



Implementing the BBOK package via auricular acupressure and health education to reduce weight and BMI in adolescents with obesity: An evidence-based nursing report

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ABSTRACT

Background: Adolescent obesity is a growing health concern with physical and psychological complications. This Evidence-Based Nursing Practice (EBNP) analyzed the effectiveness of the BBOK (Optimal Body Weight) package, combining auricular acupressure and health education, in reducing body weight (BW) and body mass index (BMI) among adolescents with obesity.

Methods: Using an EBNP approach, auricular acupressure and health education interventions were implemented over six weeks. Nine adolescents aged 13–19 years with obesity from RW 01, 02, and 05, Rawasari Village, Cempaka Putih District Health Center, were selected based on inclusion criteria. Interventions included health education on obesity, nutrition, physical activity, sleep, and stress management, plus auricular acupressure using vaccaria seeds at the hunger point. Evaluations measured BW, BMI, and knowledge, attitudes, and behaviors before and after intervention.

Results: Paired Sample T-Test analysis showed significant reductions in body weight (MD = 0.68; $p = 0.000$) and BMI (MD = 0.25; $p = 0.000$). Significant improvements were also observed in knowledge (MD = 4.78; $p = 0.000$), attitudes (MD = 2.44; $p = 0.026$), and healthy behaviors (MD = 10.67; $p = 0.000$).

Conclusion: The BBOK package was associated with significant improvements in body weight, BMI, and healthy lifestyle behaviors among adolescents with obesity. While these findings suggest potential as a community nursing strategy, the modest magnitude of weight and BMI reduction, small sample size, and absence of a control group warrant cautious interpretation. Further controlled studies are needed to validate these findings.

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1. Background

Adolescents are an age group that is highly vulnerable to nutritional problems because they experience rapid growth and development compared to previous age groups [1]. Growth acceleration affects body composition, physical activity levels, body weight, and bone mass growth [2]. Obesity is a global health problem, and the World Health Organization (WHO) has declared it a global epidemic [1]. Obesity occurs when energy intake significantly exceeds energy expenditure

over a long period, as indicated by an increase in Body Mass Index (BMI). The level of obesity can be calculated using the BMI formula, which also considers age. An increase in BMI may lead obesity to develop into Non-Communicable Diseases (NCDs). The main causes of obesity are not yet fully understood; however, obesity in adolescents tends to be complex and multifactorial, and may trigger chronic and degenerative diseases [3].

Obesity that develops during adolescence tends to continue into adulthood [4]. As previously stated, obesity is one of the risk factors for degenerative diseases such as cardiovascular disease, diabetes mellitus, arthritis, gallbladder disease, several types of cancer, respiratory dysfunction, and various skin disorders. Obesity, also known as excessive body fat accumulation, occurs when the amount of fat stored in the body exceeds the body's requirements. Obesity results from excessive fat accumulation due to an imbalance between energy intake and energy expenditure, thereby increasing health risks [5].

Recent projections from the World Obesity Federation (WOF) estimate that by 2030, around one billion people worldwide will be living with obesity, including one in five women and one in seven men. In South and Southeast Asia, obesity prevalence is predicted to double between 2010 and 2030 [6]. Data from the Indonesian Basic Health Research Survey (Riskesdas) collected in 2013 and 2018 showed an increase in overweight and obesity prevalence. The overall prevalence of overweight and obesity among children and adolescents in Indonesia is approximately 11.5% [7].

The Riskesdas survey reported that obesity among adolescents aged 13–15 years increased from 10% in 2013 to 16% in 2018. A similar pattern occurred in older age groups. Among individuals aged 16–18 years, the national survey reported that the prevalence of overweight and obesity increased from 7.3% in 2013 to 13.5% in 2018 [2]. Indonesia ranks second after Singapore in the number of obese adolescents, with a prevalence of 12.2%, followed by Thailand at 8%, Malaysia at 6%, and Vietnam at 4.6% [8].

Based on BMI measurement results in West Java in 2019, out of 3,297,304 people, 291,067 individuals (8.83%) were identified as obese. Among 26 regencies/cities reporting, the highest obesity rate was found in Bandung Regency, where all 266 examined individuals (100%) were identified as obese. In Kuningan Regency, 27.7% of residents aged 16 years experienced overweight and obesity [9]. Jakarta is one of the cities with the highest obesity prevalence in Indonesia [9], although specific obesity data in Jakarta have not yet been clearly identified.

