and treatment earlier which in turn leads to improved outcomes, enhanced survival rates, and reduced morbidity and mortality (8, 13, 14, 15, 16).

However, numerous studies have investigated the Knowledge, Attitude, and Practice KAP of BSE globally, included Pakistan, a significant research gap exists by assessing the KAP of BSE among female medical students at Poonch Medical College, Azad Kashmir, Pakistan where students were had a dearth of knowledge about risk factors of breast cancer such as; advanced age, family history, early menarche, late

menopause, combined Contraceptives Hormonal Replacement Therapy (HRT) respectively (17,18).

Surprisingly, limited research exists on the knowledge, attitudes, and practices of Bangladeshi female nursing students regarding breast cancer and BSE (19).

Furthermore, Quasi Experimental Study was implemented to evaluate the Effectiveness of a Structured Teaching Program on BSE Knowledge and Practice among Female College Students in Panipat where mainly students were had limited knowledge about BSE(95%) but after posttest intervention (77%) gained knowledge about BSE (20).

A cross-sectional study conducted in Karachi involved 970 non-medical undergraduate female students 522 from Management Sciences (MS) and 448 from Social Sciences (SS). SS students had higher overall awareness about breast cancer (31.7%) compared to MS students (23.4%). Awareness of mammography was slightly higher in the MS group (36.4%) than SS (30.8%), while unawareness of breast self-examination (BSE) was more prevalent in MS (36.8%) than SS (29%). More SS students had no awareness overall (34.8%) compared to MS (25.3%).Regarding detection knowledge, a greater proportion of MS students (83.1%) had not visited healthcare providers compared to SS (79.5%). Lack of knowledge about breast cancer spreading was more common in MS (54.4%) than SS (47.8%). Similarly, ignorance of breast cancer symptoms was slightly higher in MS (63.4%) than SS (62.1%).In terms of attitude, fear of having the disease was more common in MS students (34.9%) than SS (27.2%), and more MS students were unwilling to go for breast screening (48.3%) compared to SS (42.4%) (21).

Methodology

Quasi experiment study design was conducted. The study was performed in both private and public Colleges of Nursing in Karachi Pakistan. The duration was from June,2024 to January 2025. Purposive sampling technique was approached in this study. The sample size was calculated based on the BSE amongst undergraduate nursing students with an assumed incidence in Karachi, Pakistan (48.3%) (Ahmad et al., 2024) (22) at 5% Level of significance and 80% power. The minimum sample size was 383. Openepi.com/Sample Size/SSPropor.htm was used to calculate the sample size. Generic Nursing Students of; 1st, 2nd, 3rd and 4th year students. LHV, LHW, Midwifery and RN Students and those who were not willing to give consent. A validated questionnaire was adapted and adopted from one of research article.

Ethical approval was obtained from Ethical Review Committee of the College of Nursing female Dr. Ruth K.M Pfau Civil Hospital Karachi.

Participants were informed about the purpose of the Study and written informed consent will be taken.

They were also informed that each participant has the right to withdraw from the study at any time without any consequences.

Anonymity and confidentiality were absolutely assured throughout the study.

Tool was adopted from one of the article (Alshafie et al., 2024) (23) and reliability was tested through Cronbach's Alpha coefficient for the knowledge was 0.93, attitude was 0.77, and for the practice 0.782 respectively.

The collected data was coded, tabulated and analyzed by using Statistical Package of Social Science (SPSS). The data was analyzed on SPSS licensed V-16 software. Percentages and Frequencies was used to describe socio demographic characteristics. The quantitative variables was calculated by using Frequency tables.

