



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH NUTRITIONAL STATUS OF CHILDREN
LIVING IN WELFARE HOMES IN SELANGOR, MALAYSIA***

NUR NABILLA BINTI A RAHIM

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By

NUR NABILLA BINTI A RAHIM

**Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Master of Science**

May 2016

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

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May 2016

Chairman : Chin Yit Siew, PhD
Faculty : Medicine and Health Sciences

This cross-sectional study was conducted to determine the association between socio-demographic, psychological, dietary, and physical activity factors with BMI-for-age and Height-for-age among welfare home children in Selangor. While information on studied variables was obtained using self-administered questionnaires, height and weight were measured by trained researchers. BMI-for-age and Height-for-age were classified based on the WHO Growth Reference 2007.

The study sample consisted of 307 school-going welfare home children (mean age of 13.0 ± 2.7 years old) from 15 selected welfare homes, with 51.5% boys and 48.5% girls. There were three statuses of welfare home children in the study, including orphans (54.4%), abandoned children (23.8%), and children from problematic families (21.8%).

The prevalence of overweight and obesity (23.1%) was three times higher than thinness and severe thinness (8.5%). The findings reported that age ($r=0.169$, $p=0.003$), satisfaction of body size and shape ($r=0.551$, $p=0.0001$), self-esteem ($r=-0.112$, $p=0.049$), and energy expenditure per kilogram body weight ($r=-0.550$, $p=0.0001$) were correlated with BMI-for-age. Besides that, there were differences in BMI-for-age by sex ($t=-3.992$, $p=0.0001$), ethnicity ($F=5.358$, $p=0.001$), children status ($F=5.926$, $p=0.003$), and perception of body weight status ($F=6.523$, $p=0.0001$), respectively. The prevalence of severe stunting and stunting was 13.6%. The findings reported that age ($r=-0.128$, $p=0.024$), satisfaction of body size and shape ($r=0.117$, $p=0.040$), trying new food ($r=-0.133$, $p=0.020$) and energy expenditure per kilogram body weight ($r=-0.213$, $p=0.0001$) were correlated with Height-for-age.

The multiple linear regression analysis showed that girls ($\beta=0.428$), Malay ($\beta=0.602$) or Chinese ($\beta=0.437$), at an older age ($\beta=0.150$), abandoned ($\beta=0.369$), underestimated their body weight status ($\beta=0.460$), have higher dissatisfaction with their body size and

shape ($\beta=0.361$), and have lower energy expenditure per kilogram body weight ($\beta=-0.053$) contributed to the variances in higher BMI-for-age ($R^2=0.566$, $F=48.515$, $p<0.05$). Besides that, the multiple linear regression showed that respondents of younger age ($\beta=-0.173$), and low energy expenditure per kilogram body weight ($\beta=-0.032$) contributed to the variances in low height-for-age ($R^2=0.150$, $F=26.846$, $p<0.05$).

In conclusion, overweight and obesity problem was more prevalent than thinness and stunting problem among the welfare home children in Selangor. Hence, periodic assessment is essential to monitor their body weight status. The reported findings can be used as guidelines for planning nutrition intervention programs among welfare home children.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

FAKTOR-FAKTOR BERKAITAN DENGAN STATUS PEMAKANAN DALAM KALANGAN KANAK-KANAK DI RUMAH KEBAJIKAN DI SELANGOR

Oleh

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Kajian keratan rentas ini telah dijalankan untuk menentukan hubungan antara faktor sosiodemografi, psikologi, pemakanan, dan fizikal aktiviti dengan BMI-untuk-umur dan Tinggi-untuk-umur dalam kalangan kanak-kanak di rumah kebajikan di Selangor. Sementara maklumat mengenai pemboleh ubah yang dikaji telah diperolehi dengan menggunakan soal selidik yang ditadbir sendiri, ketinggian dan berat badan diukur oleh penyelidik terlatih. BMI-untuk-umur dan Tinggi-untuk-umur telah dikelaskan berdasarkan Rujukan Pertumbuhan WHO 2007.

