EARLY LIFE FACTORS ON CHILDHOOD OVERWEIGHT AND OBESITY AMONG PRESCHOOLERS IN PUTRAJAYA, 2017

By

FATIMAH AHMAD FAUZI

Dissertation Submitted to the Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Public Health

August 2017
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August 2017

Chairman: Assoc. Prof. Dr. Nor Afiah Mohd Zulkefli
Faculty: Medicine and Health Sciences

Background: Childhood obesity is becoming a global epidemic in this new era. According to WHO, the number of overweight children under the age of five in 2014 worldwide is estimated to be over 42 million and more than 70% of them are living in developing countries. Similar problem faced in Malaysia as being labelled as the fattest population in South East Asia.

Objectives: To determine the early life factors that contribute to childhood overweight and obesity among preschoolers in Putrajaya in 2017, which include sociodemographic factors, pre-and perinatal factors, infant feeding and weaning practices, early child care, family structure and parental behaviors, and psychosocial factors.

Methodology: A cross sectional study was conducted by cluster random sampling among 897 preschool students from all registered preschools in Putrajaya. Anthropometry measurements of body weight and height measurements were performed on the preschoolers and questionnaires were distributed to the mothers. Calculated BMI was used to determine child’s overweight and obesity status following BMI-for-age z-scores of WHO Growth Standards 2006 and WHO Growth Reference 2007.

Results: The sample comprised of 897 children, with a mean age of 5.4 ± 0.58 years. The prevalence of overweight and obese children was 7.3%, which can be predicted with elder child’s age (AOR: 2.595; 95%CI: 1.281 – 5.254), higher mother’s education level (AOR: 4.909; 95%CI: 1.065 – 22.621), higher maternal BMI (AOR: 1.122; 95%CI: 1.034 – 1.219), and unknown caregiver’s education status (AOR: 2.907; 95%CI: 1.144 – 7.386).
Conclusion: Four early life factors can be predicted with childhood overweight and obesity among preschoolers in Putrajaya, which included in three domain of early life factors of socio-demographic, pre-and perinatal, and early childcare.

Keywords: childhood overweight, childhood obesity, early life factors, preschool
Abstrak disertasi yang dikemukakan kepada Jabatan Kesihatan Komuniti, Fakulti, Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Sarjana Kesihatan Awam

FAKTOR AWAL KEHIDUPAN TERHADAP KEGEMUKAN DAN OBESITI DARIPADA KALANGAN KANAK-KANAK PRA SEKOLAH DI PUTRAJAYA, 2017.

Oleh

FATIMAH AHMAD FAUZI

Ogos 2017

Pengerusi: Prof Madya Dr Nor Afiah Mohd Zulkifli
Fakulti: Perubatan dan Sains Kesihatan

Latar Belakang: Masalah obesiti di kalangan kanak-kanak pada era masa kini telah menjadi wabak global yang serius. Mengikut WHO, jumlah kanak-kanak yang berlebihan berat badan di bawah umur lima tahun di serata dunia dianggarkan lebih daripada 42 juta orang, manakala lebih daripada 70% daripada mereka tinggal di negara-negara yang sedang membangun. Dilabelkan sebagai masyarakat yang tergemuk di Asia Tenggara, Malaysia juga antara negara-negara membangun yang mengalami masalah yang sama.


Keputusan: Responden adalah di kalangan kanak-kanak yang berjumlah 897 orang, dengan purata umur 5.4 ±0.58 tahun. Kelaziman kegemukan dan obesiti di kalangan kanak-kanak tersebut adalah 7.3%. Ianya boleh diramalkan dengan unur kanak-kanak
yang lebih tua (AOR: 2.595; 95%CI: 1.281 – 5.254), status pendidikan ibu yang lebih tinggi (AOR: 4.909; 95%CI: 1.065 – 22.621), BMI ibu yang lebih tinggi ketika mengandung (AOR: 1.122; 95%CI: 1.034 – 1.219), dan status pendidikan penjaga kanak-kanak yang tidak diketahui (AOR: 2.907; 95%CI: 1.144 – 7.386).

