Preschoolers' Physical Activity Behaviours

Parents' Perspectives

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ABSTRACT

Objectives: To understand parents' perspectives of their preschoolers' physical activity behaviours.

Methods: A maximum variation sample of 71 parents explored their preschoolers' physical activity behaviours through 10 semi-structured focus group discussions.

Results: Parents perceived Canada's Physical Activity Guidelines for Children as inadequate; that their preschoolers get and need more than 30-90 minutes of activity daily; and that physical activity habits must be established during the preschool years. Nine barriers against and facilitators toward adequate physical activity were proposed: child's age, weather, daycare, siblings, finances, time, society and safety, parents' impact, and child's activity preferences.

Discussion: The need for education and interventions that address current barriers are essential for establishing physical activity as a lifestyle behaviour during early childhood and, consequently, helping to prevent both childhood and adulthood obesity.

MeSH terms: Children; preschool; motor activity; obesity; primary prevention

La traduction du résumé se trouve à la fin de l'article.

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besity is an insidious populationhealth problem for Canadians. One third of Canadian children are either overweight or obese.^{1,2} Furthermore, a recent study from Newfoundland and Labrador has shown that one in four preschool children are overweight or obese.³ Although obesity-related morbidity tends to be expressed later in life,⁴⁻⁶ it has been shown that obesity increases the prevalence of Type II diabetes, hypertension and asthma in children.⁷⁻⁹ Moreover, it is likely that early childhood obesity will persist into adulthood.¹⁰

The determinants of childhood obesity include genetic predisposition, dietary intake and energy expenditure.¹¹ The latter two are considered the behaviourally modifiable determinants of obesity.¹¹ Relative to changing dietary patterns, efforts to increase children's energy expenditure may have potentially more positive short- and long-term benefits. For instance, in addition to decreasing their potential for overweight and obesity immediately and later in life, children who are regularly physically active also tend to experience attitude and behavioural improvements and some researchers have identified a positive correlation between exercise and academic achievement, children's self-esteem and self-efficacy.¹²⁻¹⁴ While research on preschoolers' physical activity behaviours is minimal,¹⁵ we do know that two thirds of Canadian children aged 5-17 are not active enough to promote good health.¹⁶

The health-related behaviours of preschool-aged children are predominantly under the influence and control of their parents. Parents' activity patterns are close-ly associated with those of their offspring,¹² and overweight preschool-aged boys and girls are 6.1 and 3.8 "times, respectively, more likely to have at least one obese parent."¹⁷ Consequently, parents' involvement in healthy bodyweight promotion in children is critical.

Gittelsohn et al. encourage health promotion program planners to embrace an emic (insider's) viewpoint, along with the more traditional etic (outsiders') viewpoint, to facilitate the development of an appropriate program.^{18,19} Qualitative research techniques provide an efficacious means for obtaining an emic viewpoint about what would be acceptable for the target population, prior to the development of an intervention.^{18,19} Understand-

TABLE I Measures to Ensure Data Trustworthiness Credibility Member checking was done between questions and at the end of each focus group to ensure the researchers correctly understood the responses from participants. The moderator provided her perception of participants' responses prior to moving on to the next question, and the assistant moderator summarized participant responses at the end of each focus group to ensure accuracy. Dependability Following each focus group, four of the five research team members met to obvious group and detailed minutes are used and detailed minutes are used and and an are sended at the sended at the

Confirmability Confirmation Con

f two researchers, who l'ater met to compare their analysés. Data were examined for similarities and differences across the interviews and emerging themes were identified. A summary of the analysis was prepared and discussed. The fifth team member independently reviewed all 10 transcripts and engaged in peerdebriefing with the other team members.

Transferability The research process has been documented in detail, thus enabling potentially interested parties to determine whether our results are transferable to other settings.

Note: To further reduce the possibility of bias, leaders at the various focus-group sites were utilized to recruit participants, and therefore, the researchers and participants were unknown to each other (with the exception of one focus group, as discussed earlier).

ing parents' perspectives is essential to the successful development of a primary prevention intervention to combat childhood obesity and promote healthy bodyweight.

The current study was part of a threepronged qualitative study to assess parents' perspectives of their preschoolers' physical activity and screen-viewing behaviours, and programming suggestions to encourage appropriate levels of each. This paper presents the physical activity component of the study.