Sampel kajian terdiri daripada 307 kanak-kanak rumah kebajikan yang bersekolah (min umur 13.0 ± 2.7 tahun) dari 15 rumah kebajikan terpilih, dengan 51.5% lelaki dan 48.5% perempuan. Terdapat tiga status kanak-kanak rumah kebajikan dalam kajian ini, termasuk anak-anak yatim (54.4%), kanak-kanak terbiar (23.8%), dan kanak-kanak dari keluarga yang bermasalah (21.8%).

Prevalens berat badan berlebihan dan obesiti (23.1%) adalah tiga kali lebih tinggi daripada kurus dan kurus teruk (8.5%). Hasil kajian melaporkan bahawa umur ($r = 0.169$, $p = 0.003$), kepuasan saiz badan dan bentuk ($r = 0.551$, $p = 0.0001$), harga diri ($r = -0.112$, $p = 0.049$), dan penggunaan tenaga per kilogram berat badan ($r = -0.550$, $p = 0.0001$) telah dikaitkan dengan tinggi BMI-untuk-umur. Selain itu, terdapat perbezaan BMI-untuk-umur mengikut jantina ($t = -3.992$, $p = 0.0001$), etnik ($F = 5.358$, $p = 0.001$), status kanak-kanak ($F = 5.926$, $p = 0.003$), dan persepsi status berat badan ($F = 6.523$, $p = 0.0001$), masing-masing. Prevalens pertumbuhan terbantut teruk dan terencat pertumbuhan adalah 13.6%. Hasil kajian melaporkan bahawa umur ($r = -0.128$, $p = 0.024$), kepuasan saiz badan dan bentuk ($r = 0.117$, $p = 0.040$), cuba makanan baru ($r = -0.133$, $p = 0.020$) dan penggunaan tenaga per kilogram berat badan ($r = -0.213$, $p = 0.0001$) telah dikaitkan dengan Tinggi-untuk-umur.

Analisis regresi linear menunjukkan bahawa kanak-kanak perempuan ($\beta = 0.428$), Melayu ($\beta = 0.602$) atau Cina ($\beta = 0.437$), pada usia yang lebih tua ($\beta = 0.150$), ditinggalkan ($\beta = 0.369$), mereka yang memandang ringan status berat badan ($\beta = 0.460$), mempunyai rasa tidak puas hati yang lebih tinggi dengan saiz badan dan bentuk mereka ($\beta = 0.361$), dan mempunyai penggunaan tenaga rendah bagi setiap kilogram berat badan ($\beta = -0.053$) menyumbang kepada varians yang lebih tinggi BMI-untuk-umur ($R^2 = 0.566$, $F = 48.515$, $p < 0.05$). Selain itu, analisis regresi linear menunjukkan bahawa responden yang berusia muda ($\beta = -0.173$), dan penggunaan tenaga rendah bagi setiap kilogram berat badan ($\beta = -0.032$) menyumbang kepada varians dalam ketinggian-untuk-umur rendah ($R^2 = 0.150$, $F = 26.846$, $p < 0.05$).

Kesimpulannya, masalah berat badan berlebihan dan obesiti adalah lebih banyak daripada kurus dan kurus teruk dalam kalangan kanak-kanak rumah kebajikan di Selangor. Oleh itu, penilaian berkala adalah penting untuk memantau status berat badan dan tinggi mereka. Hasil penemuan yang dilaporkan boleh digunakan sebagai garis panduan untuk program intervensi pemakanan dalam kalangan kanak-kanak rumah kebajikan.

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Thank you.

