

Effectiveness of Snowball Throwing and Buzz Group Health Education on BSE Knowledge Among Adolescent Girls

Nisa Ramadan Setianingrum¹⁾ Ulfah Musdalifah²⁾ Hanifa Andisetyana Putri³⁾

Email: nisaramadan016@gmail.com

ABSTRACT

Background: In 2022, the World Health Organization (WHO) reported 2.3 million new breast cancer cases among women. In Central Java, 10.530 cases were recorded in 2019, and in Semarang City, 1.725 cases were reported in community health centers and 3.111 in hospitals. Breast cancer may lead to organ dysfunction and death, highlighting the importance of early detection through Breast Self-Examination (BSE). Low awareness and practice of BSE are primarily due to a lack of knowledge. Health education using cooperative learning methods such as Snowball Throwing and Buzz Group is expected to improve knowledge of BSE.

Methods: The research method used is a true experimental design with a two-group pretest-posttest design. The population consisted of 191 individuals, with 72 respondents selected using stratified random sampling and randomly assigned to two groups via spinner. Each group receives a different educational method.

Results: The Mann-Whitney test results showed a difference in effectiveness between the Snowball Throwing method and Buzz Group (p -value = 0.04). There was an increase in average knowledge scores of 9.75.

Conclusion: There is a difference in the effectiveness of the level of knowledge about BSE in adolescent girls before and after being given health education Snowball Throwing and Buzz Group.

Keyword: BSE (Breast Self-Examination); Snowball Throwing; Buzz Group

^{1,2,3}Department of Midwifery, Poltekkes Kemenkes Semarang, Indonesia
Jl. Tirto Agung, Pedalangan, Banyumanik, Semarang

Received: February 2nd 2026; Revised: February 27th 2026; Accepted: March 30th 2026

Background. Breast cancer is a disease characterized by the uncontrolled growth of abnormal cells in breast tissue, which can lead to the formation of malignant tumors. This disease is caused by several factors, ranging from cells and glandular ducts to the supporting tissue of the breast, excluding the skin. Breast cancer cases increase annually and constitute the second highest cause of death after cervical cancer (Cahyanti et al., 2020).

According to the World Health Organization (WHO), in 2021 an estimated 2.3 million women were diagnosed with breast cancer, leading to approximately 670.000 deaths globally (WHO, 2021). Based on health profile data from Central Java Province in 2021, there were 8,287 breast cancer cases, while in 2022, the number reached 10,530 (Dinas Kesehatan Provinsi Jawa Tengah, 2021). In

2019, 1,725 cases of breast cancer were diagnosed in Semarang City Community Health Centers, while hospital data recorded 3,111 cases of breast cancer in Semarang City (Dinas Kesehatan Semarang, 2019).

Early detection is carried out as an effort to identify potential disorders or abnormalities in the breasts early. Delayed early detection can affect the stage of the disease and the patient's survival rate (Shidqi et al., 2022). One effort to detect breast tumors and cancer is by performing Breast Self-Examination (BSE). BSE is a technique used to recognize the normal condition of the breasts and to identify any changes that may occur. This method is considered the most practical, simple, and cost-effective form of breast examination because it can be done independently without any cost (Sitorus et al., 2021). BSE can be started when adolescent girls reach puberty.

This is done to detect abnormalities and abnormal lumps in the breasts as early as possible so they can be treated quickly and appropriately (Siregar, 2022).

Low awareness of BSE practice is due to a lack of knowledge. One effort that can be made to increase information/knowledge about BSE is through health education. Health education can be carried out using learning methods, including Snowball Throwing and Buzz Groups.

Learning methods are proven to be effective in increasing knowledge. This aligns with research on the effectiveness of increasing knowledge about permanent contraception using the Snowball Throwing method, which found a difference in average knowledge before and after the intervention. Research on the effectiveness of the Buzz Group method in increasing cadre knowledge about warm ginger foot soaks for hypertension patients also found that Buzz Groups significantly influenced respondents' knowledge.

However, previous studies have not compared interactive cooperative learning methods such as Snowball Throwing and Buzz Group in improving adolescent BSE knowledge. This study is the first experimental study comparing these two methods among Indonesian vocational school adolescents.