Results

The majority of respondents in table #1 were between the aged of 18-20 years (54.6%), followed by those 21-23 years (35.5%) and 24 years or older (9.9%). In terms of residence, (64%) of participants lived in urban areas, while (36%) resided in rural areas. Regarding marital status, most participants were single (88.8%), while (8.9%) were married, and (2.3%) belonged to other categories. The educational background of participants' mothers varied, with (36.0%) having no formal education, (20.6%) completing primary education, (27.9%) reaching secondary education, and (15.4%) attaining higher education at a university or institute. In terms of academic year, (55.6%) of participants were in their first year, (23.5%) in their second year, (12.3%) in their third year, and (8.6%) in their fourth year. When asked about a family history of breast cancer, (89.8%) reported having a family history, while (10.2%) had no such history. These findings provide insights into the demographic distribution and familial breast cancer history among the participants, with a majority being young, single, urban-dwelling students without a known family history of breast cancer.

The percentage of participants in table # 2 who heard about BSE rose from (60.8%) before and after the intervention (91.6%) with ($p = 0.001$).The percentage of participants who correctly indicated that BSE should begin at age 20 increased significantly (17% before, 82.2% after) ($p < 0.001$). Furthermore, fewer people (37.6% pre, 2.3% post) suggested beginning BSE after menopause. The suggested frequency of BSE was found to have changed significantly, with a significant rise in those who thought it should be done monthly (29.5% pre, 81.7% post) ($p < 0.001$) and a reduction in those who thought it should be done annually or as needed. Knowledge of when to perform BSE improved significantly, as evidenced by the rise in participants who identified a week following menstruation as the ideal period (19.3% pre, 85.6% post) ($p < 0.001$). Fewer people made their decisions during ovulation or at any point following the intervention.

Prior to the intervention in table # 3, that (70%) of participants strongly disagreed that learning BSE is important; however after the session, (77.5%) of participants agreed with ($p = 0.001$).There was a significant decrease in fear ($p = 0.016$) as fewer subjects strongly agreed that they were afraid to see a doctor after discovering a lump (32.6%) pre, (48%) post participants were strongly disagreed that were not felt uncomfortable while seeing the doctor after the session. (41.2%) of participants strongly agreed that they avoid BSE fear of BC consequences before intervention while (53.0%) participants strongly disagreed after intervention ($p= 0.884$). Examining the breast caused no discernible improvement in discomfort ($p = 0.576$), and the percentage of participants who experienced discomfort was same before and after the intervention. Perceptions of adequate community awareness activities to teach BSE did not significantly change ($p = 0.782$). Though there was a rise in participants who strongly disagreed with this statement after the intervention (49.34%), there change in the view that instead of doing regular mammography don't removes the need for BSE ($p = 0.175$). Though more participants strongly disagreed with this notion after the intervention, there was no discernible change in the perception that BSE is unnecessary when healthcare workers perform breast exams ($p = 0.096$). Family members and community members' encouragement of BSE significantly increased, with (7.8%) strongly agreeing before the intervention and (54.8%) after ($p = 0.011$).

In table # 4, the participants' understanding and use of BSE were greatly enhanced by the intervention. Before intervention, (23%) of participants had ever conducted BSE; after the intervention, that number rose to (73.1%) ($p = 0.011$). Participants' reasons for not doing BSE significantly decreased, stating ignorance (81.8% to 11.7%), ($p = 0.021$), whereas after-intervention fear of finding a lump was highly significant (2.6%) pre to (75.7%) post, with relation to BSE. These results demonstrate the intervention's noteworthy influence on raising BSE knowledge, comprehension, and application. Furthermore, the current study's participants showed a notable improvement in their grasp of the proper palpation technique, highlighting the significance of tactile examination and demonstrating a greater awareness of the practical steps for BSE. Karadeniz and Şener Pedgley's paper from 2021 suggests a similar

analysis. The percentage of respondents who correctly picked "standing in front of a mirror" as the best method for inspecting the breast rose from (26.1%) to (93.2%) after it (p = 0.011). From (30.8%) to (77.5%), accurate palpation with the "middle three fingers" also improved noticeably. The use of the "opposite hand" was recognized by (83.8%) of respondents, indicating a notable improvement in knowledge on the correct hand for BSE. Significant success was made in identifying inaccurate methods for assessing nipple discharge; after the intervention, uncertainty decreased from (59.8%) to (4.5%) (p = 0.011). Moreover, knowledge of other areas to look for lumps, such the armpit, increased from (24.8%) to (84.8%). Last but not least, the percentage of people who used the erroneous BSE approach (triangular) improved from (23.2% to 87.7%) after it (p = 0.011).These results demonstrate the intervention's noteworthy influence on raising BSE knowledge, comprehension, and application.

