The Utilization of Process Evaluations in Childhood Obesity Intervention Research: A Review of Reviews

Paul Branscum* and Logan Hayes

Department of Health and Exercise Science, The University of Oklahoma, 1401 Asp Avenue, Norman, Oklahoma, 73019, USA

Abstract: Process evaluations are an essential component to evaluating health promotion programs, however they are consistently under-utilized and oftentimes not reported upon in the literature. This study reports the use of process evaluations in childhood obesity prevention interventions implemented over the past three decades. Seven meta-analyses and systematic reviews were located for this *review or reviews*, and from these, 119 unique references were identified. Each article was retrieved and read for appropriateness, and 20 were excluded for a variety of reasons (ex. not published in English language), resulting in 99 articles included for this study. Overall, process evaluations were not well reported upon. Only 38 studies reported the fidelity of program implementation, 25 studies tracked participant attendance, 29 studied evaluated participant satisfaction, and 49 studies reported how staff members were trained. Additionally, one-third of the studies did not report using a single type of process evaluation, and only 5 studies reported using all four types. Results from this study suggest that the use of process evaluations has been low in this area of research, which may explain why many obesity prevention studies have reported mixed or modest results. Suggestions for implementing simple, yet effective process evaluations in future studies will be presented.

Keywords: Process Evaluation, Childhood obesity.

INTRODUCTION

Obesity is a major public health concern, which threatens the health of our current generation and those to follow. Medical consequences of obesity have been well documented, and include premature mortality and greater risk of type-2 diabetes, cardiovascular disease, sleep apnea, asthma, non-alcoholic fatty liver disease, and many forms of cancers [1]. Psychological consequences have also been found and include bias, discrimination, social marginalization, low self-esteem, and depression [2, 3]. In response to this epidemic, a growing body of research has amassed pertaining to issues surrounding causative factors related to obesity including those at the genetic, behavioral and environmental levels, effective treatments of obesity, including behavior change therapy, drug therapy, and weight loss surgeries such as gastric banding or bypass, and the prevention of obesity, including health promotion and health education interventions.

With regards to the prevention of obesity, many literature reviews have been written in previous years, including systematic reviews and meta-analyses, and suggest that school-based and community based health promotion interventions have experienced varying degrees of success. For example, in one meta-analysis, researchers analyzed 19 school-based interventions published from 1995 to 2007 and found that programs were overall significantly effective in reducing the prevalence of obesity, but treatment interventions were not effective when compared to a comparison or control intervention [4]. Additionally, one meta-analysis on obesity prevention programs delivered in the school environment found that when compared to control groups, treatment interventions had a significant, but small overall effect on BMI ($r=0.05$; $p<0.001$) [5], however in another meta-analysis, researchers reported that school-based obesity interventions had no impact on BMI [6].

While much research has focused on the efficacy and effectiveness of obesity prevention interventions, and there ability to modify important impact and outcome measures, such as BMI-percentile, obesogenic behaviors, behavioral antecedents, and overall quality of life, less has focused on process evaluations. It is commonly understood that process evaluations are important in health promotion research, as it appears in many, if not all, major community planning models. For example, conducting a process evaluation is Step 6 of the PRECEDE-PROCEED model [7], part of Step 6 of the Intervention Mapping model [8], and is included in the Multilevel Approach to Community Health Model (MATCH) and the Planned Approach to Community Health (PATCH) [9, 10]. The term *process evaluation* refers to measuring the extent to which an intervention is delivered according to how it was planned or conceptualized. As such, the goal of process evaluation is to carefully document how much and how well an intervention was delivered to its

*Address correspondence to this author at the Department of Health and Exercise Science, The University of Oklahoma, 1401 Asp Avenue, Norman, Oklahoma 73019, USA; Tel: (405) 325-9028; Fax: (405) 325-0594;
E-mail: pbranscum@ou.edu

E-ISSN: 1929-4247/13

intended audience. While there is no fully agreed upon set of criteria that defines a *complete* or *proper* process evaluation, many have proposed essential targets that are crucial for process evaluations, including program fidelity, attendance, and audience satisfaction. Given the lack of attention process evaluations have received in popular literature reviews, and potential that process evaluations have in interpreting the results of intervention studies, the purpose of this study was to serve as a 'review or reviews' in order to determine the extent to which process evaluations have been reported upon in the previous 30 years, and discuss the implications underreporting process evaluations may have in our understanding of how effective obesity prevention programs have been.

METHODS

Given the large amount of intervention studies that have been published in area of child obesity prevention in past decades, a number of popular meta-analyses and systematic reviews were located using the data-bases Academic Search Complete, CINAHL, ERIC, PUBMED, and SPORTDiscus. Overall, seven review articles were located, of which included a total of 119 unique citations [4-6, 11-14]. Each article was located and reviewed for appropriateness. Inclusion criteria included: the primary purpose of the article was program evaluation, articles were full text and not abstracts published as conference proceedings, must be published in the English language, must be peer reviewed, and must include elements of health promotion. Upon further examination 20 studies were eliminated for a variety of reasons (Figure **1**). Seven studies were not intervention studies, or had some other purpose than program evaluation [15-21], four studies were abstracts or commentaries on other articles [22-25], three studies were written descriptions of the program, but did not present any results [26-28], three studies were published in languages other than English [29-31], one was an exercise training study [32], one was not a peer-reviewed article [33], and one did not include a health education component [34]. The process for our article selection can be found on Figure **1**.

The remaining 99 articles were independently reviewed by both investigators of this article, in an effort to find evidence that process evaluations were conducted and/or reported upon. To accomplish this review, both investigators thoroughly read each article and independently evaluated the presence or absence