I certify that a Thesis Examination Committee has met on 19th May 2016 to conduct the final examination of Nur Nabilla binti A Rahim on her thesis entitled "Factors Associated with Nutritional Status of Children Living in Welfare Homes in Selangor, Malaysia" 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 Science.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Child growth is recognized internationally as an important indicator of nutritional status and health within a population (Mushtaq et al., 2011). Unlike the situation in adulthood, age, sex, weight, and height are important indices to evaluate the growth of children and adolescents. There are several different means commonly used to define stunting, thinness, overweight, and obesity among children and adolescents. Among the international definitions used are International Obesity Task Force's (IOTF) reference for children aged two until eighteen years old (Cole et al., 2000), World Health Organization's (WHO) reference for children aged six to nineteen years old (WHO, 1995), and WHO's reference for children aged zero to five years old (WHO, 2006).

The recent and ideal international reference for determining undernutrition and overnutrition among children and adolescents is WHO's reference for children aged five to nineteen years old (WHO, 2007). Indicators such as BMI-for-age and height-for-age can be used to understand their nutritional statuses. Thinness and severe thinness are defined as the proportion of children with BMI-for-age values $<-2SDs$ and $<-3SDs$, respectively. Meanwhile, overweight and obesity are defined as the proportion of children with BMI-for-age values $>2SDs$ and $>3SDs$. Besides that, severe stunting and stunting are defined as the proportion of children with height-for-age values $<-2SDs$ and $<-3SDs$.

According to World Health Organization (2005), stunting is the best indicator of child growth, while thinness is an indication of acute undernutrition, usually due to insufficient food intake or a high incidence of infectious diseases. On the other hand, overweight and obesity are a result of the imbalance between energy intake and energy expenditure (Daniels et al., 2005). According to Caulfield et al. (2006), undernutrition leads to poor school readiness and performance and becomes a risk factor that reduces the years of schooling. Meanwhile, overnutrition is associated with established risk factors for cardiovascular diseases and accelerated atherosclerotic processes (Raj et al., 2012).

Malaysia is currently in the midst of a nutritional transition, where undernutrition persists, and overnutrition is gradually increasing. The National Health and Morbidity Survey (NHMS) 2011 on children below 18 years old reported that the prevalence of thinness (12.2%) was higher than that of obesity (6.1%) (Institute of Public Health, 2011). A year after, the Malaysian School-based Nutrition Survey 2012 on adolescents aged 10-17 years old reported that the prevalence of overweight and obesity (26.9%) was higher than that of severe thinness and thinness (7.4%) (Institute of Public Health, 2013). Similarly, findings of the Nutrition Survey of Malaysian Children (SEANUTS Malaysia) 2013 on children aged six months to 12 years old showed that the prevalence of overweight and obesity (21.6%) was higher than that of thinness (5.4%) (Poh et al., 2013). However, in the most recent study of NHMS 2015, the findings showed the prevalence of overnutrition (11.9%) was higher than undernutrition (7.8%) (Institute of Public Health, 2015).

Reports on nutritional status focusing on children living in welfare homes in Malaysia are limited in National Surveys. According to Berens and Nelson (2015), welfare homes might house children having no family care for reasons of orphaning, abandonment, abuse, disabilities, mental or physical illnesses, or other special needs. Welfare homes compensate children for the missing family home, yet most of the homes are impoverished and lack basic facilities, needs, and necessities for their proper growth and development (Mwaniki & Makokha, 2013). Referring to growth, children living in welfare homes have a bigger potential for long-term malnutrition crisis, but limited study delved into their plight.

In Malaysia, there is no clear definition of the term welfare home. Based on the Social Welfare Department of Malaysia (2014), any children who are maternal orphans, paternal orphans, or double orphans; abandoned children who did not know their parents' whereabouts since birth; and children from problematic families such as divorced parents, poor, and abusive can be accepted to live in welfare homes. Throughout this study, children living in welfare homes were classified into three main categories, including orphans, abandoned, and children from problematic families. Welfare home is a viable option for survival, growth, and development of children who lack the care and love from their parents.