Table 1 Socio-demographic Information:

Items	Responses	Frequency-%
Age	18-20 21-23 >24	209(54.6%) 136(35.5%) 38(9.9%)
Place of your residence	Urban Rural	245(64%) 138(36%)
Marital status	Single Married Others	340(88.8%) 34(8.9%) 09(2.3%)
Mother's Education	No education Primary Secondary University/Institute	138(36.0%) 79(20.6%) 107(27.9%) 59(15.4%)
Academic year	First year Second year Third year Fourth year	213(55.6%) 90(23.5%) 47(12.3%) 33(8.6%)
Family history of Breast Cancer	Yes No	344(89.8%) 39(10.2%)

Table 2 Knowledge of Breast Self-Examination (BSE)

Item	Response	Pre n(%)	Post n(%)	P-Value
Have You heard of BSE before?	Yes No	233 (60.8%) 150 (39.2%)	351 (91.6%) 32 (8.4%)	0.001
At what age should BSE be started?	From 20 years From 30 years From 40 years After menopause I do not know	65 (17%) 34 (8.9%) 21 (5.5%) 144 (37.6%) 119 (31%)	315 (82.2%) 27 (7.2%) 30 (7.8%) 9 (2.3%) 2 (0.5%)	<0.001
How often should BSE be done?	Daily Weekly Monthly Yearly If necessary I do not know	13 (3.4%) 39 (10.2%) 113 (29.5%) 32 (8.4%) 36 (9.3%) 150 (39.2%)	15 (4.9%) 34 (8.9%) 311 (81.7%) 6 (1.6%) 12 (1.6%) 5(1.3%)	<0.001
What is the appropriate time to perform BSE?	A week after menstruation During ovulation Anytime I do not know	74 (19.3%) 42 (11%) 78(20.4%) 189 (49.3%)	328 (85.6%) 19(5%) 29(7.6%) 7(1.8%)	<0.001

Table 3 Attitude towards Breast Self-Examination (BSE)

Item	Response	Pre n (%)	Post n (%)	P-Value
I feel it is important to learn BSE	Strongly Agree Agree Neutral Disagree Strongly Disagree	10 (2.0%) 109 (20.0%) 22(5.0%) 12 (3.0%) 240 (70.0%)	297 (77.5%) 79 (20.7%) 3 (0.8%) 2 (0.5%) 2 (0.5%)	0.001
I fear/feel uncomfortable going to a physician for a checkup if I find a lump	Strongly Agree Agree Neutral Disagree Strongly Disagree	125 (32.6%) 69 (18%) 79 (20.6%) 66 (17.3%) 44 (11.5%)	40(10.4%) 90 (23.4%) 30 (7.8%) 40 (10.4%) 183 (48%)	0.016
I avoid BSE for fear of consequences of Breast Cancer	Strongly Agree Agree Neutral Disagree Strongly Disagree	158(41.2%) 94 (24.5%) 68 (17.8%) 29(7.6%) 24 (6.26%)	37 (9.7%) 23 (6.0%) 41 (10.7%) 79 (20.6%) 203 (53.0%)	0.884

