

REVIEW ARTICLE

Open Access

FROM FOREST TO FAST FOOD: NUTRITION AND LIFESTYLE TRANSITIONS IN SABAH

Edwin de Cruz¹, Khalid Mokti^{1*}, Azman Atil¹

Abstract

Indigenous communities in Sabah, Malaysia, are undergoing a rapid nutrition transition, shifting from traditional, nutrient-dense diets to modern, processed food consumption. This transition, driven by factors like urbanization, economic shifts, and environmental degradation, is profoundly affecting health outcomes. Data from the National Health and Morbidity Survey (NHMS) reveals that overall obesity rates in Malaysia increased from 17.7% (in 2015) to 19.7% (in 2019), with indigenous groups experiencing a disproportionate burden of non-communicable diseases (NCDs). This paper synthesizes current research on dietary shifts, rising NCD prevalence, and socioeconomic determinants among Sabah's indigenous populations, focusing on the coexistence of undernutrition and rising obesity (the double burden of malnutrition). We argue that addressing these complex challenges requires urgent, culturally tailored public health interventions that promote traditional diets, enhance food security, and integrate indigenous knowledge with modern health strategies.

Keywords: Nutrition transition, Indigenous communities, Obesity, Non-communicable diseases (NCDs), Malaysia.

*Correspondence Email: khalid.mokti@ums.edu.my

¹Department of Public Health Medicine, Faculty of Medicine & Health Sciences, Universiti of Malaysia Sabah, Jalan UMS, Kota Kinabalu 88400, Malaysia

Received: 26/03/2025

Accepted: 23/11/2025

Published (Online): 19/12/2025

INTRODUCTION

The health and nutritional status of indigenous communities globally are intimately tied to their environment and cultural practices (Pressler et al., 2022). Indigenous communities in Sabah, Malaysia, have historically maintained resilient, nutrient-dense diets based on subsistence activities such as gathering forest produce, cultivating rice, and fishing for wild-caught species (Ganesan et al., 2020). These traditional diets and physically demanding lifestyles were central to their community identity and physical health, historically offering protection against the chronic conditions now prevalent in industrialized nations (Pressler et al., 2022).

Unfortunately, rapid globalisation, urban migration, and the influence of modern market economies have initiated a swift and pervasive nutrition transition (Pressler et al., 2022). This shift involves the displacement of indigenous staples by heavily processed, energy-dense foods high in refined carbohydrates, sugar, salt, and unhealthy fats (Abang Brian et al., 2023; Pressler et al., 2022). This phenomenon mirrors broader changes occurring throughout Malaysia, leading to an alarming increase in lifestyle-related diseases.

This manuscript comprehensively synthesizes recent findings regarding the dietary and lifestyle transitions and resulting health outcomes among Sabah's indigenous populations. It specifically integrates local primary data on indigenous communities in Sabah (Ganesan et al., 2020; Rafiz Azuan et al., 2024) and Perak (Chew et al., 2022) with national epidemiological trends (Ministry of Health Malaysia, 2020).

The novelty of this paper lies in its integrated approach that:

- i. **Synthesises Disparate Data:** It connects socio-economic and cultural observations (Ganesan et al., 2020; Chew et al., 2022) with recently identified dietary patterns among Sabah's children (Rafiz Azuan et al., 2024) and national NCD statistics (Ministry of Health Malaysia, 2020).
- ii. **Addresses the Double Burden:** It critically examines the simultaneous existence of undernutrition (stunting) and rising obesity/NCDs within the same vulnerable groups, providing context often overlooked in national reports focusing solely on obesity (Ministry of Health Malaysia, 2020).
- iii. **Proposes Culturally Relevant Strategies:** It grounds policy and intervention recommendations in traditional practices and community-led initiatives, moving beyond generalized public health advice.
- iv. This analysis provides a targeted understanding necessary for developing effective, culturally relevant public health policies to mitigate the adverse effects of dietary transition.

METHODS

This article is based on a narrative review and synthesis of existing literature and national health data. The studies selected reflect the most current and relevant research concerning nutrition, lifestyle, and health outcomes among Malaysian indigenous and youth populations, contextualized by national epidemiological and global health data.

The synthesis involved analysing key findings from:

- i. National Epidemiology: Data from the Malaysian National Health and Morbidity Survey 2019 (NHMS) (Ministry of Health Malaysia, 2020) and Malaysian population statistics (Department of Statistics Malaysia, 2021) to establish national NCD burden and demographic context.
- ii. Global Health Context: Publications from the World Health Organization (WHO) (World Health Organization, 2021) and systematic global reviews (Ng et al., 2014; Pressler et al., 2022) to define terms and position the Malaysian situation within global trends of obesity and nutrition transition.
- iii. Local and Regional Studies: Peer-reviewed articles focusing on the eating habits, environmental pressures, and health issues within indigenous communities in Sabah (Ganesan et al., 2020; Rafiz Azuan et al., 2024) and Perak (Chew et al., 2022), and among Malaysian youth (Abang Brian et al., 2023).

