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Nutritional screening among paediatric indigenous population in Malaysia: a pilot study

Przesiewowa ocena stanu odżywienia wśród rdzennej populacji dzieci w Malezji: badanie pilotażowe

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Abstract

Introduction: Undernutrition is a serious health problem in developing countries. The prevalence of undernutrition is deemed higher among the indigenous community in many developing countries, owing to their relatively lower socioeconomic status, lack of healthcare awareness and essential needs, as well as poor sanitation facilities. We aimed to assess the nutritional status among children within a single indigenous community in Kampung Gabai, Malaysia. **Materials and methods:** We conducted a pilot study on the nutritional status of the paediatric population of the Orang Asli community in Kampung Gabai by assessingtheir anthropometric indices during a medical camp, as this community had never been assessed before. Anthropometric indices were based on heights, mid-upper arm circumferences and head circumferences of 21 children aged between 2 to 14 years. Additionally, skin evaluation and otoscopic examinations were performed in the same setting. **Results:** The prevalence of stunting was 38.1% among the children in Kampung Gabai. The height-for-age *Z* score distribution of the children skewed slightly to the left in comparison to the World Health Organization standard. The mid-upper-arm circumferences and the head circumferences of children who were less than 5 years old were within the normal range. The children generally had normal otoscopic and skin findings. **Conclusion:** This preliminary study concluded that the prevalence of stunting is high among indigenous children in a single community in Malaysia.

Keywords: nutritional screening, indigenous children, anthropometric measurements

Streszczenie

Wstęp: Niedożywienie stanowi poważny problem zdrowotny w krajach rozwijających się. Uważa się, że problem niedożywienia dotyczy w szczególności społeczności rdzennych zamieszkujących te kraje, ze względu na ich stosunkowo niższy status społeczno-ekonomiczny, brak świadomości zdrowotnej i możliwości zaspokojenia podstawowych potrzeb, a także złe warunki sanitarne. Celem badania była ocena stanu odżywienia dzieci w jednej z rdzennych społeczności w Kampung Gabai w Malezji. **Materiał i metody:** Przeprowadzono pilotażowe badanie dotyczące stanu odżywienia populacji dzieci ze społeczności Orang Asli w Kampung Gabai oparte na ocenie wskaźników antropometrycznych zrealizowanej w ramach prowadzonego obozu medycznego. Społeczność ta nigdy wcześniej nie była poddana takiej ocenie. Oceniane wskaźniki antropometryczne obejmowały wzrost, obwód środkowej części ramienia i obwód głowy. Oceną objęto 21 dzieci w wieku od 2 do 14 lat. Dodatkowo w tych samych warunkach dokonano oceny stanu skóry i przeprowadzono badanie otoskopowe. **Wyniki:** Częstość występowania zahamowania wzrostu wśród dzieci w Kampung Gabai wyniosła 38,1%. Rozkład wyniku *Z* w zakresie wzrostu odpowiedniego do wieku wykazywał lekkie odchylenie w lewo w porównaniu ze standardem Światowej Organizacji Zdrowia. Wartości obwodu środkowej części ramienia i obwodu głowy u dzieci poniżej 5. roku życia mieściły się w normie. Wyniki badań otoskopowych i oceny stanu skóry na ogół mieściły się w normie. **Wniosek:** To wstępne badanie wykazało wysoką częstość występowania zahamowania wzrostu wśród dzieci należących do jednej ze rdzennych społeczności w Malezji.

Słowa kluczowe: przesiewowa ocenu stanu odżywienia, dzieci ze społeczności rdzennej, pomiary antropometryczne

INTRODUCTION

Undernutrition is a serious health problem in developing countries[1]. Albeit globally mitigated, the prevalence of childhood stunting among indigenous communities remains a conundrum[2]. Indigenous people are regarded as underprivileged, as they suffer from lower socioeconomic status, lack of healthcare awareness, poor sanitation facilities, as well as lack of possibility to meet essential needs despite the growing worldwide economy[2]. The indigenous people in Malaysia account for 13.8% of the total population[2] and are known as Orang Asli (OA), especially in Peninsular Malaysia. Stunting among OA children has been a major public concern[2] despite myriad measures taken by the government to improve health and social status. Several studies in Malaysia showed that the prevalence of stunting in OA children is significant, ranging between 40 and 76%[3–5]. Yet, overall published statistics on the growth pattern of OA's children are limited[3]. Therefore, we performed nutritional screening among a single community of OA children in Kampung Gabai, Malaysia, using anthropometric measurements, as this population group had never been assessed before.

