

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_184_18

Perceived barriers to healthy lifestyle from the parental perspective of overweight and obese students

Armindokht Shahsanai, Maryam Bahreynian¹, Zahra Fallah¹, Silva Hovsepian¹, Roya Kelishadi¹

Abstract:

BACKGROUND: Over the last decades, childhood obesity has become a worldwide epidemic health problem. Identifying the barriers to a healthy lifestyle among children and adolescents is necessary for further effective intervention to prevent overweight and obesity. This study aims to assess the barriers to healthy lifestyle habits, including physical activity (PA), eating, and sleep among adolescents from the perspective of their parents.

METHODS: In this cross-sectional study, the parents of obese and overweight middle school students were enrolled. Data were collected using a questionnaire about barriers of healthy nutrition and PA.

RESULTS: Overall, 172 parents completed the questionnaire. Lack of access to affordable facilities for PA, lack of access to the appropriate place for PA, and lack of sufficient information on how to do or increase PA were the main barriers to PA. The barrier factors for healthy eating were media advertisement of unhealthy foods, lack of motivation to use healthy nutrition, and lack of adequate information about healthy eating. Regarding poor sleep, lack of knowledge about the benefits of sleep, prolonged watching television, and late sleep time of family members were reported as the main barriers. These findings were not statistically different according to the family socioeconomic level.

CONCLUSION: Our findings propose that for improving healthy lifestyle in obese children and adolescents, access to facilities, and appropriate places for PA should be provided at the community level. Moreover, training parents and students about healthy lifestyle behaviors is necessary for families of all socioeconomic levels.

Keywords:

Lifestyle, obesity, student

Department of Community Medicine, School of Medicine, Isfahan University of Medical Sciences, ¹Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non-communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran

Address for correspondence:

Dr. Silva Hovsepian, Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non-communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: silvahovsepsecret@gmail.com

Received: 17-06-2018

Accepted: 15-01-2019

Introduction

Over the last decades, childhood obesity has become a worldwide epidemic health problem. Based on a recent worldwide analysis, the trend of childhood obesity increased ten folds from 1975 to 2016.^[1] Obesity in childhood has threatened the health consequences such as heart disease, diabetes, sleep apnea, arthritis, and some types of cancer and also has negative effect on mental health and academic performance in children or adolescent.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

The probability that childhood obesity continues in adulthood is 80%. In addition, the economic cost of obesity and overweight also imposes national health system,^[2-4] that prevention and proper management of childhood obesity are considered as a high priority for health-care providers.

Different efficacious child weight control and prevention programs have been introduced to increase physical activity (PA) and/or decrease sedentary behavior, providing appropriate lifestyle modification, including healthy eating habit as well as appropriate sleep habit.^[5,6]

How to cite this article: Shahsanai A, Bahreynian M, Fallah Z, Hovsepian S, Kelishadi R. Perceived barriers to healthy lifestyle from the parental perspective of overweight and obese students. *J Edu Health Promot* 2019;8:79.

Even though lifestyle modification is the therapy of choice for childhood obesity and the efficacy of lifestyle intervention in this field has been confirmed in many interventional studies, but there are also several individuals, social, and environmental barriers to the achievement of healthy lifestyle.^[7,8] Recognition barriers to a healthy lifestyle among children and adolescents are necessary in any effective intervention to prevent and treat overweight and obesity. Many studies express different barriers for healthy lifestyle.^[9-11]

As the epidemic of childhood overweight continues to rise in developing countries, including Iran, the researches need to focus on the most effective means of reducing and preventing obesity. Interventions for overweight children such as improving PA, modifying unhealthy dietary, and sleep patterns may be improved by a better understanding of elements that promote with the interventions.

Strategies that focus on increasing support while reducing barriers to PA and appropriate lifestyle modification, particularly barriers that may be unique to obese children, may be most promising.