I feel uncomfortable to examine my breast?	Strongly Agree Agree Neutral Disagree Strongly Disagree	51 (13.3%) 173 (45.1%) 41 (10.7%) 43 (11.2%) 75 (19.7%)	61 (15.9%) 30 (7.8%) 47 (12.3%) 177 (32.2%) 68 (17.8%)	0.576
There are not enough awareness programs in our community to teach BSE.	Strongly Agree Agree Neutral Disagree Strongly Disagree	116 (30.3%) 151 (39.5%) 41 (10.7%) 41 (10.7%) 22 (5.7%)	24 (6.3%) 140 (13.8%) 53 (13.8%) 140 (36.6%) 135(35.2%)	0.782
If you do a routine mammography, you do not need to perform BSE	Strongly Agree Agree Neutral Disagree Strongly Disagree	163(42.5%) 88(22.9%) 74 (19.3%) 22(5.74%) 36 (9.5%)	29 (7.57%) 47 (12.27%) 43 (11.2%) 75(19.5%) 189(49.34%)	0.175
If you have a breast examination performed by a healthcare worker, you do not need to perform BSE	Strongly Agree Agree Neutral Disagree Strongly Disagree	133(34.7%) 83 (21.7%) 74 (19.3%) 47 (12.3%) 46 (12%)	44 (11.4%) 49 (12.7%) 51 (13.3%) 159 (41.5%) 80 (20.9%)	0.096
I encourage BSE for my family and community members.	Strongly Agree Agree Neutral Disagree Strongly Disagree	29 (7.8%) 121(31.5%) 25 (6.5%) 186 (48.5%) 22 (5.7%)	210 (54.8%) 119 (31.0%) 18 (4.6%) 23 (6.0%) 13 (3.6%)	0.011

Table 4 Skills of practicing Breast Self-Examination (BSE):

Item	Response	Pre n(%)	Post n(%)	P-Value
Have you ever performed BSE before?	Yes No Never Not known	88 (23%) 206 (53.7%) 60 (15.7%) 29 (7.6%)	280 (73.1%) 89 (23.3%) 12 (3.1%) 2 (0.5%)	0.011
Reasons for not performing BSE?	Fear of detecting a lump Not necessary as I am under 20 yrs Too busy Don't know how to do BSE Others	10(2.6%) 30 (7.8%) 20 (5.2%) 313 (81.8%) 10 (2.6%)	290 (75.7%) 30 (7.8%) 10 (2.6%) 45(11.7%) 8 (2.2%)	0.021
Ideal way to inspect the breast?	Standing in-front of mirror While bathing I don't know	100 (26.1%) 66 (17.2%) 217(56.6%)	357(93.2%) 18 (4.7%) 8 (2.1%)	0.011
How do you palpate the breast?	Using thumb and index finger Using middle three finger Whole palm I don't know	52 (13.6%) 118 (30.8%) 53 (13.8%) 160 (41.8%)	50 (13.1) 297 (77.5%) 32 (8.4%) 4 (1%)	0.011
Which hand do you use for BSE?	Hand of same side of breast Hand of opposite side of breast Use single hand for both breast I don't know	31 (8.1%) 108 (28.2%) 56 (14.6%) 188 (49.1%)	31 (8.1%) 321 (83.8%) 20 (5.2%) 11 (2.9%)	0.011
Which is NOT the correct method to evaluate nipple discharge?	Pressing it with thumb & index finger By observing it By blotting with paper I don't know	64 (16.7%) 48 (12.5%) 42 (11%) 229 (59.8%)	100 (26.1%) 23 (6.0%) 243 (63.4%) 17 (4.5%)	0.011
Where else do you look for a lump other than examining breast?	Armpit Neck Breast I don't know	95 (24.8%) 22 (5.7%) 57 (14.9%) 209 (54.6%)	325 (84.8%) 21 (5.4%) 32 (8.3%) 5 (1.5%)	0.011
Which of the following is NOT the technique for performing BSE?	Circular Vertical Triangular I don't know	39 (10.2%) 34 (8.9%) 89 (23.2%) 221 (57.7%)	27 (7%) 6 (1.6%) 336 (87.7%) 14 (3.7%)	0.011