Methods. This research was conducted in February 2025 at SMKN 3 Semarang. This study was a quasi experimental study with a two-group pretest-posttest design. The population was 10th-grade female students at SMKN 3 Semarang with a sample of 72 students drawn using stratified random sampling with a spinner. The sampling technique in this study was based on each class having a different sample size depending on the number of female students in each class. The results yielded a total of 72 respondents. Samples from each group were randomly drawn using a spinner application. The Snowball Throwing group was selected using names with the numbers (1-36) and the Buzz Group was selected using names with

the numbers (37-72). The Shapiro-Wilk test was used to test the normality of each group.

The results of the normality test showed that in the Snowball Throwing group, the significance value of the pretest ($p = 0.004$) and posttest ($p = 0.001$) were <0.05 , so the data were not normally distributed. In the Buzz Group, the significance value of the pretest ($p = 0.206$) was >0.05 , so it was normally distributed, while the posttest ($p = 0.007$) was <0.05 , so it was not normally distributed, therefore, the analysis was performed using the Wilcoxon test and the Mann-Whitney test.

Primary data were collected using a questionnaire to assess the level of knowledge regarding BSE among female students. This questionnaire contains 15 questions, consisting of 9 favorable questions and 6 unfavorable questions. The scores for favorable questions are: true: 1, false: 0, and the scores for unfavorable questions are: true: 0, false: 1. The knowledge measurement results are obtained from the number of correct scores obtained from the total knowledge answers (1-15).

The instrument was tested for validity by comparing the obtained correlation coefficient (r-count) with the critical r-value in the r-table at a 5% significance level ($\alpha = 0.05$). The instrument items were considered valid if the obtained r-value was greater than the r-table value. In this study, the r-table value was 0.361. The reliability test used Cronbach's Alpha, which is done by comparing Cronbach's Alpha with a constant value (0.6). The results of the knowledge questionnaire reliability test showed a Cronbach's Alpha of 0.793, which is greater than 0.6, indicating that the knowledge questionnaire is reliable.

The study was conducted at SMKN 3 Semarang on February 3, 2025. The Snowball Throwing and Buzz Group health education interventions were implemented alternately on the same day in the school hall. The research team was supported by four enumerators, who were fourth-year students in the Applied Bachelor of Midwifery Program at Poltekkes Kemenkes Semarang and had prior

knowledge of breast self-examination (BSE) content and procedures

Prior to the intervention, participants were provided with a detailed explanation of the study objectives and procedures, after which written informed consent was obtained. Participants then completed a 20-minute pretest to assess baseline knowledge of breast cancer and BSE, followed by a 10-minute break.

Each intervention was conducted in small groups of three to five participants and lasted approximately 60 minutes, including a 30-minute educational session covering breast cancer (definition, risk factors, and symptoms) and BSE (definition, purpose, appropriate timing, procedures, and who should perform BSE). Immediately after the intervention, participants completed a 20-minute posttest to evaluate changes in knowledge.

The researcher has submitted a certificate of research ethics or ethical feasibility to the Ethics Committee of the Semarang Ministry of Health Polytechnic for research validation, number 122/EA/F.XXIII.38/2025, on January 30, 2025.

Result and Discussion

Table 1. Mean BSE Knowledge Scores Before and After Snowball Throwing Health Education Among Adolescent Girls

Knowledge	n	Mean $\pm$ SD	Min-Max
<i>Pre Test</i>	36	10,67 $\pm$ 1.604	5-14
<i>Post Test</i>	36	13,33 $\pm$ 1.069	10-15

The mean BSE knowledge score increased from 10.67 $\pm$ 1.60 to 13.33 $\pm$ 1.07, indicating an average improvement of 2.66 points after the intervention.

Table 2. Mean BSE Knowledge Scores Before and After Buzz Group Health Education Among Adolescent Girls

Knowledge	n	Mean $\pm$ SD	Min-Max
<i>Pre Test</i>	36	9,78 $\pm$ 1.807	6-13
<i>Post Test</i>	36	11,75 $\pm$ 1.228	10-14

Table 2. shows an average increase in knowledge about BSE before and after the Buzz Group health education program, amounting to 1.97. The lowest pretest score was 6, rising to 10 in the posttest. The highest pretest score was 13, rising to 14 in the posttest.