Several regional studies in Iran have reported the prevalence rate of obesity among Iranian population, their related risk factors, and epidemiological features as well as different interventions implemented for the prevention of obesity and its related noncommunicable disorders, especially among school children and mainly through the nationwide study of CASPIAN. However, there was not any study regarding the barriers of healthy lifestyle in our community.^[12-18]

Hence, considering the key role of parents in implementing obesity control programs, this study was designed to identify parents perceived barriers to healthy lifestyle components, including PA, healthy diet, and sleep among obese and overweight students who enrolled in the obesity prevention program of Isfahan city.

Methods

This cross-sectional study was conducted in 2014 in Isfahan, Iran. The protocol of this study was approved by Regional Ethics Committee of Isfahan University of Medical Sciences with a research project number of 293325. In this study, parents of overweight and/or obese students of Isfahan middle schools were enrolled in the study.

The list of overweight and/or obese students was provided by the Adolescent and School Health Unit of The Vice-Chancellery for Health. The overweight and/or obese children were diagnosed during the annual screening of obesity in Isfahan city.

Based on the growth curves of the World Health Organization, those with gender-specific BMI for the age of >2+ z-score were defined as overweight/obese.^[19]

Using the random number table, 180 students were selected. Parents of the students were recalled to participate in a meeting which aim was to describe the objective of this study and the methods of the study in details. Parents who accepted to participate in the study were included and written informed consent was obtained from each participant.

The parents of students who could not participate in the meeting and the study due to traveling or moving to another city or country were not included in the study.

Data were collected using a questionnaire about the barriers of healthy nutrition and PA for young women that previously was published and used to investigate barriers to healthy eating and PA among adolescents.^[20,21]

Completion of the questionnaire was done by one of the parents and was voluntary. The questionnaires were anonymous and parents were assured that their information would remain confidential.

Questionnaire of barriers of healthy nutrition and physical activity

At the first step, the questionnaire was translated to Farsi by two different expert persons who were fluent in English to Farsi translation and then it was translated again to Farsi by another skilled two persons. After that, the two questionnaires were compared and modified forward and backward translation (all under the supervision of some specialists). We added some question about healthy sleep and general demographic characteristics to it. Validity was confirmed by four experts and for evaluating the reliability was used of Cronbach's alpha coefficient (81.6).

The questionnaire contained questions on individual, social, and environmental aspects of PA, healthy eating, and healthy sleeping barriers.

Statistical analysis

Statistical analyses were performed using the SPSS software package, version 21 (SPSS Inc., Chicago, IL, USA). Descriptive analysis expressed as percent of answered questions. Father and mother job, father and mother education, home, and car were considered as socioeconomic factors. Exploratory factor analysis was used for determined socioeconomic variable level to high, moderate, and low. The Chi-square tests were used for the comparison of categorical variables. The statistical significance level was set at $P < 0.05$.

Results

Overall, 172 parents completed the questionnaire (38% of girls' parents and 62% of boys' parents). From enrolled parents, 73 were fathers and 99 were mothers of overweight/obese students. The mean (standard deviation) age of the students was 12 (2) years.

Perceived barriers to healthy lifestyle, including PA, healthy eating, and healthy sleep from the parental

perspective of overweight, and obesity students based on individual, social, and environmental aspects are summarized in Table 1.

Regarding barriers of PA, the most common barriers in order were as follows: lack of access to affordable facilities for PA (71.4%), lack of access to the appropriate place for PA (56.9%), and lack of sufficient information on how to do or increase PA (56.3%).

Table 1: Frequency of perceived barriers to healthy lifestyle, including physical activity, healthy eating, and healthy sleep from the parental perspective of overweight and obesity students based on individual, social, and environmental aspects

