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Meal Patterns of Malaysian Adults: Findings from the Malaysian Adults Nutrition Survey (MANS)

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ABSTRACT

Introduction: Meal patterns have received little attention in nutrition studies. The aim of this study is to present the findings on general meal patterns of Malaysian adults. **Methods**: The Malaysian Adults Nutrition Survey (MANS), carried out in 2002 and 2003, involved 6,928 adults selected by stratified random sampling from all households by zone in Peninsular Malaysia, Sabah and Sarawak. **Results:** In general, the results showed that most respondents (74.16%) ate three meals per day; 89.20% of the respondents consumed breakfast, while 88.57% consumed lunch and 91.97% consumed dinner with no significant difference in terms of sex. In Peninsular Malaysia, the Northern Zone had the highest number of people consuming breakfast compared to other zones. Meanwhile, the population in Sarawak had the largest proportion of people consuming lunch and dinner, but the smallest proportion of people consuming breakfast. A significantly higher number of the rural population consumed breakfast and lunch than urbanites; however there was no significant difference in dinner consumption. Generally, breakfast consumption increased with age whereby significant difference existed between the 18 to 19 years age group and the age group of 30 years and older. Lunch intake among the age groups showed no significant difference. In contrast, dinner consumption was significantly lower among the 18 to 19 years age group compared to all other age groups. Comparison among the ethnic groups showed that the Indian population had the lowest percentage of having breakfast and lunch while the Orang Asli had the lowest percentage of consuming dinner. However, the Orang Asli recorded the highest percentage for taking breakfast and lunch while the Chinese had the highest percentage of taking dinner. **Conclusion:** Considering that Malaysian adults consumed their conventional breakfast, lunch and dinner, these findings indicatethat Malaysians are maintaining their traditional meal patterns.

Keywords: Meal pattern, Malaysian adults, MANS

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INTRODUCTION

Recent economic development in Malaysia has not only brought affluence to our lifestyle including meal patterns of the population but also partly explains the rapid increase in the prevalence of nationwide nutrition-related disorders. Studies show that Indians have the highest prevalence of abdominal obesity and diabetes while Malays are at greater risk of developing hypertension (Kee *et al*., 2008; Letchuman *et al*., 2010; Lim, Morad & Hypertension Study Group, 2004). These findings also identified women as the group with the highest risk to such diseases.

The health problems associated with eating behaviour are not unique to Malaysia. Well-known as a multi-racial nation, several contributing factors come into play when discussing the eating habits of Malaysians including sex, socio-economic status, ethnicity and culture. In Korea for instance, a study showed that frequent overeating was associated with risk of metabolic syndrome (Shin *et al*., 2009). In Turkey, a higher risk of hypertension was observed among those living in rural areas compared to urbanites due to inappropriate food consumption (Metintas, Arikan & Kalyoncu, 2009). Chinese-Americans have higher rates of chronic diseases such as diabetes and heart diseases (Campbell, Parpia & Chen, 1998; LeMarchand *et al*., 1997) and were reported to habitually skip breakfast and favoured the consumption of fats, sweets and soft drinks (Nan & Cason, 2004). Overall, these studies suggest a possible involvement and contribution of food consumption and eating patterns in the development of various diseases.

With this awareness in mind, the Ministry of Health Malaysia had carried out a nationwide cross-sectional survey to examine nutritional status of Malaysian adults in 2002 and 2003. This report aims to elucidate the general meal pattern of Malaysian adults.

METHODS

The Malaysian Adults Nutrition Survey (MANS) was carried out in 2002 and 2003 to assess the food consumption of Malaysians at the national level. A stratified random sampling was used for this survey, which covered six zones in Malaysia. They were the Southern, Central, East Coast and Northern zones of Peninsular Malaysia, Sabah and Sarawak. The sampling units were the Enumeration Blocks (EB) and Living Quarters (LQ). The number of units sampled was determined proportionate to population size. The EBs and LQs were provided by the Department of Statistics Malaysia. The eligible respondents were Malaysian adults aged 18 to 59 years where one adult was chosen from each household. Urban areas in this study is defined as towns having a combined population of 10,000 or more at the time of the Census 2000 or at least 60 % of the population (aged 15 years and above) being involved in non-agricultural activities.