Kesimpulan: Empat faktor awal kehidupan yang boleh meramalkan kegemukan dan obesiti di kalangan kanak-kanak pra sekolah di Putrajaya. Ianya termasuk dalam tiga domain faktor iaitu sosio demografi, sebelum dan semasa bersalin, dan penjagaaan awal kanak-kanak.

Kata Kunci: kegemukan kanak-kanak, obesiti kanak-kanak, faktor awal kehidupan, prasekolah
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I certify that a Thesis Examination Committee has met on 1st August 2017 to conduct the final examination of Fatimah ahmad Fauzi on her thesis entitled “Early Life Factors Associated with Childhood Overweight and Obesity Among Preschoolers in Putrajaya, 2017” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Public Health.

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Name of Chairman of Supervisory Committee: Associate Professor Dr. Nor Afiah binti Mohd Zulkifli
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>1</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>v</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>vi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF APPENDICES</td>
<td>XV</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xvi</td>
</tr>
</tbody>
</table>

1 INTRODUCTION 1

1.1 Background 1

1.2 Impact of Childhood Obesity 2

1.3 Prevention and Intervention on Childhood Obesity 3

1.4 Problem Statement 4

1.5 Significance of Study 4

1.6 Research Questions 5

1.7 Objectives 5

1.7.1 General Objective 5

1.7.2 Specific Objectives 6

1.8 Research Hypotheses 6

2 LITERATURE REVIEW 7

2.1 Background on Childhood Overweight and Obesity 7

2.2 Childhood Obesity in Developing Countries 8

2.3 Early Life Factors Definition 10

2.4 Early Life Risk Factors Associated with Childhood Obesity 11

2.4.1 Sociodemographic Factors 11

2.4.2 Pre- and Perinatal Factors 13

2.4.3 Early Child Growth 14

2.4.4 Feeding and Weaning Practices 15

2.4.5 Early Child Care 16

2.4.6 Lifestyle and Physical Activity 17

2.4.7 Dietary Patterns 17

2.4.8 Family Structure and Parental Behaviors 18

2.4.9 Psychosocial Factors 18

2.5 Conceptual Framework 19
3 MATERIALS AND METHODOLOGY

3.1 Study Location
3.2 Study Duration
3.3 Study Design
3.4 Sampling
   3.4.1 Study Population
   3.4.2 Sampling Population
   3.4.3 Sampling Frame
   3.4.4 Sampling Unit
   3.4.5 Sampling Method
   3.4.6 Sample Size Estimation
3.5 Variables
   3.5.1 Dependent Variables
   3.5.2 Independent Variables
3.6 Study Instruments
   3.6.1 Questionnaire
   3.6.2 Weighing Machine Scale
   3.6.3 Stadiometer
3.7 Data Collection Technique
3.8 Operational Definitions of Variables
3.9 Quality Control
   3.9.1 Validity of Study Instrument
   3.9.2 Reliability of Study Instrument
3.10 Data Analysis
3.11 Ethical Approval

4 RESULTS

4.1 Response Rate
4.2 Normality tests
4.3 Descriptive Statistics
   4.3.1 Nutritional Status Among Preschoolers in Putrajaya, 2017
   4.3.2 Early Life Factors of Childhood Overweight and Obesity among Preschoolers in Putrajaya
4.4 Association between Early Life Factors and Childhood Overweight and Obesity among Preschoolers in Putrajaya
   4.4.1 Association between Socio-demographic Factors and Childhood Overweight and Obesity
   4.4.2 Association between Pre-and Perinatal Factors and Childhood Overweight and Obesity
   4.4.3 Association between Feeding and Weaning Practices in the First Two Years of Life and Childhood Overweight and Obesity
4.4.4 Association between Early Child Care in the First Two Years of Life and Childhood Overweight and Obesity 51
4.4.5 Association between Family Structure and Parental Behaviours in the First Two Years of Life and Childhood Overweight and Obesity 53
4.4.6 Association between Psychosocial Factors among Parents in the First Two Years of Life and Childhood Overweight and Obesity 54
4.5 Predictors of Childhood Overweight and Obesity among Preschoolers in Putrajaya 55