MATERIALS AND METHODS

All OA children from Kampung Gabai were screened. Consent to perform screening as a part of the medical camp was obtained from the local authority, the head of the community, and the parents. A data collection form was used to collect all the necessary information. In addition to basic demographic details and anthropometric measurements, otoscopic examination and assessment of skin condition were carried out in the same setting. Anthropometric measurements performed included height, mid-upper arm circumference (MUAC) and head circumference (HC) using standard protocols and instruments. Height was measured by using a measuring tape taped to the wall, with the child standing without shoes. MUAC and HC were each measured using a measuring tape according to the standard method. Otoscopy was also performed for all children to identify any underlying ear problems. Skin was checked for turgor and the presence of skin conditions such as dermatitis or eczema. The anthropometric measurements were analysed using the World Health Organization (WHO) Child Growth Standard[6].

All assessments were carried out by medical officers along with specialists from the Department of Otorhinolaryngology. Additionally, only children who completed all assessments were included in this study.

RESULTS

Twenty-one children were included in our study, of which there were 11 boys and 10 girls. Their age ranged between 2 to 14 years, with a mean age of 7.3 years. In addition, there were 6 children below the age of 5 years and 15 children above the age of 5 years. Demographic characteristics and anthropometric indices of Kampung Gabai children are summarised in Tab. 1.

Characteristics	Number of children	Percentage [%]
Gender:		
• female	10	47.6
• male	11	52.4
Age groups (years):		
• 1–6	11	52.4
• 7–12	8	38.1
• 13–18	2	9.5
Heights for age – according to percentiles:		
• less than 5th centile	8	38.1
• 5th to 10th centile	4	19.0
• 10th to 25th centile	1	4.8
• 25th to 50th centile	4	19.0
• 50th to 75th centile	2	9.5
• 90th to 95th centile	1	4.8
• more than 95th centile	1	4.8
Mid-upper arm circumference:		
• 11.5 cm	21	100%
Head circumference for children below 5-year-old:		
• 3rd to 15th centile	2	33.3%
• 15th to 50th centile	2	33.3%
• 50th to 85th centile	1	16.7%
• 85th to 97th centile	1	16.7%

Tab. 1. Demographic characteristics and anthropometric indices of children from Kampung Gabai

Heights

The height of the children was analysed separately for children <5 years old and >5 years old. Heights-for-age, according to percentiles, revealed that 38.1% of the children's heights were below the 5th centile. 80.9% of the children's heights are below the 50th centile, while 19.5% were above the 50th centile (Fig. 1).

The mean *Z*-score for height-for-age (HAZ) for children <5 years old was calculated using the WHO Anthro Software (version 3, 2009). The mean *Z*-score for HAZ for children above five years old was computed using the WHO AnthroPlus Software.

The *Z*-score distribution of the HAZ for the children was slightly skewed to the left of the WHO standard (Fig. 2). Stunting is defined as a HAZ *Z*-score of less than −2 standard deviations[7]. Based on this, the prevalence rate of

