

The impact of parental health status on children's eating habits and behaviors: A narrative review

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ABSTRACT

Although the problem of childhood obesity has been broadly documented over the last decades and characterized as one of the most significant problems of public health, the percentage of overweight and obese children remains extremely high. It is undeniable that parents contribute significantly in shaping children's dietary behavior and can be a valuable factor for implementing effective strategies. However the influence of parental health status on children's eating habits is another aspect that remains almost uninvestigated. The aim of the study is to examine to what extent parental diet-related chronic diseases affect their own but also their children dietary behavior. A literature review was conducted focusing on studies published within the last decade. The majority of studies examined, indicated a moderate to very low adherence to dietary guidelines for a specific disease, as a result children's dietary behavior is not favorably affected. Therefore we should emphasize on the importance of healthy dietary modeling especially in case of a family history of disease.

KEY WORDS: *Childhood obesity, parental health, family history, dietary habits*

INTRODUCTION

Nowadays it is widely known that childhood obesity has become one of the most significant problems of public health worldwide. Recent evidence show that the percentage of childhood obesity has risen up to 30% which means that one out of three children in the U.S. is classified as either overweight or obese.¹⁻³ According to WHO in 2016, 41 million children were overweight

and obese globally. The upward trend of obesity prevalence over the last decades has been broadly confirmed despite the efforts of clinical and political makers to address the issue.⁴ Understanding the ongoing trends is a key factor in the implementation of effective strategies. Childhood obesity is associated with the development of several serious obesity-related co-morbidities that not only affect children's life but also increase the burden of the health care system.⁵ The comorbidities affect a number of systems including cardiorespiratory, endocrinologic, gastrointestinal, orthopedic and musculoskeletal.⁶ It's worth mentioning that the percentage of dyslipidemia in overweight children is double the

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TABLE 1. Characteristics of studies included in this narrative review

| Study | Design | Sample | Results | Comments |
|-------------------------------|---------------------------------------|---|---|--|
| Piotrowicz et al.,2015 (20) | Cross-sectional | 113 patients, 90 males, age 48±9 years | 91% had sedentary life, none of the patients followed cardioprotective diet recommendations | 73% required partial diet modification 27% required complete diet modification |
| Alefshat et al, 2016 (21) | Cross-sectional | 900 patients, 47,8% males, age 55.1±11.06 years | 48.4% were non adherent to medications 90,3% were non adherent to lifestyle changes | Educational levels (p<0.023), knowledge scores (p=0.001), and attitudes toward health (p≤0.001) were positively associated with better adherence to lifestyle changes score. |
| Ausili et al,2017 (22) | Cross-sectional | 302 patients, 53.6% males, median age 68 years. | Diet was the most frequent self care behavior (M=5.2 [4.2–6.0])following exercise, blood testing and foot care. | |
| Al-Khawaldeh et al, 2012 (23) | Cross-sectional | 223 patients, 56,1% males, age 59.9±8.4 years | Within a range of 0-7 medication taking was the most frequent reported behavior (M=6.1±1.7), diet followed (M=4.4±1.4) while less frequent were blood sugar testing (M=1.7±2.4) and exercise (M=1.8±1.9) | 50% of the subjects did not have their diabetes under control only 42% attended diabetes educational programs |
| Milas et al, 2006 (24) | Cross-sectional | 960 hypercholesterolemic patients, 41,6% males, mean age 43.7±16.1 years for men and 44.7±16.0 for women. | Dietary patterns differ between hypercholesterolaemics and nonhypercholerolaemics. The first consumed more frequently fish (p<0.001), bread and cereals (p=0.031), fruits and juices (p<0.001) and low fat yogurt (p<0.001) in contrast with the last ones. | Hypercholesterolaemic participants seemed to be more consistent with dietary guidelines. |
| Thomas et al, 2017 (25) | Case-control | 6235 individuals with CVD risk factors or established disease,2180 individuals with no risk factors or established disease>18 years old, 1109 children 2-17 years old residing in the same house with parents carrying CVD risk factors or an established disease, 1109 other children. | No difference concerning dietary intakes such as total fat, saturated+trans fatty acid intake, long chain n-3 fatty acids, fiber and standard drinking (p>0.05) was detected between adults with CVD risk or established disease and adults with no risk factor or established disease. Different intakes between the two groups was detected only for total energy and sodium (p<0.05). No difference was detected for children residing in the same household with affected adults in contrast with other children. | |
| Osadnik et al,2018 | Case-Control Study (MAGNETIC Project) | Healthy young adults 18-35 years old, 351 with family history of P-CAD and 338 without | Subjects with family history of P-CAD showed higher adherence by 31% and 25% to 'westernized traditional' DP (OR: 1.31, (95% CI): 1.12–1.53; p < 0.005; and adjOR 1.25, 95% CI: 1.06–1.48; p = 0.007; respectively). | Young adults follow unfavorable dietary habits concerning the P-CAD family history and health risk. |