5 DISCUSSION 57
5.1 Introduction 57
5.2 Prevalence of Overweight and Obesity among Preschoolers in Putrajaya, 2017 57
5.3 Potential Early Life Factors Associated with Childhood Overweight and Obesity among Preschoolers Not Supported by Present Study 58
5.4 Potential Early Life Factors Associated with Childhood Overweight and Obesity among Preschoolers Supported by Present Study 59
5.4.1 Socio-demographic Factors 59
5.4.2 Pre-and Perinatal Factors 59
5.4.3 Early Child Care 60

6 CONCLUSION AND RECOMMENDATIONS 62
6.1 Conclusion 62
6.2 Study Strength 62
6.3 Study Limitations 62
6.4 Recommendations 63

BIBLIOGRAPHY 65
APPENDICES 74
BIODATA OF STUDENT 118
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Prevalence of independent variables from literature review.</td>
<td>81</td>
</tr>
<tr>
<td>3.2</td>
<td>Definition of overweight and obesity among preschoolers.</td>
<td>24</td>
</tr>
<tr>
<td>3.3</td>
<td>Operational Definitions of Variables</td>
<td>28</td>
</tr>
<tr>
<td>4.1</td>
<td>Normality tests for continuous variables</td>
<td>34</td>
</tr>
<tr>
<td>4.2</td>
<td>Nutritional Status among Preschoolers in Putrajaya 2017</td>
<td>35</td>
</tr>
<tr>
<td>4.3</td>
<td>Distribution of respondents on socio-demographic factors</td>
<td>37</td>
</tr>
<tr>
<td>4.4</td>
<td>Distribution of respondents on pre-and perinatal factors</td>
<td>38</td>
</tr>
<tr>
<td>4.5</td>
<td>Distribution of respondents on feeding and weaning factors</td>
<td>40</td>
</tr>
<tr>
<td>4.6</td>
<td>Distribution of respondents on early child care factors</td>
<td>41</td>
</tr>
<tr>
<td>4.7</td>
<td>Distribution of respondents on family structure and parental behaviors</td>
<td>43</td>
</tr>
<tr>
<td>4.8</td>
<td>Distribution of respondents on psychosocial factors</td>
<td>44</td>
</tr>
<tr>
<td>4.9</td>
<td>Association between socio-demographic factors and childhood overweight and obesity</td>
<td>46</td>
</tr>
<tr>
<td>4.10</td>
<td>Association between child’s age and childhood overweight and obesity using Independent T-test</td>
<td>46</td>
</tr>
<tr>
<td>4.11</td>
<td>Association between gestational weight gain, maternal BMI, and child’s birthweight and childhood overweight and obesity using Independent T-test</td>
<td>47</td>
</tr>
<tr>
<td>4.12</td>
<td>Association between pre-and perinatal factors and childhood overweight and obesity</td>
<td>48</td>
</tr>
<tr>
<td>4.13</td>
<td>Association between feeding and weaning practices in the first two years of life and childhood overweight and obesity</td>
<td>49</td>
</tr>
<tr>
<td>4.14</td>
<td>Association between age of start weaning and childhood overweight and obesity using Independent T-Test</td>
<td>50</td>
</tr>
<tr>
<td>4.15</td>
<td>Association between duration of full breastfeeding and childhood overweight and obesity using Mann Whitney U test</td>
<td>51</td>
</tr>
<tr>
<td>4.16</td>
<td>Association between early child care in the first two years of life and childhood overweight and obesity</td>
<td>52</td>
</tr>
<tr>
<td>4.17</td>
<td>Association between family structure and parental behaviors in the first two years of life and childhood overweight and obesity</td>
<td>53</td>
</tr>
<tr>
<td>4.18</td>
<td>Association between psychosocial factors among parents in the first two years of life and childhood overweight and obesity</td>
<td>54</td>
</tr>
<tr>
<td>4.19</td>
<td>Predictors for childhood overweight and obesity among preschoolers</td>
<td>56</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Conceptual Framework on Early Life Factors associated with childhood overweight and obesity</td>
<td>20</td>
</tr>
<tr>
<td>4.1</td>
<td>Study flow chart of early life factors associated with childhood overweight and obesity among preschoolers in Putrajaya, 2017</td>
<td>33</td>
</tr>
<tr>
<td>4.2</td>
<td>Pie chart of nutritional status prevalence among preschoolers in Putrajaya 2017</td>
<td>36</td>
</tr>
<tr>
<td>4.3</td>
<td>ROC curve for childhood overweight and obesity among preschoolers</td>
<td>56</td>
</tr>
</tbody>
</table>
# LIST OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Approval letter from the Ethics Committee Involving Human Subjects of Universiti Putra Malaysia (JKEUPM)</td>
<td>74</td>
</tr>
<tr>
<td>B</td>
<td>Approval letters from respective authorities of preschools</td>
<td>75</td>
</tr>
<tr>
<td>C</td>
<td>Sample size estimation from literature reviews</td>
<td>80</td>
</tr>
<tr>
<td>D</td>
<td>WHO Growth Standards 2006 and WHO Growth Reference 2007 used in this study</td>
<td>81</td>
</tr>
<tr>
<td>E</td>
<td>Normal distribution graphs by histogram</td>
<td>88</td>
</tr>
<tr>
<td>F</td>
<td>Form B1: Respondent’s Information Sheet and Consent</td>
<td>92</td>
</tr>
<tr>
<td>G</td>
<td>Borang B1: Penerangan dan Persetujuan Responden</td>
<td>95</td>
</tr>
<tr>
<td>H</td>
<td>Form B2: Respondent’s Information Sheet and Guardian’s/Parent’s Consent</td>
<td>98</td>
</tr>
<tr>
<td>I</td>
<td>Borang B2: Penerangan dan Persetujuan Ibubapa/Parent</td>
<td>101</td>
</tr>
<tr>
<td>J</td>
<td>Questionnaire</td>
<td>104</td>
</tr>
<tr>
<td>K</td>
<td>Gannt Chart</td>
<td>116</td>
</tr>
</tbody>
</table>
LIST OF ABBREVIATIONS

