Effect of School-Based Interventions in the Prevention of Child and Adolescent Obesity to Behavioral Health, Physical Activity, and Body Mass Index: A Systematic Review

School-Based Interventions in the Prevention of Child and Adolescent Obesity

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Keywords: intervention, prevention, child, teen, obesity, based school.

Abstract: Background: Prevalence of obesity in Indonesia in children aged 5-12 years by 18.8%, 13-15 years of 10.8%, and 16-18 years of 7.3%. School based Intervention is one of the interventions that have been widely used to prevent obesity in children and adolescents. This study identifies the effectiveness of school-based intervention programs on physical activity, body mass index, and health behavior. Methods: Search articles through database: Scopus, Proquest, ScienceDirect, and PubMed. The year limit used is 5 years (year 2013 - 2017). Results: There are fifteen selected journal articles from 11,723 journal articles found. Conclusions: This systematic review generally recommends school-based interventions with multi-component that are classroom curricula, school environment support, family involvement, fun programs (playing computer, jogging) and regular health education to prevent obesity in children and adolescents that involve multiple parties. However, it should be done more and more research by using RCT with good preparation and cooperation with all elements in the implementation and implementation of the program.

1 BACKGROUND

Obesity in children can cause several chronic diseases including glucose metabolism, insulin resistance, type 2 diabetes in adolescents, hypertension, dyslipidemia, hepatic steatosis, gastrointestinal disorders, and sleep-disordered breathing obstruction. More specifically, obesity in adolescents in the Asia Pacific region is associated with type 2 diabetes at younger ages (Ministry of Health RI 2013).

In 2013 the prevalence of obesity in Indonesia in children aged 5-12 years by 18.8%, 13-15 years of 10.8%, and 16-18 years of 7.3% (Agency for Health Research and Development 2013).

Indonesia, like other developing countries, has started to face multiple nutritional burdens since the last few years. The problem of malnutrition is still a health problem while obesity and obesity problems show an equally high prevalence even higher than the prevalence of malnutrition. The explosion of obesity in some areas in Indonesia will bring new problems that have serious consequences for the development of the Indonesian nation, especially in the field of health. To reduce deaths due to diseases of metabolic and circulatory disorders in the future, in addition to overcoming the disease also by eliminating the incidence of obesity as the main cause. Some of the efforts that have been made are mass counseling or individual counseling, treatment through counseling, and referring to obese children accompanied by comorbidities. The difficulty in developing a program is to maintain the sustainability of the program (Hastoety et al., 2017).

Various interventions have been undertaken to prevent obesity in children and adolescents, one of the interventions being school-based intervention or obesity prevention interventions implemented in school environments and integrated with school learning programs. School based Intervention is considered as an effective way to prevent obesity by increasing student physical activity, reducing body mass index, and improving health behavior.
The research was conducted in Surabaya from September to December 2017. This research is a policy research using quantitative approach with systematic review method. The objective of the study was to produce a systematic combination of prior research in order to reach agreement.

In systematic review method can not be separated from the search of articles according to the topic studied. Search articles / references are searched via the internet from major databases such as Scopus, Proquest, Sciedirect, and PubMed, by including keyword intervention, prevention, child, teen, obesity, based school. The year limit used is 5 years (year 2013-2017).

After getting a number of articles, then checked to see the existence of the same article / double. If found the same article, then do the disposal so that there is only one article whose title and content are the same.

The next stage of the feasibility study of the article whether in accordance with the inclusion criteria that we set or not. If it does not meet the specified inclusion / eligibility criteria, the article is excluded or not included in the next analysis. In the inclusion and exclusion criteria referred to consider the population, interventions, outcomes, place of intervention, design, and year of publication. Detail details of the description of inclusion and exclusion criteria can be seen in Table 1.