Meal pattern questionnaire

Meal pattern was assessed through interview by trained interviewers using a questionnaire specifically designed for this study. The questionnaire recorded whether respondents consumed meals in terms of sex, zone, strata, age group and ethnic group. The main three meals assessed were breakfast, lunch and dinner. Breakfast refers to the first meal of the day eaten by the respondent; it can be taken early in the morning or up until mid-morning which is about 10.30 a.m whereas lunch is the midday meal eaten between breakfast and dinner which is typically eaten by Malaysians during mid-day normally between 12.30 pm to 2.30 pm. Dinner is the final meal of the day which is normally eaten in the evening or at night. The actual time of dinner among Malaysian varies between

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families and individuals depending on their work schedule or meal time. The normal time for dinner among Malaysians ranges from 6.00 pm to 9.00 pm.

Data analysis

This survey was carried out based on a multistage sampling design. Data analysis for this survey took into account the complexity of the survey design. Thus, sample weights were used to produce correct population estimates. The calculated sample weights compensated for unequal probabilities of selection, adjustment for non-response and post stratification (stratum, age and sex). The data analysis was done using SPSS version 14.0 with complex sample module.

The 95% Confidence Interval (CI) charts

The CI charts represent in graphical form the mean and the upper and lower limits of a particular continuous variable measured. The mean is shown as a dot in the middle of a vertical line. The upper and lower limits of the 95% confidence interval are shown as horizontal bars on the lower and upper ends of the vertical line respectively. The CI charts give excellent graphic representation of whether the proportion of a group is significantly different from the others. A CI chart which does not overlap with the others indicates that the mean of that group is significantly different from the proportion of the other groups.

RESULTS

Meal consumption was divided into five sections; sex, age group, strata, zone and ethnic group. In general, breakfast was consumed by 89.20% of the respondents, while lunch by 88.57% and dinner by 91.97% (Table 1). The percent of population who took the mentioned three meals per day was 74.16% while the percentage of those who consumed two meals per day was 5.33% for breakfast and lunch, 8.33% for breakfast and dinner, and 8.34% for lunch and dinner only. Meanwhile, only 1.57%, 0.92% and 1.35% of the population took one meal per day either breakfast, lunch or dinner respectively.

Meal consumption by sex

Figure 1 shows meal consumption based on sex. The consumption of dinner was observed to be higher than breakfast and lunch and this observation was significant in men but not in women. There was no significant difference between men who took breakfast [87.99% (CI: 86.32%, 89.48%)] and lunch [87.81% (CI: 86.28%, 89.18%)] with women who took breakfast [90.46% (CI: 89.10%, 91.67%)] and lunch [89.36 % (CI: 88.10%, 90.51%)], although women showed a higher percentage of having both meals than men. Men were inclined to take dinner [92.63% (CI: 91.16%, 93.87%)] more than women [91.28% (CI: 90.15%, 92.30%)]; however, the difference was not significant.

Meal consumption by age group

Figure 2 shows meal consumption based on age group. Generally, the percentage of adults consuming breakfast increased with age whereby significant differences exist between the 18 to 19 years age group [79.46% (CI: 73.45%, 84.39%)] and the age group 30 years and older. Lunch intake among the age groups showed no significant difference;

Table 1. Meal pattern of Malaysians aged 18 to 59 years

Meal	*Percent (%)(95% Confidence Interval)*	*Estimated population*
Breakfast	89.20	12, 628, 399
Lunch	88.57	12, 548, 586
Dinner	91.97	13, 635, 708