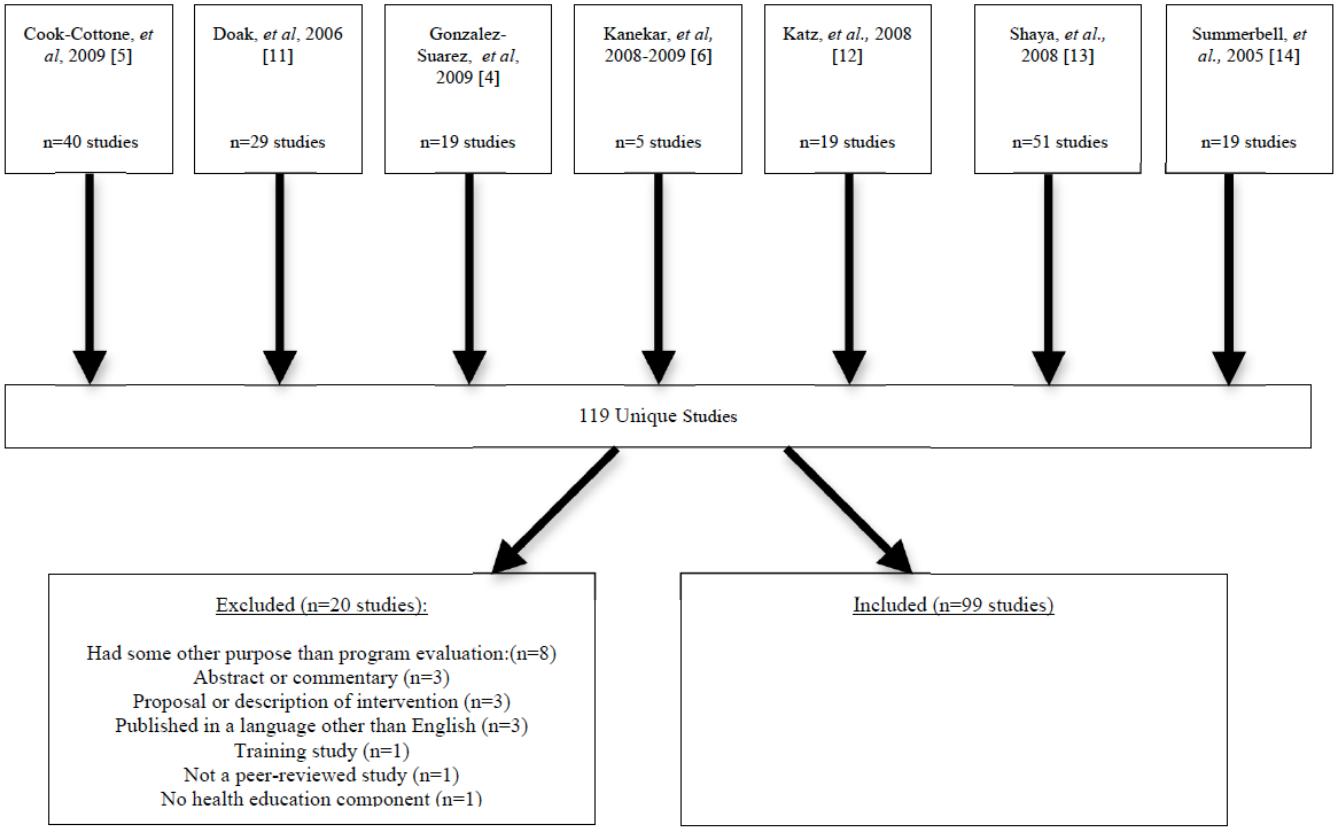

Figure 1: Process of Program Article Selection.

of each type of process evaluation. In order to assist both investigators in the review, key types of process evaluations were operationalized and coded categorically to indicate the presence or absence of each type of process evaluation. *Implementation Fidelity* was operationalized as any evaluation that took place in order to monitor program activities to assure the program was implemented as planned. Research methods could include self-report, direct observation, video surveillance, or any mix of the three types. *Attendance* was operationalized as an evaluation to track attendance of program participants. Attendance could occur once during the program, every session of the program, or on an infrequent basis. *Training* was operationalized as any description of how program facilitators were trained to adequately implement the intervention. Training could occur once before the start of the program, periodically during the implementation of the program, or on an infrequent basis. *Satisfaction* was operationalized as any evaluation that collected information about the satisfaction of the primary or secondary audience of the intervention. For example, the audience could have been the children receiving the program (primary audience), or the parents or teachers of the children in the program (secondary audience). Both qualitative (ex. focus groups) and quantitative (ex. surveys) designs were considered appropriate for this criteria, however if the author made an anecdotal statement in the article, or stated that participants enjoyed the program without describing how they collected data to support the claim, then it was not counted. Finally, *Context* was operationalized as any description of how environmental or outside factors could influence the impact or outcome evaluation implemented in the study. Upon reading and rating each article, both investigators compared findings, and settled any discrepancies between evaluations by re-reading the article together.

In addition to reporting the presence or absence of each type of process evaluation it was hypothesized that the average date of publication and the current impact factor of the journal the article was published, may differ between the studies reporting each type of process evaluation. Therefore, an independent t-test was used to compare both variables between groups.

RESULTS

Overall, 99 studies were reviewed for this study. Table **1** shows each study with what type of process evaluation was reported. According to observations, 38 studies (38%) reported program fidelity, 25 studies (25%) reported taking attendance, 49 studies (49.5%) reported some details about training program facilitators, and 29 studies (29%) studies reported the satisfaction of the primary or secondary audience (Table **2**). Additionally, 33 studies (33.3%) reported using no type of process evaluation, 25 studies (25.3%) reported using one type process evaluation, 21 studies (21.4%) reported using at least two types of process evaluations, 15 studies (15.2%) reported using at least three types of process evaluations, and 5 studies (5.1%) reported using all four types of process evaluations. Not included on Table **2** were results on context, as only 6 studies reported using this type of process evaluation [35-40].

Table 1: Process Evaluation Summary for Childhood Obesity Prevention Articles

Study	A	F	S	T	Study	A	F	S	T	Study	A	F	S	T
[41] Amaro, *et al*., 2006					[72] Graf, *et al*., 2005					[102] Paradis, *et al*., 2005	✓	✓	✓	✓
[42] Alexandrov, *et al*., 1992				✓	[73] Grey, *et al*. 2004					[103] Perman, *et al*., 2008				
[35] Baranowski, *et al*., 2003	✓			✓	[74] Haerens, *et al*., 2006				✓	[104] Resnicow, *et al*., 1993			✓	✓
[36] Bayne-Smith, *et al*., 2004	✓			✓	[75] Harrell, *et al*., 2005					[105] Robinson, 1999				✓
[43] Beech, *et al*., 2003	✓		✓	✓	[76] Harrell, *et al*., 1998					[106] Robinson, *et al*., 2003	✓		✓	✓
[44] Bonhauser, *et al*., 2005	✓	✓			[77] Harrell, *et al*., 1996				✓	[107] Sadowsky, *et al*., 1999	✓			
[45] Burke, *et al*., 1998		✓			[78] Hopper, *et al*., 1992					[108] Sahota, *et al*., 2001		✓	✓	✓
[46] Burke, *et al*., 1996					[79] Huang, *et al*., 2007					[109] Sahota, *et al*., 2001				✓

(Table 2). Continued.

