EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 4
Issue: 4
99-105
Year: 2017

A REVIEW ON THE CAUSE, EFFECT AND PREVENTION OF CHILDHOOD OBESITY IN MALAYSIA

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Article Received on 27/01/2017 **Article Revised on 16/02/2017** **Article Accepted on 09/03/2017**

1.0 INTRODUCTION

The National Health Morbidity Survey (NHMS 2015) shown that more than 7% of children in Malaysia under the age of 7 years old are overweight and 8% suffered acute malnutrition.[1] According to Marianne Clark-Hattingh, UNICEF Malaysia Representative, the reason was due to the changing lifestyles and dietary habits, which was a new challenge, brought up by the improving income nationhood.[1] According to Engel"s (1977) biopsychosocial model of obesity[2], childhood obesity was caused by the increase of sedentary activities[3], lacking physical activities[4] and children"s unhealthy eating behavior[5], which was resulted from the interaction of complex multiple factors[6] such as the biological factors[7], psychological factors[8] and the complex contextual force of social factors.[6] Too much sedentary activities such as playing computer, cell phone or watching television caused childhood obesity.[9] The findings of a cross-sectional study conducted on 760 samples of school children in urban area of Babol, Northern Iran[10] indicated that parental obesity, spending more times on television and playing computer games were evidently associated with childhood obesity. As Malaysia children were fonder of computer game, cell phone and television viewing[9], physical activities were very much abandoned.[3]

KEYWORDS: Biopsychosocial Model, Childhood Obesity, Sedentary, Physical, Overeating, Disease, Parents' support, Breast Feeding, Biological, Psychological, Social Factors.

The findings of the study conducted by Moore (1987) to examine the effect of children's physical activity on the change in body fatness[11] indicated that physical activity had significant effect on obesity during early life. Children with low levels of physical activity gained substantially more subcutaneous fat than did more active children.[11] Malaysian face-paced lifestyle created lenient parenting style[12] that caused children's unhealthy eating habit, contributing to children's weight gain.[5]

Studies focusing on human imaging used biological mechanism theory to argue that our brain developed a strong automatic approach response toward food as compared with non-food items[7] and that these responses can be strengthened by the attractiveness of food related advertisement[13] and pricing.[14] Malaysian parents who ate a lot do influenced their children's eating habit[15] The findings of an observational study conducted by Drucker, (1999) indicated that mothers who delivered eating prompt more frequently had encouraged children's rapid eating behavior that were responsible to the number of calories eaten and the time spent eating.[15]

Childhood obesity if not attended during the early stage could extend to teenagers and adulthoods, increasing their risk to the many obesity related disease later in life.[16] The problem of obesity in children needed to be addressed effectively as it created many health complications including heart and lungs diseases, under development of muscles and bones, kidneys and digestive tract complications.[17] Pathological studies claimed that childhood obesity was the potential consequences associated very high risk factors of developing later disease in lives[16] including formation of early atherosclerosis, carotid IMT, cardiovascular disease (CVD) and type-2 diabetes. Atherosclerosis was evidently associated with the number and severity of risk factors.[18]

High measured of BMI was proven to be associated with the composition of fat and fibrous plaques found in

children who died from other causes.[35] The researchers from the Bambino Gesù Children's Hospital in Italy conducted a detailed blood test on 200 obese children claimed that metabolic abnormalities linked with obesity were present in young children that had although recently developed obesity. The Pathological Determinants of Atherosclerosis conducting test on 3000 individuals provided strong evident of advance atherosclerosis lesions being responsible for the death.[19]

Obesity, hypercholesterolemia and hypertension were found to be strongly associated with Carotid IMT in children.[20] A study conducted to examine carotid IMT in over 70 children indicated that 52 of the samples had advanced vascular age contributed by high triglyceride levels.[21] Although the evidence directly linking obesity as an independent risk factor to CVD in children was not strong yet[22] but obesity combined together with other risk factors was responsible for cardiovascular complications such as hypertension and insulin resistance.[18]