TABLE 1. Characteristics of studies included in this narrative review (*continued*)

| Study | Design | Sample | Results | Comments |
|---------------------|-----------------|--|---|----------|
| Haycraft et al,2017 | Case-control | 437 mothers with their 2-6 years old children, 249 health weight, 188 overweight/obese, age 34±5.7 years | Overweight/obese mothers provided less healthy food environment (p=0.021), reported giving their child more control around eating (p<0.01), encourage less variety around food (p=0.021), showed less healthy food modeling(p<0.01) in contrast with healthy weight mothers | |
| Ejtahed et al,2018 | Cross-sectional | 14400 students, 7-18 years old with one of their parents aged 44.2±7.1 fathers, 38.1±6.5 mothers | The risk of excess weight (OR: 1.30, 95%CI: 1.17–1.44), obesity (OR: 1.36, 95%CI: 1.18–1.59), abdominal obesity (OR: 1.16, 95%CI: 1.05–1.29) and elevated BP (OR: 1.17, 95%CI: 1.04–1.31) were higher in students whose parents had excess weight compared with other students. | |

percentage in overall pediatric population while diabetes is one of the most common chronic diseases of childhood and obesity enhances the prevalence.⁷ Concerning cardiovascular diseases, childhood nutrition is highly linked to increased coronary heart disease risk in adulthood.⁸ Parents are commonly regarded as the key influence in shaping children's dietary behavior and eating habits. Parents influence their children either by their own dietary intake or by the food parenting practices they have been using. First of all parents act as food models and parental food intake behaviors are observed and eventually adopted by children.⁹ Through the process of modeling and mimicry, children's dietary intake is affected by the children's perception that their parents' eating habits are the most appropriate.⁹ Experimental studies have shown that children are more likely to eat unfamiliar foods after they have seen a nother person consuming that food, especially if it is their parents.¹⁰ Parent –child correspondence has been reported in several cross-sectional studies examining the intake of healthy and unhealthy foods indicating a strong correspondence, especially for mothers.¹¹⁻¹³ Although common genetics may contribute in parent-child correspondence intakes, environmental factors such as food availability and food modeling are stronger moderators especially among younger children. This hypothesis is confirmed by a large population-based twin study indicating the shared environmental influences to be the major determinants of dietary behavior in young children.¹⁴ Food parenting practices (FPP) are techniques or behaviors used by parents to affect their children's dietary behavior. FPP are divided into three main categories: coercive control (pressure to

eat, threats and bribes etc.), structure (rules and limits, limited choices, monitoring etc) and autonomy support (nutrition education, child involvement, praise, negotiation etc).¹⁵ Each FPP has a different impact on children's dietary behavior although a detailed review of their results runs beyond the scope of this review.