BMI Body Mass Index
CI Confidence Interval
IQR Interquartile Range
KEMAS Jabatan Kebajikan Masyarakat
MOH Ministry of Health
NHMS National Health Morbidity Survey
SD Standard Deviation
SE Standard Error
SVD Spontaneous Vaginal Delivery
TV Television
VIF Variation Inspection Factor
WHO World Health Organization
YOL Years of Life
≥ Greater than or equal to
≤ Lesser than or equal to
> Greater than
< Lesser than
± Plus and minus of
CHAPTER 1

INTRODUCTION

1.1 Background

Childhood obesity is defined by the World Health Organization as “excessive fat accumulation that may impair health among children” (World Health Organization, 2016). It is considered as one of the most serious public health challenges in this 21st century. Though it was previously known as vulgar among adults but the rising of the prevalence of overweight and obesity among the children and adolescent is alarming and becoming epidemic globally. The highest prevalence rates of childhood obesity have been observed in developed countries such as United States and Europe countries but its prevalence in developing countries has shown increasing trend over the past few years (Mahshid, Noori & Anwar, 2005). As from the worldwide estimate on the number of overweight children under-five years of age in 2014, it was estimated to be over 42 million and more than 70 percent of them are living in developing countries. In the same year, the number of children who were overweight and obese had nearly doubled to 10.6 million in Africa from 1990. As in Asia, nearly half of the overweight and obese children under-five in 2014 were living in the region (WHO, 2016). The increasing trend of child obesity can also be observed in Malaysia, in which three times increased in the prevalence of child obesity within four years since 2011 (Ministry of Health, 2011;2015).

Evidence has shown the relationship of childhood obesity and adult obesity. Children who are obese after six years of age are at risk of remaining as obese adults with probability exceeds 50% (Segal & Sanchez, 2001). This may affect their immediate health, educational achievement, and quality of life as they may also at risk of developing chronic illness related to obesity (WHO, 2016).

One of the key factors contributing to childhood obesity is the obesogenic environment where the children are living nowadays (Brownell, 2004). High saturated fat dietary consumption coupled with reduced physical activity and sedentary behaviors result in energy imbalance and encourage weight gain and obesity (Sherina & Rozali, 2004). In addition, there are three critical periods in the life-course of a child which are also needed to be looked upon: preconception and pregnancy; infancy and early childhood; and older childhood and adolescence (WHO, 2016). The first 2 life-courses are considered as early life and the early life risk factors of childhood obesity are currently being researched as part in planning for the early prevention in combating childhood obesity (Koletzko et al., 2009).