Table 3. Comparison of BSE Knowledge Scores Before and After Snowball Throwing Health Education Using Wilcoxon Test (n=36)

Knowledge	N	Mean $\pm$ SD	Min-Max	p-value
<i>Pre Test</i>	36	10,67 $\pm$ 1.604	5-14	0,000
<i>Post Test</i>	36	13,33 $\pm$ 1.069	10-15	

The Wilcoxon test showed a statistically significant difference in knowledge scores before and after the intervention ($p < 0.001$). Thus, there was an effect on the level of knowledge about BSE before and after being given Snowball Throwing health education in grade X female students of SMKN 3 Semarang. Knowledge is the result of knowing and this occurs after people sense a particular object. Sensing occurs through the five human senses, namely the senses of sight, hearing, smell, taste, and touch. Most human knowledge is obtained from the eyes and ears (Notoatmodjo, 2018).

The effectiveness of the Snowball Throwing method can be explained through several educational theories. From the perspective of active learning, students gain deeper understanding when they actively participate in questioning, discussing, and responding rather than passively receiving information. The method also reflects participatory learning principles, as collaborative interaction enhances motivation and knowledge retention. Furthermore, consistent with constructivist theory, knowledge is constructed through social engagement and shared experiences. Through discussion and clarification of BSE concepts, students collectively reconstruct

understanding, strengthening cognitive processing and long-term retention. Thus, Snowball Throwing is effective because it integrates active engagement, peer interaction, and experiential learning, which are fundamental to meaningful health education.

This study is consistent with the findings of previous research conducted by Marsito & Anandhita (2020) which showed that before being given intervention with the Snowball Throwing method, the respondents knowledge was in the good category, 76.7% experienced an increase in the posttest to 93.0%, the sufficient category was 18.6% experienced a decrease in the posttest to 7.0% and in the less category was 4.7% decreased to 0% in the posttest. The difference in pretest and posttest scores in the Snowball Throwing method group can be determined by the Wilcoxon statistical test. The test results obtained a p value = 0.000 or $p < 0.05$ meaning there was a significant difference in adolescents' knowledge about the dangers of alcohol before and after being given health education with the Snowball Throwing method

According to Mursid et al., (2021), the Snowball Throwing cooperative learning strategy offers several advantages. It creates an enjoyable and engaging learning atmosphere, encourages students to think critically through question construction, and enhances their readiness to respond to various types of questions. The strategy promotes active participation, making the learning process more effective and efficient while simultaneously developing cognitive, affective, and psychomotor domains

However, this method also has certain limitations. Its effectiveness depends largely on students' understanding of the material, as the questions generated may remain limited to previously provided examples. Inadequate explanations within groups may hinder peer understanding and require additional discussion time. Furthermore, the absence of quizzes or rewards may reduce collaborative motivation, and the implementation of this

strategy can be time-consuming. Classroom management challenges may also arise if disruptive behaviors occur during the activity

Through health education, it is hoped that adolescent girls will gain a better understanding of the importance of early detection of breast tumors or cancer and will be able to consciously perform BSE regularly every month. Delays in early detection due to a lack of knowledge about BSE can be minimized through health education. The implementation of innovative and engaging learning methods like Snowball Throwing can serve as a model for other schools in improving the reproductive health of young women.

Table 4. Comparison of BSE Knowledge Scores Before and After Buzz Group Health Education Using Wilcoxon Test (n=36).

Knowledge	n	Mean $\pm$ SD	Min-Max	p-value
<i>Pre Test</i>	36	9,78 $\pm$ 1.807	6-13	0,000
<i>Post Test</i>	36	11,75 $\pm$ 1.228	10-14	

The Wilcoxon test indicated a significant increase in knowledge after the intervention ($p < 0.001$). Therefore, there is an effect on the level of knowledge about BSE among 10th-grade adolescent girls at SMKN 3 Semarang before and after receiving Buzz Group health education.