Another important factor to consider is that dietary patterns adopted in childhood remain stable through adulthood, emphasizing the importance of early interventions in children especially younger than 12 years old before patterns are less likely to change.¹⁶ In addition it has been proved that behaviors adopted through parents' own behavior have a strong lasting effect even when children have left their home.¹⁷

Multiple factors lead to overweight and obesity in childhood and thereby influence the recommendations for management. One significant approach to tackling childhood obesity and disordered eating behaviors is to understand the most important modifiable determinants of healthy eating behaviors in early life and implement effective strategies. Parental influence on child's dietary behavior is a valuable tool of guiding interventions preventing unhealthy dietary behavior and development of overweight and obesity.¹⁸ Obesity prevention efforts should focus on healthy family based lifestyle modifications.¹⁹ The condition of parents' health and its impact on their own but also on their children's dietary intake has not been adequately examined. Thus, the aim of this review is to evaluate the association between the parents' health status (i.e., having a chronic disease) and the impact this condition may have on their children's eating behavior.

METHODS

The research studies included in the review were published in English and were selected after a thorough review of the existing literature from the scientific database PubMed (<https://pubmed.ncbi.nlm.nih.gov/>). The literature review focused on studies published within the last decade (i.e 2010-2020) with just one exception concerning hypercholesterolaemic patients (2006) since more recent evidence was not found. The keywords used during the search procedure were: childhood AND/OR overweight / obesity, parents, parents' health; children; family history. In addition, the reference lists of the retrieved articles were used in order to find additional relevant studies. Studies were considered eligible for inclusion in the present review provided that they were carried out in patients with an established disease or at high risk and that the age of the patient was >18 and <60 years old so that children are more likely to live in the same household with their parents. Due to the limitation of the existing literature, all types of studies were included, such as cross-sectional, case-control, and observational studies. The exclusion criteria included studies that were not written in English and those who included healthy parents.

RESULTS

The impact of parents' health status on their eating behavior.

In order to examine the effect of parents' health on children's dietary behavior, it was necessary to first examine the way parents' health condition affects their own dietary habits. A few studies have examined the impact of diet-related diseases on patients eating behavior. In particular Piotrowicz et al., assessed the self-reported health-related behaviors and dietary habits of patients with the metabolic syndrome (MetS). A sample of 113 patients with confirmed characteristics of the syndrome participated in the study. Leading characteristics were central obesity (100%), following respectively family history of CAD, elevated LDL and hypertension while the vast majority of the sample (85%) presented at least moderate cardiovascular risk according to the European Society Cardiology (ESC) SCORE system.²⁰ Diet quality was assessed using three methods: 24-h recall, diet history questionnaire and the Healthy Eating Index. The study findings were quite impressive revealing that 85% of the patients were not aware of the dietary recommendations for CV risk reduction, they had a disturbed meal pattern and an exceeded energy intake leading to the result that 73% of the patients required a partial and 27% a complete diet modification.²¹ These findings are consistent with another cross-sectional study carrying a

larger sample which examines the self-reported adherence of individuals in high risk of metabolic syndrome. Almost half of the participants were non-adherent to medications while the vast majority, namely 90% of the sample was non-adherent to lifestyle changes.²²

In regards to diabetic patients several studies have assessed the self-care behaviors of those patients, one of which is a recent cross-sectional study by Ausili et al., investigating the self-care behaviors of patients along with the quality of life and clinical outcomes. A sample of 302 T2DM patients took part in this study and the behaviors assessed were diet, blood-testing, exercise and foot care. According to the assessment, diet was the most frequently followed behavior with the less frequent being exercise.²³ Similar studies have indicated that diet was the most common behavior among patients after medication. However, in the same study less than half of the patients had their diabetes under control.²⁴ It is confirmed that diabetic patients recognize the significant role of a recommended healthy diet in metabolic control.

Additionally, a cross-sectional survey by Millas et al., investigating the prevalence of hypercholesterolaemia and its relation to nutritional habits has revealed more promising results of patients' behavior. A large sample consisting of 5003 adults was included in the study of which 38% were hypercholesterolaemic. Data concerning demographic, socioeconomic characteristics and nutritional assessment were collected through telephone interview conducted by an expert. Hypercholesterolaemic patients were following a more favorable diet consisting of more frequent consumption of fish, bread and cereals, fruit and juices and low fat dairy products in contrast to non cholesterolaemic participants. The first seemed to be more consistent with dietary guidelines.²⁵

The association of parents' health and their children's dietary behavior.