The Indonesian government established "The Indonesian National Movement to Reduce Obesity (Gerakan Nusantara Tekan Angka Obesitas [GENTAS])" program through the Ministry of Health of the Republic of Indonesia in 2017 [10].

This initiative was marked by the publication of the general GENTAS guidelines in the same year. However, findings in the field indicate that the effectiveness of this program in addressing obesity still requires improvement in various aspects. Information obtained regarding the GENTAS program remains incomplete. Interviews with the district health office revealed that obesity cases fall under the Prevention and Control of Diseases (P2P) program and are only integrated with the nutrition division without any specific obesity-focused program. Interviews with the Adolescent-Friendly Health Services (PKPR) staff at the Cempaka Putih District Health Center showed that obesity management is currently limited to school-based screening and providing education regarding BMI results and recommended or restricted foods.

Obesity among adolescents may occur due to various factors, both genetic and environmental. One contributing factor is genetics. Scientists have long observed that obese children generally come from families with obese parents. If one parent is obese, 40–50% of their children are at risk of obesity, while if both parents are obese, 80% of their children are at risk [5],[6]. Research findings also revealed a relationship between parental obesity and obesity incidence among adolescents [11].

Interviews conducted by the resident researcher in November 2024 with parents and adolescents revealed that many adolescents skipped breakfast due to nausea or being rushed to school. Several adolescents stated that they preferred buying snacks at school and only ate heavy meals in the afternoon after school or at night. Although rice meals were available at school, adolescents rarely purchased them and instead preferred foods such as meatballs, spicy snacks (seblak), and packaged snacks. When asked about physical activity, almost all adolescents stated that they only engaged in physical activity during school sports classes, while outside school they mostly spent their time using smartphones to watch movies or access social media. Parents also played an important role in adolescent obesity. Interviews with parents revealed that many did not closely monitor their children's diet, rarely cooked at home, and relied more on ready-made food or meals from local food stalls (warteg). Furthermore, many parents still perceived obesity as a condition that did not require immediate intervention.

Based on these findings, the resident, as a prospective community nursing specialist nurse, has a role in helping address one of the non-

communicable diseases, namely adolescent obesity, by reducing BMI and body weight through acupressure methods and healthy lifestyle education. Acupressure is a form of physiotherapy involving massage and stimulation at specific points on the body. Auricular acupressure therapy is a technique that involves attaching organic seeds such as Vaccaria seeds or magnetic pellets to acupuncture points on the outer ear. These seeds or pellets are gently pressed until sensations such as warmth, mild pain, or tingling are felt. This technique aims to stimulate acupuncture points and restore the balance of body energy (qi). The healing touch involved in acupressure reflects caring behavior that can strengthen the therapeutic relationship between nurses and clients. The tragus, a small protruding part in front of the ear canal, functions in appetite control and addiction management, as well as reducing anxiety and stress, and regulating nasal and sinus pathways [12].

Another supportive innovation for reducing BMI and body weight in obesity management is providing modern and engaging education for adolescents. The success of health education interventions also depends on how messages are delivered so that the information can effectively influence adolescent behavior, with education serving as an important method for information delivery [13]. The education provided includes healthy eating patterns, sleep patterns, and stress management using pocketbooks and social media platforms such as Instagram. It is expected that visual and digital-based educational approaches will be more attractive and easier for adolescents to remember.

2. Methods

2.1 Research design

This study used an Evidence-Based Nursing Practice (EBNP) approach with a pre-post intervention design. The intervention consisted of auricular acupressure and health education aimed at reducing body weight and Body Mass Index (BMI) in adolescents with obesity.

2.2 Setting and sample

The study was conducted in RW 01, 02, and 05 of Rawasari Village, within the working area of the Cempaka Putih District Health Center, Jakarta. The participants were 9 adolescents aged 13–19 years with obesity ($\text{BMI} \geq 25 \text{ kg/m}^2$), selected based on inclusion and exclusion criteria.