The Buzz Group method has advantages and benefits, including creating a pleasant atmosphere, encouraging previously withdrawn participants to open up by expressing their opinions after discussions, fostering self-confidence and active interaction (Kamza et al., 2021).

This is in line with research by Septiyono (2024), which showed a Wilcoxon test result with a p-value of 0.001, indicating that ($p=0.001$) $\leq$ ($\alpha=0.05$), indicating that Buzz Group health education influenced pregnant women's knowledge about the COVID-19 pandemic. Health education can change a person's lifestyle into a healthy lifestyle based

on self-awareness, whether from within individuals, groups, or society on a larger scale, to maintain and improve health systematically and periodically (Aji et al., 2023).

By providing appropriate education about BSE as an early detection method for breast cancer, young women will not only receive accurate information but also develop the awareness to perform BSE regularly in their daily lives. Therefore, health education programs in schools, especially for young women, need to be optimized to better understand the importance of reproductive health for women.

Table 5. Comparison of BSE Knowledge Score Improvement Between Snowball Throwing and Buzz Group Methods Using Mann–Whitney Test (n=72)

Group	n	Mean Rank	Sig.
<i>Snowball Throwing</i>	36	41,38	0,04
<i>Buzz Group</i>	36	31,63	

The Mann–Whitney test showed a statistically significant difference between groups ($p = 0.04$), indicating that the Snowball Throwing method resulted in higher knowledge improvement compared to the Buzz Group method.

The results showed a difference in the mean scores of respondents' knowledge about BSE with Snowball Throwing health education and Buzz Group health education at SMKN 3 Semarang. This is because knowledge can be improved through health education through this method, as it can increase student participation in active discussions.

The Mann-Whitney test obtained a significance value of 0.04 ($p < 0.05$), thus concluding that H_a was accepted and H_o was rejected. There is a significant difference in the effectiveness of Snowball Throwing and Buzz Group health education in improving knowledge about BSE among adolescent girls at SMKN 3 Semarang. Furthermore, an

increase in respondents' average knowledge was found after receiving health education through both Snowball Throwing and Buzz Groups. This indicates that both health education programs are effective in providing health education.

Health education using the Snowball Throwing method can train female students to be more responsive to messages in the form of paper snowballs. Each student has the opportunity to develop their thinking skills by creating questions and finding answers. This also trains students' readiness to face various possibilities because they don't know what form their peers will take (Mursid et al., 2021).

Health education using the Buzz Group method allows students to quickly discuss a specific issue by discussing it from different perspectives. Each individual can express their opinion freely. However, the Buzz Group method has the potential to produce weak leaders and groups consisting of people who lack understanding, resulting in a less than satisfactory level of knowledge of Buzz Group health education (Desemyati, 2020).

The results of the study indicate that both Snowball Throwing and Buzz Group health education are effective in increasing knowledge of BSE among 10th-grade female adolescents at SMKN 3 Semarang. However, Snowball Throwing health education is more effective than Buzz Group health education.

Conclusion and Suggestions. There was a significant difference in knowledge levels before and after health education using the Snowball Throwing and Buzz Group (p -value = 0.000). The Snowball Throwing method was more effective in increasing knowledge about BSE than the Buzz Group. Therefore, it is hoped that schools can develop educational programs about BSE using the snowball throwing method so that it can increase the motivation of young women in early detection of breast cancer

Acknowledgements. The author would like to express sincere gratitude to the teachers and students of SMKN 3 Semarang, as well as to the supervising lecturer of the

Midwifery Study Program, Poltekkes Kemenkes Semarang, for their invaluable, support, and contribution to the completion of this research.

