PARENTS' KNOWLEDGE OF COMPLEMENTARY FEEDING AND ITS RELATIONSHIP WITH STUNTING: A SURVEY OF PARENTS HAVING CHILDREN IN NURSERIES IN KUANTAN, PAHANG

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Abstract

Introduction: The present study was designed to assess the knowledge of complementary feeding practices among parents who send children to nurseries in Kuantan, Pahang. **Method:** This research was a cross-sectional survey conducted on 137 parents. A convenient sampling method was used to choose ten selected nurseries in Kuantan, Pahang. A research questionnaire was modified from existing questionnaires and pre-tested. The demographic information and data on feeding practices on stunting were gathered using a questionnaire and the collected data was statistically analysed using SPSS software (version 16.0). The data results were regarded as significant at a probability level of 95% confidence interval (CI, $P<0.05$). **Result:** The age range of parents was 31 - 39 years old. The participants either worked in government or private sectors and had a tertiary level of education with on average four members in a family. This survey involved 66 boys (48.2%) and 71 girls (51.8%). The analysis showed that most parents (98.5%) chose 6-12 months as the suitable child's age to introduce complementary feeding while only two respondents (1.5%) chose 4-5 months. The responses from the parents' knowledge on the complementary feeding showed that out of 137 children, 78 (56.9%) were normal while 59 children (43.1%) were stunted. Among the 78 normal children, 50:50% were boys and girls. Among the stunted children, 32 (54.2%) of them were girls whilst 27 (45.8%) were boys. There was no association between parents' knowledge on complementary feeding and stunting. **Conclusion:** This study shows that considerable number of children are stunted in the study area. Furthermore, this study also indicates that there is no relationship between the parents' knowledge on complementary feeding practices and stunting.

Keywords: Complementary Feeding, Practices, Knowledge, Stunting, Parents, Nurseries

Introduction

Malnutrition can be categorized as either undernutrition or overnutrition. Both can be explained in specific situations as undernutrition is the main reason for stunting and wasting meanwhile overnutrition can be the risk factor for obesity and related diseases. Malnutrition can increase the risk of morbidity and mortality among children, specifically protein-energy malnutrition (Murtaza et al., 2018). This situation has increased the concerns about the emerging public health problems in countries that are struggling with the double burden of malnutrition including Malaysia which is one of the upper-middle-income countries (How et al., 2020). Linear growth is the best overall indicator of children's well-being and provides an accurate borderline of inequalities in human development. This is tragically reflected in

millions of the children globally who failed to thrive in their normal linear growth and suffered severely irreversible physical and cognitive damage because of suboptimal health conditions and inadequate nutrition and care (De Onis & Branca, 2016).

The World Health Organization (WHO) mentioned that stunting is the impaired growth and development that children face due to repeated infection, poor nutrition and inadequate psychosocial stimulation. Stunting is identified by the height-for-age (HAZ) of children less than 2 standard deviations (SD) which has been used widely as the global indicator to measure long-term chronic undernutrition (Perumal, Bassani & Roth, 2018; Murtaza et al., 2018 & WHO, 2018). In other words, the height of children who are lower than his or her age can be considered stunted. Individual growth from birth until adulthood is not a linear process. Generally, most infants are likely to have a longer trunk than a leg, and it will be vice versa when they grow over time (Poh et al., 2016). Prendergast & Humphrey (2014) mentioned that stunting masked more pervasively the developmental potential of humans because of its longer-term impact on cognitive function and adult economic productivity.

In Malaysia, the Ministry of Health (2020) recorded the data about stunting in the National Health & Morbidity Survey (NHMS) 2019. In the findings, the stunting prevalence among children under the age of five was 21.8%. Children from rural areas showed a higher prevalence of stunting (22.2%) than those from urban areas (21.7%). Besides, females showed a higher prevalence of stunting (23.5%) than males (20.2%). Moreover, those from the B40 income group of Malaysia (Income Classifications in Malaysia) had the highest prevalence of stunting (22.4%) based on the household income group. Early feeding practice was one of the factors that have a significant influence on growth and cognitive performance among children globally. Studies showed that inappropriate feeding practices during the first year of life were the main factor for malnutrition and poor cognitive performance in children under five years old (Chekol et al., 2017). Early feeding practices included breastfeeding practices and solid and semi-solid feeding practices during the first two years of life. Early feeding practices were associated with the growth and development of toddlers. Studies showed that the time of introduction, taste and texture of solids foods during the first year of life has a strong effect on moulding the eating preferences of a child in later years of life (Bork & Diallo, 2017). Therefore, this study was designed to assess the knowledge of parents on complementary feeding among parents who send their children in nurseries in Kuantan, Pahang. Besides that, this study was also intended to determine the possible relationship between parents' knowledge on complementary feeding and stunting of children.