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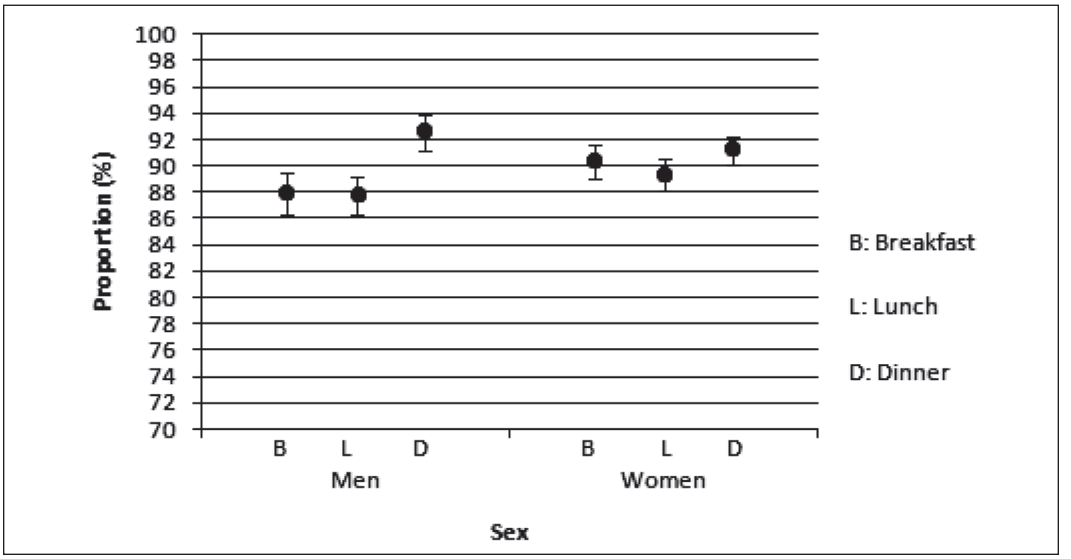