References

- Aji, S. P., Nugroho, F. S., & Rahardjo, B. (2023). Promosi dan Pendidikan Kesehatan di Masyarakat (Strategi dan Tahapannya). In *Promosi dan Pendidikan Kesehatan* (1st ed.). PT Global Eksekutif Teknologi.
- Cahyanti, D., Rahmayani, A., & Husniar, S. A. (2020). Analisis performa metode Knn pada Dataset pasien pengidap Kanker Payudara. *Indonesian Journal of Data and Science*, 1(2), 39–43. <https://doi.org/10.33096/ijodas.v1i2.13>
- Desemyati, S. A. (2020). Meningkatkan Hasil Belajar Bahasa Indonesia Materi Teks Eksposisi dalam Media Massa dengan Strategi Buzz Group pada Siswa Kelas VIII SMP Negeri 1 Praya Tahun Pelajaran 2018/2019. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, 4(1), 156–165. <https://doi.org/10.36312/jisip.v4i1.1036>
- Dinas Kesehatan Provinsi Jawa Tengah. (2021). Jawa Tengah Tahun 2021. *Profil Kesehatan Provinsi Jawa Tengah Tahun 2021*, i–123.
- Dinas Kesehatan Semarang. (2019). Profil Kesehatan Kota Semarang tahun 2019. *Dinkes.Semarang.Go.Id*, 1–104. http://www.depkes.go.id/resources/download/profil/PROFIL_KAB_KOTA_2015/3374_Jateng_Kota_Semarang_2015.pdf
- Kamza, M., Ibrahim, H., & Lestari, A. I. (2021). Pengaruh Metode Pembelajaran Diskusi dengan Tipe Buzz Group Terhadap Keaktifan Belajar Siswa pada Mata Pelajaran IPS. *Jurnal Basicedu*, 5(5), 4120–4126. <https://doi.org/10.31004/basicedu.v5i5.1347>
- Kusuma, N. H., & Ernawati. (2022). Hubungan Antara Tingkat Pengetahuan Dan Sikap Wanita Usia Subur (WUS) Dengan Penggunaan Alat Kontrasepsi di Puskesmas Sibela. *Jurnal Kesehatan Tambusai*, 3(3), 420–425. <https://doi.org/10.31004/jkt.v3i3.6559>
- Marsito, M., & Anandhita, J. (2020). Efektifitas Pendidikan Kesehatan Tentang Bahaya Minuman Keras pada Remaja dengan Metode FGD dan Snowball Throwing. *Health Care : Jurnal Kesehatan*, 9(1), 26–33. <https://doi.org/10.36763/healthcare.v9i1.72>
- Mursid, K. B., Suryana, A., & Sugiyanto, A. (2021). Pengaruh Model Pembelajaran Cooperative Tipe Snowball Throwing Terhadap Hasil Belajar Siswa Di Mi Al-Mursyid Citeureup-Bogor. *EduInovasi: Journal of Basic Educational Studies*, 1(1), 54–76. <https://doi.org/10.47467/edui.v1i1.242>
- Notoatmodjo, S. (2018). Metodologi Penelitian Kesehatan. In *Rineka Cipta*.
- Septiyono, E. A. (2024). Pengaruh Pendidikan Kesehatan Terhadap Metode Buzz Group Terhadap Pengetahuan Ibu Hamil Tentang Pandemi COVID-19 Di Jember. *Jambura Nursing Journal*, 6(1), 28–39. <https://doi.org/https://doi.org/10.37311/jnj.v6i1.18344>
- Shidqi, Z. N., Saraswati, L. D., Kusariana, N., Sutiningsih, D., & Udiyono, A. (2022). Faktor-Faktor Keterlambatan Diagnosis Kanker Pada Pasien Kanker Payudara : Systematic Review. *Jurnal Epidemiologi Kesehatan Komunitas*, 7(2), 471–481. <https://doi.org/10.14710/jekk.v7i2.14911>
- Siregar, R. (2022). Faktor-Faktor Yang Mempengaruhi Perilaku Pemeriksaan Payudara Sendiri (Sadari) Pada Remaja Putri Kelas X. *Indonesian Journal for Health Sciences*, 6(1), 35–42. <https://doi.org/10.24269/ijhs.v6i1.4355>
- Sitorus, R. S., Sari, A. P., & Meilyn, P. (2021). Perawatan Paliatif Pemeriksaan Payudara Sendiri (Sadari) Di Desa Paluh Sibaji. *Jurnal Mitra Keperawatan Dan Kebidanan Prima*, 3(2), 61–65.
- WHO. (2021). *Kanker Payudara*. <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>