Barriers	Agree (%)	No idea (%)	Disagree (%)
Personal barriers for PA			
Lack of motivation	44.6	8.3	47.1
Lack of enjoyment	34	5	61
Lack of skill	38.8	18.4	42.8
Social barriers for PA			
Not enough parental support	30.8	10.3	59.0
Not enough colleagues support	48.0	20.4	31.6
Not enough teacher/school support	34.4	27.3	38.3
Environmental barriers for PA			
Lack of enough information about PA	56.3	17.2	26.5
Lack of appropriate place	56.9	7.2	35.9
Lack of accessibility to low-cost PA place	71.4	8.4	20.1
Lack of enough time	49.0	7.6	43.3
Feeling shy for PA in public	26.5	11.6	61.9
Not having appropriate climate	32.1	17.9	50.0
Cultural factors	24.5	21.9	53.5
Economic factors	51.0	12.4	35.9
Not having time due to homework	53.2	9.1	37.7
Not having enough PA do to obesity	44.9	10.3	44.9
Not having enough ability for doing PA	42.2	11.7	46.1
Personal and environmental barriers for healthy diet			
Lack of knowledge about healthy food	52.2	10.7	37.1
Lack of motivation to use healthy food	65.2	13.3	21.5
Lack of enjoyment to healthy food	44.5	11.6	43.9
Lack of appropriate knowledge in family	23.4	7.6	69.0
Not having enough facility to prepare healthy food	19.2	12.2	68.6
Not having familial accessibility to healthy diet	13.0	12.3	74.7
Cost of healthy food	43.6	10.9	45.5
Social barriers for healthy diet			
Lack of parental support for healthy diet	15.4	7.7	76.9
Lack of friends or colleagues support for healthy diet	48.3	19.9	31.8
Lack of teacher or school support for healthy diet	19.4	21.3	59.4
Not having enough time to prepare healthy foods	15.6	12.3	72.1
Inappropriate media advertisement	70.1	14.9	14.9
Personal and environmental barriers for healthy sleep			
Lack of information about healthy sleep	46.8	10.3	42.9
Lack of sleep due to TV watching	61.4	7.6	31.0
Lack of sleep due to homework	34.4	14.6	51.0
Lack of sleep due to computer's games and entertainment	44.5	11.6	43.9
Lack of knowledge about benefits of sleep	61.6	10.1	27.7
Social barrier for healthy sleep			
Not having enough sleep due to family	51.3	7.6	41.1

PA=Physical activity

The most common barriers for healthy eating were media advertisement of unhealthy foods (70.1%), lack of motivation to use healthy nutrition (65.2%), and lack of adequate information about healthy eating (52.2%) in order.

Regarding healthy sleep, the most common barriers in order were lack of knowledge about the benefits of sleep (61.6%), prolonged watching television (61.4%), and late sleep time of family (51.3%).

Frequency of parental consent for the reported barriers of the studied healthy lifestyle factors based on socioeconomic levels of families is presented in Figure 1. There was no statistically significant difference between the frequencies of reported barriers in different socioeconomic levels ($P > 0.05$).

Discussion

In this study, we investigated barriers to lifestyle modification among overweight and obese Isfahan students. The results indicated that lack of adequate and proper facilities to affordable PA and lack of proper education regarding the more appropriate physical activities were the most common barriers for PA. For dietary habits, unhealthy foods advertisements through media, lack of motivation for implementation of the principles of healthy nutrition, and lack of adequate information about healthy eating were the most important obstacles. Among the causes of inappropriate sleep, lack of knowledge about the benefits of proper sleep, late sleeping time of family members, and TV watching were the main barriers.

Obesity in childhood is a significant public health problem that requires comprehensive prevention and intervention efforts.^[3] As mentioned though different epidemiological as well as interventional studies have been conducted

among Iranian students, it seems that investigating the barriers of implementing effective lifestyle modification in this field is necessary to providing successful preventive strategies and improving the nutritional and health status of the community.^[22,23]

Childhood obesity management needs multidisciplinary approach and providers of the issue reported that there are different barriers for achieving healthy lifestyle. The barriers are related to patients, their parents, health-care providers, culture, and environmental factors as well as social context.^[24]

Many studies have investigated different barriers to healthy lifestyle and its components including PA and healthy diet. Based on the mentioned studies, factors such as unsafe neighborhood for PA, inconvenient location of health services, and social barriers including time and financial costs have been reported as the most important barriers in this field.^[25-28]

Evidence indicated that parents have important role in the prevention and interventional programs of childhood obesity. Their perception about barriers to healthy lifestyle as well as their knowledge in this field should be evaluated and considered for designing the programs.