Discussion

The purpose only a small percentage of participants reported having a family history of breast cancer. Interestingly, a significant portion of participants held a positive attitude toward BSE, while a larger proportion displayed negative or indifferent attitudes. The study identified three of the most common signs of breast cancer: breast lumps, nipple discharge, and nipple retraction. These findings are consistent with a similar study conducted by Khan et al,(2021) (25). which also highlighted these as prominent signs of the disease. While participants were generally aware of breast cancer, they lacked comprehensive knowledge regarding its significant features, such as the

symptoms and risk factors associated with the disease; this lack of understanding mirrors the findings of Abdul et al. (2024) (26). The study also identified a positive relationship between attitude and knowledge of BSE. Respondents with a more positive attitude toward BSE were more likely to demonstrate higher knowledge levels, which aligns with findings from Bell et al. (2021) (27). And Pal et al. (2021). Additionally, when considering both knowledge and practice, this study found that participants who held a favorable attitude toward BSE were more likely to be well-informed and engage in proper practices. These results are consistent with Aslam et al. (2024) (29). Which reported that 46.3% of participants shared a similar positive attitude toward BSE.

In terms of correct breast inspection techniques, the present study found that the ideal method "standing in front of a mirror" was correctly identified by participants, with a significant increase in recognition post-intervention; this improvement is supported by findings in past studies, such as Fakhari et al. (2022) (30). Additionally, the current study examined common risk factors for breast cancer, including age (over 50 years), dense breasts, family history of breast cancer, early menstruation, late menopause, late pregnancies, use of birth control pills, atypical hyperplasia of the breast, and previous radiation therapy. These findings align with the research conducted by Kashyap et al. (2022) (31). which highlighted the same risk factors as prevalent among individuals at increased risk for breast cancer. The study also revealed that the educational intervention, focusing on both knowledge and practical skills related to BSE, led to a significant improvement in participants' knowledge and practices. This outcome is consistent with Mansoor et al. (2024) (32). The intervention played a key role in improving participants' understanding of proper BSE techniques, including inspection and palpation methods, as well as their ability to detect lumps. These improvements were statistically significant and consistent with the results reported by Sarkar et al. (2022). The findings of this study underscore the substantial impact of educational interventions on improving participants' knowledge, attitudes, and practices related to BSE. By addressing gaps in awareness, clarifying misconceptions, and reinforcing correct techniques, the intervention empowered individuals with the skills necessary for effective breast health monitoring. This aligns with the conclusions drawn by Naseri et al. (2024) (33). which highlighted the importance of education in empowering individuals to take charge of their health through BSE.

However, the comprehensive approach utilized in this study, which combined education, skill-building, and addressing emotional barriers, contributed to a significant improvement in participants' knowledge and practice of BSE. Such interventions are vital in promoting early detection and improving breast cancer outcomes, as early detection remains one of the most effective ways to reduce mortality rates associated with breast cancer. Regular reinforcement, emotional support, and ongoing education will be crucial in ensuring that these gains are maintained and translated into long-term improvements in breast health awareness and practice (Aslam et al. 2024) (34).

Conclusion

In a nutshell, the intervention significantly enhanced participants' knowledge, attitudes, and practices related to Breast Self-Examination (BSE). Positive attitudes toward BSE increased, with more participants recognizing its importance and receiving it. Fear of finding a lump decreased. However, perceptions of discomfort and views on community awareness efforts showed little change. Furthermore, the current study's participants showed a notable improvement in their grasp of the proper palpation technique, highlighting the significance of tactile examination and demonstrating a greater awareness of the practical steps for BSE.

A limitation of this research study is that it was conducted exclusively among undergraduate nursing students in Karachi, which restricts the generalizability of the findings to other populations or regions."

The result of this study suggests integration of Breast Cancer education into University in Curriculum to promote early detection and prevention. This study not only provide collaboration with health care providers to offer free or low cost breast cancer screening services for undergraduate students but also develop and implement breast cancer awareness programs that cater to the needs of female students. Advocate for policy changes that support breast cancer education and screening among undergraduate government and private female nursing students.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMNCS-0331d-24)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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