Study	A	F	S	T	Study	A	F	S	T	Study	A	F	S	T
[47] Bush, *et al*., 1989		✓	✓	✓	[80] Harvey-Berino, *et al*., 2003				✓	[110] Sallis, *et al*., 1993		✓		✓
[48] Caballero, *et al*. 2003	✓	✓	✓	✓	[81] Hawley, *et al*., 2006					[111] Sallis, *et al*., 1997		✓		✓
[49] Carrel, *et al*., 2005	✓				[37] James, *et al*., 2004					[112] Salmon, *et al*., 2008	✓	✓	✓	
[50] Chavarro, *et al*., 2005					[82] James, *et al*., 2007					[113] Simon, *et al*., 2006	✓	✓		✓
[51] Chen, *et al*., 2001				✓	[83] Jamner, *et al*., 2004					[114] Simonetti, *et al*., 1986				
[52] Christodoulos, *et al*., 2006					[84] Jiang, *et al*., 2007	✓			✓	[115] Singh, *et al*., 2007				
[53] Coleman, *et al*., 2005	✓	✓	✓	✓	[85] Kafatos, *et al*., 2005		✓		✓	[116] Skybo, *et al*., 2002				✓
[54] Connor, *et al*., 1986		✓	✓		[38] Kain, *et al*., 2004	✓		✓		[117] Spiegel, *et al*., 2006				✓
[55] Damon, *et al*., 2005					[86] Killen, *et al*., 1988		✓			[118] Stephens, *et al*., 1998				✓
[56] Danielzik, *et al*., 2007			✓	✓	[87] Kipping, *et al*., 2008			✓	✓	[119] Stewart, *et al*., 1997				
[57] Davis, *et al*., 1993					[88] Lazaar, *et al*., 2007		✓		✓	[120] Stock, *et al*., 2007				
[58] Dennison, *et al*., 2004					[89] Lionis, *et al*., 1991			✓	✓	[121] Stolley, *et al*., 1997		✓		
[59] Donnelly, *et al*., 1996					[90] Liu, *et al*., 2008					[122] Story, *et al*., 2003	✓	✓	✓	✓
[60] Duncan, *et al*., 1983		✓			[91] Luepker, *et al*., 1996	✓	✓	✓	✓	[40] Tamir, *et al*., 1990				
[61] Dwyer, *et al*., 1983					[92] Manios, *et al*., 1998					[123] Taylor, *et al*., 2007				
[62] Economos, *et al*., 2007					[93] Manios, *et al*., 1999		✓		✓	[124] Vandongen, *et al*., 1995	✓	✓	✓	✓
[63] Edwards, 2005				✓	[94] Manois, *et al*., 2002		✓		✓	[125] Vizcaıno, *et al*., 2007	✓	✓	✓	✓
[64] Eliakim, *et al*., 2007				✓	[95] McKenzie, *et al*., 2001	✓	✓	✓	✓	[126] Walter, *et al*., 1985	✓	✓		✓
[65] Epstein, *et al*., 2001		✓		✓	[96] McMurray, *et al*., 2002					[127] Walter, *et al*., 1986		✓		✓
[66] Flores, 1995	✓				[97] Mo-Suwan, 1993					[128] Walter, *et al*., 1988		✓		✓
[67] Foster, *et al*., 2008					[98] Mo-suwan, *et al*., 1998		✓			[129] Warren, *et al*., 2003			✓	
[68] Gans, *et al*., 1990				✓	[99] Mueller, *et al*., 2001	✓		✓	✓	[130] Webber, *et al*., 1996	✓	✓	✓	✓
[69] Goran, *et al*., 2005					[100] Nader, *et al*., 1999	✓	✓	✓	✓	[131] Williamson, *et al*., 2007		✓	✓	✓
[70] Gortmaker, Cheung, *et al*., 1999			✓		[101] Neumark-Sztainer, *et al*., 2003			✓	✓	[132] Wilson, *et al*., 2005	✓	✓	✓	✓
[71] Gortmaker, Peterson, *et al*., 1999		✓	✓	✓	[39] Pangrazi, *et al*., 2003				✓	[133] Yin, *et al*., 2005	✓	✓		✓

Note: A=Attendance; F=Fidelity; S=Satisfaction; T=Training*
Note: (✓) Represents the presence of type of process evaluation reported.
*Operational definitions for each type of process evaluation can be found in the Methods section of this article.

Table 2: Overall Summary of Process Evaluations Reported for Childhood Obesity Prevention Studies

	Reported	Not Reported
Fidelity	38 studies	61 studies
Attendance	25 studies	74 studies
Training	49 studies	50 studies
Satisfaction	29 studies	70 studies

Table 3: Comparisons of Year of Publication and Journal Impact Factor Among Studies that Reported and Did Not Report Process Evaluations

Process Evaluation Type	Variable of Interest	Reported Mean (SD)	Not Reported Mean (SD)	t-value	p-value
Fidelity	Year	1999.4 (6.7)	2000.9 (6.4)	-1.11	0.27
	Impact Factor	6.87 (10.1)	4.23 (5.0)	1.72	0.09
Attendance	Year	2001.7 (5.1)	1999.9 (6.9)	1.18	0.24
	Impact Factor	4.76 (5.5)	5.40 (7.9)	-0.37	0.71
Training	Year	2000.5 (5.9)	2000.2 (7.2)	0.19	0.85
	Impact Factor	6.18 (9.1)	4.26 (5.1)	1.28	0.20
Satisfaction	Year	2001.0 (5.8)	2000.1 (6.9)	0.67	0.50
	Impact Factor	5.31 (5.6)	5.20 (8.1)	-0.07	0.95

The years of publication for the studies in this review ranged from 1983 to 2008. An independent samples t-test was performed, comparing studies that reported each type of process evaluation (excluding context), and there was no significant difference found for any variable. The impact factor for the journals of studies in this review ranged from 0.0 to 53.0. An independent samples t-test was performed, comparing studies that reported each type of process evaluation (excluding context), and there was no significant difference found for any variable. Means and standard deviations for each variable and group can be found on Table **3**.

DISCUSSION

Process evaluations are an essential component to evaluating health promotion programs, such as those directed towards the prevention of childhood obesity, however results from this study indicate that they are oftentimes underutilized. Take into consideration a basic logic model of how an obesity prevention intervention is planned. Typically resources are gathered in order to plan, implement and evaluate the intervention, the intervention is subsequently implemented, and data is collected regarding whether the objectives of the intervention were met, such as changes health-related behaviors, and behavioral antecedents. It should be apparent that process evaluations are essential for interpreting impact and outcome evaluations. Said another way, unless a proper process evaluation is conducted, a practitioner or researcher will not know if the results from an impact or outcome evaluation are trustworthy. Another advantage to conducting a proper process evaluation is that the information collected from them can be used discern effective intervention activities versus ineffective intervention activities. For example, through an evaluation of satisfaction, participants may report minor enjoyment for some aspects of an intervention, and great enjoyment other aspects. By tracking attendance, it may also become apparent that at some point during the intervention participant interest waivers by evidence of lower participation rates. Finally, a proper process evaluation can help practitioners and researchers standardize program activities so they are implemented identical across various settings. For example, it is likely the case that programs will be implemented by a number of practitioners in a variety of settings. By identifying key intervention elements in an evaluation of program fidelity, all program staff members can be trained to implement the program uniformly.

As Steckler and Linnan [131] reported, the practice of performing process evaluations is not necessarily a

new concept in the field of public health and health promotion. They note that the idea of process evaluations has been around since the 1960's, however it was not until the 1980's that process evaluations became well known. Surprisingly however, in our study we did not see a trend that indicated process evaluations are becoming more popular with time. This finding did bring about the following conundrum however: "Are process evaluations not conducted and therefore, are not reported?" Or, "Are process evaluations conducted but not reported upon in the literature?" In the first case, if process evaluations are not done, then a logical follow-up question is "Why are process evaluations not collected?" There are many possible explanations for why process evaluations may not be collected. Improper training or a low level of awareness of researchers and health practitioners may be two possible explanations. In the systematic reviews and meta-analyses for which the studies were retrieved for this article, rarely did authors mention process evaluations as a limitation to program evaluation. Another explanation may be a lack of resources, such as time, money or trained personnel to collect process evaluations. It may also be that researchers and practitioners place more value on impact and outcome evaluations. If this is indeed the case that process evaluations are not being collected, then it would be recommended that more emphasis should be given to them in academic training and other venues such as grant requests for proposals (RFP's).

In the second case, if process evaluations are done and not reported upon, then a logical follow-up question is "Why are process evaluations not reported upon?" This was observed in a few of the studies reviewed in this article. For example in Taylor *et al.* [122], a brief statement mentioning process evaluations was present, however this statement referenced unpublished data, making it impossible to find more information about the actual procedures of the process evaluation. Another example comes from Bush *et al.* [47], a study reporting the effectiveness of the popular 'Know Your Body' intervention. While there were no mention of process evaluations in this report, and no citation to any studies documenting the implementation of the program, another report by Taggart *et al.* [135], documented the implementation and process evaluation of the program, and referenced the Bush *et al*. [47] study. Another reason process evaluations may not be reported upon in greater detail, is that researchers may consider this type of evaluation similar to testing statistical assumptions, which have also been found to be poorly documented in many cases [134, 135].