The findings of these selected papers were qualitatively compared and discussed to identify common themes, contradictions, and mechanisms driving the nutrition and lifestyle transitions.

RESULTS AND DISCUSSION

The Burden of Non-Communicable Diseases (NCDs)

The rise of NCDs is one of the most critical public health challenges in Malaysia. According to the NHMS 2019 (Ministry of Health Malaysia, 2020), the national burden is significant:

- i. Obesity and Overweight: The combined prevalence of overweight and obesity ($BMI \geq 25\text{kg}/\text{m}^2$) among Malaysian adults reached 50.1% in 2019 (Ministry of Health Malaysia, 2020). The prevalence of obesity alone ($BMI \geq 30\text{kg}/\text{m}^2$) rose from 17.7% (2015) to 19.7% (2019) (Ministry of Health Malaysia, 2020). Globally, the prevalence of obesity has more than doubled since 1990 (World Health Organization, 2021).
- ii. Diabetes: The prevalence of overall raised blood glucose (known and undiagnosed diabetes) among adults was 18.3% in 2019, an increase from 13.4% in 2015 (Ministry of Health Malaysia, 2020).
- iii. Hypertension and Hypercholesterolaemia: The prevalence of hypertension remained high at 30.0% and raised blood cholesterol was 38.1% (Ministry of Health Malaysia, 2020). These NCDs are major risk factors for cardiovascular disease, the leading cause of death in Malaysia (Ministry of Health Malaysia, 2020).

The economic development and urban migration of rural families underpin this health burden. The urban population of Sabah reached 55.5% in 2021 (Department of Statistics Malaysia, 2021), a trend that accelerates the shift away from physically active, subsistence-based lifestyles towards sedentary work and reliance on convenient, processed foods.

Dietary Transition and the Double Burden

The shift in dietary habits among Sabah's indigenous populations is a classic case of nutrition transition (Pressler et al., 2022). This involves three distinct, and often simultaneous, challenges:

Loss of Traditional Diets

Traditional diets of Sabah's communities, exemplified by the Lundayeh, emphasized rice, wild meats, fish, and foraged vegetables (Ganesan et al., 2020). This pattern is being displaced by modern foods high in refined carbohydrates and sugars. For instance, one study in Sabah identified that children following a "Fish Dietary Pattern" had favourable outcomes (taller stature), while others followed a "White Rice Dietary Pattern" that was associated with higher weight and Body Mass Index (BMI) (Rafiz Azuan et al., 2024).

The Double Burden of Malnutrition

The most challenging aspect of this transition is the emergence of the double burden of malnutrition, where undernutrition (specifically stunting) coexists with rising overweight/obesity (Ministry of Health Malaysia, 2020) within the same vulnerable population.

- The national prevalence of stunting (Height for Age < -2SD) among children under five years old increased to 21.8% in 2019 (Ministry of Health Malaysia, 2020), a figure comparable to the global prevalence of 21.9% (World Health Organization, 2021).
- A recent study in Sabah found a high prevalence of stunting (~ 16.5%) alongside overweight / obesity (~ 21.4%) among low-income children (Rafiz Azuan et al., 2024).

This dual problem indicates that while energy intake is sufficient (or excessive) to cause obesity, the quality of diet is poor, leading to nutrient deficiencies and stunting (Ministry of Health Malaysia, 2020). Health practitioners working with the Orang Asli children in Perak noted that barriers such as poverty and food taboos contribute to this ongoing cycle of undernutrition (Chew et al., 2022).

The Role of Processed Foods and Youth

The shift towards "fast food" and convenience items is amplified among younger generations (Abang Brian et al., 2023). As a universal feature of modern diets, the increased consumption of sugar-sweetened beverages (SSBs) and instant snacks directly contributes to metabolic risk (Ministry of Health Malaysia, 2020). The NHMS 2019 found that 94.9% of Malaysian adults do not consume adequate fruits and vegetables (Ministry of Health Malaysia, 2020), pointing to a severe national deficiency in protective foods. Furthermore, 25% of Malaysian children (aged 5-17) are overweight or obese (Ministry of Health Malaysia, 2020).

Lifestyle and Environmental Factors

The rapid rise in NCDs is exacerbated by a parallel decline in physical activity. Traditional lifestyles including farming, fishing, and hunting are highly physically demanding (Ministry of Health Malaysia, 2020). These activities are being replaced by sedentary occupations,

particularly following urban migration. NHMS 2019 reported that 25.1% of adults in Malaysia were physically inactive (Ministry of Health Malaysia, 2020), a significant decrease from the 33.5% in 2015 (Ministry of Health Malaysia, 2020).

Furthermore, environmental degradation is a significant pressure point for food security. Deforestation and agricultural expansion have reduced access to wild foods (Ganesan et al., 2020), forcing indigenous families to rely on imported, store-bought foods. This commodification of traditional food systems (Pressler et al., 2022) increases vulnerability to food insecurity and displaces indigenous wisdom regarding food preparation and harvesting.