1.2 Problem Statement

Malnutrition is serious among children living in welfare homes. Previous studies have reported that there were differences in nutrition-related problems among children who are living in orphanages and their counterpart (Lindblade et al., 2003; Watts et al., 2007).

A United Nations Children's Fund study reported that orphans are more likely to be stunted in their growth and less likely to be enrolled in schools compared to children living with both parents (UNICEF, 2012). Meanwhile, findings by B. Shukla, and D. Shukla (2011) reported that more than half of the children living in welfare homes were malnourished. About a quarter of the children in a welfare home in Southeast Nigeria were found to be stunted (Bismarck et al., 2014). Furthermore, it was reported from other studies as well that children living in welfare homes were more likely to be stunted (Dininger et al., 20013; Lindblade et al., 2003; Nwaeri & Omuemu, 2013; Sadik, 2010).

Moreover, several researchers have reported that the common nutritional problems experienced by children living in welfare homes were related to undernutrition such as stunting, underweight, and wasting (Duefield & Aguka, 2013; Jayasekara, 2006; Linblade et al., 2003; Nwaeri & Omuemu, 2013; Obidual et al., 2013; Ramakrishanan, 2004; Sadik, 2010; Sebanjo et al., 2011). Nonetheless, a few researchers reported measures of over nutrition that includes overweight and obesity (Bismarck et al., 2014; Sadik, 2010).

On the other hand, studies in Malaysia are limited to report on either undernutrition or overnutrition problems among children living in welfare homes. To the best of the author's knowledge, two studies in Malaysia reported such malnutrition problems among the children living in welfare homes. According to Chee et al. (2008), the prevalence of undernutrition (21.0%) was about five times higher than the prevalence of overnutrition (4.0%) among 73 children aged six to seventeen years old in a welfare home in Kuala Lumpur. On the contrary, Mohd Dzulkhairi et al. (2015) reported that the prevalence of overnutrition (32.1%) was higher than that of undernutrition (6.2%) among 128 children below 18 years old living in welfare homes in Selangor and Melaka.

Taking into account the fact that children belong to one of the two groups to the greatest extent and exposed to the effects of malnutrition, there is a need to understand the factors that contribute to malnutrition among children living in welfare homes. It must be noted that the study by Chee et al. (2008) only focused on girls and studied the association between dietary factors and body weight status of the respondents. Meanwhile, Mohd Dzulkhairi et al. (2015) studied on nutritional status, knowledge, attitude, and practice of children living in welfare homes. The trend of malnutrition in Malaysia has shifted from undernutrition in the NHMS 2011 (Institute of Public Health, 2011) to over nutrition in the NHMS 2015 (Institute of Public Health, 2015). Therefore, there is an urgent need to undertake a study targeting the nutritional status of children living in welfare homes in Malaysia and to determine factors such as socio-demographic, psychological, dietary, and physical activity factors towards the problem.

1.3 Objectives of the Study

1.3.1 General Objective

To determine factors associated with nutritional status in terms of height-for-age and BMI-for-age among children living in welfare homes in Selangor.

1.3.2 Specific Objectives

1. To determine the association between socio-demographic factors, psychological factors, dietary factors, and physical activity factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.
2. To determine the prevalence of severe stunting, stunting, severe thinness, thinness, overweight, and obesity among children living in welfare homes in Selangor.
3. To describe characteristics of welfare homes (location of residence, number of caregivers, number of children, source of financial support, food insecurity) in Selangor.
4. To determine socio-demographic factors (age, sex, ethnicity, enrollment status, duration of stay), psychological factors (self-esteem, depressive disorders, perception of body shape, perception of body weight status), dietary factors (risk of eating disorders, main meal consumption, snacking consumption, outside meals consumption, dietary supplement consumption, food approach behaviors, food avoidant behaviors, energy intake, macronutrients intake, micronutrients intake), and physical activity factors (energy expenditure per kilogram body weight, duration of screen-based media activities) among children living in welfare homes in Selangor.
5. To determine the association between socio-demographic factors, psychological factors, dietary factors, and physical activity factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.
6. To determine the contribution of socio-demographic factors, psychological factors, dietary factors, and physical activity factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.