There were a few notable limitations to this review. First, our search strategy was limited to articles that have been previously reviewed, and therefore we could have excluded some studies. Although, it should be noted that systematic reviews and meta-analyses typically have higher standards when retrieving articles to review, therefore even if some articles were omitted, it is likely that they were of lesser quality or level of rigor. As mentioned previously, it may also be the case that process evaluations are being implemented, but not reported upon, which limits our ability to generalize about the current state of research. However, a common saying in the medical field among practitioners is "If it wasn't documented, it never happened" and this statement should hold true for public health and health promotion and education.

In conclusion, process evaluations are not a new phenomenon that would be expected to be absent in our current literature. Health promotion and education is a science, and according to the scientific method, scientists should carefully document their methodologies so that others may replicate their research if desired. Process evaluations can also be easily incorporated into program design, at very little cost. Attendance is an important process evaluation that ensures that the program dose reaches the target audience. Researchers and practitioners can keep basic attendance, and set minimum acceptable attendance rates for each program session. While it may be unrealistic to expect 100% attendance for an intervention, acceptable or realistic attendance rates, such as 70% or 80% can be considered. Participant satisfaction can be evaluated using simple qualitative or quantitative measures. Qualitative measures can be obtained with focus groups, individual or group interviews, and any other method that enables the users to respond to open ended questions. Quantitative measures can be obtained through surveys. Program fidelity is important as it ensures that every stage of a program is being implemented entirely as designed. Program fidelity can be collected in a number of ways, including using outside observers or self-report. Fidelity can be evaluated by creating a set of objectives the intervention is intended to address, and keeping track of whether these objectives were met. Finally, program training is an important process evaluation that can have profound effect on the implementation of the program. When writing final reports, researchers

should mention if the participating staff of the program was trained, and provide a basic description of how the staff members were trained.

In order to move forward in this area of public health and health promotion researchers and practitioners should be mindful of what gaps exist in research and practice. Determining what components of an intervention are successful, for whom, and under what conditions, are all questions that can be answered by appropriate process evaluations. It is apparent from this review that in this area of childhood obesity prevention research, process evaluations are highly underutilized. This is not to say that there have not been improvements in this area however. Take into consideration the CATCH program. Multiple reports have been published that solely focus on process evaluations for the physical activity component [135], classroom component [136], family component [137], and food service component [138]. More attention should be given to process evaluations in future studies.

DISCLOSURE

There are no financial disclosures or conflicts of interests related to this study.

REFERENCES

[1] Finer N. Medical consequences of obesity. Medicine 2011; 39: 18-23. http://dx.doi.org/10.1016/j.mpmed.2010.11.008

[2] Puhl R, Brownell KD. Bias, discrimination, and obesity. Obes Res 2001; 9: 788-805. http://dx.doi.org/10.1038/oby.2001.108

[3] Strauss RS, Pollack HA. Social marginalization of overweight children. Arch Pediatr Adolesc Med 2003; 157: 746. http://dx.doi.org/10.1001/archpedi.157.8.746

[4] Gonzalez-Suarez C, Worley A, Grimmer-Somers K, Dones V. School-based interventions on childhood obesity: a meta-analysis. Am J Prev Med 2009; 37: 418-27. http://dx.doi.org/10.1016/j.amepre.2009.07.012

[5] Cook-Cottone C, Casey CM, Feeley TH, Baran J. A meta-analytic review of obesity prevention in the schools: 1997–2008. Psychol Schools 2009; 46: 695-719. http://dx.doi.org/10.1002/pits.20409

[6] Kanekar A, Sharma M. Meta-analysis of school-based childhood obesity interventions in the UK and US. Int Q Community Health Educ 2008; 29: 241-56. http://dx.doi.org/10.2190/IQ.29.3.d

[7] Green LW, Kreuter MW. Health program planning: An educational and ecological approach. 4th ed. Boston: McGraw-Hill 2005.

[8] Bartholomew LK, Parcel GS, Kok G, Gottlieb NH, Fernandez ME. Planning health promotion programs: An Intervention Mapping Approach. 3rd ed. San Francisco: Jossey-Bass 2011.

[9] Kreuter MW. Patch: its origin, basic concepts, and links to contemporary public health policy. J Health Educ 1992; 23: 135-39.

[10] Simons-Morton B, McLeroy K, Wendel M. Behavior theory in health promotion practice and research. 1st ed. Sudbury: Jones and Bartlett 2012.

[11] Doak CM, Visscher TLS, Renders CM, Seidell JC. The prevention of overweight and obesity in children and adolescents: a review of interventions and programmes. Obes Rev 2006; 7: 111-36. http://dx.doi.org/10.1111/j.1467-789X.2006.00234.x

[12] Katz DL, O'Connell M, Njike VY, Yeh MC, Nawaz H. Strategies for the prevention and control of obesity in the school setting: systematic review and meta-analysis. Int J Obes 2008; 32: 1780-9. http://dx.doi.org/10.1038/ijo.2008.158

[13] Shaya FT, Flores D, Gbarayor CM, Wang J. School-based obesity interventions: a literature review. J Sch Health 2008; 78: 189-96. http://dx.doi.org/10.1111/j.1746-1561.2008.00285.x

[14] Summerbell CD, Waters E, Edmunds LD, Kelly S, Brown T, Campbell KJ. Interventions for preventing obesity in children. COCH 2005; 3.

[15] Berkey CS, Rockett HR, Gillman MW, Colditz GA. One-year changes in activity and in inactivity among 10-to 15-year-old boys and girls: relationship to change in body mass index. Pediatrics 2003; 111: 836-43. http://dx.doi.org/10.1542/peds.111.4.836

[16] Kimm SY, Glynn NW, Obarzanek E, Kriska AM, Daniels SR, Barton BA, Liu K. Relation between the changes in physical activity and body-mass index during adolescence: a multicentre longitudinal study. Lancet 2005; 366: 301-7. http://dx.doi.org/10.1016/S0140-6736(05)66837-7

[17] Lohman T, Thompson J, Going S, *et al*. Indices of changes in adiposity in American Indian children. Prev Med 2003; 37: S91-6.

[18] Rochon J, Klesges RC, Story M, *et al*. Common design elements of the girls health enrichment multi-site studies (GEMS). Ethn Dis 2003; 13: S16-14.

[19] Stewart KJ, Brown CS, Hickey CM, McFarland LD, Weinhofer JJ, Gottlieb SH. Physical fitness, physical activity, and fatness in relation to blood pressure and lipids in preadolescent children: Results from the Fresh Study. J Cardiopulm Rehabil 1995; 15: 122-9. http://dx.doi.org/10.1097/00008483-199503000-00005

[20] Warren JM, Henry CJK, Simonite V. Low glycemic index breakfasts and reduced food intake in preadolescent children. Pediatrics 2003; 112: e414-9. http://dx.doi.org/10.1542/peds.112.5.e414

[21] Story M, Sherwood NE, Obarzanek E, *et al*. Recruitment of African-American pre-adolescent girls into an obesity prevention trial: the GEMS pilot studies. Ethn Dis 2003; 13: S178-87.

[22] Atkinson RL, Nitzke SA. Randomized controlled trial of primary-school based intervention to reduce risk factors for obesity. J Pediatr 2002; 140: 633-4.