After the selection phase based on the inclusion and exclusion criteria, the next process looks at the similarity of the intervention. In the case of this study, it appears that interventions that provide the same picture are school-based interventions

### RESULTS

Based on the search results in accordance with the keywords and inclusion and exclusion criteria then finally got the number of references as shown in Table 2. Description of number and source of reference can be seen in Table 2. In the table shows that there are 4 sources of reference the most number of references obtained from Proquest of 16 journals and the least of Science Direct sources. Overall, the articles obtained in accordance with the objectives of 47 articles after the year dilimitasi and the field of nursing science and has been through the process of selecting the title.

### Table 1: Inclusion and Exclusion Criteria.

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria</th>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>School-age children are 6-14 years old</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>School-based interventions related to physical activity, dietary modification, either combined, alone, or part of a learning intervention program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Result</td>
<td>Physical activity, health behavior, body mass index (prevalence of obesity)</td>
<td>Obesity prevalence using indicator Weight/age, Height/age etc.</td>
</tr>
<tr>
<td></td>
<td>Place of Intervention</td>
<td>School</td>
<td>No intervention at school</td>
</tr>
<tr>
<td></td>
<td>Study Design</td>
<td>any experimental research design with RCT or non-RCT</td>
<td>Cross sectional and case control</td>
</tr>
<tr>
<td></td>
<td>Publication Issues</td>
<td>2013 to 2017</td>
<td>Publication before 2013</td>
</tr>
</tbody>
</table>

### 2 METHODS

The research was conducted in Surabaya from September to December 2017. This research is a policy research using quantitative approach with systematic review method. The objective of the study was to produce a systematic combination of prior research in order to reach agreement.

In systematic review method can not be separated from the search of articles according to the
The next process of 47 existing articles, traced the existence of duplicate articles, and found as many as 6 articles, so the article after issued a duplicate there are 41 articles. Then from 41 remaining articles traced again and there are 2 articles including systematic review and/or metaanalysis articles, and excluded from the analysis and live 39 articles. The next process sees the same intervention, in this case school-based intervention and meets the inclusion criteria so as to find as many as 15 articles, and fifteen of these articles are finally included in the systematic review. For more details see Figure 1.

4 DISCUSSION

The fifteen journals that have been collected, reviewed and scored obtained the following results.

Fourteen studies were using randomized control trial, and one study used quasy experiment.

Three of the four RCT journals have an effect on health behavior, namely the intervention of The Dutch Obesity Intervention in Teenagers (DOiT), Active for Life Year 5 (AFLY5) and the Healthy School Start Study II.

The DOI intervention was conducted by focusing on five EBRBs: (1) reducing intake of SCB (sugar containing beverage); (2) reduce the intake of high-energy foods/candy; (3) reduce screen time; (4) increase the level of physical activity and (5) consume daily breakfast. The DOiT implementation consists of 12 theoretical lessons and four physical education lessons that are divided into two years of learning. It also involves parents to increase social support and on raising parental awareness about the availability and accessibility of healthy products and activities in the home environment. The results of the implementation show that this intervention is effective in reducing the consumption of sugar-containing beverages in girls and in boys, there is a significant positive effect of intervention on breakfast frequency (van Nassau et al., 2014).

In the Active for Life Year 5 (AFLY5) interventions school-based interventions are conducted by providing teacher training, implementing lesson plans that provide interactive homework between children and parents. The goal of AFLY5 is to improve children's self-efficacy and knowledge, followed by motivating parents, to increase levels of physical activity, reduce sedentary behavior, and increase fruit and vegetable consumption. The results showed no significant effects on physical activity, but there were changes in health behaviors such as decreased sedentary behavior, and increased consumption of fruits and vegetables in primary school children (Kipping et al., 2014).

In the intervention of the Healthy School Start Study II is done by providing health information to parents through brochures in which there are facts and suggestions for parents, motivational interviewing with the target of The Parental Self-Efficacy, and teaching activities in the classroom.
with children using teacher guides and books assignment, the child is given an assignment to be discussed and equipped with the parent. After that the results obtained will be discussed again in the class. The results showed that behavior change was a significant decrease of unhealthy food consumption in the intervention group (Nyberg et al., 2016).