METHODS

Ten semi-structured focus-group interviews, with 4-11 people in each, were conducted with parents of preschool-aged children (2.5 to 5 years). Participants were asked about their children's physical activity behaviours. The qualitative method of focus groups was chosen to assess parents' perspectives before developing an intervention. The Canadian Institutes for Health Research funded this project and ethical approval was obtained through The University of Western Ontario.

Parents of preschoolers were recruited through flyers, information sheets and site visits at community locations (five playgroups, three daycare centres, one resource centre and one workplace). Two of the 10 sites were located in rural areas. Sites from different geographic areas within London and Middlesex County were selected to provide a maximum-variation sample. Homogeneous participants were recruited for each focus group and an overall sample of parents with diverse socio-economic status (education level, income, employment status) were recruited.

To facilitate focus-group attendance, childcare, bus tickets and a meal for parents and children were provided. Focus groups were also planned at times when parents would normally be at the selected location.

All focus-group meetings were facilitated by one of two experienced moderators and lasted for approximately 1-1.5 hours. In one focus group only, many participants knew the moderator; however, this seemed to have minimal impact on their participation. Focus groups were audio-recorded and transcribed verbatim. Saturation was reached by the tenth focus group.

Data collection and analysis took place simultaneously using a combination of the editing and template organizing styles outlined by Miller and Crabtree.²⁰ A minimum of two researchers independently conducted inductive content analysis on each transcript and compared their findings. NVivo software was utilized to code and categorize emerging themes. Although there was a risk of introducing bias into a study because only one form of data collection was used, a number of strategies were employed to ensure the trustworthiness of the findings (Table I).^{21,22}

RESULTS

Participants

Seventy-one people participated in this study, most of whom were female (68).

TABLE II Participant Domograph

Participant Demographics (n=71)

Pe	ercentage (%)
Participant age (years)	0
20-29	27
30-39	62
40-49	7
50-59	1
60+	3
Annual family income	
\$0-\$24,999	20
\$25,000-\$59,999	32
\$60,000-\$99,999	35
≥\$100,000	13
Highest education levels	
Some or completed high scho	ool 16
Some or completed college	45
Some or completed university	y 34
Graduate degree	6
Current employment	
Part time '	23
Full time	42
No paid employment	35
Ethnicity	
Caucasian	95.5
Southeast Asian	1.5
Black	1.5
Other	1.5

Participants ranged in age from 21 to 63, with approximately 60% in their 30s. Although all recruitment materials specifically asked for parents, three grandparents significantly involved in the guardianship of their grandchildren participated. Our recruitment strategy appeared to offer relatively homogeneous focus groups, while providing an overall mix of participants with different income, education and employment backgrounds (Table II). Areas lacking in diversity were gender and ethnicity.

Perspectives on early habits

Parents stressed the importance of encouraging healthy behaviours early in their children's lives and explained that establishing physical activity during the preschool-aged years would facilitate the development of a long-term healthy lifestyle and an alternative to getting into trouble. Table III provides some illustrative comments.

Amount and types of physical activity

Parents reported that their preschoolers engaged in anywhere from 1 to 10 hours of daily physical activity, depending on the weather, with the majority hovering around 3 to 4 hours per day. The types of physical activity in which preschoolers were involved varied; they included everything from organized sports to chasing squirrels at the park. Many preschoolers were involved in both organized and

TABLE III

Perspectives on Early Habits

"I think from two perspectives when you try to think long-term is (a) the physical part of it, of staying physically fit is one aspect of it but the other part is the more active you are, the more you're involved in stuff, the less spare time you have, the less trouble you may get into."

"If you start them young, then they'll build a lifestyle to carry them right through their entire life."

TABLE IV

Structured and Unstructured Activities

"I find having her registered in something has really helped out. Last year I was determined to teach her how to skate. I never did it because I didn't have a specific time I was going to do it. This year I signed her up for skating and we both go and do it and it's more structured and that's been helpful."

"Some of the other issues though with organized activities like that is cost. I mean none of them are inexpensive. I live in a rural area so I would have to go to a city to access a lot of them and cost is simply prohibitive. Then you've got the time on top of it."

"So you have the organized sport but you can also form an informal play group with them as well. It teaches them rules and how to get along with others, whatever games they're playing and teaches them how to work together as a team, perhaps. The downside is that if you have your kids scheduled most days of the week then you're right, they don't have the play time just to be kids. They don't have the down time that they need."