2.3 Instruments and data collection

Data were collected using questionnaires, body weight scales, height measurements, and BMI calculations. The intervention was carried out for six weeks through auricular acupressure using vaccaria seeds at the hunger point and weekly health education sessions on healthy diet, physical activity, sleep patterns, and stress management. Measurements were conducted before and after the intervention.

2.4 Data analysis

Data were analysed using Statistical Product and Service Solutions (SPSS). Univariate analysis was presented using frequencies, percentages, means, and standard deviations. Bivariate analysis used the Paired Sample T-Test with a significance level of $p < 0.05$ to evaluate the effectiveness of the intervention.

2.5 Research ethics

This EBNP implementation obtained permission from local authorities and community leaders. All participants and their parents provided informed consent before participating. Confidentiality and privacy of respondents were maintained throughout the study.

3. Results

The implementation of this Evidence-Based Nursing Practice (EBNP) was conducted in RW 01, 02, and 05 of Rawasari Village from May 18 to June 28, 2025, over a six-week period. The program received approval from community leaders and adolescent health cadres. Initial activities included socialization of the intervention involving local stakeholders, health center representatives, and target participants.

The intervention was supported by trained cadres who assisted with auricular acupressure at the hunger point, health education, questionnaire distribution, leaflet dissemination, and replacement of vaccaria seed plasters. A total of nine obese adolescents who met the inclusion criteria participated in the study. Health education sessions were conducted weekly, while auricular acupressure was performed before meals and the plaster was replaced every three days at the RPTRA center.

Participants were monitored through video submissions before meals to ensure adherence to the intervention. Evaluation was conducted daily and at the end of the sixth week through post-tests and repeated measurements of body weight and Body Mass Index (BMI).

Table 1. Frequency Distribution of Respondents' Characteristics

Variable	N (%) / Mean (SD)	Description
Gender		
Male	3 (33.3%)	
Female	6 (66.7%)	
Age	9 (100%) / 16.00 (2.12)	Age range: 13–19 years
Body Weight	9 (100%) / 92.83 (17.47)	Weight range: 73–128 kg
Body Mass Index (BMI)	9 (100%) / 36.18 (5.39)	BMI range: 30–45
25.0–29.9 (Overweight)	3 (33.3%)	
30.0–34.9 (Obesity Class I)	4 (44.4%)	
35.0–39.9 (Obesity Class II)	2 (22.2%)	
>40.0 (Obesity Class III)	0 (0%)	

Data analysis based on respondents' characteristics showed that most respondents were female, with 6 respondents (66.7%). The mean age

of respondents was 16.00 years. The mean body weight was 92.83 kg, while the mean Body Mass Index (BMI) was 36.18 kg/m².

Table 2. Bivariate Analysis Results (Paired T-Test)

Variables	Pre-test Mean	SD	Post-test Mean	SD	MD	t	p-value	95% CI
Knowledge	6.44	1.20	11.22	1.72	4.78	11.926	0.000	3.85 – 5.70
Attitude	37.44	2.70	35.00	4.90	2.44	2.718	0.026	0.37 – 4.52
Behavior	26.67	2.18	16.00	1.32	10.67	14.683	0.000	8.99 – 12.34
Body Weight	92.83	0.28	92.15	17.63	0.68	7.455	0.000	0.47 – 0.89
Body Mass Index	36.26	0.11	36.00	5.37	0.26	6.782	0.000	0.17 – 0.34

Based on the results of the Paired T-Test analysis, there were significant differences in knowledge scores before and after the intervention ($p = 0.000 < 0.05$), indicating an improvement in participants' knowledge following the educational sessions. Attitude also showed a significant difference ($p = 0.026 < 0.05$), although there was a slight decrease in the mean score, which may be influenced by changes in perception or a more

realistic understanding after participating in the intervention. In addition, there was a significant decrease in behaviour scores ($p = 0.000$), indicating improvements in eating patterns and physical activity consistent with the program objectives. Body weight and Body Mass Index (BMI) also showed significant reductions ($p = 0.000$). Although the differences were relatively small, the results were consistent.