Two studies have investigated the interaction concerning dietary behaviors between parents with a disease and their children. Specifically, Thomas et al., through a cross-sectional study has determined whether the presence of cardiovascular disease risk factors or of an established disease influences the dietary intake of affected adults and their children living under the same roof. Data from the large Australian Health Survey were used, and information concerning dietary intake of macro- and micronutrients was collected through 24-h recall of at least eight days apart. Despite the total energy and sodium being significantly lower in adults with CVD risk or established disease, although sodium intake was still higher than recommended, no other difference was observed. The

same result applies to children, where no difference was observed between selected nutrients and the proportion of children meeting the recommendations for selected nutrients among children who reside with an adult with CVD risk or established disease and children who not. The results indicated that evidence-based recommendations for relevant nutrients aiding in the prevention of chronic diseases such as CVD are not followed as a whole and compliance to optimal dietary intakes of adults with CVD risk or established disease remains low. Similar results were reported concerning their children, as expected since children's behavior reflects that of adults.²⁶

Furthermore, Osadnik et al., have examined whether and how family history of Premature Coronary Artery Disease (P-CAD) affects dietary patterns of Young Healthy offspring through a case-control study. The participants were healthy young adults (ages 18-35 years old), 351 with (case) and 338 without family history of P-CAD (control). Even though we examine the impact of parents' health on children's dietary patterns it has been proved that dietary patterns established early in the life form the basis of the dietary habits followed in adulthood. Consequently, the sample of young adults is accepted. The data used were collected from the Magnetic case-control study and the dietary data from a food frequency questionnaire (FFQ-6). According to the results, young healthy adults with family history of P-CAD reported higher adherence to 'westernised' traditional diet which consisted of frequent consumption of processed meats, potatoes, refined grain products, red meats, sweet and snacks. As it is highlighted by the researchers, the most possible explanation of the aforementioned results is the powerful impact of parents' behavior on children's dietary choices even once they have left home.²⁷

The impact of Overweight/Obese parents on children's eating behavior.

The study conducted by Haycraft et al., compared the differences between healthy weight and overweight/obese mothers on their reported feeding practices and their children's eating behavior. In total, 437 mothers with a 2-6 years old child took part in the study. Dietary intake data were collected through self-reported questionnaires. First of all, as expected, overweight/obese mothers did not demonstrate the appropriate healthy eating model, provided a less healthy home food environment, less balance and variety around food and more control around eating in contrast with healthy mothers. Overweight or obese mothers used less healthy feeding practices and as it was also indicated, they had a wrong perception of their child's eating behavior reporting that their child was

more reluctant and refused to eat but not to drink. These findings emphasize the need of a better support to those mothers concerning healthy eating feeding practices.²⁸

A recent study focusing on the association of parental obesity and children's health was conducted by Ejhated et al in 2015. 14.400 students aged 7 to 18 years old with one of their parents were included in the study. Student's and parent's questionnaire concerning anthropometric characteristics and information about dietary habits and behaviors were completed by expert health care professionals. According to the analysis, children whose parents were classified as obese or abdominal obese presented higher risk of having excess body weight, obesity, abdominal obesity as well as elevated blood pressure. Further than the underlying mechanism of common genetics, common lifestyle factors such as dietary habits and physical activity are strongly associated with this outcome.²⁹ Although several studies have evaluated the impact of parental overweight and obesity on children's body weight as a result of a combination of genetic and lifestyle factors documenting similar results with the above study, they are not mentioned here as parental obesity is included as a part of disturbed health status of parents.