There is no any study in Iranian population in this field. In literature review, we found few studies about parental perceived barriers to healthy diet and PA.^[29,30]

Moore *et al.*, in the USA, have identified barriers to adequate PA and a healthy diet among 110 students aged 6–13 years old. Their findings indicated that factors related knowledge and access to healthy foods were barriers to PA and healthy diet, respectively.^[31]

Norman *et al.*, in Sweden, have indicated that both lack of parental support and parent-child disinter actions are considered as barriers to healthy eating and PA. They recommended to design more health-related behaviors intervention studies in children.^[32]

Musaiger *et al.* have evaluated the perceived personal, social, and environmental barriers to healthy eating and PA among 4698 Arab adolescents aged 15–18 years from public schools. They indicated that not enough information, motivation, and time to prepare healthy food as the important barriers to healthy eating. However, deficit of motivation, support from teachers, and time to do PA were the main barriers to PA. Parents and friends had positive role, but teachers were negative support for eating a healthy diet or to do PA.^[21]

Findings of a recent study from the USA about barriers to childhood obesity prevention based on parents' knowledge and attitudes demonstrated that

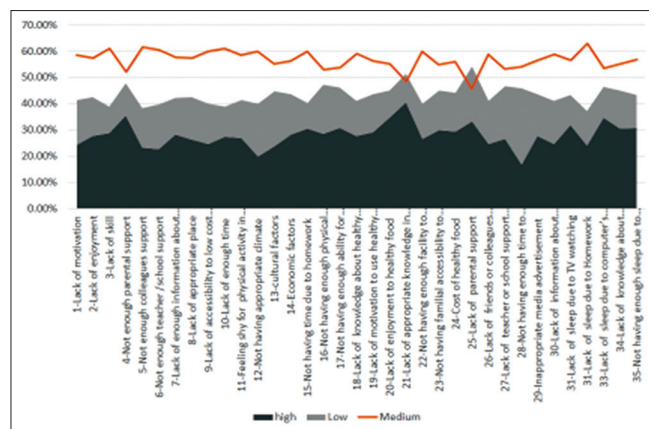


Figure 1: Frequency of parental consent for the reported barriers of the healthy lifestyle including physical activity, healthy eating, and healthy sleep based on the socioeconomic levels of families

the most important barriers toward healthy lifestyle and appropriate weight control were lack of parents' knowledge regarding obesity trends, its health risks, healthy eating and PA recommendations, food cost, and lack of time.^[33]

The findings of the current study regarding barriers of PA from the perception of obese students' parents were mainly referred to health policy-makers for not providing appropriate facilities for students' PA and also referred to parents' lack of awareness about the importance of PA as well as the suitable and perfect practices of physical activities for obesity.

Our findings regarding parents' knowledge were similar to that reported in previous studies. Regarding accessing to proper facilities for students' PA by health policy-makers, the policies are different in various communities. It is suggested that reporting our findings would be helpful for health-care policymakers in designing future obesity control programs in our community.

For healthy diet, lack of parents' information related to healthy nutrition, insufficient nutrition education, and lack of enough motivation for preparing healthy foods were the most predominant barriers. Another important barrier was mass media advertisements. Our results were similar to that reported by both Arab and Western countries.^[21]

It is well established that students' motivation for using healthy nutrients and making healthy food choices is mainly influenced by parents, peers, mass media, and teachers.^[21] Hence, it is suggested that educating both parents and general population about the principles of healthy diet and nutrients by mass media and health-care providers would reduce the influence of mentioned barriers.

Although the most common barriers for healthy lifestyle from the perspective of obese students' parents were almost similar to previously reported studies, there were some differences which may be due to the differences in socioeconomic, regional, and cultural factors and the prevalence rate of obesity in different countries. Moreover, it seems that the nutrition transition in developing countries during the last decade, in turn, could influence on healthy lifestyle habits and its related barriers in students.