Bogalusa Heart Study had concluded that BMI was most strongly associated with insulin levels. On the study, 40% of children obtained a BMI greater than the 99th percentile obtained high insulin level.[23] Insulin resistance and hyper-insulinemia might be precursors of type-2 diabetes. The drastic increase of type-2 diabetes in youth today was mostly from those diagnosed as obese in childhood.[24]

Prevention of children obesity was crucial as the rate of childhood obesity had been increasing rapidly and had became one of the most serious public health challenges of the 21st century[1][32] Effective prevention of children obesity started with parents' interference.[25] Obesity Preventive Parenting Support (OPPS) intervention helped in children obesity prevention.[25]

The findings of an observational study conducted by Harvey-Berino and Rourke concluded that lifestyle behaviors and improving parenting skills[12] in controlling children's eating habit, increased physical activities and reduced sedentary activities were effective for obesity prevention in high-risk children.[26]

Prevention of childhood obesity has to begin as early as the infant stage. The benefits of breastfeeding were great to the health of infant and can protect children from gaining excess weight later in life. The findings of an observational study conducted by Baughcum (2001) indicated that mothers who breast-fed for longer than 3 months were not likely to have overweight children as compare to non-breastfeeding mothers.

Prevention in a broader population level[27] involved interference of the contextual forces such as built environment, social environment and health disparities, economic and agricultural factors that affected human's biological mechanism.[28]

2.0 MATERIALS COLLECTION

Material on the cause, effect and prevention of children obesity were obtained through systemic search on literature, educational journal, case studies and thesis written on relevant subject and by university conducting similar research published on educational website. The search strategy was refined and studies information was identified by searching relevant reputable website such as Medical Journal and Pub Med (restricted to reviews). Multiple sources of evidence that were being search including self-report, case study, health journals, obesity related journal, World Health Organization's obesity statistic and articles written by reputable health psychologists. Thesis on related topic published by University's educational forum and relevant website linking to the cause, effect and prevention of childhood obesity was obtained through search engine such as Yahoo and Google. Given the relatively developed field of work, Internet searches using "Yahoo" search engine under the keywords statement of "cause, effect, prevention and coping of children's obesity" had produced 21, 000 hits. A pragmatic approach was adopted and the first 200 results were extracted and reviewed. 74 articles were further rejected deal to the reason of relevancy and out of the 126 articles reviewed, 36 were selected for inclusion in this paper based on the objective and type of study, the setting, sample, intervention undertaken, measures used to evaluate impact, results and the validity and reliability of the studies. The types of studies ranged from simple observational methods to higher order studies.

2.1 Systemic Literature Search

A systemic literature search was conducted to identify interventions containing relevant information on investigating the cause, effect and prevention of Childhood obesity. To strengthen the effect of Childhood obesity that focused on health, information were also collected to observe how obesity causes life threatening diseases for instance, type-2 diabetes, cardio vascular disease and colon cancers. Drug therapy to deal with obesity related diseases was excluded as it was not very much related to the key factors of our topic and searches were restricted to English language. The literature search identified 126 obesity related articles. 36 articles met the inclusion criteria. The interventions identified in included articles were grouped around themes developed from the scoping search via breastfeeding, physical activity, sedentary activity, dietary support; obesity related diseases and family or school based interventions. The quality of each article was assessed in terms of study design including subject numbers, randomization, control for confounding and minimization of bias.

2.2 Research Design

A broad scoping search was undertaken to identify key terms, to assess the breadth and depth of the topic relating to obesity and research are designed to establish a broad structure to identify the cause and effect and ideas to deal with the prevention and coping of obesity

among children. Inclusion criteria are obesity related research studies providing information on body mass index (BMI), weight-for-height index and or skin fold thickness with some form of intervention and some assessment of effectiveness. Titles and abstracts of obesity related articles were assessed for relevancy and if the relevancy of article was uncertain from the title, the full paper was obtained for further assessment. Further primary articles related to obesity was identified and extracted from citations and review articles that specifically addressed obesity issues in children. Assessment of studies was undertaken with caution to ensure quality data with good reliability and validity were obtained for systematic reviewing.

