Research Article

Dietary Patterns and Food Habits During the Covid-19 Endemic Phase: Impact on Malaysian Adults' Food Preferences

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Abstract
This cross-sectional study examines the correlations between dietary patterns, food habits, and eating behaviours among Malaysian adults during the endemic phase of COVID-19 in the Klang Valley, Malaysia. A questionnaire was designed to gather information about Malaysian adults' dietary habits and food preferences in order to gain a better understanding of their food habits. Specifically, the survey questionnaire aimed to collect information about Malaysian consumers' food habits, dietary patterns and food preferences. The results of the multiple regression analysis indicate that dietary pattern explains 68.7 percent (R2 =.687, F=842.571, p0.001) of changes in food habits. A beta coefficient value of .829, p 0.001, indicates how dietary habits are related to changes in food habits. During the endemic phase, dietary patterns appear to positively influence individual food habits. As a result of this study, it will be possible to gain a deeper understanding of Malaysian food habits and to develop better policies to ensure Malaysians' nutritional wellbeing. Gaining a better understanding of dietary habits is essential in order to develop interventions that are tailored to the needs of the Malaysian population. This will help to improve the health and nutrition of Malaysians.

Keywords:
Covid-19, Endemic, Food Habit, Food Preference, Dietary Pattern

1 Introduction

It has been shown that large disasters such as the COVID-19 pandemic disrupt people's food system (Galanakis, 2020), individuals' food preferences, and how eating patterns and everyday behaviours are conducted (Di Renzo et al., 2020). There is a possibility that people are still living in fear of the Covid-19 virus and unable to change from their previous dietary pattern during the pandemic phase, since the Covid-19 virus is still lingering in the communities and threatening the livelihood of the people. Research shows that overcoming destructive eating behaviours is difficult and very complicated, especially when the brain is in survival mode (Anderson, 2017). As a result of COVID-19, pandemic lockdown fatigue is a phenomenon characterized by exhaustion or "burnout" that mainly affects people. People's brains were forced into survival mode during the pandemic phases, which has continued to adversely affect dietary patterns (Gill et al., 2020) until this day. The trend in the pandemic period saw Malaysians reducing their shopping trips, stock up on processed food and non-processed food as well as increases of high-calorie food intake that may harm them (Tan et al., 2022). Although the phases had changed to endemic, all these habits are likely hard to change as the brain processes that it is the safest way to consume food and thus not be infected with COVID-19 (Gill et al., 2020).

2 Literature Review

2.1 Covid-19 pandemic and Food Habit

The past Covid-19 pandemic has caused substantial changes in people's eating habits due to several consecutive months of physical and social isolation (Lombardo et al., 2021). During the isolation period, Malaysians were pushed to reduce on shopping excursions, stock up on processed and unprocessed foods, and consume more high-calorie foods that might harm them (Tan et al., 2022). Their minds have been programmed to believe that these behaviours are the most effective way to eat to avoid contracting COVID-19, despite the change in phase (Gill et al., 2020), and they have continued to develop despite the shift in phase to endemic. Endemic phases should improve Malaysian eating habits as there is no more restriction towards grocery shopping trips, availability of the products on the shelves is improving and the vaccination rate among Malaysians has made it much safer to be outside nowadays (Salim, 2021).

In light of this, some people still practice the same habits as they did during the pandemic phase because of the uncertainty surrounding COVID-19 conditions (Webster, 2021), as well as the cases and deaths that continue to rise to this day, (World Health Organization, 2022). Moreover, most studies focus on eating habits pre and during pandemics and studies regarding eating habits in endemic phases are still lacking and not fully understood. This is especially true in developing countries like Malaysia (Ferreira- Rodrigues et al., 2021).

2.2 Dietary Pattern & Food Preferences

The consumption rate of people from the previous pandemic lockdown period had not been updated and observed, as most of the data are from the pandemic period. During this time, food consumption increased in most countries, with individuals eating more than five times daily (Di Renzo et al., 2020), which is difficult to change (Anderson, 2017) and may not improve during this endemic. The increased consumption of sugary products and comfort foods with regular snacking habits (Gallo et al., 2020), may contribute to eating disorder problems and obesity (El Ansari et al., 2011). Additionally, psychological and emotional reactions to the recent deaths and cases.