In addition to the effect on health behavior change there are two studies that affect the physical activity with the intervention of the HEalth in Adolescents (HEIA). The implementation in southeastern Norway is done in several areas, namely in class (giving lessons through booklets, posters in class, rest time to eat fruit and vegetables and physical activity, providing sports equipment, doing joint activity campaigns, pedometers, and individual tailored computers advice), at home (providing fact sheets, information sheets, and brochures), in the school environment (holding king off meetings at each school, inspirational courses from sports teachers, resource box for school management, and committee meetings, and involving the role of NGO’s) This study shows the effect of intervention on overall physical activity at the p = 0.05 level, the effect seems to be more profound among women (p = 0.03) and in addition, the intervention affecting physical activity between the normal weight group is more positive than between overweight, and participants with parents who have 13-16 years of more positive education if rather than participants with either a lower parent or a higher number of years of education. Interventions seem to be successful in reducing the sedentary activity on the meeting but not among boys (Grydeland et al., 2013). The results of HEIA implementation in Australia also showed an effect of intervention on overall physical activity at p = 0.05 with a net effect of 50 cpm increase from baseline post intervention supporting intervention group (95% CI 0.4, 100).

Subgroup analyzes show that the effect appears to have more impact on female respondents (Hollis et al., 2016).

Three studies have shown that it has no impact on physical activity but has an effect on changes in activity. Improved skills in physical activity after receiving Active Teen Leaders Avoiding Screen-time (ATLAS) intervention (Lubans et al., 2016). There was a change in the number of footsteps after receiving the intervention of 18-month school obesity prevention intervention on the health behaviors (Safdie et al., 2013). In an adapted efficacious school-based intervention proved ineffective in increasing overall child activity every minute from moderate to strong, when adapted for implementation on a scale. However, interventions improve physical activity every minute of strong and physical school activity from moderate to strong, quality learning and school physical activity practices are also increasing (Sutherland et al., 2017).

There is one RCT study that influences the body mass index of CLICK interventions with Multi-component interventions that are classroom curricula, school environment support, family involvement and fun programs (playing computer, jogging) and regular health education. Overall, 1108 (93.7%) of the 1182 enrolled students completed the intervention study until the end. The intervention group experienced a greater decrease than the overall control group with a 0.5-kg/m² reduction in BMI (Xu et al 2015). There is one more quasy experiment study that influences the body mass index of water jet intervention. The results showed that there was a significant effect of water jet on the BMI standard, a decrease of 12.3 (95% CI, -19.371 to -5.204) (Rev 2015).

In two studies of the fifteen journals there was an effect of intervention on the decrease in obesity, ie. the intervention of a family-individual-school-based comprehensive intervention model and Project Energize. In a family-individual-school-based comprehensive intervention model, the overall prevalence of overweight / obesity decreased from 28.92% in 2011 to 24.77% in 2014, with a difference of 4.15% in the intervention group compared with a 0.03% decline (from 30.71% to 30.68%) in the control group (Cao et al., 2015). In the long-term Project Energize with a local school-based program it was found that its implementation was associated with decreased prevalence of obesity and secular obesity (Rush et al., 2014).

Three other studies of fifteen showed no good effects on physical activity, health behavior or body mass index, the Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) intervention (Dewar et al., 2013), Healthy Buddies (Santos et al. 2014), and the Let’s Go! 5-2-1-0 pediatric obesity intervention program (Lynch et al., 2016).

5 CONCLUSIONS

School-based intervention has been implemented in several countries around the world, with the aim of
preventing obesity in children and adolescents. Some of these studies show that interventions have a positive and effective impact on body mass index, health behavior and physical attributes, but in practice there are still many shortcomings. In the future, it is expected that more similar research will be conducted, with longer implementation and follow-up time. If such intervention is successfully implemented then it is expected that the level of health in children also increases it is also useful to prevent the occurrence of metabolic diseases in the future.

REFERENCES


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Xu, F. et al., 2015. Effectiveness of a randomized controlled lifestyle intervention to prevent obesity...