Limitations of the Study

The synthesis relies heavily on large-scale cross-sectional survey data (Ministry of Health Malaysia, 2020) and regional studies (Ganesan et al., 2020; Rafiz Azuan et al., 2024; Chew et al., 2022). While NHMS provides excellent national-level prevalence, it lacks the detailed longitudinal data to fully establish causality between dietary changes and NCD onset (Ministry of Health Malaysia, 2020). Furthermore, while the indigenous studies provide vital qualitative and localized context, their small-scale limits generalizability across all diverse indigenous groups in Sabah (Chew et al., 2022).

CONCLUSION

The transition from a forest-based diet to a market-based diet among indigenous communities in Sabah presents a critical public health emergency, defined by escalating NCD rates and the complex double burden of malnutrition (Ministry of Health Malaysia, 2020). This crisis is rooted in the interplay of economic development, rapid urbanization, changing consumption patterns, and environmental loss (Pressler et al., 2022; Ganesan et al., 2020).

Addressing these challenges requires a multi-pronged approach that prioritizes both economic resilience and cultural preservation. Interventions must be culturally sensitive and target key mechanisms:

- i. Reclaiming Traditional Food Systems: Health campaigns should emphasize the nutritional and cultural value of traditional foods, complementing global evidence on the effectiveness of community-led nutrition programs (Pressler et al., 2022).
- ii. Targeted Education: Nutrition education must be integrated into school curricula, allowing youth to appreciate the health benefits of their heritage foods while discouraging the consumption of highly processed, aggressively marketed foods (Abang Brian et al., 2023).
- iii. Policy Support: State and federal support, such as incentivizing local production of traditional crops and creating targeted programs for high-risk, low-income groups, is essential to ensure healthy food choices are the most accessible and affordable (Chew et al., 2022).

By acknowledging the uniqueness of indigenous lifestyles and leveraging indigenous wisdom, public health initiatives can move beyond surface-level solutions to provide sustainable and effective health outcomes for these vulnerable populations.

Acknowledgements

The authors acknowledge the foundational work of the researchers involved in the National Health and Morbidity Survey (NHMS) 2019 and the critical ethnographic data collected by the scholars researching Malaysian indigenous food security and health.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Funding

This study received no external funding.

REFERENCES

Abang Brian C, Stephenson, M. L., & Tan, A. L. (2023). Recent research patterns and factors influencing eating behaviour amongst Malaysian youths: a scoping review. *Frontiers in Sustainable Food Systems*, 7. <https://doi.org/10.3389/fsufs.2023.1252591>

Chew, C. C., Lim, X. J., Low, L. L., Lau, K. M., Kari, M., Shamsudin, U. K., & Rajan, P. (2022). The challenges in managing the growth of indigenous children in Perak State, Malaysia: A qualitative study. *PloS one*, 17(3), e0265917. <https://doi.org/10.1371/journal.pone.0265917>

Department of Statistics Malaysia. (2021). Population statistics: Demographics and health trends in Malaysia. Department of Statistics Malaysia. <https://www.dosm.gov.my/portal-main/release-content/current-population-estimates-malaysia-2021>

Ganesan, K., Govindasamy, A. R., Wong, J. K. L., Rahman, S. A., Aguol, K. A., Hashim, J., & Bala, B. (2020). Environmental Challenges and Traditional Food Practices: The Indigenous Lundayeh of Long Pasia, Sabah, Borneo. *ETropic: Electronic Journal of Studies in the Tropics*, 19(1). <https://doi.org/10.25120/etropic.19.1.2020.3734>

Ministry of Health Malaysia. (2020). National health and morbidity survey 2019: non-communicable diseases, healthcare demand, and health literacy. Ministry of Health Malaysia. https://iku.gov.my/images/IKU/Document/REPORT/NHMS2019/Infographic_Booklet_NHMS_2019-English.pdf

Ng, M., Fleming, T., Robinson, M., et al. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults, 1980–2013: A systematic analysis. *The Lancet*, 384(9945), 766–781. [https://doi.org/10.1016/S0140-6736\(14\)60460-8](https://doi.org/10.1016/S0140-6736(14)60460-8)

Pressler, M., Devinsky, J., Duster, M., Lee, J. H., Glick, C. S., Wiener, S., Laze, J., Friedman, D., Roberts, T., & Devinsky, O. (2022). Dietary Transitions and Health Outcomes in Four Populations - Systematic Review. *Frontiers in Nutrition*, 9, 748305. <https://doi.org/10.3389/fnut.2022.748305>

Rafiz Azuan, N. B., Harun, N. M., Chen, A., Ooi, Y. B., & Khor, B. H. (2024). A Posteriori Dietary Patterns among Children in Sabah: A Cross-Sectional Study. *International Journal of Food*. <https://eprints.ums.edu.my/id/eprint/39223/1/ABSTRACT.pdf>

World Health Organization. (2021). Obesity and overweight. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>