1.4 Null Hypothesis

1. There is no significant association between socio-demographic factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.
2. There is no significant association between psychological factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.
3. There is no significant association between dietary factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.

4. There is no significant association between physical activity factors with BMI-for-age and height-for-age among children living in welfare homes in Selangor.
5. There is no significant contribution of socio-demographic factors, psychological factors, dietary factors, and physical activity factors to BMI-for-age and height-for-age among children living in welfare homes in Selangor.

1.5 Significance of the Study

The information from this study adds to the existing body of knowledge on the nutritional status of Malaysian children living in welfare homes. The study provides evidence as to whether the children in welfare homes are at risk of malnutrition and thus raise awareness about their nutritional status, psychological health, adequacy of nutrients intake, other nutritional-related factors, and physical activities. Prevention and intervention require consideration of the children living in welfare homes as the main target, whereby policies and practices can be changed or improved to enable targeted behaviors and discourage competing behaviors among children living in welfare homes.

The findings will help government agencies, Non-Governmental Organizations (NGOs), and donors identify the factors that contribute to the problems of under nutrition and over nutrition in welfare homes. Research institutions can also use the outcomes of this study to develop intervention programs that can improve the living conditions of these children. The output from this study provides baseline data for future nutrition intervention programs, besides helping welfare homes and their caregivers improve their nutritional care practices. Finally, it enables the nutritionists to understand the difficulties faced by the children and allows them to monitor their nutritional status.

1.6 Conceptual Framework

The conceptual framework of this study is as shown in Figure 1.1. The dependent factor in this study is nutritional status. The independent factors in this study include the children's socio-demographic factors, psychological factors, dietary factors, and physical activity factors.

In socio-demographic factors, age, sex, ethnicity, enrollment status, and duration of stay were studied. A previous study reported that the prevalence of overweight and obesity increased with increasing age (Poh et al., 2013). Meanwhile, the prevalence of stunting was higher in younger age compared to older age children. By sex, boys were likely to be overweight and obese (Deepthi et al., 2014), while another study reported the opposite (Barrett & Huffman, 2011). By ethnicity, previous studies reported that the prevalence of overweight and obesity was highest among Chinese (Institute of Public Health, 2015) and the prevalence of severe thinness and thinness was highest among

Indian children (Rampal et al., 2009). For stunting, it was reported that higher prevalence of stunting was found with increasing age (Al-Saffar, 2009; Kimani Murage et al., 2010). Also, some studies reported that stunting prevalence was higher in boys than girls (Gur et al., 2006; Oninla et al., 2007). Meanwhile, Van et al. (2007) reported that longer duration of stay was associated with more prevalence of stunting.

Previous studies have shown that psychological factors such as self-esteem, depression (Sadik, 2010), the perception of body shape, and perception of body weight status (Khor et al., 2009; Kim & Kim, 2003; Nur Syuhada Zofiran et al., 2011) were associated with nutritional status. A study by Nazrat et al. (2005) examined the association among self-reported body image, self-esteem, and measured BMI among El-Salvadoran American youth. The findings showed that higher BMI was associated with body size dissatisfaction and lower self-esteem.

Besides that, past studies have shown that dietary factors such as risk of eating disorders (Dan et al., 2011; Monir et al., 2010), eating behaviors (Chin & Mohd Nasir, 2009), food-approach and food-avoidant behaviors (Loh et al., 2008), as well as dietary intake (Chee et al., 2008) were associated with nutritional status. Food-approach behaviors predisposed respondents to a higher risk of becoming obese, whereas food-avoidant behaviors prevent unnecessary weight gain among the respondents (Loh et al., 2008).