Materials And Methods

Subjects

In total, 137 participants (male = 16, female = 121) from all ten nurseries were recruited through convenience sampling method. Participants who voluntarily participate in this study were enrolled. The inclusion criteria were the parents who have children aged 5 years old and below and have registered in the ten selected nurseries. Informed consent was obtained from the respondents. Furthermore, ethical approval was obtained from the IIUM Research Ethics Committee (IREC).

Study design

This project involved observational and cross-sectional study design. This design was used to identify what is happening in a defined population at a particular time (Cherry, 2019). In this case, cross-sectional study design was used to assess the knowledge on complementary feeding among parents having children in nurseries in Kuantan, Pahang. Besides, this study also determined the relationship between parents' knowledge on complementary feeding and stunting among their children. In addition, other reasons for this study design includes to conduct it faster and inexpensive.

Sampling method and Data collection:

Convenience sampling method was applied in this study. Convenience sampling is one of the non-probability sampling techniques considering the subjects availability and accessibility. The flow of data collection is shown in Figure 1.

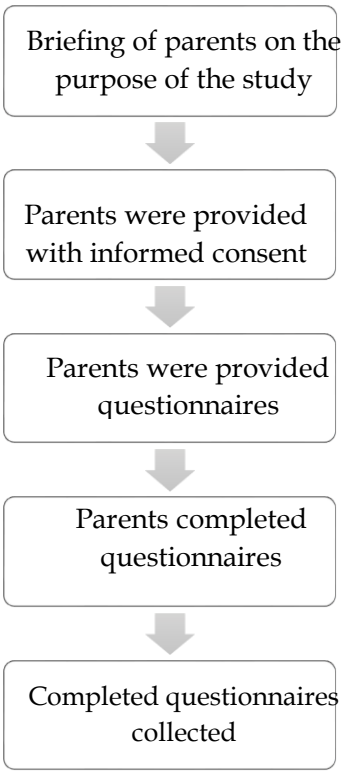

Figure 1: Flow of data collection

Children classification

Child's age, weight and height were obtained through the survey which have been self-reported by their parents. The recorded age, weight and height were then categorized as either stunted or normal according to the child growth standard (WHO, 2006).

Statistical analysis

The data collected from each questionnaire was compiled and statistically analysed using SPSS software (version 25.0). The statistical analysis included were descriptive analysis, Chi-square test and Spearmen correlation test.

Results

Sociodemographic data

This study involved 137 children out of which 78 children (56.9%) were normal while 59 children (43.1%) were stunted. Out of 78 normal children, half were male, and half were female. On the other hand, it was observed that the number of stunted girls which were 32 (54.2%) were more than stunted boys which were 27 (45.8%) as shown in Table 1.

Table 1: The distribution of child's status

Gender	Children status	
	Normal	Stunted
Boy	39 (50.0%)	27 (45.8%)
Girl	39 (50.0%)	32 (54.2%)

Parent's knowledge on complementary feeding

In this survey, the participants were asked about the suitable child's age to introduce complementary feeding. The choices of answer were 3 months, 4-5 months, 6-12 months and 12 months and above. Most participants (98.5%) chose 6-12 months as the suitable child's age to introduce CF while only two respondents (1.5%) chose 4-5 months as tabulated in Table 2.

Table 2: The frequency of suitable child's age for complementary feeding

Children age	Frequency	Percentage (%)
4-5 months	2	1.5
6-12 months	135	98.5

Chi-square goodness of fit test

The proportion of normal and stunted children that were observed in this study were compared to the nation's prevalence of stunting. The Chi-square goodness of fit test as indicated in Table 3 showed that there was a significant ($P< 0.001$) difference in the proportion of normal and stunted children.