[23] Kerr CM. A school-based, interdisciplinary curriculum in grades 6 and 7 reduced obesity in girls. Evid Based Nurs 2000; 3: 13. http://dx.doi.org/10.1136/ebn.3.1.13

[24] Robinson TN. Can a school-based intervention to reduce television use decrease adiposity in children in grades 3 and 4?. West J Med 2000; 173: 40. http://dx.doi.org/10.1136/ewjm.173.1.40

[25] Walter HJ, Wynder EL. The development, implementation, evaluation, and future directions of a chronic disease prevention program for children: the "Know Your Body" studies. Prev Med 1989; 18: 59-71. http://dx.doi.org/10.1016/0091-7435(89)90054-6

[26] Perry CL, Stone EJ, Parcel GS, *et al*. School-based cardiovascular health promotion: the child and adolescent

trial for cardiovascular health (CATCH). J Sch Health 1990; 60: 406-13.
http://dx.doi.org/10.1111/j.1746-1561.1990.tb05960.x

[27] Yin Z, Gutin B, Johnson MH, *et al*. An environmental approach to obesity prevention in children: Medical College of Georgia FitKid Project year 1 results. Obesity 2005; 13: 2153-61.
http://dx.doi.org/10.1038/oby.2005.267

[28] Zahner L, Puder JJ, Roth R, *et al*. A school-based physical activity program to improve health and fitness in children aged 6–13 years. BMC Public Health 2006; 6: 147.
http://dx.doi.org/10.1186/1471-2458-6-147

[29] Hsu L, Wang R. The effectiveness of an intervention program to promote physical activity among female adolescents in a vocational nursing school. J Nursing-Taipei 2004; 51: 27-36.

[30] Seo NS, Kim YH, Kang HY. Effects of an obesity control program based on behavior modification and self-efficacy in obese elementary school children. Taehan Kanho Hakhoe Chi 2005; 35: 611-20.

[31] Suzuki M, Tatsumi M. Effect of therapeutic exercise on physical fitness in a school health program for obese children. Jpn J Public Health 1993; 40: 17-28.

[32] Rowland TW, Boyajian A. Aerobic response to endurance exercise training in children. Pediatrics 1995; 96: 654-8.

[33] Just for Kids. Fairfax CA. Balboa Publishing Corporation. The evaluation of a school-based obesity prevention program among fourth grade students [cited May 2013]: Available from http://www.just-for-kids.org/links.htm

[34] Sallis JF, McKenzie TL, Conway TL, *et al*. Environmental interventions for eating and physical activity: A randomized controlled trial in middle schools. Am J Prev Med 2003; 24: 209-17.
http://dx.doi.org/10.1016/S0749-3797(02)00646-3

[35] Baranowski T, Baranowski JC, Cullen KW, *et al*. The fun, food, and fitness project (FFFP): The Baylor GEMS pilot study. Ethn Dis 2003; 13: S1-30.

[36] Bayne-Smith M, Fardy PS, Azzollini A, Magel J, Schmitz KH, Agin D. Improvements in heart health behaviors and reduction in coronary artery disease risk factors in urban teenaged girls through a school-based intervention: the PATH program. Am J Public Health 2004; 94: 1538.
http://dx.doi.org/10.2105/AJPH.94.9.1538

[37] James J, Thomas P, Cavan D, Kerr D. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. BMJ 2004; 328: 1237.
http://dx.doi.org/10.1136/bmj.38077.458438.EE

[38] Kain J, Uauy R, Albala FV, Cerda R, Leyton B. School-based obesity prevention in Chilean primary school children: methodology and evaluation of a controlled study. Int J Obes 2004; 28: 483-93.
http://dx.doi.org/10.1038/sj.ijo.0802611

[39] Pangrazi RP, Beighle A, Vehige T, Vack C. Impact of Promoting Lifestyle Activity for Youth (PLAY) on children's physical activity. J Sch Health 2009; 73: 317-21.
http://dx.doi.org/10.1111/j.1746-1561.2003.tb06589.x

[40] Tamir D, Feurstein A, Brunner S, Halfon ST, Reshef A, Palti H. Primary prevention of cardiovascular diseases in childhood: changes in serum total cholesterol, high density lipoprotein, and body mass index after 2 years of intervention in Jerusalem schoolchildren age 7–9 years. Prev Med 1990; 19: 22-30.
http://dx.doi.org/10.1016/0091-7435(90)90003-3

[41] Amaro S, Viggiano A, DiCostanzo A, *et al.* A new educational board-game, gives nutritional rudiments and encourages healthy eating in children: a pilot cluster randomized trial. EJPD 2006; 165: 630-5.

[42] Alexandrov AA, Maslennikova GY, Kulikov SM, Propirnu GA, Perova NV. Primary prevention of cardiovascular disease: 3-year intervention results in boys of 12 years of age. Prev Med 1992; 21: 53-62.
http://dx.doi.org/10.1016/0091-7435(92)90005-3

[43] Beech BM, Klesges RC, Kumanyika SK, *et al*. Child-and parent-targeted interventions: the Memphis GEMS pilot study. Ethn Dis 2003; 13: S1-40.

[44] Bonhauser M, Fernandez G, Püschel K, *et al*. Improving physical fitness and emotional well-being in adolescents of low socioeconomic status in Chile: results of a school-based controlled trial. Health Promot Int 2005; 20: 113-22.
http://dx.doi.org/10.1093/heapro/dah603

[45] Burke V, Milligan RA, Thompson C, *et al*. A controlled trial of health promotion programs in 11-year-olds using physical activity" enrichment" for higher risk children. J Pediatr 1998; 132: 840-8.
http://dx.doi.org/10.1016/S0022-3476(98)70315-4

[46] Burke V, Thompson C, Taggart AC, *et al*. Differences in response to nutrition and fitness education programmes in relation to baseline levels of cardiovascular risk in 10 to 12-year-old children. J Hum Hypertens 1996; 10: S99-106.

[47] Bush PJ, Zuckerman AE, Theiss PK, *et al*. Cardiovascular risk factor prevention in black schoolchildren: two-year results of the “Know Your Body” program. Am J Epidemiol 1989; 129: 466-82.

[48] Caballero B, Clay T, Davis SM, *et al*. Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren. Am J Clin Nutr 2003; 78: 1030-8.

[49] Carrel AL, Clark RR, Peterson SE, Nemeth BA, Sullivan J, Allen DB. Improvement of fitness, body composition, and insulin sensitivity in overweight children in a school-based exercise program: a randomized, controlled study. Arch Pediatr Adolesc Med 2005; 159: 963-8.
http://dx.doi.org/10.1001/archpedi.159.10.963

[50] Chavarro JE, Peterson KE, Sobol AM, Wiecha JL, Gortmaker SL. Effects of a school-based obesity-prevention intervention on menarche (United States). Cancer Causes Control 2005; 16: 1245-52.
http://dx.doi.org/10.1007/s10552-005-0404-5

[51] Chen MY, Huang LH, Wang EK, *et al*. The effectiveness of health promotion counseling for overweight adolescent nursing students in Taiwan. Public Health Nurs 2001; 18: 350-6.
http://dx.doi.org/10.1046/j.1525-1446.2001.00350.x

[52] Christodoulos AD, Douda HT, Polykratis M, Tokmakidis SP. Attitudes towards exercise and physical activity behaviours in Greek schoolchildren after a year long health education intervention. Br J Sports Med 2006; 40: 367-71.
http://dx.doi.org/10.1136/bjsm.2005.024521

[53] Coleman KJ, Tiller CL, Sanchez J, Heath EM, Sy O, Milliken G, Dzewaltowski DA. Prevention of the epidemic increase in child risk of overweight in low-income schools: the El Paso coordinated approach to child health. Arch Pediatr Adolesc Med 2005; 159: 217-24.
http://dx.doi.org/10.1001/archpedi.159.3.217