Figure 1. Meal consumption by sex

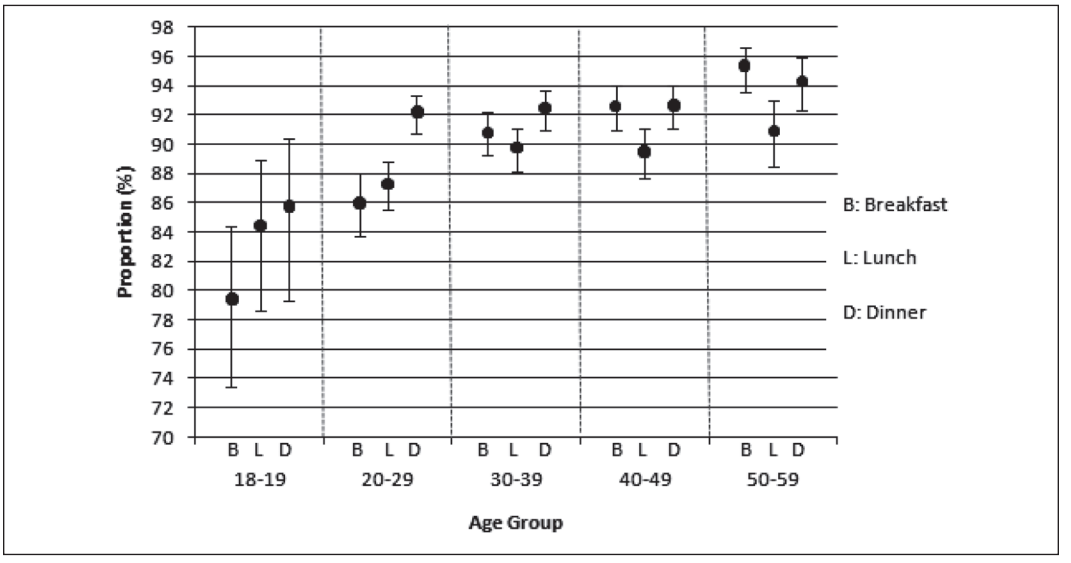

Figure 2. Meal consumption by age group

nonetheless, the lowest percentage for lunch was among the 18 to 19 years age group [84.48% (CI: 78.64%, 88.95%)], while the highest percentage was among the 50 to 59 years age group [90.97% (CI: 88.50%, 92.96%)]. Dinner consumption was significantly lower among the 18 to 19 years age group [85.77% (CI: 79.36%, 90.43%)] compared to all other age groups whereas there were no significant differences among all other age groups.

Meal consumption by ethnic group

Figure 3 demonstrates little variation among the three meals in the Malay population. The Indian population had the lowest percentage of having breakfast [84.99% (CI: 80.60%, 88.53%)] and lunch [87.08% (CI: 83.09%, 90.24%)], while the Orang Asli had the lowest percentage of consuming dinner [89.60% (CI: 74.13%, 96.29%)]. In contrast, the Orang Asli of Peninsular Malaysia recorded the highest percentage for breakfast [91.32% (CI: 71.51%, 97.78%)] and lunch [97.42% (CI: 82.93%, 99.66%)] while the Chinese [95.47% (CI: 93.55%, 96.84%)] population had the highest percentage for dinner. Overall, the percentage for each meal consumption was more than 84% in all ethnic groups.

Meal consumption by strata

Figure 4 shows meal consumption pattern by strata, where 91.78% (CI: 90.46%, 92.93%) of the rural population, and 87.44% (CI: 85.87%, 88.86%) of the urban population had their breakfast, respectively, and this difference was significant. A higher percentage of the rural [87.46% (CI: 86.04%, 88.75%)] population took their lunch compared to the urban population [90.21% (CI: 88.93%, 91.36%)] whereas there was no significant difference in dinner consumption between the urban [92.08% (CI: 90.74%, 93.24%)] and rural [91.80% (CI: 90.63%, 92.84%)] population. However, there was a significantly higher intake of dinner in urban areas than breakfast and lunch consumption, but there was no significant difference between the meals in rural areas.

Meal consumption by zone

As shown in Figure 5, the East Coast [92.06% (CI: 89.60%, 93.97%)] and Northern [92.35% (CI: 90.12%, 94.11%)] regions had higher proportions of the population consuming breakfast compared to other regions, such as the Central region [87.56% (CI: 85.81%, 89.12%)] and Sarawak [86.61% (CI: 81.44%, 90.51%)] with the lowest proportion. However, Sarawak had the highest percentage of population who consumed lunch [92.71% (CI: 88.06%, 95.64%)] and dinner [95.80% (CI: 93.26%, 97.41%)] compared to other regions. There was a significant difference in terms of dinner