Many putative early life factors studied can be associated with child overweight and obesity including parental obesity, adiposity rebound and weight gain in early years of life, screen time, and reduced sleep duration (Reilly et al, 2005). This warrant for further research on this matter as part of the efforts in achieving part of the second Sustainable Development Goal in improving the worldwide nutrition.
1.2 Impact of Childhood Obesity

Previously, obesity related non-communicable diseases are thought to be associated among adults only. This shouldn’t be the case as the outcomes may affecting the children as well include metabolic syndromes (OR: 1.55, 95% CI: 1.16 – 2.08), which comprised of Diabetes Mellitus Type II, hypertension, and dyslipidemia (Weiss, Dziura, Burgert, Tamborlane, & Taksali, 2004).

Based on a twenty years’ longitudinal study done in United States, overweight or obesity developed in childhood and adolescent is significantly related to subsequent overweight or obesity in adulthood, which increased with age. The probability of adult obesity for those with BMI at 95th percentile during childhood or adolescent was less than 20% from three to four years of age and increased to 40 – 59.9% from 12 to 17 years of age (Guo, Wu, Chumlea, & Roche, 2002). This may be related to insulin resistance development in obesity child, which may also be associated to long term vascular complications in adult example coronary heart disease with relative risk mortality of 2.3 (95% CI: 1.4 – 4.1) in men (Must, Jacques, Dallal, Bajema, & Dietz, 1992).

Other diseases which may be resulted from childhood obesity are new onset bronchial asthma (RR: 1.60; 95% CI: 1.08, 2.36) (Gilliland et al., 2003), hypertension (Sorof, Poffenbarger, Franco, Bernard, & Portman, 2002), obstructive sleep apnea, and orthopaedics problems for example slipped capital-femoral epiphysis (Sorof & Daniels, 2002). Obesity may not be independently cause these illnesses, but the precipitating factors from the environment and social factors which result in obesity to become an important factor to be looked upon as part of the diseases development.

Apart from that, psychosocial problems among children are also very important threat in children with obesity. Adolescent may be the period of greatest risk to suffer from psychological disturbance as they may consider themselves as significant ‘handicapped’ (WHO, 2000). The association between obesity and poor mental health such as depression can be bi-directional, in which adolescence with obesity may lead to depression in adulthood, while adolescent depressive symptoms may result in adult obesity later on (Gatineau & Dent, 2011). Based on a study done in 4703 Swedish adolescents, those with many encounters of disgrace had an increased risk (OR: 11.3; 95% CI: 8.3 – 14.9) to develop depression (Sjoberg, Nilsson, & Leppert, 2005).

Obese children should be evaluated for associated morbidity as they can develop similar complications as for adult like early onset Type 2 Diabetes Mellitus. This is due to strong association of obesity with insulin resistance, accompanied by relative insulin deficiency. As adverse health effects, children and adolescents with Type 2 Diabetes Mellitus may experience the macrovascular and microvascular complications of the disease earlier as compared to those who develop diabetes later in adulthood. This include atherosclerotic cardiovascular disease, myocardial infarction, stroke, renal impairment, limb-threatening neuropathy, vasculopathy, and retinopathy (Hannon, Rao, & Arslanian, 2015).
On top of the health impacts, childhood obesity will also affect economically directly through medical costs expenditure, and indirectly such as job absenteeism and lower productivity (Cawley, 2010). Based on surveys done in United States, the estimated direct costs of childhood obesity outpatient costs which include annual prescription drug, emergency room is $14.1 billion (Trasande & Chatterjee, 2009) plus inpatient costs of $237.6 million (Trasande, Liu, Fryer, & Weitzman, 2009). Higher cost is incurred if obese children developed into obese adults as the cost of treating obesity-related illness in adults can be overwhelming.

1.3 Prevention and Intervention on Childhood Obesity

The key plan in curbing the developing epidemic of childhood obesity is to enhance the primary and secondary prevention, which are seemed to more effective in children than in adults (Mahshid, Noori & Anwar, 2005). These strategies can be achieved through various kind of interventions aiming built environment, physical activity, and dietary practice.