[54] Connor MK, Smith LG, Fryer A, Erickson S, Fryer S, Drake J. Future Fit: A cardiovascular health education and fitness project in an after-school setting. J Sch Health 1986; 56: 329-33.
http://dx.doi.org/10.1111/j.1746-1561.1986.tb05764.x

[55] Dämon S, Dietrich S, Widhalm K. PRESTO—Prevention Study of Obesity: A project to prevent obesity during childhood and adolescence. Acta Paediatr 2005; 94: 47-8.
http://dx.doi.org/10.1080/08035320510035546

[56] Danielzik S, Pust S, Muller M. School based interventions to prevent overweight and obesity in pre-pubertal children: process and 4 years outcome evaluation of the Keil Obesity Prevention Study (KOPS). Acta Paediatr 2007; 96: 19-25.
http://dx.doi.org/10.1111/j.1651-2227.2007.00165.x

[57] Davis S, Gomez Y, Lambert L, Skipper B. Primary prevention of obesity in American Indian Children. Ann NY Acad Sci 1993; 699: 167-80. http://dx.doi.org/10.1111/j.1749-6632.1993.tb18848.x

[58] Dennison BA, Russo TJ, Burdick PA, Jenkins PL. An intervention to reduce television viewing by preschool children. Arch Pediatr Adolesc Med 2004; 158: 170-6. http://dx.doi.org/10.1001/archpedi.158.2.170

[59] Donnelly JE, Jacobsen DJ, Whatley JE, *et al*. Nutrition and physical activity program to attenuate obesity and promote physical and metabolic fitness in elementary school children. Obes Res 1996; 4: 229-43. http://dx.doi.org/10.1002/j.1550-8528.1996.tb00541.x

[60] Duncan B, Boyce WT, Itami R, Puffenbarger N. A controlled trial of a physical fitness program for fifth grade students. J Sch Health 1983; 53: 467-71. http://dx.doi.org/10.1111/j.1746-1561.1983.tb03168.x

[61] Dwyer T, Coonan WE, Leitch DR, Hetzel BS, Baghurst RA. An investigation of the effects of daily physical activity on the health of primary school students in South Australia. Int J Epidemiol 1983; 12: 308-13. http://dx.doi.org/10.1093/ije/12.3.308

[62] Economos CD, Hyatt RR, Goldberg JP, *et al*. A community intervention reduces BMI z-score in children: Shape Up Somerville first year results. Obesity 2007; 15: 1325-36. http://dx.doi.org/10.1038/oby.2007.155

[63] Edwards B. Childhood obesity: a school-based approach to increase nutritional knowledge and activity levels. Nurs Clin North Am 2005; 40: 661-9. http://dx.doi.org/10.1016/j.cnur.2005.07.006

[64] Eliakim A, Nemet D, Balakirski Y, Epstein Y. The effects of nutritional-physical activity school-based intervention on fatness and fitness in preschool children. J Pediatr Endocrinol Metab 2007; 20: 711-8. http://dx.doi.org/10.1515/JPEM.2007.20.6.711

[65] Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski, CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. Obes Res 2001; 9: 171-8. http://dx.doi.org/10.1038/oby.2001.18

[66] Flores R. Dance for health: improving fitness in African American and Hispanic adolescents. Public Health Reports 1995; 110: 189-93.

[67] Foster GD, Sherman S, Borradaile KE, *et al*. A policy-based school intervention to prevent overweight and obesity. Pediatrics 2008; 121: e794-802. http://dx.doi.org/10.1542/peds.2007-1365

[68] Gans KM, Levin S, Lasater TM, *et al*. Heart healthy cook-offs in home economics classes: an evaluation with junior high school students. J Sch Health 1990; 60: 99-102. http://dx.doi.org/10.1111/j.1746-1561.1990.tb05409.x

[69] Goran MI, Reynolds K. Interactive multimedia for promoting physical activity (IMPACT) in children. Obes Res 2005; 13: 762-71. http://dx.doi.org/10.1038/oby.2005.86

[70] Gortmaker SL, Cheung LW, Peterson KE, *et al*. Impact of a school-based interdisciplinary intervention on diet and physical activity among urban primary school children: eat well and keep moving. Arch Pediatr Adolesc Med 1999; 153: 975-83. http://dx.doi.org/10.1001/archpedi.153.9.975

[71] Gortmaker SL, Peterson K, Wiecha J, *et al*. Reducing obesity *via* a school-based interdisciplinary intervention among youth: Planet Health. Arch Pediatr Adolesc Med 1999; 153: 409-18. http://dx.doi.org/10.1001/archpedi.153.4.409

[72] Graf C, Rost SV, Koch B, *et al*. Data from the StEP TWO programme showing the effect on blood pressure and different parameters for obesity in overweight and obese primary school children. Cardiol Young 2005; 15: 291-8. http://dx.doi.org/10.1017/S1047951105000594

[73] Grey M, Berry D, Davidson M, Galasso P, Gustafson E, Melkus G. Preliminary testing of a program to prevent type 2 diabetes among high-risk youth. J Sch Health 2004; 74: 10-5. http://dx.doi.org/10.1111/j.1746-1561.2004.tb06595.x

[74] Haerens L, Deforche B, Maes L, Stevens V, Cardon G, Bourdeaudhuij I. Body mass effects of a physical activity and healthy food intervention in middle schools. Obesity 2006; 14: 847-54. http://dx.doi.org/10.1038/oby.2006.98

[75] Harrell JS, Gansky SA, McMurray RG, Bangdiwala SI, Frauman AC, Bradley CB. School-based interventions improve heart health in children with multiple cardiovascular disease risk factors. Pediatrics 1998; 102: 371-80. http://dx.doi.org/10.1542/peds.102.2.371

[76] Harrell JS, McMurray RG, Bangdiwala SI, Frauman AC, Gansky SA, Bradley CB. Effects of a school- based intervention to reduce cardiovascular disease risk factors in elementary-school children: the Cardiovascular Health in Children (CHIC) study. J Pediatr 1996; 128; 797-805. http://dx.doi.org/10.1016/S0022-3476(96)70332-3

[77] Harrell TK, Davy BM, Stewart JL, King DS. Effectiveness of a school-based intervention to increase health knowledge of cardiovascular disease risk factors among rural Mississippi middle school children. South Med J 2005; 98: 1173-80. http://dx.doi.org/10.1097/01.smj.0000182499.59715.07

[78] Hopper CA, Gruber MB, Munoz KD, Herb RA. Effect of including parents in a school-based exercise and nutrition program for children. Res Q Exerc Sport 1992; 63: 315-21. http://dx.doi.org/10.1080/02701367.1992.10608748

[79] Huang SH, Weng KP, Hsieh KS, *et al*. Effects of a classroom-based weight-control intervention on cardiovascular disease in elementary-school obese children. Acta Paediatr Taiwan 2007; 48: 201-6.