Recently, there was an increasing interest on the importance of child sleep to health and their growth and development, and it considered as a health promotion priority. Thellman *et al.* reported that inappropriate sleeping habits such as short sleep duration, late

bedtimes, or poor sleep quality are associated with poor diet quality, excess food intake, and consequently with obesity. They concluded that sleep hygiene is an important component of childhood obesity prevention and treatment.^[34]

In spite of the fact that sleep health has a crucial role in healthy lifestyle, but it seems that it is often neglected mainly by policy and health-care makers and much of the attention is paid to PA and dietary habits. In literature review, we did not find the study which has focused on barriers to healthy sleep in children.

In this study, the most important parents' perceived barrier was lack of enough knowledge in this field.

It is also suggested that though parents were aware of sleep importance to their children's health and weight management, there is a gap between their knowledge and implementation of them in practice.

It is also interesting that based on the study of Boerner *et al.*, the most important barriers related to sleep care from the perspectives of health-care professionals are lack of enough knowledge, training, and education in this field.^[35]

Given the findings of the current study, providing educational intervention for parents, schoolchildren as well as teachers and promoting strategies for developing healthy sleeping patterns for students in terms of quality and duration would be helpful for improving obesity management programs in community.^[36-38]

The results of this study demonstrated that the frequency of reported barriers for PA, healthy eating, and sleep by parents was not any significant different in different socioeconomic levels of families. The results of studies in this field were not similar and conclusive. Voss *et al.* indicated that family income had no significant association with the level of PA of their children,^[39] whereas Hey *et al.* demonstrated that economic factors are important and effective factors for preparing healthy food.^[40] It seems that as the main barrier for the three studied lifestyle habits were lack of awareness of parents about the importance of the factors and their implementation, so in this step, the most important factor is knowledge.

The limitation of this study was its small sample size and not evaluation the barriers based on gender differences. Previous studies indicated that the studies lifestyle component, especially PA and sleep habits are different in girls and boys.^[21]

The strength of the current study was its novelty, especially regarding its findings about healthy sleeping

habits as well as that the studied patients and their parents were selected from different regions of Isfahan city.

Conclusion

Our findings propose that for improving healthy lifestyle in obese children and adolescents, access to facilities, and appropriate places for PA should be provided at the community level. Moreover, training parents and students about healthy lifestyle behaviors is necessary for the families of all socioeconomic levels.