Covid-19 pandemic may increase the risk of problematic eating habits (Wang et al., 2020). It is widely recognized that emotional eating (Evers et al., 2018) can alter eating habits. Feeling of fear and anxiety towards death from Covid-19 pandemic infections made people seek comfort in food especially towards snack and canned food (Guei, 2022).

Hence, this study sought to determine how the endemic phase affected Malaysian food habits and preferences. As a result of understanding this relationship, people may become more responsible about their consumption, which will surely improve their quality of life.

3 Methodology

3.1 Study Design and Population

This study investigated the changes in food habits among the adult population in Klang Valley, Malaysia who are above 18 years old. To ensure the accuracy and reliability of the data collected, the target respondents were selected randomly as the majority of Malaysians were affected by the Covid-19 pandemic. This meant that every adult above 18 years old had an equal chance of participation in the survey. This method of sampling helped to avoid bias and ensured that the study results were representative of the entire adult population in Klang Valley, Malaysia.

Malaysia had an estimated population of 34.5 million, including 22.2 million adults (World Population Review, 2024). According to Krejcie and Morgan (1970) and Rahman M. M. (2023), the sample size needed to be determined according to the population size. Malaysia's population is above 100,000. Therefore, a sample size large enough to be representative of the population in Malaysia should have been into consideration. A minimum of 384 respondents was required to conduct the study if the population is above 1,000,000. The questionnaires were distributed digitally through Google Form to individuals who met the inclusion criteria. All respondents gave informed consent before answering the survey questions.

The survey consisted of twenty-three (23) items divided into four section. The first section of the questionnaire asked about demographic details, such as age, gender, education, and occupation. The second section of the questionnaire asked about food

habits which consist of six (6) items. The third section included seven (7) items about individual dietary patterns. The fourth section included six (6) items that sought information on participant food preferences during the Covid-19 endemic phase periods on the product category such as gourmet product, fresh vegetables, grains and cereal, dairy product preferences and so on. This section was the most detailed and comprehensive, as it inquired about individual food preferences during the endemic, specifically within various product categories.

3.2 Reliability Coefficient

For this study, the analysis of internal reliability needs to be undertaken before answering the objectives and questions of this study. This analysis is important to produce the information regarding the level of consistency of the rating provided by the respondents in the database. Thus, analysis of an item that was suggested by Alavi et al., (2020) has been conducted to meet Malaysia's demographic setting. Besides, Pallant (2020) stated that reliability of instruments is important as it shows the quality of the measurement method. Cronbach's Alpha Coefficient is considered as the common analysis to indicate and measure the internal consistency. Each section of the questionnaire is calculated separately. The results for Alpha Coefficient tests for all the variables are computed in Table below:

Table 1: Reliability Analysis

Section	Variables	Items	Cronbach's Alpha Values
1	Food Habit	6	0.937
2	Dietary Pattern	7	0.948
3	Food Preference	6	0.920

The result of Cronbach's Alpha reliability test shows that the instrument is accurate, as evidenced by the Cronbach's alpha finding, which demonstrated that all parts have an acceptable level of reliability value. Each of the constructs is found to be at the good level, which is between 0.920 and 0.948.

3.3 Descriptive Analysis

Each item in all dimensions of food habit, dietary pattern and food preference were measured with descriptive analysis that consist of mean and standard deviation based on a five-point Likert-scale (1: strongly disagree, 2: disagree, 3: neutral, 4: agree and 5: strongly agree).

Table 2: Descriptive analysis for Food Habit

Items	N	Mean	Std. Deviation
FH1: I noticed an increase in the amount of food eaten in general.	384	4.13	1.041
FH2: I noticed an increase in meals per day.	384	4.21	.908
FH3: I noticed an increase of the food purchased volume.	384	4.12	1.027
FH4: I noticed an increase in homemade food consumption/preparation.	384	4.06	1.016
FH5: I noticed an increase in fresh food consumption.	384	4.13	1.041
FH6: I noticed a decrease in processed foods consumption.	384	3.96	.999

The analysis for food habit shows that the mean score is range from 3.96 to 4.21. There is split response for items in food habit with 3 (neutral) and 4 (agreed) point of Likert scale. The mean scores attained by FH1 and FH2 depicts that respondents generally noticed that the amount of food eaten have increased. Respondents also agreed with FH3 (M=4.12) and FH4 (4.06) on question 'I noticed an increase of the food purchased volume.' and 'I noticed an increase of homemade foods consumption/preparation'. Meanwhile, for FM5 with score of (M=4.13), it shows that the respondents are agreed on question 'I noticed an increase of fresh food consumption'. However, for FH6 (M=3.96) which respondents shows neutral response on question 'I noticed a decrease of processed foods consumption'.