Table 3: Summary table Chi-square goodness of fit test

Indicators	Value
Chi-Square value	36.343
p-value	0.000

Correlation analysis

The Pearson correlation analysis reveals that parents' knowledge on complementary feeding and stunted children were not associated based on the correlation coefficient, r=-0.082 and p value = 0.341.

Discussion

Prevalence of stunting

This study recorded a higher number of stunted girls (54.2%) compared to boys (45.8%). In contrast, Muniandy, et al., (2020) mentioned a higher prevalence of stunting among male children compared to females. They stated that the result may be related to their calcium intake in which the girls seem to consume higher calcium intake compared to the boys. Studies in a few third-world countries also indicated a higher prevalence of stunting in males compared to female children (Abrams and Becker, 2015 & Adnan and Muniandy, 2012). However, the higher prevalence of stunting among the boys may be caused by the poor calcium and protein intake in boys during the first year of life in third-world countries. A similar reason also has been stated by Hijra & Kartasurya, (2016) in their study. The low protein intake was caused by insufficient intake of animal-based foods such as chicken, beef and fish. They also stated that the subjects only ate fish once weekly, chicken once a month or at longer intervals, and beef once a year. Besides, legumes were also occasionally consumed as some children did not like to consume vegetables and fruits (Hijra & Kartasurya, 2016).

Parent's knowledge on complementary feeding

In this study, more participants chose 6-12 months age as the suitable child's age for complementary feeding (CF) while only two of them chose 4-5 months. The WHO Informal Meeting on Feeding the non-breastfed child 6-24 months of age recommended that solid foods may be introduced at six months of age for non-breastfed infants (WHO, 2004). Abeshu et al., (2016) also mentioned that the target age range for CF was from the age of 6 to 23 months (with continued breastfeeding). During this period, most infants had reached a general and neurological stage of development (e.g. chewing, swallowing, digestion, and excretion) that allowed them to be fed other foods rather than breast milk (Abeshu et al., 2016). This study also showed that most of the participants agreed (80.3%) when answering the question regarding the frequency of protein provided during CF. According to Guideline Feeding Infants and Young Children (MOH, 2009), proteins from animal sources such as meat, poultry, fish and eggs should be given daily because it is the main source of iron and zinc. If this practice is quite impossible to be done, the parents should choose fortified food or nutrient supplements to meet the nutrient requirements.

All of the respondents agreed to the question "Is it necessary to change the texture and the methods of food preparation gradually according to the age of the child?". This result indicates some similarities with the recommendation of the USDA (2009) and MOH Malaysia (2014) in the sequence of introducing CF textures and feeding styles as mentioned in the Figure 2 and Figure 3 respectively.

<table>
<tr><td>Age of infant in months</td><td colspan="12">Birth 1 2 3 4 5 6 7 8 9 10 11 12</td></tr>
<tr><td>Age grouping</td><td colspan="3">Birth to 3 months</td><td colspan="4">4–6 months</td><td colspan="3">6–8 months</td><td colspan="2">8–12 months</td></tr>
<tr><td>Sequence of introducing foods</td><td colspan="3">Breast milk or infant formula</td><td colspan="4">Complementary</td><td colspan="3">Foods</td><td colspan="2"></td></tr>
<tr><td rowspan="3">Texture of complementary foods</td><td colspan="3" rowspan="3"></td><td colspan="9">Strained/pureed (thin consistency cereal)</td></tr>
<tr><td colspan="4" rowspan="2"></td><td colspan="5">Mashed</td></tr>
<tr><td colspan="3"></td><td colspan="2">Ground/finely chopped</td></tr>
<tr><td colspan="3"></td><td colspan="4"></td><td colspan="3"></td><td colspan="2">Chopped</td></tr>
<tr><td rowspan="4">Feeding style</td><td colspan="12">Breast feeding/bottle feeding</td></tr>
<tr><td colspan="3" rowspan="3"></td><td colspan="9">Spoon feeding</td></tr>
<tr><td colspan="9">Cup feeding</td></tr>
<tr><td colspan="4"></td><td colspan="3"></td><td colspan="2">Self-feeding/ feeding finger foods</td></tr>
</table>