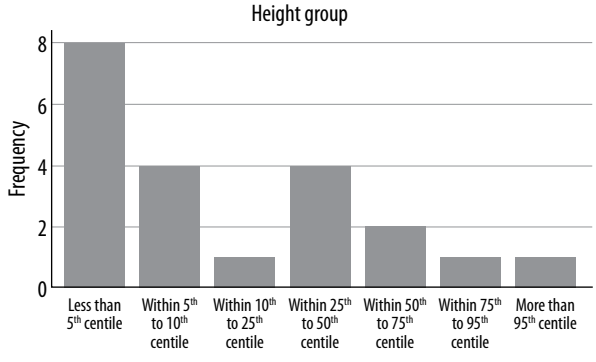

Fig. 1. Height-for-age of children according to percentiles

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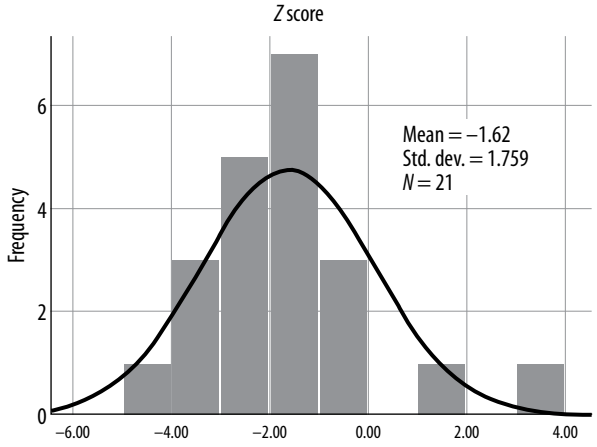

Fig. 2. Z-score distribution of the height-for-age based on WHO standards, N = *21*

stunting among the children in Kampung Gabai is as high as 38.1%.

MUAC for children less than 5 years old

In children less than 5 years old, a MUAC of less than 11.5 cm indicates severe acute malnutrition, which requires medical attention[8]. In our study, all 21 children had MUAC of more than 12.5 cm. The smallest arm circumference was 14 cm, while the largest was 31 cm, with a mean of 18.5 cm.

HC for children less than 5 years old

For 6 children under the age of 5 years, HC was measured and analysed based on the WHO HC chart for boys/girls aged <5 years. All children's HC was within the 3rd to 97th centiles. HC less than 50th centiles was found in 66.7% of children.

Otoscopy examination

None of the children included in this study was found to have an active ear infection. Otoscopy examinations for the children were mostly normal, with only 3 children having impacted ear wax. General ear care and hygiene were taught and stressed.

Skin

The majority of the children had normal skin. However, five children were detected to have mild forms of dermatitis, while another two were found to have dry skin.

DISCUSSION

These preliminary data demonstrate that the prevalence of stunting is 38.1%, which is comparable to the prevalence data obtained from other studies among OA children in Malaysia[2,4]. Nevertheless, there are several studies that report a higher rate of stunting among OA children (41 to 64%)[2]. High prevalence rates of stunting confirm that childhood malnutrition is still at an alarming stage in the OA community. The differences in the prevalence of stunting among different studies may be due to the different locations and sub-tribes studied[2]. The subtribes, such as Temuan, Jah-hut and Temiar, are residing on different grounds with their socioeconomic practices[2], whereby certain tribes may therefore have better housing conditions and basic amenities compared to the rest, resulting in a lower rate of stunting amongst children.

Our local study findings on OA populations are compared to studies on indigenous communities overseas. For example, case studies carried out over the past 2 decades in Amazonia revealed that the prevalence of stunting among indigenous children is higher compared to non-indigenous children[1]. In Brazil, the rate of stunting in indigenous children was reported to be 2 to 5 times higher compared to non-indigenous children.

The myriad factors contributing to malnutrition among children in indigenous communities include lower socioeconomic status, poor sanitation awareness and the resulting lack of proper sanitation, as well as parasitic infections[2,4]. Wong et al. reported that a short breastfeeding period, less dietary diversity, and poor hygiene practices[5] were the leading causes of poor nutritional health among OA children in Malaysia. Moreover, insufficient food supply and cultural food taboos among the OA community further compromise their nutritional status[9].

An otoscopic examination was carried out for all children in our study to look for signs of ear infection. The otoscopic examination was carried out routinely in most studies to screen indigenous children[10]. Coleman et al. reported a higher incidence of otitis media among the indigenous population worldwide, and that it tends to occur earlier and in more severe forms[11]. It was reported that up to one-third of the Greenlandic and Alaskan Inuit, Native American, and Indigenous Australian children suffer from chronic suppurative otitis media[11]. Furthermore, the infection has been traditionally linked to nutritional deficit. However, in our study population, none of the children complained of ear symptoms, and their otoscopy findings were normal, albeit showing evidence of stunting, which may indicate that the children in the Kampung Gabai population are not susceptible to infection as compared to the other indigenous group.