Acknowledgments

The authors would like to thank all participants and research team in Child Growth and Development Research Center.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Rivera-Vega MY, Flint A, Winger DG, Libman I, Arslanian S. Obesity and youth diabetes: Distinguishing characteristics between islet antibody positive vs. negative patients over time. *Pediatr Diabetes* 2015;16:375-81.
2. Bacha F, Edmundowicz D, Sutton-Tyrell K, Lee S, Tfayli H, Arslanian SA, *et al.* Coronary artery calcification in obese youth: What are the phenotypic and metabolic determinants? *Diabetes Care* 2014;37:2632-9.
3. Zabinski MF, Saelens BE, Stein RI, Hayden-Wade HA, Wilfley DE. Overweight children's barriers to and support for physical activity. *Obes Res* 2003;11:238-46.
4. Huybrechts I, De Bourdeaudhuij I, De Henauw S. Environmental factors: Opportunities and barriers for physical activity, and healthy eating among children and adolescents. *Verh K Acad Geneeskd Belg* 2010;72:277-93.
5. U.S. Department of Health and Human Services. The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity. Rockville, MD, Washington: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, U.S. GPO; 2001.
6. Dunton GF, Schneider M. Perceived barriers to walking for physical activity. *Prev Chronic Dis* 2006;3:A116.
7. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. *Med Sci Sports Exerc* 2000;32:963-75.
8. Norman GJ, Schmid BA, Sallis JF, Calfas KJ, Patrick K. Psychosocial and environmental correlates of adolescent sedentary behaviors. *Pediatrics* 2005;116:908-16.
9. Jacobson Vann JC, Finkle J, Ammerman A, Wegner S, Skinner AC, Benjamin JT, *et al.* Use of a tool to determine perceived barriers to children's healthy eating and physical activity and relationships to health behaviors. *J Pediatr Nurs* 2011;26:404-15.
10. Grow HM, Hsu C, Liu LL, Briner L, Jessen-Fiddick T, Lozano P, *et al.* Understanding family motivations and barriers to participation in community-based programs for overweight youth: One program model does not fit all. *J Public Health Manag Pract* 2013;19:E1-10.
11. Jefferson A. Breaking down barriers – Examining health-promoting behavior in the family. *Kellogg's Family Health Study 2005. Nutr Bull* 2006;31:60-4.
12. Bahreynian M, Motlagh ME, Qorbani M, Heshmat R, Ardalan G, Kelishadi R, *et al.* Prevalence of growth disorders in a nationally representative sample of Iranian adolescents according to socioeconomic status: The CASPIAN-III study. *Pediatr Neonatol* 2015;56:242-7.
13. Ataie-Jafari A, Heshmat R, Kelishadi R, Ardalan G, Mahmoudarabi M, Rezapoor A, *et al.* Generalized or abdominal obesity: Which one better identifies cardiometabolic risk factors among children and adolescents? The CASPIAN III study. *J Trop Pediatr* 2014;60:377-85.
14. Rahmanian M, Kelishadi R, Qorbani M, Motlagh ME, Shafiee G, Aminae T, *et al.* Dual burden of body weight among Iranian children and adolescents in 2003 and 2010: The CASPIAN-III study. *Arch Med Sci* 2014;10:96-103.
15. Kelishadi R, Ardalan G, Qorbani M, Ataie-Jafari A, Bahreynian M, Taslimi M, *et al.* Methodology and early findings of the fourth survey of childhood and adolescence surveillance and prevention of adult non-communicable disease in Iran: The CASPIAN-IV study. *Int J Prev Med* 2013;4:1451-60.
16. Kelishadi R, Motlagh ME, Roomizadeh P, Abtahi SH, Qorbani M, Taslimi M, *et al.* First report on path analysis for cardiometabolic components in a nationally representative sample of pediatric population in the Middle East and North Africa (MENA): The CASPIAN-III study. *Ann Nutr Metab* 2013;62:257-65.
17. Mahjoub S, Haji Ahmadi M, Faramarzi M, Ghorbani H, Moazezi Z. The prevalence of metabolic syndrome according to the Iranian committee of obesity and ATP III criteria in Babol, North of Iran. *Caspian J Intern Med* 2012;3:410-6.
18. Kelishadi R, Ardalan G, Gheiratmand R, Majdzadeh R, Hosseini M, Gouya MM, *et al.* Thinness, overweight and obesity in a national sample of Iranian children and adolescents: CASPIAN study. *Child Care Health Dev* 2008;34:44-54.
19. de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J, *et al.* Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ* 2007;85:660-7.
20. Andajani-Sutjahjo S, Ball K, Warren N, Inglis V, Crawford D. Perceived personal, social and environmental barriers to weight maintenance among young women: A community survey. *Int J Behav Nutr Phys Act* 2004;1:15.
21. Musaiger AO, Al-Mannai M, Tayyem R, Al-Lalla O, Ali EY, Kalam F, *et al.* Perceived barriers to healthy eating and physical activity among adolescents in seven Arab countries: A cross-cultural study. *ScientificWorldJournal* 2013;2013:232164.
22. McCarron DA, Richartz N, Brigham S, White MK, Klein SP, Kessel SS, *et al.* Community-based priorities for improving nutrition and physical activity in childhood. *Pediatrics* 2010;126 Suppl 2:S73-89.
23. Huybrechts I, De Bourdeaudhuij I, De Henauw S. Environmental factors: Opportunities and barriers for physical activity, and healthy eating among children and adolescents. *Verh K Acad Geneeskd Belg* 2009;72:277-93.
24. Kelleher E, Harrington JM, Shiely F, Perry IJ, McHugh SM. Barriers and facilitators to the implementation of a community-based, multidisciplinary, family-focused childhood weight management programme in Ireland: A qualitative study. *BMJ Open* 2017;7:e016459.
25. Ling J, B Robbins L, Hines-Martin V. Perceived parental barriers to and strategies for supporting physical activity and healthy eating among head start children. *J Community Health* 2016;41:593-602.
26. Pocock M, Trivedi D, Wills W, Bunn F, Magnusson J. Parental perceptions regarding healthy behaviours for preventing overweight and obesity in young children: A systematic review