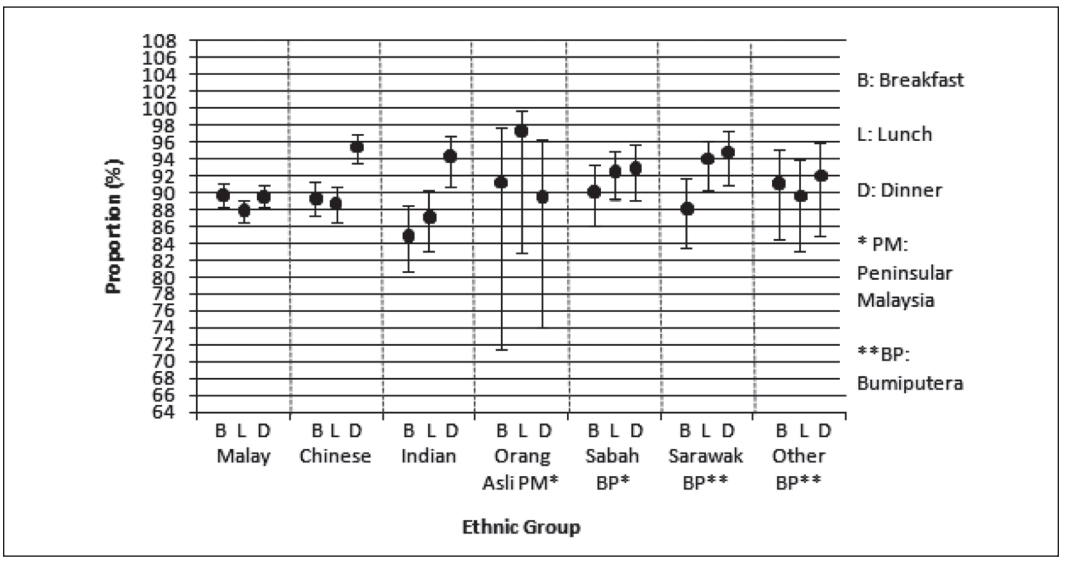

Figure 3. Meal consumption by ethnic group

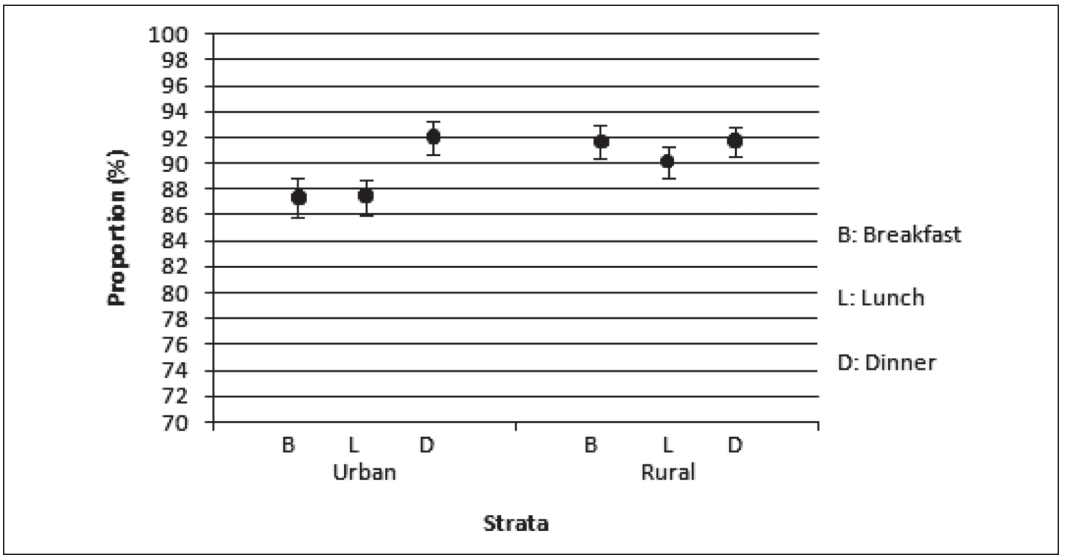

Figure 4. Meal consumption by strata

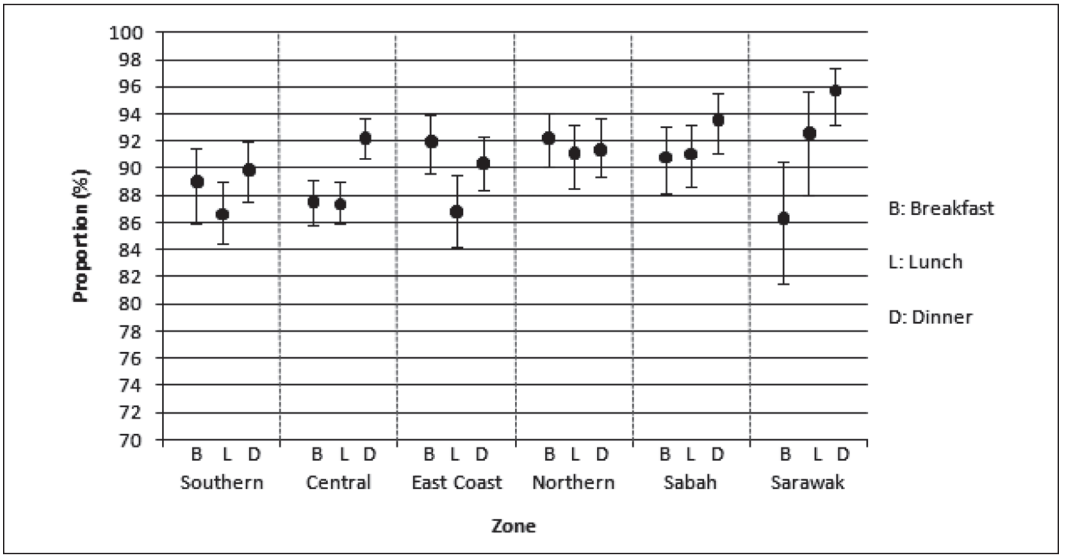

Figure 5. Meal consumption by zone

consumption between the population in Sarawak as compared to those from the Southern zone [89.93% (CI: 87.48%, 91.95%)].

DISCUSSION

Detailed findings on meal patterns presented showed that Malaysians generally still adhere to the traditional meal pattern by consuming breakfast, lunch and dinner. The percentage of Malaysian adults (74.16%) taking three meals per day was comparable to other studies elsewhere, for instance, 72.6% of the studied population in Korea (Kim & Kim, 2010) also consumed a similar number of meals per day.

This study showed no significant difference between men who took breakfast and lunch with their women counterparts. Nonetheless, the higher percentage of women having both meals than men could be explained by the role of the women in the household. Women are the homemakers who often make major decisions on the meal size and manage food preparation for their family. Therefore, we postulated that their higher exposure to food sources brought about a marginally higher proportion of women having both meals than men. Besides, this insignificant difference perhaps explains the current social trends present in our society where increased participation of women in the labour force limits their time to prepare meals. When it comes to dinner, men showed a tendency to take dinner more than women did; however the difference was not significant. More men are likely to take dinner after work , perhaps to compensate for energy consumption during the day. This is in agreement with a study which reported that working adults reward themselves for making it through a long, stressful day by having dinner and some even by taking heavy snacks while watching television (Kim & Kim, 2010; Ovaskainen, Tapanainen & Pakkala, 2010)