Anthropometric indices have traditionally been used to assess nutritional status as it is simple, non-invasive and inexpensive method[7]. In addition to standard measurements such as height, weight, body mass index (BMI), MUAC and HC, there are many other assessments that have been utilised, such as calf circumference, chest circumference, waist circumference, hip circumference, biceps skinfold, triceps skinfold, calf skinfold, subscapular skinfold, as well as supra iliac skinfold[7]. Moreover, skin assessment will enable early detection of skin conditions, such as impetigo, scabies,

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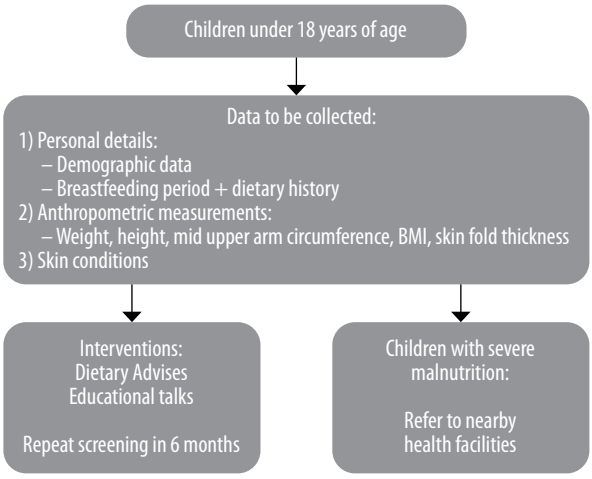

Fig. 3. Simple screening protocol for OA children in Malaysia

and fungal infections, as well as to check skin turgor, which represents the child's hydration status[12]. BMI and MUAC are reported to be more reliable and significant compared to the other indices[7]. MUAC is especially valuable as it is a measure of muscle and subcutaneous fat in the upper arm, which are important determinants of survival in starvation[7]. On the other hand, HC is important for measuring growth in the first 3 years of life, though its potential as a screening tool has not been fully established. However, since the currently available assessment tools have a similar cut-off value, irrespective of ethnicity, their accuracy is still debatable.

Bhattacharya et al. advocated the usage of a novel tool to rigorously assess the nutritional status by using 12 anthropometric traits represented into one composite score through confirmatory factor analysis[7]. In the same vein, various laboratory assessments based on blood and urine samples can be used to assess nutritional status. For example, low haemoglobin and lack of certain nutrients and proteins can be detected early through laboratory tests, though it is more expensive and time-consuming.

We propose a simple screening protocol be used among OA children in Malaysia as a standardised screening protocol enables large-scale data collection among the OA community in Malaysia (Fig. 3).

Moving forward, we should include a larger paediatric population in the study, with more complete anthropometric measurements, such as weight and skinfold thickness. Additionally, complete dietary history, as well as data on the socioeconomic background of the OA population should be collected through an interview, and questionnaire methods need to be incorporated as this information will enable us to understand the OA community better and, thus, help tailor interventions to improve their overall nutritional status.

CONCLUSIONS

The prevalence of stunting reported in this preliminary study is comparable to other previous studies conducted among OA children in Malaysia. Malnutrition is prevalent among children in the OA community and deserves more attention and interventions. Future studies should incorporate large-scale data collection among the OA community along with standardised anthropometric screening protocol to ensure a better assessment of the nutritional status of the OA children.

How does this paper make a difference in general practise?

- Indigenous populations are predisposed to myriad health issues due to their poor living conditions and economic status.
- Malnutrition leads to stunting in approximately 40% of children in the indigenous population due to lack of adequate nutrition.
- This study may pave way for future longitudinal studies and research on the nutritional status among various indigenous populations both in Malaysia and across the globe.
- This study aims to raise awareness on the importance of health screening, nutritional screening in particular, among indigenous populations as well as to develop a relief programme to curb nutritional deficiency among indigenous populations.

Conflict of interest

All authors have no potential conflict of interest.

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