[80] Harvey-Berino J, Rourke J. Obesity prevention in preschool Native-American children: A pilot study using home visiting. Obes Res 2003; 11: 606-11. http://dx.doi.org/10.1038/oby.2003.87

[81] Hawley SR, Beckman H, Bishop T. Development of an obesity prevention and management program for children and adolescents in a rural setting. J Community Health Nurs 2006; 23: 69-80. http://dx.doi.org/10.1207/s15327655jchn2302_1

[82] James J, Thomas P, Kerr D. Preventing childhood obesity: two year follow-up results from the Christchurch obesity prevention programme in schools (CHOPPS). BMJ 2007; 335: 762. http://dx.doi.org/10.1136/bmj.39342.571806.55

[83] Jamner MS, Spruijt-Metz D, Bassin S, Cooper DM. A controlled evaluation of a school-based intervention to promote physical activity among sedentary adolescent females: project FAB. J Adolesc Health 2004; 34: 279-89.

[84] Jiang J, Xia X, Greiner T, Wu G, Lian G, Rosenqvist U. The effects of a 3-year obesity intervention in schoolchildren in Beijing. Child Care Health Dev 2007; 33: 641-6. http://dx.doi.org/10.1111/j.1365-2214.2007.00738.x

[85] Kafatos A, Manios Y, Moschandreas J. Health and nutrition education in primary schools of Crete: follow-up changes in body mass index and overweight status. Eur J Clin Nutr 2005; 59: 1090-2. http://dx.doi.org/10.1038/sj.ejcn.1602216

[86] Killen JD, Telch MJ, Robinson TN, Maccoby N, Taylor CB, Farquhar JW. Cardiovascular disease risk reduction for tenth graders. JAMA 1988; 260: 1728-33. http://dx.doi.org/10.1001/jama.1988.03410120074030

[87] Kipping RR, Payne C, Lawlor DA. Randomised controlled trial adapting US school obesity prevention to England. Archiv Dis Childhood 2008; 93: 469-73. http://dx.doi.org/10.1136/adc.2007.116970

[88] Lazaar N, Aucouturier J, Ratel S, Rance M, Meyer M, Duché P. Effect of physical activity intervention on body composition in young children: influence of body mass index status and gender. Acta Paediatr 2007; 96: 1321-5. http://dx.doi.org/10.1111/j.1651-2227.2007.00426.x

[89] Lionis C, Kafatos A, Vlachonikolis J, Vakaki M, Tzortzi M, Petraki A. The effects of a health education intervention program among Cretan adolescents. Prev Med 1991; 20: 685-99. http://dx.doi.org/10.1016/0091-7435(91)90064-B

[90] Liu A, Hu X, Ma G, *et al*. Evaluation of a classroom-based physical activity promoting programme. Obes Rev 2008; 9: 130-4. http://dx.doi.org/10.1111/j.1467-789X.2007.00454.x

[91] Luepker RV, Perry CL, McKinlay SM, *et al*. Outcomes of a field trial to improve children's dietary patterns and physical activity: The Child and Adolescent Trial for Cardiovascular Health. JAMA 1996; 275: 768-76. http://dx.doi.org/10.1001/jama.1996.03530340032026

[92] Manios Y, Kafatos A, Mamalakis G. The effects of a health education intervention initiated at first grade over a 3 year period: physical activity and fitness indices. Health Educ Res 1998; 13: 593-606. http://dx.doi.org/10.1093/her/13.4.593

[93] Manios Y, Moschandreas J, Hatzis C, Kafatos A. Evaluation of a health and nutrition education program in primary school children of Crete over a three-year period. Prev Med 1999; 28: 149-59. http://dx.doi.org/10.1006/pmed.1998.0388

[94] Manios Y, Moschandreas J, Hatzis C, Kafatos A. Health and nutrition education in primary schools of Crete: changes in chronic disease risk factors following a 6-year intervention programme. Br J Nutr 2002; 88: 315-24. http://dx.doi.org/10.1079/BJN2002672

[95] McKenzie TL, Stone EJ, Feldman HA, *et al*. Effects of the CATCH physical education intervention: teacher type and lesson location. Am J Prev Med 2001; 21: 101-9. http://dx.doi.org/10.1016/S0749-3797(01)00335-X

[96] Mcmurray RG, Harrell JS, Bangdiwala SI, Bradley CB, Deng S, Levine A. A school-based intervention can reduce body fat and blood pressure in young adolescents. J Adolesc Health 2002; 31: 125-32. http://dx.doi.org/10.1016/S1054-139X(02)00348-8

[97] Mo-suwan L, Junjana C, Puetpaiboon A. Increasing obesity in school children in a transitional society and the effect of the weight control program. Southeast Asian J. Trop. Med. Public Health 1993; 24: 590-4.

[98] Mo-suwan L, Pongprapai S, Junjana C, Puetpaiboon A. Effects of a controlled trial of a school-based exercise program on the obesity indexes of preschool children. Am J Clin Nutr 1998; 68: 1006-11.

[99] Müller MJ, Asbeck I, Mast M, Langnäse K, Grund A. Prevention of obesity--more than an intention. Concept and first results of the Kiel Obesity Prevention Study (KOPS). Int J Obes Relat Metab Disord 2001; 25: S66-74. http://dx.doi.org/10.1038/sj.ijo.0801703

[100] Nader PR, Stone EJ, Lytle LA, *et al*. Three-year maintenance of improved diet and physical activity: the CATCH cohort. Arch Pediatr Adolesc Med 1999; 153: 695-704. http://dx.doi.org/10.1001/archpedi.153.7.695

[101] Neumark-Sztainer D, Story M, Hannan PJ, Rex J. New Moves: a school-based obesity prevention program for adolescent girls. Prev Med 2003; 37: 41-51. http://dx.doi.org/10.1016/S0091-7435(03)00057-4

[102] Paradis G, Levesque L, Macaulay AC, *et al*. Impact of a diabetes prevention program on body size, physical activity, and diet among Kanien'keha:ka (Mohawk) children 6 to 11 years old: 8-year results from the Kahnawake Schools Diabetes Prevention Project. Pediatrics 2005; 115: 333-9. http://dx.doi.org/10.1542/peds.2004-0745

[103] Perman JA, Young TL, Stines E, Hamon J, Turner LM, Rowe MG. A community-driven obesity prevention and intervention in an elementary school. J Ky Med Assoc 2008; 106: 104-8.

[104] Resnicow K, Cross D, Lacosse J, Nichols P. Evaluation of a school-site cardiovascular risk factor screening intervention. Prev Med 1993; 22: 838-56. http://dx.doi.org/10.1006/pmed.1993.1076

[105] Robinson TN. Reducing children's television viewing to prevent obesity: A randomized controlled trial. JAMA 1999; 282: 1561-7. http://dx.doi.org/10.1001/jama.282.16.1561

[106] Robinson TN, Killen JD, Kraemer HC, *et al*. Dance and reducing television viewing to prevent weight gain in African-American girls: the Stanford GEMS pilot study. Ethn Dis 2003; 13: S65-77.

[107] Sadowsky HS, Sawdon JM, Scheiner ME, Sticklin AM. Eight week moderate intensity exercise intervention elicits body composition change in adolescents. Cardiopulm Phys Ther J 1999; 10: 38-44.

[108] Sahota P, Rudolf MC, Dixey R, Hill AJ, Barth JH, Cade J. Randomised controlled trial of primary school based intervention to reduce risk factors for obesity. BMJ 2001; 323: 1-5.

[109] Sahota P, Rudolf MC, Dixey R, Hill AJ, Barth JH, Cade J. Evaluation of implementation and effect of primary school based intervention to reduce risk factors for obesity. BMJ 2001; 323: 1-4.