2.3 Study Selection

Studies in young children's lifestyle to identify the cause for instance, eating behaviors, physical activity and sedentary activity related to childhood obesity was included. Studies to detect the effect of children obesity on health issue were included. Studies on the preventive measures that deal with Childhood obesity were also included. Randomized controlled trials or RCT to reduce bias during research survey, observational studies and case series (uncontrolled longitudinal study) to observe uncontrolled group of individual's response before and after the studies were appropriate for inclusion. Complete relevant articles were retrieved for further assessment if the information were found to be related to childhood obesity and had given suggestions of studies that included:

1. Parent's obesity is association with children's weight gain.
2. Uncontrolled eating behavior is associated with children's weight gain.
3. Lacking physical activities or physical movement associated with children's weight gain.
4. Sedentary activities (television viewing, computer) associated with children's weight gain
5. Diseases in related to childhood obesity.
6. Breast feeding in related to children's weight.
7. Preventive measures to deal with children's weight gain.

2.4 Quality Control of Data Inclusion

All research data identified for inclusion were independently assessed. Quality of research data was prioritized and after screening, the extracted data was acquired. Information received from authors and journals were screened. In order to maintain highest data validity and to reduce bias and manipulation during the research, the quality of data provided by authors and those extracted from journal were assessed by randomization; concealment of allocation and through research blinding. Quality assessment was done individually, which required a substantial amount of time to perform. The answers of scoring on these questions were compared later and the overall quality was graded as A (Very Satisfied), B (Satisfied), C (Unsatisfied), before meeting the standard of inclusion criteria. The extracted data were entered in a structured Excel sheet for further analyzing. Studies with comparable interventions were grouped and the results were synthesized in a narrative way.

3.0 Literature's Methodology Quality

The quality of the included studies was overall satisfactory. The study conducted in Bambino Gesù Children's Hospital in Italy to check for metabolic abnormalities and the Pathological Determinants of Atherosclerosis' research to check on risk factors contributed to children's mortality rate were conducted using large sampling involving a broader base of population to justify and strengthen the validity and reliability of the researches and tests. Some of the research in the studies was performed under small samplings and without evidence of follow-up research in a different setting to further support its validity. In one study, where research is conducted in a video recording condition, blinding application was impossible with intervention and control conducted in each setting leading to the possibility of data contamination and bias.

However, many of the research conduct in the studies involved laboratory testing and some involved forensic pathology dissertation.[18] The findings of these studies are derived from information obtained through hospital data base, questionnaires and interviews, laboratory test, forensic pathology dissertation and anthropometric measurements and some of the research studies were performed in long duration of 5 consecutive years. Such quality of scientific methodology used in the research studies was evidently sufficient enough to justify and confirmed the overall reliability and validity of the specific research's findings in the studies.

a) Data Collection from Computer Databases

Ascertainment of many health complications including lungs diseases, kidneys and digestive tract complications[17] early atherosclerosis, carotid IMT, cardiovascular disease (CVD) and type-2 diabetes[18] involved a review of the existing database in hospital using multiple source of evidence including patient's self-report, linking to primary and secondary care registers, hospital admissions and mortality data.[16] Information, figures and statistic related to the rate of obesity and the mortality rate of obesity in children were retrieved from the World Health Organization (WHO) and UNICEF computer database. An analysis was based on cross-sectional data collected and the overall design of the survey was a modification of the Third National Health and Nutrition Examination Survey (NHANES III) conducted by US National Centre for Health Statistics.

b) Questionnaires

In an observational study conducted by Baughcum (2001), the 'Infant Feeding Questionnaire' (IFQ) to assess infant feeding behavior during the first year of age was used on large sampling of 453 mothers of children aged between 11 to 23 months while The 'Pre-School Feeding Questionnaire' (PFQ) was used on 634 mothers

of children ages of 2–5 years. BMI of both children and mothers were recorded and scores from the IFQ and PFQ were compared between obese and non-obese mothers, between mothers who was having or not having obese children and between different incomes status mothers.