Identifying and changing the obesogenic environment may requires cooperation and multi-angle approaches from the community. Creating a neighborhood with recreation facilities for outdoor and physical activities is part of built environment in overcoming obesity (Mahshid, Noori, & Anwar T, 2005). Apart from that, screen time control among the children must be implemented at home by parents as screen time is associated with BMI in children (Lee et al., 2015).

The efforts in overcoming childhood obesity in Malaysia has been started even in the early 90s where the Ministry of Education of Malaysia has launched The Healthy Lifestyle Campaign among pupils and school personnel in promoting healthy school living. Another successes of activities are The Healthy Eating Campaign (1997–2002), on food and dietary practices, nutrition labeling, body weight management, and food hygiene (Nidhi, Kashish, Priyali, & Anoop, 2016).

Recently in 2014, a school-based intervention program (My Body is Fit and Fabulous, My BFF) has been implemented by the Ministry of Health Malaysia with the cooperation of the Ministry of Education in curbing the high prevalence of childhood obesity in Malaysia. This program focusing on structured physical activity and improving the school children knowledge, self-esteem and self-empowerment (Vikneswaran et al., 2015).

Many interventions targeting on physical activities and dietary intake among school children have been done and some of them showed significant improvements in the BMI of the participants (Meng et al., 2013). The subsequent question is: can it be sustained even after the intervention has stopped? Based on a systematic reviewed randomized clinical trials on intervention on childhood obesity among children aged six to twelve years old, there were significant differences in the outcomes assessed in treatment studies, not in prevention studies (Sbruzzi et al., 2013).
At present, many researchers are looking into the early factors which contribute to childhood obesity so that early primary prevention could be implemented, even on pregnant mothers (Watt, Appel, Roberts, Flores, & Morris, 2013). This is because once obesity already established, it is challenging to treat as multiple physiological, behavioral and socio-cultural influence need to be considered (Gillman & Ludwig, 2013).

1.4 Problem Statement

The accelerating prevalence of childhood overweight and obesity in many parts of the world has become one of the major public health concern (Ogden et al, 2006). In developed and developing countries, the increment prevalence of overweight and obesity among preschool children were 48% and 65% respectively from 1990 until 2010 (de Onis, Blossner, & Borghi, 2010). With the status of an upper middle-income country, Malaysia also not being excluded from facing similar problem of growing child overweight and obesity as statistics shows that the prevalence of obesity in children less than 18 years old has tripled from 3.9% (0.3 million) in 2011 to 11.9% (1.0 million) in 2015 (Ministry of Health Malaysia, 2011; Ministry of Health Malaysia, 2015). As ranked to be the fattest country in South-East Asia and the sixth in the Asia-Pacific region (Ng et al., 2014), Malaysia issues on overweight and obesity is considered as a national issue and further escalation on child overweight and obesity should be avoided if the nation development and healthy well-being needed to be preserved.

Apart from at increased risk of becoming overweight and obese adult, overweight and obese child will further at risk to develop related non-communicable diseases such as Diabetes Mellitus Type II, hypertension, and dyslipidemia (Weiss et al., 2004). Diabetes Mellitus and cardiovascular diseases are part of the main four non-communicable diseases which contribute to the high mortality between ages 30 and 70 years as the probability of dying prematurely is 20% (WHO, 2014). Furthermore, overweight and obese children may be affected with mental health disorder such as depression as the result of low self-esteem, body dissatisfaction, lower physical activity, and social stigma (Gatineau & Dent, 2011). These related non-communicable diseases with childhood overweight and obesity will further result in economic burden for a country with increasing financial costs of the treatment of its complications, and increased disability-adjusted life-years (DALYs), which can be overwhelming particularly in developing countries (Parvez, Bisher, & Meguid, 2007).

1.5 Significance of Study

Early childhood development which comprised of the gestational development up to eight years of age are considered as the critical period of child development of obesity (Irwin, Arjumand, & Hertzman, 2007). For example, the early development of excess adiposity in infancy is influenced by the establishment of eating habits and food transitions (J. Zhang et al., 2013).