"I think another issue with organized sport is the competitiveness of it......I don't think the competition at that age is really appropriate and it really affects kids' self-esteem...."

TABLE V

Responses to Guidelines

"So for preschoolers I don't think that would even apply. I think they need a lot more than that."

"I just think it's a very sad commentary that the . . . current guide says only 30 minutes a day and they're increasing it to 90 It's very sad if there are children out there who are only getting 30 minutes of active play a day and I'm sure there probably are."

home-based activities. The home-based activities included bike riding, dancing, chasing squirrels or the family dog, tobogganing, roller blading, jumping and skipping, walking, playing hide and seek, swimming, running on the treadmill, hiking, duck-feeding, collecting sticks, climbing, playing basketball and baseball, wrestling, playing tag, swinging, and jumping on the trampoline. The organized activities included ice hockey, soccer, skating lessons, 'Kindermusic', floor hockey, gymnastics, basketball, baseball, and power skating.

Structured and unstructured activities

Parents had differing views on the value of structured physical activity, as reflected in Table IV. Some felt structure was helpful for making sure activities took place. Some rural parents felt that the extra time, effort and cost necessary to get their kids to those activities made it more desirable to create more home-based activities. Some parents suggested that organized activities (e.g., hockey) fostered inappropriate competitiveness and would detract from the quality of their children's or their families' lives. Other parents indicated that as long as preschoolers were active, it really did not matter whether it was organized or not, and they believed that some parents may have lost sight of that.

Responses to Guidelines

Canada's Physical Activity Guidelines for Children (CPAG-C)²³ and specific examples of moderate and vigorous activity (e.g., swimming, running, riding a bike) were presented to parents. Most suggested the guidelines were insufficient and explained that 30-90 minutes of physical activity for their preschooler was easy. Few parents shared concerns about meeting the guidelines (see Table V).

Barriers and facilitators to preschoolers' physical activity

The reported barriers and facilitators to appropriate physical activity among preschoolers included: the preschoolers' age; the season/weather; daycare providers; the presence or absence of siblings; the financial costs of participating; time; scheduling; society and safety issues; parents' impact; and the child's activity preferences. Table VI provides illustrative comments.

Age

Some parents indicated that the age of their preschoolers was a barrier to their physical activity opportunities. Because some physical activity organizations required that all participants be toilet trained, a number of preschoolers were excluded. Also, the paucity of organized activities for preschool-aged children meant there was little from which to choose.

Season and weather

The season and weather impacted preschoolers' physical activity. The warmer seasons were more conducive to physical activity, and the colder seasons posed greater challenges, although in some cases the preschoolers were willing to go outside and play but parents were not. For a few parents, getting outside and being active was too important to let the weather have any impact.

Daycare

Parents reported consistently that having their preschoolers enrolled in some form of daycare program facilitated their children's physical activity. They felt that licenced daycare centres consistently offered higher quality, more structured, and routine physical activity experiences than home daycare settings.

Siblings

For some parents, having more than one child posed unique challenges to facilitating their preschoolers' physical activity, especially when trying to participate in structured programs. For others, multiple children made physical activity much easier because they took pressure off parents by providing other kids with whom the preschoolers could be active.

Financial costs

Although parents recognized the value of physical activity, the financial costs associated with structured or organized activities were highlighted as a barrier, especially for single-income families.

Time

Insufficient time, especially for working parents, was a barrier to preschoolers getting regular physical activity.

Society and safety issues

The current society, described by participants as busier, less safe, and with more

alternatives than when they were children, was identified as a barrier to preschoolers' physical activity. None of the focus-group participants suggested that today's society facilitated physical activity better than in the past. Safety concerns, ranging from unsafe driving to abductions, were brought forward by many participants. There was a general feeling that because of safety concerns, children have less freedom to play outdoors today than in the past.

Parents' impact

Parents' creativity, perspectives on organized sport, personal activity habits and preferences, and organizational abilities reportedly all contributed to either supporting or detracting from preschoolers' physical activity habits. Some parents felt that as long as they supported their children's physical activity, they were not required to participate with their preschoolers, whereas others felt that being a physically active role model was critical.

Child's activity preferences

The activities in which preschoolers preferred to participate had a large impact on their parents' abilities to facilitate regular physical activity. For example, for children who enjoyed more sedentary activities, it was a greater challenge to get them physically active compared to those children who loved physical activity.