c) Interview

A cross-sectional study to examine whether parental weight status modified the association of childhood obesity was conducted on 760 samples of school children in urban area of Babol, Northern Iran to associate parental obesity and sedentary activity with childhood obesity. The methodology of the study included interviewing parents to collect socio-demographic and life style data was conducted. Interview with parents was also conducted on the OPPS study based on educational orientated approach and on children's eating prompt conducted by Drucker, (1999). Interview with breastfeeding mothers was conducted after the comparison of IFQ and PFQ questionnaires to conclude the effect of different duration of feeding time.

d) Educational Orientated

The observational study conducted by Harvey-Berino and Rourke to examine and compare the effectiveness between parenting support (PS) and obesity prevention with parenting support (OPPS) intervention in curbing obesity was employing educational approach to alter condition. Mothers were randomly assigned to a 16-week of either OPPS lessons or PS lessons in a one-on-one basis by peer educator. The 16-week assessments were basically education on weight and height, dietary intake, physical activity, parental feeding style and maternal outcome expectations, self-efficacy and intention to change diet and exercise behaviors. The findings concluded that lifestyle behaviors and improving parenting skills were effective for obesity prevention in high-risk children.

e) Laboratory Test

A study conducted in Italy involving a larger sampling of more than 5,700 healthy children who visited pediatricians in Rome between 2011 and 2012 conducted detailed laboratory blood test on selected obese children to find out if metabolic abnormalities linked with obesity were present in young children that had although recently developed obesity. Bogalusa Heart Study conducted laboratory test to find out if BMI was most strongly associated with insulin levels. Laboratory test was conducted to check on insulin resistance and hyper-insulinemia, which might be precursors of type-2 diabetes.[24] Laboratory test conducted by Le, Spencer and McCrary, (2008) confirmed that high triglyceride levels were factors contributed to the advance of vascular age.

f) Anthropometric Measurement

The methodology of the studies conducted on 760 samples of school children in urban area of Babol, Northern Iran to conclude whether parental weight status modified the association of childhood obesity applied initial measurement of children's weight and height to obtain BMI using standard method. In an observational study conducted by Baughcum (2001) on breast feeding, BMI of both children and mothers were also measured. On Moore's (1987) study to examine the effect of children's physical activity on the change in body fatness, measurement of Triceps Skin fold (TSF) thickness was taken and assessed twice per year for 5 consecutive years using an electronic motion sensor.

3.1 Intervention

Energy imbalance seen in Malaysia children today was not caused by a single risk factor but rather by a complex interaction of biological susceptibilities, built environment, socio environmental changes, health inequalities, economic status and agricultural factors.[29] Intervention in the national level should be lead by effective government policies to promote breastfeeding and to address the wider scope of social and economic factors which contribute to disease risk. In practice, government policy should be formulated to check on social elements such as retail environments, built environments, health inequality, economic status and media content or product formulation.[30] Interventions recommended dealing with sedentary activities involved high levels of parental support at home and schools participation in monitoring. School education should emphasize on increasing physical activity among children. An emphasis on decreasing sedentary behaviors and increased physical activity was an effective intervention control weight in children and adolescents.[9] Obesity Preventive Parenting Support (OPPS) in controlling the young children from spending too much time viewing television, increased physical activity and promote healthy eating behavior hold promised results.[31]

3.2 Quantitative Synthesis

Childhood obesity has been increasing rapidly and has become one of the most serious public health challenges of the 21st century (1).[32] Children's excess weight gain is a result of adaptation to a changed environment for instance, fast paced lifestyle[33] and the improved income modern trend of living that motivated eating behaviors[1][5][34] Physical activity has significant effect on obesity during early life. Children with low levels of physical activity gained substantially more subcutaneous fat than did more active children[11] [26] [35] Too much sedentary activities such as playing computer, cell phone or watching television cause childhood obesity.[9][10] According to Engel's (1977) biopsychosocial model of obesity, increased sedentary activity[3], lacking physical activities[4] and developing overeating habits[5] in children is a result of the interaction between biological, psychological and social factors.[6] Engel's (1977) biopsychosocial model of obesity claimed that biological mechanism developed a strong automatic approach response toward food[7] and that these responses can be strengthened by social factors such as convenience and