Table 3: Descriptive Analysis for Dietary Pattern

Items	N	Mean	Std. Deviation
DP1: I noticed a change in my dietary pattern.	384	4.24	.887
DP2: I am consuming more fresh products.	384	4.27	.822
DP3: I am consuming more fruit and vegetables.	384	4.16	.892
DP4: I am consuming more grains and cereals.	384	4.38	.788
DP5: I am consuming more dairies products.	384	4.03	1.005
DP6: I am consuming more meat products.	384	4.04	1.006
DP7: I believe that my emotional state has influenced my eating habits.	384	4.07	.956

As indicated by table above, the magnitude of mean score for dietary pattern with 7 items ranging from 4.03 to 4.38. This shows that majority of the respondents favoured

with the item described for this construct with result that most of the respondents answered (4: agree) based on the Likert scale. The mean score in the table above illustrated that DP4 has score with (M=4.38) which most respondents agreed on the question 'I am consuming more grains and cereals. Despite DP5 score recorded the lowest means with (M= 4.03), it is still under category of respondents agreed that they are consuming more dairies products. Respondents agreed that they noticed a change in their dietary pattern DP1(M=4.24). Meanwhile, DP2 has score (M=4.27) which most respondents agreed that they are also consume more fresh products. For DP3, DP6, and DP7 with score of (M=4.16), (M=4.04), and (M=4.07) respondents agreed that they consume more fruit, vegetables, meat products and believe that their emotional state has influenced their eating habits.

Table 4: Descriptive Analysis for Food Preference

Items	N	Mean	Std. Deviation
FP1: I choose gourmet product category as my food preference.	384	4.17	.852
FP2: I choose fresh products categories as my food preference.	384	4.13	.908
FP3: I prioritize fruits and vegetables as my food preference.	384	4.10	.886
FP4: I prioritize grains and cereals as my food preference.	384	4.31	.832
FP5: I prioritize dairy products as my food preference.	384	4.29	.832
FP6: I prioritize meat products as my food preference	384	4.21	.868

Result from the table above display that most of the respondents respond with 5 Likert-scale which they agree with all items written. The mean score for FP1 and FP2 which (M=4.17) and (M=4.13) which majority of respondents agreed they preferred to consume gourmet and fresh products. FP3, FP4 and FP5 have mean score with (M=4.10), (M=4.31) and (M=4.29) with they are also preferred fruit and vegetables, grains and cereals and dairy products. The other mean score (M=4.21) is FP6 with they agree that they also preferred to prioritize meat products.

3.4 Regression Analysis

Regression analysis was conducted to understand how one independent variable affecting one dependent variable. The objective of the study is to examine the relationship between dietary pattern and food habits changes in endemic phase and to analyse the relationship between the food preference and food habit changes in endemic phase. To answer the first hypothesis, multiple regression analysis was conducted.

H1: There is a relationship between dietary pattern and food habit changes during endemic phases.

Table 5: Multiple Regression Analysis Food Habit and Dietary Pattern

Step and Variables	Model 1 / Std.β
Testing step 1	
Outcome: Food Habit (FH)	.829***
Predictor: Dietary Pattern (DP)	
R	.829
R^2	.687
Adjusted R^2	.686
F change	842.571***

*Note: *p<0.05, **p<0.01, ***p<0.001*

Based on table above, dietary pattern is able to explain 68.7 percent (R2 =.687, F=842.571, p<0.001) of the variance in changes of food habit. Beta coefficient value (β=.829, p<0.001) result shows that changes in food habit is influenced by the dietary pattern. Meanwhile, table below illustrate that food preference is able to explain 67.7 percent (R2 =.677, F=806.491, p<0.001) of the variance in changes of food habit. Beta coefficient value (β=.823, p<0.001) result shows that changes in food habit is influenced by the food preference.

H2: There is a relationship between food preference and food habit changes during endemic phases.