- of qualitative studies. *Obes Rev* 2010;11:338-53.
27. Sonnevile KR, La Pelle N, Taveras EM, Gillman MW, Prosser LA. Economic and other barriers to adopting recommendations to prevent childhood obesity: Results of a focus group study with parents. *BMC Pediatr* 2009;9:81.
 28. Schalkwijk AA, Bot SD, de Vries L, Westerman MJ, Nijpels G, Elders PJ, *et al.* Perspectives of obese children and their parents on lifestyle behavior change: A qualitative study. *Int J Behav Nutr Phys Act* 2015;12:102.
 29. Lindsay AC, Sussner KM, Kim J, Gortmaker S. The role of parents in preventing childhood obesity. *Future Child* 2006;16:169-86.
 30. Jarvis JW, Harrington DW, Manson H. Exploring parent-reported barriers to supporting their child's health behaviors: A cross-sectional study. *Int J Behav Nutr Phys Act* 2017;14:77.
 31. Moore MM, Robinson JC, Rachel MM, Boss BJ. Barriers to physical activity and healthy diet among children ages 6 through 13 in a Mississippi elementary school. *J Pediatr Nurs* 2014;29:74-82.
 32. Norman Å, Berlin A, Sundblom E, Elinder LS, Nyberg G. Stuck in a vicious circle of stress. Parental concerns and barriers to changing children's dietary and physical activity habits. *Appetite* 2015;87:137-42.
 33. Vittrup B, McClure D. Barriers to childhood obesity prevention: Parental knowledge and attitudes. *Pediatr Nurs* 2018;44:81-94.
 34. Thellman KE, Dmitrieva J, Miller A, Harsh JR, LeBourgeois MK. Sleep timing is associated with self-reported dietary patterns in 9- to 15-year-olds. *Sleep Health* 2017;3:269-75.
 35. Boerner KE, Coulombe JA, Corkum P. Barriers and facilitators of evidence-based practice in pediatric behavioral sleep care: Qualitative analysis of the perspectives of health professionals. *Behav Sleep Med* 2015;13:36-51.
 36. Golley RK, Maher CA, Matricciani L, Olds TS. Sleep duration or bedtime? Exploring the association between sleep timing behaviour, diet and BMI in children and adolescents. *Int J Obes (Lond)* 2013;37:546-51.
 37. Roenneberg T, Allebrandt KV, Meroz M, Vetter C. Social jetlag and obesity. *Curr Biol* 2012;22:939-43.
 38. Anuradha RK, Sathyavathi RB, Reddy TM, Hemalatha R, Sudhakar G, Geetha P, *et al.* Effect of social and environmental determinants on overweight and obesity prevalence among adolescent school children. *Indian J Endocrinol Metab* 2015;19:283-7.
 39. Voss LD, Hosking J, Metcalf BS, Jeffery AN, Wilkin TJ. Children from low-income families have less access to sports facilities, but are no less physically active: Cross-sectional study (*EarlyBird 35*). *Child Care Health Dev* 2008;34:470-4.
 40. Hey DW, Kelly KM, Teaford S, McDermott AY. Barriers to physical activity and healthy eating in children as perceived by low-income parents: A case study. *Int J Nutr* 2015;1:75.