Up to present, there has been no universally effective preventive strategies or management for reducing obesity prevalence among children in the community and primary health care (Zhang et al., 2013). Many efforts and resources have been invested
and channeled in various programs to combat this issues of overweight and obesity, which mainly focusing on dietary habits and physical activity such as Global Strategy on Diet, Physical Activity and Health 2004, Aerobic Exercise Program, and Outline on the Management of a Healthy Canteen (Vikneswaran et al., 2015). Therefore, it becomes of utmost importance to prevent childhood overweight and obesity at the earlier stage, requiring the evaluation of associations between early modifiable risk factors and overweight and obesity status in their early lives (Zhang et al., 2013). In that case, the application of these early life factors associated with childhood overweight and obesity can be implemented in formatting new and more effective preventive and control strategies for childhood overweight and obesity.

According to National Health and Morbidity Survey of Malaysia (NHMS) 2015, Putrajaya has been labeled as the city with the highest percentage (43%) of overweight, obesity and abdominally obese people in the country (MOH, 2015). As for children, a study conducted by the Nutrition Society of Malaysia in 2010 in Kuala Lumpur, Putrajaya, and Selangor showed that 14.5% children aged one to three years old were overweight and 16.6% children aged four to six years old were overweight (Tee, 2011).

This worrying situation should be prevented earlier at children level as the rates of childhood overweight and obesity are also increasing. The growing prevalence of child overweight and obesity in Putrajaya should be prevented as to hinder from additional increment in the prevalence of overweight and obesity among adults in the future. As for that, a background study on the early life factors on childhood overweight and obesity among preschoolers in Putrajaya is prudent to explore the possible relations of adult and child overweight and obesity, in the hope of dampening the rising statistics of overweight and obesity in the area. Furthermore, this study may fill in some of the research gaps in the region related to determine the early life factors associated with childhood overweight and obesity.

1.6 Research Questions

1.1.1 What is the prevalence of overweight and obesity among preschoolers in Putrajaya in 2017?
1.1.2 What are the early life factors that affect childhood overweight and obesity among preschoolers in Putrajaya in 2017?
1.1.3 Is there any association between the early life factors and the prevalence of overweight and obesity among preschoolers in Putrajaya in 2017?
1.1.4 What are the early life predictors on childhood overweight and obesity among preschoolers in Putrajaya in 2017?

1.7 Objectives

1.7.1 General Objective

To determine the early life factors that contribute to childhood overweight and obesity among preschoolers in Putrajaya in 2017.
1.7.2 Specific objectives

i. To determine prevalence of childhood overweight and obesity among preschoolers in Putrajaya.

ii. To determine socio-demographic factors among preschoolers and their mothers in Putrajaya.

iii. To determine the pre-and perinatal factors, feeding and weaning practices, early child care, family structure and parental behaviors, and psychosocial factors in the first two years of life among preschoolers in Putrajaya.

iv. To determine the association between socio-demographic factors and childhood overweight and obesity among preschoolers in Putrajaya.

v. To determine the association between pre-and perinatal factors and childhood overweight and obesity among preschoolers in Putrajaya.

vi. To determine the association between feeding and weaning practices in the first two years of life and childhood overweight and obesity among preschoolers in Putrajaya.

vii. To determine the association between early child care in the first two years of life and childhood overweight and obesity among preschoolers in Putrajaya.

viii. To determine the association between family structure and parental behaviors in the first two years of life and childhood overweight and obesity among preschoolers in Putrajaya.

ix. To determine the association between psychosocial factors among parents in the first two years of life and childhood overweight and obesity among preschoolers in Putrajaya.

x. To determine the predictors of childhood overweight and obesity among preschoolers in Putrajaya.

1.8 Research Hypotheses

H1: There is a significant association between socio-demographic factors and childhood overweight and obesity among preschoolers in Putrajaya.

H2: There is a significant association between pre-and perinatal factors and childhood overweight and obesity among preschoolers in Putrajaya.

H3: There is a significant association between feeding and weaning practices and childhood overweight and obesity among preschoolers in Putrajaya.

H4: There is a significant association between early child care and childhood overweight and obesity among preschoolers in Putrajaya.

H5: There is a significant association between family structure and parental behaviors and childhood overweight and obesity among preschoolers in Putrajaya.

H6: There is a significant association between psychosocial factors among parents and childhood overweight and obesity among preschoolers in Putrajaya.
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68