Table 6: Multiple Regression Analysis Food Habit and Food Preference

Step and Variables	Model 1 / Std.β
Testing step 2	
Outcome: Food Habit (FH)	.823***
Predictor: Food Preference (FP)	
R	.823
R^2	.677
Adjusted R^2	.677
F change	806.491***

*Note: *p<0.05, **p<0.01, ***p<0.001*

4 Results

In order to address research question 1 and question 2, a multiple regression analysis was conducted to examine the relationship between participants' food habits (FH) and two potential predictor variables: food preference (FP) and dietary pattern

(DP). The analysis aimed to explore whether participants' reported food preferences and dietary patterns could significantly predict their food habits and to what extent these variables contribute to explaining the variations in reported food habits.

The results indicated a significant positive relationship between participants' food preference and their reported food habits. The coefficient (Std. β) of 0.823 suggested that for each standard deviation increase in food preference, there was a corresponding increase of approximately 0.823 standard deviations in food habits. This finding implies that individuals who expressed stronger preferences for certain types of foods were more likely to report specific food habits that align with their preferences.

The R2 value of 0.677 indicated that approximately 67.7% of the variability in food habits could be explained by food preference. This substantial portion of variance suggests that food preference plays a critical role in shaping individuals' eating behaviors. Moreover, the adjusted R2 value of 0.677 confirmed the goodness-of-fit of the model when accounting for the number of predictors. The F change value of 806.491 was highly significant ($p < 0.001$), indicating that the overall model was a good fit for predicting food habits based on food preferences. The strong positive correlation ($R = 0.823$) between food preference and food habits further emphasized the significant association between these variables. Participants who exhibited greater food preferences tended to engage in specific eating behaviors that reflected their favored food choices. This finding has important implications for understanding how individual food preferences influence dietary choices and overall eating habits.

The results also demonstrated a significant positive relationship between participants' dietary patterns and their reported food habits. The coefficient (Std. β) of 0.829 indicated that for each standard deviation increase in dietary pattern scores, there was a corresponding increase of approximately 0.829 standard deviations in reported food habits. This suggests that individuals with healthier dietary patterns were more likely to report healthier food habits. The R2 value of 0.687 indicated that approximately 68.7% of the variability in food habits could be explained by dietary patterns. This substantial amount of explained variance highlights the significant impact of dietary patterns on individuals' reported food habits. The adjusted R2 value of 0.686 confirmed the model's robustness, considering the number of predictors. The F change value of 842.571 was highly significant ($p < 0.001$), indicating that the model effectively predicted food habits based on dietary patterns. The strong positive correlation ($R = 0.829$) between dietary patterns and food habits reinforces the notion that individuals with healthier dietary patterns tend to adopt food habits that align with their nutritious choices. This finding has important implications for public health interventions and nutrition education programs, as promoting healthier dietary patterns may positively influence individuals' overall eating behaviors and food habits.

Both dietary pattern and food preference emerged as strong and significant predictors of participants' reported food habits. These findings suggest that individual food preferences and dietary choices play a substantial role in shaping eating behaviours. The high R2 values for both predictors indicate that they collectively

account for a significant portion of the variability in food habits changes, supporting their relevance in understanding and predicting individuals' eating behaviours. It is important to note that this study's results are based on a cross-sectional analysis and cannot establish causality. Additional longitudinal research and the consideration of other potential confounding variables would further enhance the understanding of the complex relationship between food preferences, dietary patterns, and food habits. Furthermore, the study's generalizability may be limited by the specific sample characteristics and data collection methods. Therefore, cautious interpretation and consideration of the findings' broader implications are essential.