DISCUSSION

Parents in this study were passionate about their preschoolers' health, including their physical activity behaviours. Although the Canadian guidelines²³ were not tailored for preschoolers, they were chosen for this study because they were the clearest healthrelated physical activity guidelines available. Most parents reported that their preschoolers met and exceeded the guidelines. However, the accuracy of parents' reports are of concern. Although Burdette et al. found that parental-report measures provide an accurate reflection of preschoolers' actual physical activity levels,²⁴ Sallis et al. suggested that parents tend to report that their preschoolers are continually active, even though heart rate recordings indicate that two thirds are insufficiently active.²⁵ Previous research suggests that young children lead insufficiently active

TABLE VI

Barriers and Facilitators to Preschools' Physical Activity

Age "I find a lot of stuff in the [activity centre] ... will say your child has to be fully potty trained. So like it might be only an hour or two hours so what's the big deal of having a child potty-trained?"

"...I find there's not enough things for that age group...."

Season and Weather

"I think climate really plays a factor in our abilities. I know we're much more active in the summertime and the spring and fall and in the winter it's not as easy.

"During the summer their activity behaviours are great. I love how active they are and how they want to be outside doing things but in the winter[I]t's cold and I don't want to go outside and play with them anymore

"It's really important that I get my kids out. I try at least every day to do that, to get some outside air and activity because that's important to me too, like I get cabin fever so fast."

Daycare

"It's structured, it's consistent. It goes from group to group, the expectations are there. Obviously it is overseen by the Ministry. There is so much outdoor activity anticipated and if they can't have that there are alternate activities....

"My preschooler actually is in a [private preschool] program and they don't have the room to have the physical activity part of it every day or even once a week, so they get it once a month."

Siblings

"It's really hard when you've got one at home and one big person and they think that you're the cruise director all day.' I agree. On weekends the three of them will play even though there's a wide range of age. They will just take off and find something that the three of them will play and I never hear from them unless I want to do something with them and then we're all together, but the three of them will entertain each other quite well. But the minute the older two are gone, it's 'What are we doing now Mom?'

"I'm having a problem because both my kids love swimming. [My daughter's session] will be at one time and [my son's] is a half-hour later. Well do you think I can hold him for half an hour with-out him screaming and kicking because she's in the pool and we're sitting there watching? No, so I have to have both times so we're both in the pool at the same time so there's no fighting."

Financial Costs

...being a single parent, I don't have the funds to pay for uniforms and fees and all that stuff."

Time

"... I've just started working full-time and it's a long commute and I'm away from the home for such a long period of the day that [I] do more with the kids on the weekend. Yeah, okay then between the laundry and the cleaning and everything else, especially at this time of year [December] when there's so much extra stuff to do that I can't even begin to think of doing some organized physical activity with the kids."

Society and Safety

"I always think of the toys the kids have today.... there are many more things that will also keep them inside more so than before. Where if she didn't have that then she'd be outside because there'd be nothing to do inside. I think today they are so focused in on the mind, like you need to sit down and you need to learn. So everything they're inventing are not things that you take outside and do.

"I think the other thing to mention is that the climate, the culture in our society today is very differ-ent from when we all grew up where in the morning you could say go outside and play and I'll call you when it's time for lunch or ...dinner. Safety issues come into play, you don't want your kids out of your sight for a long period of time...because you don't know what's out there that could impact on their safety and well being."

Parents' Impact

"But we try to find ways to be physically active other ways, like for example, maybe parking at the other end of the mall and when you go in one door, go out the wrong door and have to walk all the way around as a family and skip and hop and try to make it fun. So we try to be creative in ways to increase the activity to help her out so that she does get a little bit extra and to make it fun and a family sort of thing.

"...what the child sees he is going to do moreso.... Like if parents are active, kids are going to be active. And if parents aren't the kids aren't either.'

Child's Activity Preferences

"She is more the reader, more the crafty type...you find her a lot of times just sitting down in the sand box trying to build something but a lot of times we have to get her moving and we go for walks to try to get her moving.

"Mine [children's activity levels] vary actually and I think that is to do with their personality. So my older one is a lot more physical, so he needs to run around and let off steam.... For my 3-year old, who is a girl.... [s]he never stops from the time she gets up. She hasn't napped since she was a year and a half."

lifestyles.¹⁵ Still, it is possible that the parents in this study had very active children, given their self-reported characterization of being "keen" parents. Due to the nature of the sampling method utilized, the selfselected parents in the current study are not representative of parents of preschoolers.