[110] Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Hovell MF, Nader PR. Project SPARK: Effects of physical education on adiposity in children. Ann N Y Acad Sci 1993; 699: 127-36. http://dx.doi.org/10.1111/j.1749-6632.1993.tb18844.x

[111] Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Faucette N, Hovell MF. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. Sports, Play and Active Recreation for Kids. Am J Public Health 1997; 87: 1328-34. http://dx.doi.org/10.2105/AJPH.87.8.1328

[112] Salmon J, Ball K, Hume C, Booth M, Crawford D. Outcomes of a group-randomized trial to prevent excess weight gain, reduce screen behaviours and promote physical activity in 10-year-old children: Switch-Play. Int J Obes 2008; 32: 601-12. http://dx.doi.org/10.1038/sj.ijo.0803805

[113] Simon C, Wagner A, Platat C, *et al*. ICAPS: a multilevel program to improve physical activity in adolescents. Diabetes Metab J 2006; 32: 41-9. http://dx.doi.org/10.1016/S1262-3636(07)70245-8

[114] Simonetti D'Arca A, Tarsitani G, Cairella M, *et al*. Prevention of obesity in elementary and nursery school children. Public Health 1986; 100: 166-73. http://dx.doi.org/10.1016/S0033-3506(86)80030-0

[115] Singh AS, Paw MJMCA, Brug J, Van Mechelen W. Short-term effects of school-based weight gain prevention among adolescents. Arch Pediatr Adolesc Med 2007; 161: 565-71. http://dx.doi.org/10.1001/archpedi.161.6.565

[116] Skybo TA, Ryan-Wenger N. A school-based intervention to teach third grade children about the prevention of heart disease. Pediatr Nursing 2002; 28:223-9.

[117] Spiegel SA, Foulk D. Reducing Overweight through a Multidisciplinary School-based Intervention. Obesity 2006; 14: 88-96. http://dx.doi.org/10.1038/oby.2006.11

[118] Stephens MB, Wentz SW. Supplemental fitness activities and fitness in urban elementary school classrooms. Family Med 1998; 30: 220-3.

[119] Stewart KJ, Seemans CM, McFarland LD, Weinhofer JJ. Social learning versus traditional teaching in an elementary school cardiovascular health promotion program. AJHP 1997; 11: 194-7. http://dx.doi.org/10.4278/0890-1171-11.3.194

[120] Stock S, Miranda C, Evans S, *et al*. Healthy Buddies: a novel, peer-led health promotion program for the prevention of obesity and eating disorders in children in elementary school. Pediatr 2007; 120: e1059-68. http://dx.doi.org/10.1542/peds.2006-3003

[121] Stolley MR, Fitzgibbon ML. Effects of an obesity prevention program on the eating behavior of African American mothers and daughters. Health Edu Behav 1997; 24: 152-64. http://dx.doi.org/10.1177/109019819702400204

[122] Story M, Sherwood NE, Himes JH, *et al*. An after-school obesity prevention program for African-American girls: the Minnesota GEMS pilot study. Ethn Dis 2003; 13: S54-64.

[123] Taylor RW, McAuley KA, Barbezat W, Strong A, Williams SM, Mann JI. APPLE Project: 2-y findings of a community-based obesity prevention program in primary school–age children. Am J Clin Nutr 2007; 86: 735-42.

[124] Vandongen R, Jenner DA, Thompson C, *et al*. A controlled evaluation of a fitness and nutrition intervention program on cardiovascular health in 10-year-old to 12-year-old children. Prev Med 1995; 24: 9-22. http://dx.doi.org/10.1006/pmed.1995.1003

[125] Vizcaíno VM, Aguilar FS, Gutiérrez RF, *et al*. Assessment of an after-school physical activity program to prevent obesity among 9-to 10-year-old children: a cluster randomized trial. Int J Obes 2008; 32: 12-22. http://dx.doi.org/10.1038/sj.ijo.0803738

[126] Walter HJ, Hofman A, Connelly PA, Barrett LT, Kost KL. Primary prevention of chronic disease in childhood: changes in risk factors after one year of intervention. Am J Epidemiol 1985; 122: 772-81.

[127] Walter HJ, Hofman A, Connelly PA, Barrett LT, Kost KL. Coronary heart disease prevention in childhood: one-year results of a randomized intervention study. Am J Prev Med 1986; 2: 239-45.

[128] Walter HJ, Hofman A, Vaughan RD, Wynder EL. Modification of risk factors for coronary heart disease. N Engl J Med 1988; 318: 1093-100. http://dx.doi.org/10.1056/NEJM198804283181704

[129] Warren JM, Henry CJK, Lightowler HJ, Bradshaw SM, Perwaiz S. Evaluation of a pilot school programme aimed at the prevention of obesity in children. Health Promot Int 2003; 18: 287-96. http://dx.doi.org/10.1093/heapro/dag402

[130] Webber LS, Osganian SK, Feldman HA, *et al*. Cardiovascular risk factors among children after a 2 1/2–year intervention – The CATCH Study. Prev Med 1996; 25: 432-41. http://dx.doi.org/10.1006/pmed.1996.0075

[131] Williamson DA, Copeland AL, Anton SD, *et al*. Wise Mind Project: A school-based environmental approach for preventing weight gain in children. Obesity 2007; 15: 906-17. http://dx.doi.org/10.1038/oby.2007.597

[132] Wilson DK, Evans AE, Williams J, Mixon G, Sirard JR, Pate R. A preliminary test of a student-centered intervention on increasing physical activity in underserved adolescents. Ann Behav Med 2005; 30: 119-24. http://dx.doi.org/10.1207/s15324796abm3002_4

[133] Yin Z, Hanes J, Moore JB, Humbles P, Barbeau P, Gutin B. An after-school physical activity program for obesity prevention in children: The Medical College of Georgia FitKid Project. Eval Health Prof 2005; 28: 67-89. http://dx.doi.org/10.1177/0163278704273079

[134] Steckler AE, Linnan LE. Process evaluation for public health interventions and research. San Francisco: Jossey-Bass 2002.

[135] Taggart V, Bush P, Zuckerman A, Theiss P. A process evaluation of the District of Columbia "Know Your Body" project. J Sch Health 1990; 60: 60-6. http://dx.doi.org/10.1111/j.1746-1561.1990.tb05907.x

[136] Ottenbacher KJ, Ottenbacher HR, Tooth L, Ostir GV. A review of two journals found that articles using multivariable logistic regression frequently did not report commonly recommended assumptions. J Clin Epidemiol 2004; 57: 1147-52. http://dx.doi.org/10.1016/j.jclinepi.2003.05.003

[137] Tetrault JM, Sauler M, Wells CK, Concato J. Reporting of multivariable methods in the medical literature. J Investig Med 2008; 56: 954-7.

[138] McKenzie TL, Strikmiller PK, Stone EJ, *et al*. CATCH: Physical activity process evaluation in a multicenter trial. Health Educ Q 1994; S2: S72-89.

[139] Edmundson EW, Luton SC, McGraw SA, *et al*. CATCH: classroom process evaluation in a multicenter trial. Health Educ Q 1994; S2: S27-50.

[140] Johnson CC, Osganian SK, Budman SB, *et al*. CATCH: family process evaluation in a multicenter trial. Health Educ Q, 1994; S2: S91-106.

[141] Raizman DJ, Montgomery DH, Osganian V, Edzery MK, Nicklas TA, Clesi AL. CATCH: food service program process evaluation in a multicenter trial. Health Educ Q 1994; S2: S51-71.

Received on 20-08-2013 Accepted on 26-09-2013 Published on 28-11-2013

http://dx.doi.org/10.6000/1929-4247.2013.02.04.1