In terms of age group, the older age group (more than 30 years old) had a significantly higher frequency of breakfast consumption compared to the younger age group (18-19 years). Perhaps the older adults who might be retired from work have more time to prepare breakfast at home. Besides, it was presumed that young adults at this age group generally attend college that requires less energy consumption compared to working adults aged 30 years and older; hence accounting for the significant difference in consuming breakfast between the age groups. Moreover, previous studies showed that the younger adults to some extent skipped their breakfast due to depression, tight budget, inconsistent sleep hours and shortage of time especially in the morning (Davy, Benes & Driskell, 2006; Allgöwer, Wardle & Steptoe, 2001; Buscher, Martin & Crocker, 2001; Chapman, Melton & Hammond, 1998). Lunch intake showed no significant differences among the age groups; nonetheless the lowest percentage for lunch was recorded in the 18 to 19 years age group, while the highest percentage was in the 50 to 59 years age group. Dinner consumption was significantly lower among the 18 to 19 years age group compared to all other age groups whereas there were no significant differences among all other age groups. Comparisons of meal patterns among age groups showed interesting findings where older adults especially the age group of 50-59 took meals more frequently than younger adults especially aged less than 29 years old. It is unclear as to why the older adults had the highest proportion of dinner consumption than the younger counterparts; however the younger adults aged less than 29 had lower meal consumption probably because at this age, they are more concerned about their body weight or image (Pearson & Gleaves, 2006; Davis, Karvinen & McCreary, 2005).