DISCUSSION

According to the findings of the review the existence of a diet-related disease influences in various extend the group of patients. Patients with cardiovascular disease and metabolic syndrome are the least adherent to the recommended dietary intakes while diabetic patients and patients with hypercholesterolaemia seem to be more consistent with the guidelines. A few studies have evaluated the eating behaviors of children who live in the same house with parents carrying established diseases although they tend to be similar with parental eating behavior. The main reasons that lead to low levels of adherence in patients are knowledge and the attitude towards the disease. Especially in patients with metabolic syndrome educational levels, knowledge scores and attitudes towards health were positively associated with better adherence to lifestyle changes.²⁰ However, there is not a single approach that can be implemented in all patients to improve adherence and therefore different interventions are required for each patient.³⁰

Parents' influence on children's dietary behavior is undeniable but the first step that has to be done so that parents positively change their children's eating behavior is to understand and recognize the health risk their children face either due to the family history or the parental overweight and obesity. Misclassification of weight is a common phenomenon especially among parents with

low educational level and obese parents. False negatives are way more common than false positives and parents tend to underestimate their child's weight.³¹ Concerning family history and parental perception of risk for their children, a study by Petricevic et al., reported that family history of obesity or obesity-related illnesses is not related to increased recognition of overweight of their children.³² On the other hand, a study conducted by Nsiah-Kumi et al., evaluated the impact of Family history of diabetes risk in overweight children. The factors that contribute to the parental perceived risk of diabetes and CVD are parental education, child gender and race/ethnicity. Parents whose child had Family history for diabetes or CVD or was obese

perceived higher risk of diabetes in overweight children than those without Family history. However, parents with low educational level, African American parents and parents of girls were less likely to perceive the increased risk of diabetes in overweight children.³³

Parents should be informed about the health risk of avoiding a healthy lifestyle and be educated about the crucial role they play in shaping children's health behaviors. The importance of modeling healthy behaviors for children should be highlighted by clinicians and transmitted to parents. Healthy family-based interventions are a promising strategy for the onset of chronic diseases prevention in childhood and later in life.

ΠΕΡΙΛΗΨΗ

Κατάσταση υγείας των γονέων και διατροφικές συνήθειες και συμπεριφορές των παιδιών. Μια αφηγηματική ανασκόπηση

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Παρόλο που το πρόβλημα της παιδικής παχυσαρκίας έγινε ευρέως γνωστό τις τελευταίες δεκαετίες και αποτελεί ένα από τα σημαντικότερα προβλήματα δημόσιας υγείας, το ποσοστό των παιδιών που είναι υπέρβαρα ή παχύσαρκα παραμένει αρκετά υψηλό. Ο ρόλος των γονέων στην διαμόρφωση της διαιτητικής συμπεριφοράς των παιδιών είναι αδιαμφισβήτητος και μπορεί να αποτελέσει έναν πολύτιμο σύμμαχο στην διαμορφωση αποτελεσματικών στρατηγικών για την αντιμετώπιση αυτού του φαινομένου. Ωστόσο η επίδραση της κατάστασης υγείας των γονέων στην διαμόρφωση των διαιτητικών συνηθειών των παιδιών αποτελεί ένα αρκετά ανεξερεύνητο πεδίο. Σκοπός της μελέτης είναι να εξετασθεί σε ποιο βαθμό οι χρόνιες παθήσεις των γονέων που σχετίζονται με τη διατροφή επηρεάζουν τη διατροφική συμπεριφορά τόσο των ίδιων όσο και των παιδιών τους. Πραγματοποιήθηκε ανασκόπηση της βιβλιογραφίας για την ανεύρεση σχετικών άρθρων που δημοσιεύθηκαν εντός της τελευταίας δεκαετίας. Η πλειονότητα των μελετών που εξετάστηκαν έδειξε μέτρια έως πολύ χαμηλή τήρηση των διαιτητικών οδηγιών για την εκάστοτε ασθένεια με αποτέλεσμα η διατροφική συμπεριφορά των παιδιών να επηρεάζεται αρνητικά. Επομένως θα πρέπει να τονίσουμε την σημασία ενός υγιεινού διατροφικού προτύπου για τα παιδιά ειδικά όταν υπάρχει οικογενειακό ιστορικό μιας νόσου σχετιζόμενης με τη διατροφή.

ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ: Παιδική παχυσαρκία, οικογενειακή κατάσταση υγείας, οικογενειακό ιστορικό, διατροφικές συνήθειες

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