5 Conclusion

The study aimed to explore the relationship between food habits changes during endemic and two potential predictor variables, namely dietary pattern and food preference. The findings from the multiple regression analysis revealed significant and meaningful associations between these variables, shedding light on the factors influencing individuals' eating behaviors. The first major finding of this study was the positive relationship between dietary pattern and food habits. Participants with healthier dietary patterns were more likely to report healthier food habits. This highlights the role of overall dietary quality in shaping eating behaviors. Individuals who adhere to nutritious and balanced dietary patterns tend to exhibit consistent healthy eating habits, reflecting their commitment to a wholesome diet. This finding reinforces the idea that promoting healthier dietary patterns can have a positive impact on individuals' overall eating behaviors (Xu, Steffen, Selvin, & Rebholz, 2019). Public health interventions and nutrition education programs can leverage this knowledge to emphasize the importance of adopting and maintaining healthier dietary patterns for improved health outcomes. The second significant finding pertained to the positive relationship between food preference and food habits. Participants who expressed stronger preferences for specific types of foods were more likely to report consistent food habits that aligned with their preferred food choices. This result is in line with previous research suggesting that individual food preferences significantly influence dietary choices and eating behaviors (Jaeger, Vidal, Chheang, & Ares, 2022) Individuals tend to select foods they enjoy and are familiar with, leading to the formation of stable eating habits over time. These findings have important implications for nutrition interventions and health promotion programs, as understanding individuals' food preferences can aid in developing personalized dietary recommendations to encourage healthier food choices.

The high R2 values for both dietary pattern and food preference as predictors of food habit changes suggest that these variables collectively explain a substantial portion of the variability in reported food habits. This implies that while individual dietary choices and preferences are essential, they do not fully account for the complexity of food habits. Other factors, such as cultural influences, environmental cues, and socioeconomic factors, may also play a role in shaping eating behaviors ((Jaeger et al., 2022) Further research could explore the interplay of these variables to gain a more

comprehensive understanding of the determinants of food habits. It is crucial to acknowledge some limitations of this study. The cross-sectional nature of the data limits our ability to establish causal relationships between the variables. Longitudinal studies could provide valuable insights into the dynamic nature of food habits and how they are influenced by changes in food preferences and dietary patterns over time. Additionally, the study's sample was likely drawn from a specific population, which may affect the generalizability of the findings to other demographic groups. Replication of the study with diverse populations would strengthen the external validity of the results.

In conclusion, this study provides valuable insights into the factors influencing individuals' food habits. Dietary pattern and food preference emerged as significant predictors of food habits, highlighting the importance of understanding individuals' food preferences and promoting healthier dietary patterns for overall well-being. These findings contribute to the growing body of research on dietary behavior and have implications for health professionals, policymakers, and educators striving to improve public health through targeted nutrition interventions and health promotion strategies.

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7 References

Alavi, M., Visentin, D. C., Thapa, D. K., Hunt, G. E., Watson, R., & Cleary, M. (2020). Exploratory factor analysis and principal component analysis in clinical studies: Which one should you use? *Journal of Advanced Nursing*, *76*(8), 1886–1889. https://doi.org/10.1111/jan.14377

Anderson, K. (2017, September 13). *Why Changing Eating Habits (Permanently) Is So Hard.* Psychology Today. https://www.psychologytoday.com/intl/blog/behernow/201709/why-changing-eating-%20habits-permanently-is-so-hard

Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., Leggeri, C., Caparello, G., Barrea, L., Scerbo, F., Esposito, E., & De Lorenzo, A. (2020). Eating Habits and Lifestyle Changes during COVID-19 lockdown: an Italian Survey. *Journal of Translational Medicine*, *18*(1). https://doi.org/10.1186/s12967-020-02399-5

El Ansari, W., Stock, C., Snelgrove, T. U. S. H. G. S., Hu, X., Parke, S., Davies, S., John, J., Adetunji, H., Stoate, M., Deeny, P., Phillips, C., & Mabhala, A. (2011). Feeling Healthy? A Survey of Physical and Psychological Wellbeing of Students from Seven Universities in the UK. *International Journal of Environmental Research and Public Health*, *8*(5), 1308–1323. https://doi.org/10.3390/ijerph8051308

Evers, C., Dingemans, A., Junghans, A. F., & Boevé, A. (2018). Feeling bad or feeling good, does emotion affect your consumption of food? A meta-analysis of the experimental evidence. *Neuroscience & Biobehavioral Reviews*, *92*, 195–208. https://doi.org/10.1016/j.neubiorev.2018.05.028

Ferreira Rodrigues, J., Cunha dos Santos Filho, M. T., Aparecida de Oliveira, L. E., Brandemburg Siman, I., Barcelos, A. de F., de Paiva Anciens Ramos, G. L., Almeida Esmerino, E., Gomes da Cruz, A., & Arriel, R. A. (2021). Effect of the COVID-19 pandemic on food habits and perceptions: A study with Brazilians. *Trends in Food Science & Technology*, *116*, 992–1001. https://doi.org/10.1016/j.tifs.2021.09.005