Figure 2: The sequence of introducing complementary feeding with food textures and feeding styles according to the infant's age (USDA, 2009)

Kumpulan Makanan	Umur (bulan)		
	6-8	9-11	12-23
Bijirin, hasil bijirin dan ubi-ubian	1½ cawan bubur	2½ cawan bubur	2 cawan nasi
Sayur	2 sudu makan sayur (dimasak)	4 sudu makan sayur (dimasak)	4 sudu makan sayur (dimasak)
Buah	¼ hiris betik ATAU pisang saiz kecil (1 pisang mas: 33g)	1 hiris betik ATAU 2 pisang saiz kecil (1 pisang mas: 33g)	1 hiris betik ATAU 2 pisang saiz kecil (1 pisang mas: 33g)
Daging, ayam, ikan dan kekacang	2 sudu teh daging (sebarang jenis) atau ¼ ikan	2 sudu teh daging (sebarang jenis) atau ¼ ikan atau telur	½ ikan kembung saiz sederhana atau 1 biji telur
Susu	Susu ibu mengikut keperluan	Susu ibu mengikut keperluan	3 gelas susu
Lemak, minyak	1 sudu teh minyak tambahan	1½ sudu teh minyak tambahan	1 sudu teh minyak tambahan
Tip tambahan bagi ibu bapa	➢ Tekstur: puri/lecek dengan kepekatan yang cair ➢ Kekerapan 2-3 kali sehari atau lebih jika anak lapar.	➢ Tekstur: makanan yang dicincang halus/lecek , juga makanan yang boleh dipegang dengan jari ➢ Kekerapan 3-4 kali sehari atau lebih jika anak lapar.	➢ Tekstur: mula berikan makanan keluarga tetapi jika dia mengalami kesulitan, teruskan pemberian makanan yang dicincang/lecek dan perkenalkan pelbagai jenis makanan keluarga secara perlahan-lahan ➢ Kekerapan 3-4 kali sehari atau lebih jika anak lapar.

Figure 3: The suggestions of foods and its recommended texture according to the infant's age (MOH, 2014)

Correlation between parents' knowledge and complementary feeding practices with stunting

According to Barir et al., (2019) there is significant association between exclusive breastfeeding and the incidence of stunting. The lack of emphasizing exclusive breastfeeding cause the failure to thrive after birth. Sufficient exclusive breastfeeding can stimulate protection against gastrointestinal infections. Barir et al., (2019) stated that there was a significant association between timely CF and stunting children based on the results. Akram et al., (2018) explained that stunting was related to the early implementation of CF in infants aged less than 6 months and the occurrence of infectious diseases such as diarrhoea. Infants experienced digestive disorders when they have been given solid or semi-solid food are prone to stunting if no treatments were given. Basnet et al., (2015) mentioned in their study that most mothers did not introduce CF during the child's age of six months because of inadequate breast milk production, hence they felt that they need to introduce CF early than the recommendation's age. According to Basnet et al., (2015) reasons for early implementation of CF are due to dependant on the parent's time of returning from jobs and also receive advice from family members, friends or due to lack of knowledge.

Conclusion

This study concludes that in terms of stunting, more than half of the children (56.9%) involved in this study were categorized as normal while the remaining (43.1%) were considered as stunted. There was no significant association between parents' knowledge on complementary feeding practices with stunting.

Acknowledment

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References

Abeshu, M.A., Lelisa, A., & Geleta, B. (2016). Complementary Feeding: Review of Recommendations, Feeding Practices, and Adequacy of Homemade Complementary Food Preparations in Developing Countries – Lessons from Ethiopia. Front Nutr. 17; 3:41

Abrams, E.M., & Becker, A.B. (2015). Food introduction and allergy prevention in infants. CMAJ, 187(17), 1297-1301.

Adnan, N., & Muniandy, N.D. (2012). The relationship between mothers' educational level and feeding practices among children in selected kindergartens in Selangor, Malaysia: A cross-sectional study. AJCN, 4(2), 39-52.