Parents reported that their activity behaviours and preferences impacted their preschoolers; if parents enjoyed physical activity, they passed that enjoyment on to their preschoolers, and the reverse was equally true. Parents and caregivers largely influence the behaviours of preschoolers. Clearly then, parents can have a tremendous impact on preventing obesity.²⁵⁻²⁷ Finding out what facilitates and hinders parents' ability to provide their preschoolers with appropriate physical activity is essential for understanding how best to address these barriers and facilitators.

Previous research corroborates our findings regarding barriers and facilitators to preschoolers' physical activity.^{26,28-31} Namely, we determined that time, resources and safety concerns, along with daycare providers and the weather, were among the components that either facilitate or hinder activity levels.

Parents in this study identified physical activity as critical for the emotional and physical health of their preschoolers, including the prevention of obesity. Parents' perceptions of their preschoolers' activity behaviours, including barriers and facilitators to appropriate levels, are essential ingredients for the next step of this project - identifying an efficacious program to prevent childhood obesity in preschoolers. Although effective obesity treatment programs are much needed, preventing obesity before it starts has even more potential for positively impacting the lives of children who need not live with the psychological and physical strain of being obese.

In conclusion, education and interventions addressing current barriers are essential for establishing physically active lifestyles during early childhood, and consequently, helping to prevent both childhood and adulthood obesity. Furthermore, objective measures to quantitatively determine the prevalence of physical activity among Canadian preschoolers would be valuable for understanding the extent of the inactivity problem among this age group.

REFERENCES

1. Tremblay MS, Katzmarzyk PT, Willms JD. Temporal trends in overweight and obesity in Canada, 1981-1996. *Int J Obes Relat Metab Disord* 2002;26:538-43.

- Tremblay MS, Willms JD. Secular trends in the body mass index of Canadian children. CMAJ 2000;163:1429-33.
- 3. Canning PM, Courage ML, Frizzell LM. Prevalence of overweight and obesity in a provincial population of Canadian preschool children. *CMAJ* 2004;171(3):240-42.
- Lauer RM, Burns TL, Clarke WR, Mahoney LT. Childhood predictors of future blood pressure. *Hypertension* 1991;18:I74-I81.
- Mahoney LT, Lauer RM, Lee J, Clarke WR. Factors affecting tracking of coronary heart disease risk factors in children. The Muscatine Study. Ann N Y Acad Sci 1991;623:120-32.
- Chopo GR, Lazaro MA, Ucles P. Obstructive sleep apnea syndrome in childhood. *Rev Neurol* 2001;32:86-91.
- Figueroa-Colon R, Franklin FA, Lee JY, Aldridge R, Alexander L. Prevalence of obesity with increased blood pressure in elementary schoolaged children. *South Med J* 1997;90:806-13.
- Figueroa-Munoz JI, Chinn S, Rona RJ. Association between obesity and asthma in 4-11 year old children in the UK. *Thorax* 2001;56:133-37.
- Fagot-Campagna A. Emergence of type 2 diabetes mellitus in children: Epidemiological evidence. *J Pediatr Endocrinol Metab* 2000;13(Suppl 6):1395-402.
- Serdula MK, Ivery D, Coates RJ, Freedman DS, Williamson DF, Byers T. Do obese children become obese adults? A review of the literature. *Prev Med* 1993;22:167-77.
- Andersen RE. The spread of the childhood obesity epidemic. *CMAJ* 2000;163:1461-62.
- 12. Řitchie LD, Ivey S, Masch M, Woodward G, Ikeda J, Crawford P. Pediatric overweight: A review of the literature. The Centre for Weight and Health, University of California. Berkley, CA, 2001.
- 13. Canadian Paediatric Society (CPS). Healthy active living for children and youth. *J Paediatr Child Health* 2002;7:339-45.
- 14. American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription, 6th ed. Philadelphia, PA: Williams & Wilkins, Lippincott, 2000.
- 15. Benham Deal T. The preschool mover: A comparison between naturally-occurring and program-directed physical activity patterns. *Early Child Dev Care* 1993;96:65-80.
- Craig CL, Cameron C, Russell S, Beaulieu A. Increasing physical activity – supporting children's participation. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute, 2001.
- Trost SG, Sirard JR, Dowda M, Pfeiffer KA, Pate RR. Physical activity and overweight and nonoverweight preschool children. *Int J Obes* 2003;27:834-39.
- Gittelsohn J, Evans M, Story M, Davis SM, Metcalfe L, Helitzer DL, et al. Multisite forma-

RÉSUMÉ

Objectifs : Comprendre le point de vue des parents sur les habitudes d'activité physique de leurs enfants d'âge préscolaire.