Various factors are known to influence the dietary pattern and food preferences such as sex, socio-economic status, ethnic group and culture (Hu, 2002). This survey showed that the Indian population had the lowest proportion who consumed breakfast and lunch, while the Orang Asli recorded the lowest percentage for dinner. In contrast, the Orang Asli of Peninsular Malaysia recorded the highest percentage for taking breakfast and lunch while the Chinese population had the highest percentage for dinner. In this case, the Orang Asli of Peninsular Malaysia appear to have a consistent meal pattern as they have the highest proportion consuming meals during the day. It could be due to the nature of their occupation as indigenous people require more energy expenditure to do work such as cultivating plant crops or hunting for food to make a living.

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The study showed that a significantly higher percentage of the rural population (91.78%) consumed breakfast than their urban counterparts (87.44%). Residents in rural settings rely on crop or livestock farming, fishing and laborious work for earnings and these energy-intensive jobs demand that they load themselves with breakfast before beginning their tasks. Besides, rural communities are typically elderly or low-wage individuals who do not have tight work schedules, hence they could find some time in the morning to enjoy breakfast or make their own inexpensive meals to save household expenses (Devine *et al*., 2006; Dammann & Smith, 2009). Moreover, a study which showed that inflexible and time pressured employed people are likely to skip breakfast and develop continuous snacking or frequent light eating behaviour (Blake *et al*., 2009). A similar trend was observed during lunchtime where a higher percentage of the rural population took their lunch compared to the urban population. When it comes to dinner, there was no significant difference in dinner consumption between the urban and rural population. This could be due to availability of more time for cooking after coming back from a working day (Jabs & Devine, 2006). This observation suggests that urbanites who skip breakfast and lunch are at increased likelihood of consuming dinner rather than having to balance three meals, hence creating or worsening their unhealthy lifestyle.

The Central zone is the city area which accommodates workplaces that offer greater employment opportunities and a high density of colleges. We presumed that the breakfast skipping habits of the population in the Central zone may be due to lack of time and the need to arrive in the workplace on time during the morning rush hour. Perhaps this finding reflects a trend that Sarawak is undergoing rapid urbanisation, hence there are similarities in the population's eating patterns and health risks with the population in the Central zone. Other zones showed no significant difference in meal consumption, hence they probably have a relatively similar meal patterns, undergoing equal economic growth, cultural, lifestyle and eating behaviours. The small differences indicated that Malaysians continue to consume their meals every day, with more adults in the Central region skipping their breakfast.

Limitations of the study & recommendations for future studies

In this present study, the reasons behind the population's dietary patterns were not studied. Thus future studies can include these elements to investigate the rationale of the dietary patterns practised by Malaysians. Moreover, future studies on differences and overlapping between dietary patterns among different ethnic groups residing in comparatively similar environments at a time such as in Malaysia would be an interesting topic to be further explored.

CONCLUSSION

Findings from this study suggest that a trend of consuming the conventional three meals is still being practised by Malaysian adults irrespective of sex. A significantly higher number of older adults more than 30 years old consumed breakfast than their 18-19 years aged younger counterparts but this was not a pattern for lunch. On the other hand, a significantly lower number of younger adults consumed dinner compared to all older adults. The Orang Asli of Peninsular Malaysia consistently recorded a higher percentage of taking breakfast and lunch while the Chinese population enjoyed dinner the most. On the contrary, the Indian population showed the least preference for taking breakfast and lunch while the Orang Asli took less dinner. In addition, a higher percentage of the rural population took breakfast and lunch than their urban

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counterparts but not dinner. The meal skippers were highly likely to be people residing in the Central zone, urbanites, young adults aged less than 29 years old and of Chinese ethnicity.

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