Finally, previous studies showed that physical activity factors such as energy expenditure and duration of screen-based time activities (Fara Wahida et al., 2006; Woon et al., 2014) were associated with nutritional status. They reported that energy expenditure was significantly higher in overweight and obese respondents compared to their other counterparts.

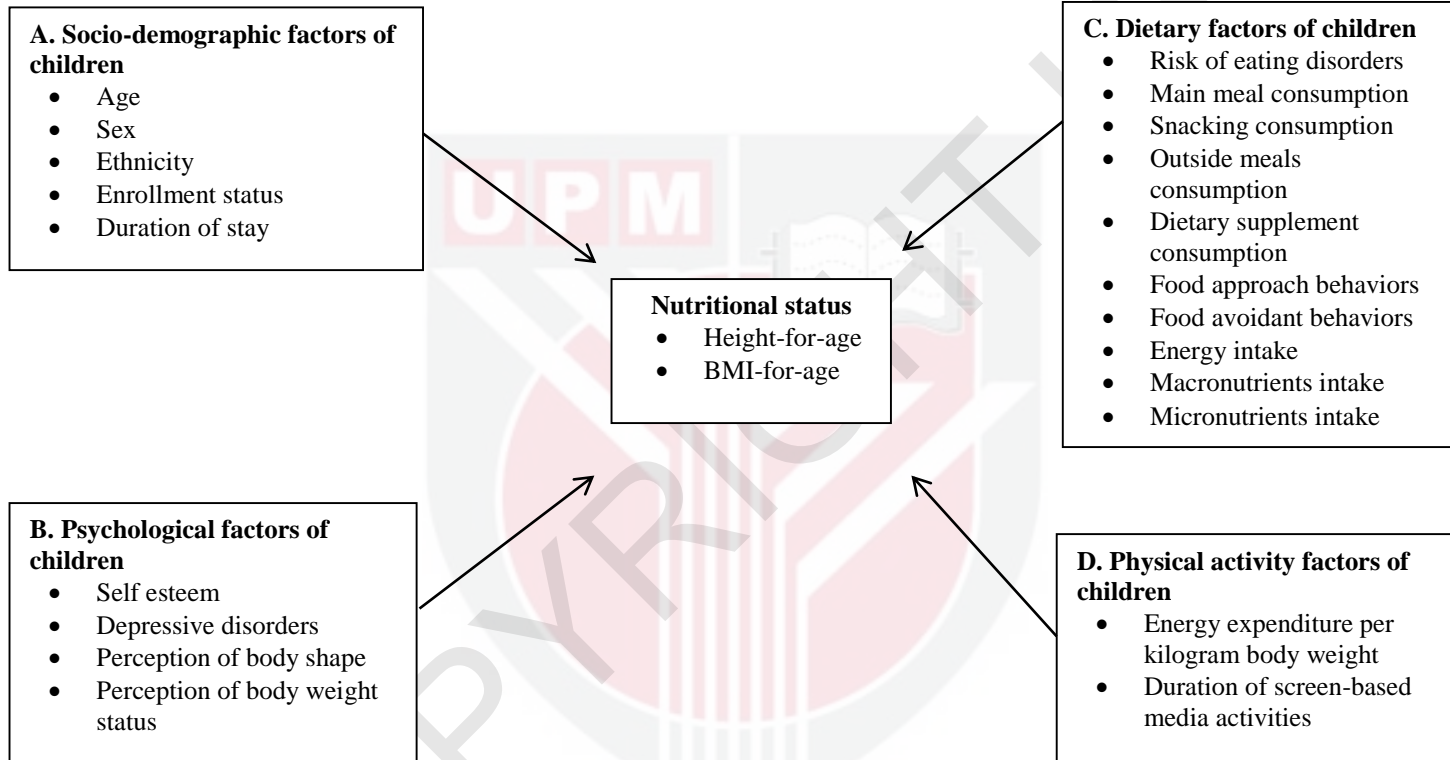


Figure 1.1: Conceptual Framework

of malnutrition, the establishment of healthy eating habits at a young age in the welfare home is critical. Since preventive measures must be taken into account at an early stage, it is recommended that assessment of nutritional status of children staying in welfare homes be carried out periodically. An intervention program that targets children, as well as the caregivers, is necessary to address the problem of malnutrition in the welfare home setting.