availability of fast food outlets, the attractiveness of food related advertisement[13] and pricing.[14] Biological mechanism associated with psychological stress and negative emotions[8] contribute to unhealthy eating behavior. Childhood obesity if not attended during the early stage could extend to teenagers and adulthoods, increasing their risk to the many obesity related disease later in life.[16] BMI greater than the 99th percentile obtained high insulin level[23] and insulin resistance and hyper-insulinemia might be precursors of type-2 diabetes. The drastic increase of type-2 diabetes in youth today was mostly from those diagnosed as obese in childhood.[24] Obesity in children creates many health complications including heart and lungs diseases, under development of muscles and bones, kidneys and digestive tract complications.[17] Formation of early atherosclerosis, carotid IMT, cardiovascular disease (CVD) and type-2 diabetes[18] [19] [20] [21] [22] were responsible for the increased in children's mortality rate. Parents played important role in the prevention of childhood obesity [25] as parents could modify children's lifestyle behavior[35] and children's eating habit. Increased physical activities and reduced sedentary activities were effective for obesity prevention in high-risk children.[25] Malaysian parents' unhealthy eating habits do influence their children's eating habit[15] Prevention of childhood obesity should begin with breastfeeding to protect children from gaining excess weight later in life.[36] To be effective, interference on the contextual forces such as built environment, social environment, health disparities, economic and agricultural factors that affected human's biological mechanism[27] [28] is crucial.

4.0 DISCUSSION

Realistically, the present studies revealed two important findings. Firstly, in view of today's modernization, children's exposure to advance telecommunication and computer has no doubt promoted children's sedentary activities. More times are spent on computer game, cell phones and television than on physical activities. Those days in Malaysia, every household must have a badminton racket for their children are now replaced by computer or I-pad. Parent's busy lifestyle and the convenience of fast food outlets, advertisement, and availability of junk food promoted unhealthy eating behavior not only for children but also for parents themselves. G.L Engel's (1977) biopsychosocial model is used to link all the factors such as biological, psychological and social factors that are influencing each other to increase sedentary activity, reduce physical activity and promote unhealthy eating behavior. Secondly, all studies reviewed on the effect of childhood obesity has evidently shown the relationship between numerous diseases in associated with childhood obesity. BMI greater than the 99th percentile[23] are of risk in obtaining of type-2 diabetes, atherosclerosis, carotid IMT, cardiovascular disease (CVD), which are the causes of many death among young people. Obesity in children also creates many health complications including lungs diseases, weak muscles and bones, kidneys and digestive tract complications[17], which justified the importance of early intervention to prevent childhood obesity and promote healthy well-being of children. childhood obesity prevention has to begin with breastfeeding and parenting support as studies evidently revealed that parent plays important role in shaping children's behavior. To prevent childhood obesity in a broader population, corporation from all level of population within the community is essential. Government interference to check on social elements such as retail environments, built environments, health inequality, economic status and media content or product formulation[30] should yield positive result.

5.0 CONCLUSION

As obesity can be caused by many factors including unhealthy diets, non self-regulative eating behaviors and lacking mobility, the reliability and validity of the research findings on a particular factor could be further strengthen if other obesity factors are used as a control "factor" to combine with the examined factor on the research. For instance, will children spending long hour watching television and playing computer gain weight if they are physically active and consume healthy diet? However, some of the test and research studies included in this review are performed with sufficient sampling and are conducted in long term follow-up to check if the results of interventions are sustainable over period of time to justify and confirmed the reliability and validity of the specific research's findings. Most of the studies to identify the disease of children obesity involved larger sampling, scientific tools and reliable data information, which I concluded as justified and have strengthened the validity and reliability of the researches and tests.

What has been put into practice, using behavior modification theory to deal with the complex task of obesity is basically about trying to change children's eating behaviors, physical activities, and sedentary activity in a controlled individual level environment. The intervention might yield some success at the individual level but has recorded very little success in either coping obesity or maintaining weight loss on a greater perspective of population level[27] If the findings are replicated in different settings to include the coping way to these risks factors, it may, for example, educate the public on the different strategies dealing with the risk factors. With the identification of different effective strategies and with the involvement of authorities and the public in all walks of life, intervention would have the greatest effect on coping with obesity among children.

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