Akram, R., Sultana, M., Ali, N., Sheikh, N., & Sarker, A. R. (2018). Prevalence and determinants of stunting among preschool children and its urban–rural disparities in Bangladesh. FN&B, 39(4), 521-535.

Barir, B., Murti, B., & Pamungkasari, E. P. (2019). The associations between exclusive breastfeeding, complementary feeding, and the risk of stunting in children under five years of age: A path analysis evidence from Jombang East Java. JMCH, 4(6), 486-498.
Basnet, S., Sathian, B., Malla, K., & Koirala, D. P. (2015). Reasons for early or late initiation of complementary feeding: A study in Pokhara. Am J Publ Heal Res, 3(4A), 69-75.

Bork, K. A., & Diallo, A. (2017). Boys are more stunted than girls from early infancy to 3 years of age in rural Senegal. JN, 147(5): 940-947.

Chekol, D.A., Biks, G.A., Gelaw, Y.A., & Melsew, Y A. (2017). Exclusive breastfeeding and mothers' employment status in Gondar town, Northwest Ethiopia: A comparative cross-sectional study. International breastfeeding journal, 12(1):1-9.

Cherry, K. (2019). What Is a Cross-Sectional Study?Retrieved from https://www.verywellmind.com/what-is-a-cross-sectional-study-2794978. (Accessed on 18-10-2022).

De Onis, M., & Branca, F. (2016). Childhood stunting: A global perspective. MCN, 12, 12–26.
Hijra, H., Fatimah-Muis, S., & Kartasurya, M. I. (2016). Inappropriate complementary feeding practice increases risk of stunting in children aged 12-24 months. Universa Medicina, 35(3), 146155.

How, E.T.C., Shahar, S., Robinson, F., Manah, A.M., Ibrahim, M.Y., Jeffree, M.S., & Rahim, S., Yusuff, A. (2020). Risk factors for undernutrition in children under five years of age in Tenom, Sabah, Malaysia. MJPHM, 20(1), 71-81.

Ministry of Health. (2009). Garis Panduan Pemberian Makanan Bayi dan Kanak-Kanak Kecil.

Ministry of Health. (2014). Malaysian Dietary Guidelines for Children and Adolescents.

Ministry of Health. (2020). National Health and Morbidity Survey (NHMS) 2019: Noncommunicable diseases, healthcare demand, and health literacy. Volume 1: – Non-communicable diseases: Risk factors and other health problems.

Muniandy, N.D., Mahdy, N.A.A., & Saad, I.R.M. (2020). Nutritional status and feeding practices among toddlers in selected nurseries in Puncak Alam, Selangor, Malaysia. Healthscope: The Official Research Book of Faculty of Health Sciences, UiTM, 3(3), 69-73.

Murtaza, S. F., Gan, W.Y., Sulaiman, N., & Shariff, Z. M. (2018). Factors associated with stunting among Orang Asli preschool children in Negeri Sembilan, Malaysia. MJN, 24(2):215-226.

Perumal, N., Bassani, D.G., & Roth, D.E. (2018). Use and misuse of stunting as a measure of child health. JN, 148(3), 311-315.

Poh, B.K., Wong, J.E., Norimah, A.K., & Deurenberg, P. (2016). Differences in body build in children of different ethnic groups and their impact on the prevalence of stunting, thinness, overweight, and obesity. Food and nutrition bulletin, 37(1), 3-13.

Prendergast, A. J., & Humphrey, J. H. (2014). The stunting syndrome in developing countries. Paediatr Int Child Health . 34(4):250-265.

United States Department of Agriculture (USDA), & US (USDA). (2009). Complementary Feeding. Infant Nutrition and Feeding, 101-128.
World Health Organization. (2004). Feeding the non-breastfed child 6-24 months of age: Geneva, 8-10 March 2004: meeting report (No. WHO/FCH/CAH/04.13). World Health Organization.

World Health Organization. (2006). Length/height-for-age.

World Health Organization. (2018). Reducing stunting in children: Equity considerations for achieving the Global Nutrition Targets 2025.