Some of the suggestions to improve the nutritional status of children living in welfare homes are education on nutrition knowledge for children staying in there. Besides that, caregivers of the welfare homes should be trained to different cooking methods to add variety to the food, which may help to improve their appetite and minimize the incidence of skipping meals. Intervention needs to be tailored to meet the needs of children in welfare homes to promote good dietary practices and physical activities throughout childhood and adolescence. It is recommended that proper supervision of the welfare homes by the supervising authorities and training courses for the caregivers be regularly done. Identification of variables studied in this study might be valuable for the development of future intervention programs in a child-care institution like welfare homes.

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BIODATA OF THE STUDENT

My name is Nur Nabilla A Rahim. I was born on 26th of October 1990 in Sungai Petani, Kedah. I live in Johor since I was two years old. My hometown is at Bandar Penawar, Kota Tinggi, Johor. I had graduated with a bachelor's degree in Nutrition and Community Health from Universiti Putra Malaysia (UPM) in 2013. Due to my passion for improving my skills and knowledge in research-wise, I decided to further my Master's degree in Community Nutrition at the same university. The idea to continue Master with Full-time Research came out during my final year project in undergraduate study. I am always ready to learn and receive advice on how to improve my skills in research-wise, especially in the academic writing and presentation.

For my work experience, I have worked as a part-time cashier at a shop in 17th College, Universiti Putra Malaysia. I was responsible for management of daily cash accounts, maintaining knowledge of shop inventory and sales activities, merchandise pricing, responding to customers' complaints, resolving their issues, and training of other staff members to work as a cashier. The work experience helped me to improve my soft skills, especially on management and communication skills.

During my postgraduate study, I was given the opportunity to participate in the Post Intervention II of *Program Cara Hidup Sihat* (Healthy Lifestyle Program): a National Intervention Program, as an enumerator. Besides, I have been involved in the intervention study of Eat Right, Be Positive about your Body, and Live Actively (EPaL) as a trainer in the training of trainers (TOT) among secondary school students in Selangor. Additionally, I have worked as a student helper in the Faculty Excellence Month, seminars, and conferences. Through these experiences, I had developed leadership skills and learned to be a good team player.

My short-term goals are to complete my Master degree and continue my postgraduate studies of Doctoral degree in future. My long-term goal is to become a university lecturer and researcher to share my knowledge and experiences with the younger generations. I hope I can make significant contributions to the community, especially in the nutrition field.

LIST OF PUBLICATIONS

- Nur Nabilla, A.R., Yit Siew, C., Norhasmah, S. (2019). Socio-demographic factors and body image perception are associated with BMI-for-age among children living in welfare homes in Selangor, Malaysia. *Nutrients*, 11 (1),142.
- Nur Nabilla, A.R., Chin, Y.S., & Norhasmah, S. Psychological and physical activity difference between overweight/obese and non-overweight/obese welfare home children. Poster Presentation. MASO 2015 Scientific Conference on Obesity, Kuala Lumpur, Malaysia, 28-29 October 2015.
- Nur Nabilla, A.R., Chin, Y.S., & Norhasmah, S. Factors associated with body weight status among welfare home children in Selangor, Malaysia. Oral Presentation. Nutrition Society of Malaysia's 30th Scientific Conference, Kuala Lumpur, Malaysia, 2-3 June 2015.
- Nur Nabilla, A.R., Chin, Y.S., & Norhasmah, S. Are welfare home children growing right in Selangor, Malaysia?. Poster Presentation. 9th Asia Pacific Conference on Clinical Nutrition, Kuala Lumpur, Malaysia, 26-29 January 2015.