Méthode : Soixante-et-onze parents composant un échantillon le plus variable possible ont analysé les habitudes d'activité physique de leurs enfants d'âge préscolaire au sein de 10 groupes d'entretien en profondeur semi-structurés.

Résultats : Selon les parents, le *Guide d'activité physique canadien pour les jeunes et les enfants* est insuffisant. Les parents ont par ailleurs indiqué que leurs enfants d'âge préscolaire faisaient plus de 30 à 90 minutes d'activité par jour, qu'ils avaient besoin de ce niveau d'activité, et que c'est à l'âge préscolaire que s'acquièrent les bonnes habitudes d'activité physique. Ils ont cerné neuf facteurs qui facilitent ou font obstacle à une activité physique adéquate : l'âge de l'enfant, les conditions météorologiques, la garderie, les frères et sours, les moyens financiers, le temps, la sécurité du milieu de vie, l'influence des parents et les activités préférées de l'enfant.

Discussion : La sensibilisation et les interventions qui tiennent compte des obstacles courants sont deux éléments indispensables à l'acquisition de bonnes habitudes d'activité physique dès la petite enfance. Ces deux éléments peuvent donc aussi aider à prévenir l'obésité, depuis l'enfance jusqu'à l'âge adulte.

tive assessment for the Pathways study to prevent obesity in American Indian schoolchildren. *Am J Clin Nutr* 1999;69:7678-7728.

- Gittelsohn J, Evans M, Helitzer D, Anliker J, Story M, Metcalfe L, et al. Formative research in a school-based obesity prevention program for Native American school children (Pathways). *Health Educ Res* 1998;13:251-65.
- 20. Miller WL, Crabtree BF. Clinical research: A multimethod typology and qualitative roadmap. In: Crabtree BF, Miller WL (Eds.), *Doing Qualitative Research*, 2nd ed. Thousand Oaks, CA: Sage, 1999;3-30.
- 21. Guba EG, Lincoln YS. Fourth Generation Evaluation. London, England: Sage, 1989;233-43.
- 22. Guba EG. Criteria for assessing the trustworthiness of naturalistic inquiries. *Educ Commun Technol* 1981;29(2):75-91.
- 23. Health Canada, the College of Family Physicians of Canada, Canadian Paediatric Society, Canadian Society for Exercise Physiology; 2002 Cat: H39-611/2002-2E ISBN 0-662-31932-X
- 24. Burdette HL, Whitaker RC. Neighborhood playgrounds, fast food restaurants, and crime: Relationships to overweight in low-income preschool children. *Prev Med* 2004;38:57-63.
- Sallis JF, Patterson TL, McKenzie TL, Nader PR. Family variables and physical activity in preschool children. *Develop Behav Pediatr* 1988;9(2):57-61.
- Sallis JF, Nader PR, Broyles SL, Berry CC, Elder JP, McKenzie TL, et al. Correlates of physical activity at home in Mexican-American and Anglo-American preschool children. *Health Psychol* 1993;12:390-98.
- Trost SG, Sallis JF, Pate RR, Freedson PS, Taylor WC, Dowda M. Evaluating a model of parental influence on youth physical activity. *Am J Prev Med* 2003;25(4):277-82.
- Bosch A, Servais L, Reicks M. Physical activity for preschool children: Growing up fit – together. J Nutr Educ Behav 2000;32:60C.
- Finn K, Johannsen N, Specker B. Factors associated with physical activity in preschool children. *J Pediatr* 2002;140(1):81-85.
- Baranowski T, Thompson WO, DuRant RH, Baranowski J, Puhl J. Observations on physical activity in physical locations: Age, gender, ethnicity, and month effects. *Res Q Exerc Sport* 1993;64(2):127-33.
- Klesges RC, Eck LH, Janson CL, Haddock CK, Klesges LM. Effects of obesity, social interactions, and physical environment on physical activity in preschoolers. *Health Psychol* 1990;9(4):435-49.

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