4. Discussion

The implementation of this Evidence-Based Nursing Practice (EBNP) aimed to assess the feasibility and preliminary effectiveness of auricular acupressure combined with health education among adolescents with obesity as a complementary curative and rehabilitative nursing intervention. Overall, the intervention showed promising preliminary results in supporting appetite control and promoting healthier lifestyle behaviours among participants. These findings are consistent with recent evidence suggesting that auricular stimulation may contribute to weight management when combined with lifestyle

modification, although the magnitude of its effects may vary across populations [14].

The increasing prevalence of obesity among adolescents has been associated with unhealthy dietary patterns, frequent fast-food consumption, sedentary lifestyles, inadequate sleep duration, and genetic susceptibility [15]. Therefore, adolescents require comprehensive interventions that integrate nutrition education with complementary therapies such as auricular acupressure to encourage healthier food choices and improve appetite regulation. Previous studies have suggested that auricular acupressure may support weight reduction by influencing appetite-related

mechanisms, although it should be considered as an adjunct rather than a replacement for lifestyle interventions [3].

The implementation process required a gradual, participant-centered approach because many adolescents were initially reluctant to participate in community health activities. After one week of trust-building and orientation, selected participants agreed to participate in intervention activities conducted at the RPTRA center in RW 01. This experience highlights the importance of establishing rapport and participant engagement before implementing health promotion programs, particularly among adolescents.

The intervention was supported by two trained adolescent health cadres after one cadre withdrew because of academic commitments. Auricular acupressure was administered using vaccaria seed plasters placed on predetermined auricular points, allowing participants to perform self-acupressure before meals while being monitored through a WhatsApp group by submitting short videos. Plasters were replaced every three days to maintain stimulation. Following two weeks of implementation, many participants reported better appetite awareness and reduced cravings for unhealthy foods. These observations are consistent with previous randomized trials and systematic reviews reporting that auricular acupressure may contribute to appetite regulation and modest weight reduction among overweight and obese adolescents [8].

Family support emerged as an important contextual factor during the intervention. Several participants reported difficulty maintaining healthy eating patterns because family members continued to provide energy-dense foods or were unable to prepare healthier meals. This finding suggests that family involvement may be associated with adherence to healthy lifestyle behaviours and weight management among adolescents. Similar observations have been reported in previous studies emphasizing the importance of family support and environmental influences in adolescent obesity management [16].

Health education delivered through leaflets and interactive discussions appeared to support improvements in participants' knowledge, attitudes, and self-reported healthy behaviors related to obesity prevention, including healthy eating habits, regular physical activity, adequate sleep, and stress management. Previous studies have demonstrated that nutrition education and

school-based health promotion programs are associated with improved dietary behaviors and healthier weight management among adolescents [17]. Likewise, national obesity prevention guidelines recommend combining behavioral education with environmental support to achieve sustainable lifestyle changes [18].

During the six-week intervention period, participants experienced an average weight reduction of approximately 0.68 kg. Although this reduction was relatively modest, it suggests that the intervention may have potential benefits when implemented consistently over a longer period alongside sustained healthy lifestyle practices. Similar findings have been reported in previous studies indicating that auricular acupressure combined with lifestyle modification may contribute to gradual weight reduction in adolescents [19].

Several strengths of this EBNP implementation were identified, including its low cost, ease of application, minimal reported adverse effects, active involvement of adolescents, and successful empowerment of adolescent health cadres. Nevertheless, several limitations should be acknowledged, including variations in participant adherence, limited family support, academic pressures, social influences, and differences in participants' confidence and engagement during educational activities. Therefore, the findings should be interpreted as preliminary evidence. Future studies using larger samples, longer follow-up periods, and randomized controlled designs are needed to better evaluate the effectiveness of combining auricular acupressure with health education for obesity management among adolescents.

5. Conclusion

Based on the results of the six-week intervention combining complementary auricular acupressure at the hunger point with nutrition and healthy lifestyle education, the intervention showed promising preliminary results in supporting improvements in knowledge, attitudes, and behaviors among adolescents with obesity regarding healthy dietary practices and lifestyle management. Collaboration with adolescent health cadres and support from the local community also appeared to facilitate the implementation of the intervention. These findings suggest that this combined approach may have potential for use in community-based obesity prevention and

management programs. However, further studies involving larger sample sizes, longer follow-up periods, and controlled study designs are needed to confirm these findings and establish the effectiveness of the intervention.

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