Galanakis, C. M. (2020). The Food Systems in the Era of the Coronavirus (COVID-19) Pandemic Crisis. *Foods*, *9*(4), 523. https://doi.org/10.3390/foods9040523

Gallo, L. A., Gallo, T. F., Young, S. L., Moritz, K. M., & Akison, L. K. (2020). The Impact of Isolation Measures Due to COVID-19 on Energy Intake and Physical Activity Levels in Australian University Students. *Nutrients*, *12*(6), 1865. https://doi.org/10.3390/nu12061865

Gill, B. S., Jayaraj, V. J., Singh, S., Mohd Ghazali, S., Cheong, Y. L., Md Iderus, N. H., Sundram, B. M., Aris, T. B., Mohd Ibrahim, H., Hong, B. H., & Labadin, J. (2020). Modelling the Effectiveness of Epidemic Control Measures in Preventing the Transmission of COVID-19 in Malaysia. *International Journal of Environmental Research and Public Health*, *17*(15), 5509. https://doi.org/10.3390/ijerph17155509

Guei, L. H., & Guei, L. H. (2022, June 5). *The courage essential to combat food inflation*. Focus Malaysia. https://focusmalaysia.my/the-courage-essential-to-combat-food-inflation/

Jaeger, S. R., Vidal, L., Chheang, S. L., & Ares, G. (2022). Consumer conceptualisations of food-related wellbeing: An exploration of wellbeing-related terms in four industrialised countries. *Appetite*, *179*, 106286. https://doi.org/10.1016/j.appet.2022.106286

Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, *30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Lombardo, C., Novara, C., Mallia, L., Pastore, M., & Vacca, M. (2021). The Short Forms of the Hewitt and Flett's Multidimensional Perfectionism Scale: Which Factor Structure Better Fits Italian Data? *Journal of Personality Assessment*, 1–22. https://doi.org/10.1080/00223891.2021.1905651

Pallant, J. (2020). *SPSS SURVIVAL MANUAL : a step by step guide to data analysis using ibm spss statistics.* Allen & Unwin.

Rahman, M. M. (2023). Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations. *Journal of Entrepreneurship, Business and Economics*, *11*(1), 42-62.

Salim, S. (2021, May). *Khairy: AstraZeneca vaccine not on "opt in" basis anymore.* The Edge Markets. https://www.theedgemarkets.com/article/khairy-no-more-optin-%20astrazeneca-vaccine-it-will-be-included-national-covid19-immunisation

Story, M., Kaphingist, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. [Review of *Creating healthy food and eating environments: Policy and environmental approaches.*]. *Annual Review of Public Health*, *29*, 253–272.

Tan, S. T., Tan, C. X., & Tan, S. S. (2022). Changes in Dietary Intake Patterns and Weight Status during the COVID-19 Lockdown: A Cross-Sectional Study Focusing on Young Adults in Malaysia. *Nutrients*, *14*(2), 280. https://doi.org/10.3390/nu14020280

Wang, C., Horby, P. W., Hayden, F. G., & Gao, G. F. (2020). A novel coronavirus outbreak of global health concern. *The Lancet*, *395*(10223), 470–473. https://doi.org/10.1016/s0140-6736(20)30185-9

Webster. (2021, May 20). *Survey: food habits returning to pre-pandemic patterns, but insecurities remain*. Voice of Muscatine. https://voiceofmuscatine.com/2021/05/20/survey-food-habits-returning-to-pre-

World Health Organization. (2022, July 19). *Rapidly escalating COVID-19 cases amid reduced virus surveillance forecasts a challenging autumn and winter in the WHO European Region.* Www.who.int. https://www.who.int/europe/news/item/19-07-2022-%20rapidly-escalating-covid-19-cases-amid-reduced-virus-surveillance-forecasts-a-%20challenging-autumn-and-winter-in-the-who-european-region

World Population Review (2024, March 28) *Malaysia Population 2024 (Live)*. https://worldpopulationreview.com/countries/malaysia-population

Xu, Z., Steffen, L. M., Selvin, E., & Rebholz, C. M. (2019). Diet quality, change in diet quality and risk of incident CVD and diabetes. *Public Health Nutrition*, *23*(2), 329–338. https://doi.org/10.1017/s136898001900212x